

# Body satisfaction and self-perception profile: Reliability and validity analyses of the Children's body image scale for Turkish children

Çiğdem Keven Aklıman<sup>1</sup>  | Mehmet Avcı<sup>2</sup>  | İlknur Kiraz Avcı<sup>3</sup> 

<sup>1</sup>Eskişehir Osmangazi University, Eskişehir, Turkey

<sup>2</sup>Guidance and Psychological Counseling, Recep Tayyip Erdogan University, Rize, Turkey

<sup>3</sup>Community Mental Health Center, Rize State Hospital, Rize, Turkey

## Correspondence

Çiğdem Keven Aklıman, Eskişehir Osmangazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Meşelik Yerleşkesi, Odunpazarı, Eskişehir (26480), Turkey.  
Email: [keven.akliman@gmail.com](mailto:keven.akliman@gmail.com)

## Abstract

In recent years, appearance, and body image in particular, has become a very important concern not only for adults but also for children. Children's self-evaluation of their bodies is critical in the occurrence of eating disorders. This study aims to conduct (1) a validity and reliability analysis of *the Children's Body Image Scale (CBIS)* adapted to the Turkish culture and (2) the relationship between body satisfaction, self-worth and physical appearance. The psychometric properties of the CBIS were examined on a sample of 473 (211 girls and 262 boys) children aged 8–11 (mean 9.38). The data obtained from boys and girls were divided into two groups according to grade and analysed using descriptive and inferential statistics. The reliability level of the scale was at an acceptable level, and a statistically significant relationship was found between the scale's Body Mass Index and the dimensions of Self-Perception Profile. The results revealed that there is a significant relationship between body satisfaction and general self-worth and physical appearance. In addition, the scores obtained on the CBIS after a 3-week period showed significant internal consistency and test-retest reliability. The analyses

revealed that the CBIS is a valid and reliable measurement tool for Turkish children. The results of the study can be a useful tool for education and health professionals that they need screening tools to help them detect body dissatisfaction. The study also showed some correlates of high body dissatisfaction in children that can be used before the rise in eating disorders in adolescence.

#### KEYWORDS

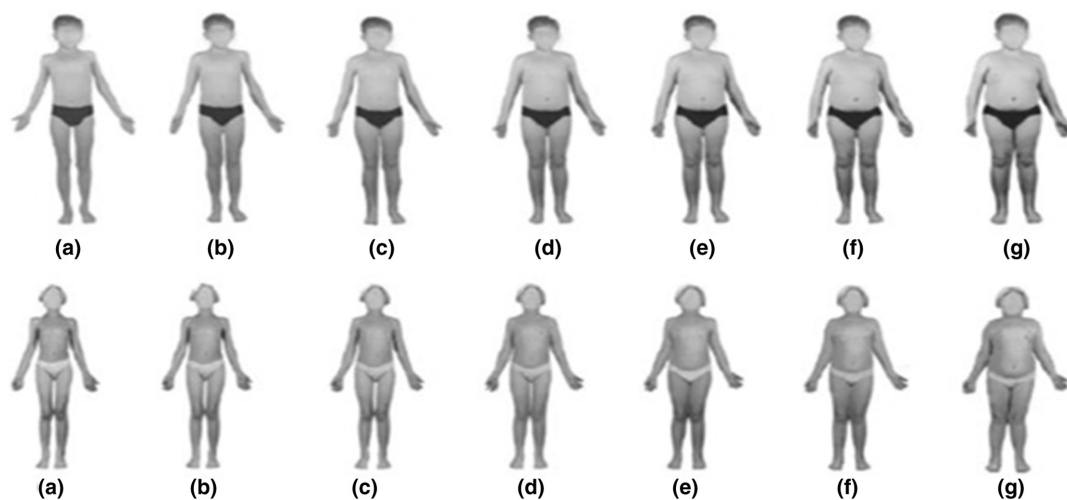
body image scale, body size satisfaction, children, self-perception

## INTRODUCTION

With the increasing prevalence of negative body image outcomes in children and adolescents (Bray et al., 2018; Dohnt & Tiggemann, 2004), the need for simple, valid and reliable measurement tools to better understand body image perceptions and dissatisfaction in this population is also increasing. There are several body image assessment tools for scientific investigation and clinical assessment protocols (Thompson, 2004). These measures are individually essential to assess body image satisfaction. However, as Thompson (2004) stated that although the theoretical frameworks involved a supported rationale for the measures, the issues about the measurement have not been well documented for children.

Body image perception and dissatisfaction in adults and adolescents have been analysed by using a wide range of techniques (Ben-Tovim & Walker, 1991; Thompson et al., 1999), one of which is figure rating. In this type of rating, a series of human figures ranging from underweight to overweight (5–12) are shown to children by asking about their own body shape perceptions and desired body shape preferences. These scales, which were first developed to investigate adult body image perception (Ben-Tovim & Walker, 1991), were later adapted to be used with children (Collins, 1991; Sherman et al., 1995). These scales are one of the most common methods used to measure children's body perception and satisfaction. Collins's (1991) figure rating scales for children illustrate this type of assessment, and various scales have been developed by creating a series of figures ranging from an extremely underweight child figure on the far left to an overweight child with the thickest waist and an overweight face on the far right, with different ratings for boys and girls.

The questions that children are often asked when using these scales are about their current and desired body shape: 'Which picture is most like you?', 'Which of these pictures would you like to look like?' and any difference between the perceived and ideally chosen figures is used as a measure of body shape dissatisfaction. The absence of a difference between an individual's real BMI (Body Mass Index) and the figure s/he perceives as her/himself indicates the reality of body perception, while the presence of a difference indicates deterioration in body perception (Truby & Paxton, 2002). Since the only thing that changes in each figure are body size, measured satisfaction only shows satisfaction with weight.



**FIGURE 1** Truby and Paxton (2002) Children's body image scale figure rating scale. The figure rating scale indicates seven groups of body image. From "Development of the children's body image scale," by H. Truby and S. Paxton, 2002, *British Journal of Clinical Psychology*, 41(2), 185–203. Copyright 2002 by CC BY 4.0.

## Children's body image scale

Figure rating scales for children continued to be improved by taking into account some variables (race, clothing, drawing techniques, rating types, etc.) (Rand & Wright, 2000). The most radical development in this regard is Truby and Paxton's (2002) Children's Body Image Scale (CBIS; Figure 1). Known Body Mass Indices (BMI) were used in the photographic images of children, whereas previously only child figures representing the white race were used, in this scale, visual child figures suitable for their racial characteristics were included to help children identify with the images so that children could make better choices. Furthermore, some extensive psychometric studies were carried out to develop the CBIS, which is intended to be used for children aged 7–12. For example, the correlation between perceived body size and actual BMI yielded good results for all groups except for young boys. The scale also has positive test–retest reliability (Truby & Paxton, 2002).

The Children's Body Image Scale (CBIS) evaluates children's perceptions of their own body measurements and their satisfaction with these body measurements. It includes seven photographic figures of children whose bodies range from very thin to obese. It is a measurement tool in which they choose from among figures that they believe similar in size to them (perceived) and represent the (desired) child body they want to be. Inconsistency between perceived and desired figures is an indicator of body dissatisfaction. As a measure of body dissatisfaction, CBIS perceived–desired mismatch has been shown to have robust construct validity for children aged 8–12 (Truby & Paxton, 2002).

There are varying opinions about the evaluation of body image in children through figure scales. These scales have been criticized for the lack of strong psychometric data. It was argued that the correlations between current figures and actual BMI indicate poor scale reliability (Truby & Paxton, 2002). It does not seem possible to measure dissatisfaction with other parts of the body with scales that only emphasize weight in body image perception. Although these scales provide strong evidence for test–retest reliability for children aged 8 years and older, they do not provide a reliable measure for younger age groups (Collins, 1991; Truby & Paxton, 2002). Requiring fewer

verbal skills, having visual appeal and offering ease of use for the tester are the major strengths of these scales. A unique feature of the CBIS is that the scale represents a range of population body mass index (BMI) norms because the size of each digit is based on a BMI considered a marker of obesity. This feature, used in conjunction with a child's measured BMI, allows researchers to determine the accuracy of a child's perception of her/his own body size (Truby & Paxton, 2002).

This aspect of the CBIS has also been valuable for use by medical practitioners in determining the accuracy of the perception of healthy or overweight children (Spurrier et al., 2006). Although these international definitions are not universally accepted, it is necessary to know the CBIS figures, which are equivalent to BMI definitions, to determine a healthy weight, overweight and obesity in children (Chinn, 2006). In addition, it would be valuable to know to what extent the CBIS matches the newer BMI ranges in various countries' population norms.

Although body image perception has not yet been fully evaluated in terms of promoting positive body image for children, there is emerging evidence that it plays an important role in reducing negative body image and problematic eating behaviours (Alberts et al., 2012). To date, any figure rating scale for children's body image satisfaction has not been adapted for use in Turkey. Given the high prevalence and negative effects of body dissatisfaction and the limited time available for school counsellors, psychologists and paediatricians that they need screening tools to help them detect body dissatisfaction and related problems as early as possible. In longitudinal studies, CBIS has been used to determine the relationship between body dissatisfaction and eating disorders (Evans et al., 2017; Parkinson et al., 2012; Steegers et al., 2021).

Body dissatisfaction is defined as one of the main risk factors for eating disorders (Bray et al., 2018) that cause significant physical and psychological health problems such as physical inactivity (Neumark-Sztainer et al., 2006), obesity/anorexia (Haines et al., 2010) and depression (Barnes et al., 2020; Brausch & Gutierrez, 2009). Body image satisfaction has been found to be one of the greatest single predictors of self-esteem for adolescents in different cultures (Tiggemann, 2005; Verkuyten, 1990). Consistent with body image research in other cultures, there is a significant strong relationship between self-esteem and body image among Turkish adolescents (Dorak, 2011). Smolak (2012) stated that girls' and boys' body-related concerns are similar to adults' concerns by the age of eight and body dissatisfaction might occur at very early ages of girls and boys (Grogan, 2016; León et al., 2021).

Today, the healthy body is affected by cultural and social factors as well as medical-biological factors. Turkey is a bridge between Asia and Europe, people have the characteristics of these two cultures, but in recent years, they have an attitude towards European culture. In a recent study in Turkey, Öngören (2015) indicated that focusing on physical appearance, presenting thinness as an 'ideal' body image, and emphasizing the importance of physical appearance in social success have been seen in Turkey as in western cultures. In a comparison study between Turkey and England, it has been observed that there is a relationship between the variables of feeling pressure caused by traditional media, comparing one's body with celebrities, and ideal body awareness and trying to look like celebrities in both countries (Sönmez & Özgen, 2017).

Body image affects the quality of life from early childhood through emotions, thoughts, behaviours and relationships (Latiff et al., 2018). As a learned behaviour, body image emerges in infancy, and as children grow and socialize, they begin to compare themselves with other children, especially in terms of appearance (Cash, 2012). Body shape is increasingly taken into account by the age of 6, and it has been found that 40%–50% of children between the ages of 6–12 showed dissatisfaction with their body shape and size (Smolak, 2012). Also, negative body image was found to be a prospective predictor of chronic eating problems in adolescence and young adulthood in the same study. In a recent study in Turkey, it has been found that the prevalence

of overweight and obesity among primary school children is high and this rate increased with age (Özsoy et al., 2020). Moreover, Sezer (2018) found that childhood obesity is not noticed by Turkish parents they did not perceive obesity as a health threat. Therefore, identifying and intervening in body dissatisfaction in early childhood may be effective in preventing problems such as low self-esteem and alexithymia that occurred in adolescence (Haspolat & Kağan, 2017).

In line with the studies mentioned above, the primary aim of the current study is to investigate the validity and reliability of the Children's Body Image Scale, which is used to evaluate the accuracy of body size perceptions and body size dissatisfaction in Turkish children. The secondary aim of the study is to examine the relationship between body satisfaction and self-perception profile.

## METHOD

### Participants

The participants were randomly selected from children aged 8–11 in Ankara's Beypazarı district who volunteered to participate in the research. All the participants attending the third (76 girls, 89 boys) and fourth (135 girls, 173 boys) grades were given information about the study. Body Mass Indices ( $\text{kg}/\text{m}^2$ ) were calculated by dividing the measured weights (kg) of the children by the square of their heights, that is by anthropometric measurements. They were then categorized according to the BMI in the CBIS (Truby & Paxton, 2002). The children were asked to choose one of the figures they believed to be closest to them (perceived body size) and the ones they most wanted to have (desired body size) in the CBIS. This procedure was conducted with the participation of 480 children. Children with physical disabilities or cognitive impairments were not included in the research. The data of seven students were excluded because they needed help in the selection of body images. This might be doctored data, therefore, the data of 473 participants were used in the analysis. Approximately, 44.6% of the participants were girls, and 55.4% were boys, with mean age = 9.38 ( $\pm 0.65$ ) and mean BMI = 17.42 ( $\pm 3.27$ ).

### Procedure

Before starting the research, the necessary ethical approval was obtained from the Human Research Ethics Committee (2021-140). The data for the study were collected between the dates of June 2021 and May 2022. First of all, the teachers of third and fourth grades were contacted to reach out to families. The researcher attended the parent–teacher meetings and explained the scope of the study. The researcher also gathered contact information at the end of meetings from parents who were willing to participate in the study. Later, parents were contacted and invited for the study. Parents were informed about the study in detail and parents' signed consent forms were obtained. The children also informed about the confidentiality of their answers. The researcher explained that only their opinions were sought in the study, there was no right or wrong answer, and that the figures they saw were of the same height and age. One-on-one meetings with the children were conducted by the researcher, and their weight and height were measured without shoes and with their clothes to calculate their body mass index. The height and weight measurements of the students were taken immediately after giving the questionnaires. Parents were contacted for the post-tests and randomly selected from 473 participants. The same procedure

was applied for this second administration. The test–retest reliability of the CBIS was assessed 3 weeks later using the same procedures with 55 participants (25 boys and 30 girls;  $N = 55$ ).

## Measures

### Personal information form

The personal information form developed by the researcher includes participants' age, gender, grade, height and weight variables.

### Children's body image scale

The Children's Body Image Scale (CBIS; Figure 1) developed by Truby and Paxton (2002) aims to determine the reality of body size perception and body size satisfaction in children aged 7–12. The gender-specific scale consists of seven child figures, each representing a BMI range of 3%–97%. With the category number assigned to each child figure representing each percentile range in ascending order, the scale is as follows: (1) 14.0–14.6 (3%), (2) 14.7–15.5 (10%), (3) 15.6–16.5 (25%), (4) 16.6–18.5 (50%), (5) 18.6–24.9 (75%), (6) 25.0–28.4 (90%) and (7) 28.5–29.0 (97%), for girls (1) 13.0–13.5 (3%), (2) 13.6–14.9 (10%), (3) 15.0–16.6 (25%), (4) 16.7–17.7 (50%), (5) 17.8–19.4 (75%), (6) 19.5–24.6 (90%) and (7) 24.7–28.5 (97%). One of the four CDC weight categories was assigned to each figure in the CBIS (Truby & Paxton, 2008). For the girls, figure 1 was considered underweight, figures 2–5 were healthy weight, figure 6 was overweight and figure 7 was obese. For the boys, figure 1 was underweight, figures 2–4 were healthy weight, figure 5 was overweight and figures 6 and 7 were obese. Participants were asked 'Show me the picture that looks most like you' and 'Which of these would you like to look like?' prior to their anthropometric measurements to indicate their current body size (i.e. perceived body size) and the child's figure that best represents their desired body size. The difference between the perceived body figure and the desired body figure is used as a measure of dissatisfaction with the body size (the discrepancy between perceived—desired). If the person's actual body mass index (BMI) and perceived body measurements match, the person has a realistic body image. The mismatch between BMI range and perceived body measurements indicates that he or she does not have a realistic body image. In the reliability studies of the scale, significant correlations ( $p < .05$ ) were found between Pearson values, varying between .67 and .87 (Truby & Paxton, 2008).

### Self-perception profile for children

'Self-Perception Profile for Children' developed by Harter (1985) was used to assess the criterion validity of the CBIS. The scale consists of a total of 36 items and six dimensions, namely, academic competence, social approval, athletic competence, physical appearance, satisfaction with behaviour and general self-worth. In the current study, physical appearance and general self-worth dimensions were used. The six items in each dimension aim to measure the self-perception of children aged 8–11 (Harter, 1985). The scale is a Likert-type measurement tool. The researcher administers scale directly by reading each statement to the child, then asking 'which kind of kid is more like you?' Each item has a value of between one and four. Higher scores represent greater

self-worth. The scale was adapted to Turkish by İlkin (1997), and values between .83 and .64 were found in the test–retest reliability analysis. In the study conducted by Gabay (1994), Cronbach's alpha values of the subscales were found to be between .51 and .63.

## Data analysis

The data obtained from boys and girls were divided into two groups according to grade and analysed using descriptive and inferential statistics. The frequency and percentage values of BMI and CBIS were calculated to determine the BMI and CBIS categories of the participants. In the current study, BMI weight status categories for age were determined to be consistent with Truby and Paxton (2002) according to the Center for Disease Control (CDC) classification. The correlations between the measured BMI, CBIS and Self-Perception Profile for Children were examined using *t* test and Pearson correlations. The test–retest reliability of the scores obtained from the CBIS was examined using paired *t* tests and Pearson product–moment correlations. SPSS 25. package program was used in the analysis of the data. The critical level of significance was set at .05.

## RESULTS

### Validity and reliability analysis of the Children's body image scale

According to the actual BMI category in Table 1, 21.8% of girls are underweight, 58.3% are normal, 18.5% are overweight and 1.4% are obese. Approximately, 32.8% of boys are underweight, 48% are normal, 14.5% are overweight and 4.6% are obese. CBIS figures represent the weight categories as follows: figures 1 and 2 represent underweight for both and girls, figures 3 and 4 represent normal weight for both gender, figure 5 represents overweight for boys and normal weight for girls, figure 6 represents obese for boys and overweight for girls, and figure 7 represents obese for both boys and girls (Truby & Paxton, 2008).

According to the perceived BMI category in Table 1, 24.7% of the girls perceive their body mass index as underweight, 68.2% perceive it as normal, 4.7% as overweight and 2.4% as obese.

**TABLE 1** Percentages of boys and girls in the actual, perceived and desired categories of the CBIS.

CBIS category	Actual BMI category		Perceived body BMI category		Desired body BMI category	
	Girl (N = 211)	Boy (N = 262)	Girl (N = 211)	Boy (N = 262)	Girl (N = 211)	Boy (N = 262)
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
1	15 (7.1)	48 (18.3)	16 (7.6)	31 (11.8)	34 (16.1)	42 (16.0)
2	31 (14.7)	38 (14.5)	36 (17.1)	56 (21.4)	67 (31.8)	66 (25.2)
3	64 (30.3)	41 (15.6)	77 (36.5)	79 (30.2)	80 (37.9)	99 (37.8)
4	21 (10.0)	85 (32.4)	45 (21.3)	54 (20.6)	21 (10.0)	46 (17.6)
5	38 (18.0)	38 (14.5)	22 (10.4)	22 (8.4)	6 (2.8)	7 (2.7)
6	39 (18.5)	8 (3.1)	10 (4.7)	14 (5.3)	3 (1.4)	2 (0.8)
7	3 (1.4)	4 (1.5)	5 (2.4)	6 (2.3)	—	—

**TABLE 2** The mean (standard deviations) of actual and perceived BMI categories for each gender and class group, and the relationship between actual and perceived BMI categories.

Grade	Actual BMI categories mean (standard deviation)	Perceived BMI categories mean (standard deviation)	Difference between actual and perceived BMI categories		Correlation between the actual and perceived BMI categories	
			(standard deviation)	<i>t</i> ( <i>p</i> )	Power	Power
Third-grade girls ( <i>n</i> = 76)	3.63 (1.74)	3.30 (1.30)	−0.33 (1.37)	−2.09* (.040)	0.63**	0.950
Third-grade boys ( <i>n</i> = 89)	2.97 (1.47)	2.89 (1.35)	−0.09 (1.23)	−0.69 (.493)	0.62**	0.950
Fourth-grade girls ( <i>n</i> = 135)	3.87 (1.50)	3.36 (1.37)	−0.51 (1.28)	−4.64** (.000)	0.61**	0.950
Fourth-grade boys ( <i>n</i> = 173)	3.40 (1.49)	3.32 (1.45)	−0.07 (1.24)	−0.79 (.430)	0.64**	0.950
All girls ( <i>n</i> = 211)	3.78 (1.59)	3.34 (1.34)	−0.44 (1.31)	−4.93* (.000)	0.61**	0.951
All boys ( <i>n</i> = 262)	3.25 (1.49)	3.18 (1.43)	−0.08 (1.24)	−1.05 (.296)	0.64**	0.950

\**p* < .05.

\*\**p* < .01.

Twenty-nine girls who are actually in the overweight category do not perceive themselves as overweight, whereas two girls who are not in the obese category perceive themselves as obese. According to the perceived BMI category, 33.2% of boys perceive their BMI as weak, 40.8% as normal, 8.4% as overweight and 7.6% as obese. According to Table 1, 16 boys in the overweight category do not perceive themselves as overweight, and eight boys who are not in the obese category perceive themselves as obese.

The desired BMI category in Table 1, 47.9% of the girls want to have a lean BMI, 50.7% want to have a normal BMI and 1.4% want to have an overweight BMI. Seven girls who perceive their body mass index as overweight and five girls who perceive themselves as obese want to have a thin or normal BMI. According to the desired BMI category, 42.1% of the boys want to have a lean BMI, 55.4% have a normal BMI, 2.7% have an overweight BMI, and 0% of them want to have an obese BMI. According to Table 1, 15 boys who perceive their BMI as overweight and 18 boys who perceive it as obese want to have a thin or normal BMI.

The difference between the actual BMI and perceived BMI was found to be statistically significant for the girls in the third grade ( $t = -2.09$ ;  $p < .05$ ), girls in the fourth grade ( $t = -4.64$ ;  $p < .05$ ) and girls regardless of their grade ( $t = -4.93$ ;  $p < .05$ ) (Table 2). Accordingly, it can be said that all girls in the third, fourth grade and those of their grade do not have a realistic perception of their BMI and that they perceive themselves as thinner than they are. No significant difference was found between the actual and perceived body mass indices of boys in the third and fourth grades ( $p > .05$ ). When the relationship between actual and perceived BMI was examined, it was determined that there was a high-level, positive and significant relationship between actual and perceived BMI in all grade levels and gender ( $p < .05$ ). In other words, there was a high level of correlation between the perceived BMI of girls and boys in the third and fourth grades and the visual body image scale.

The difference between the perceived BMI and the desired BMI was found to be statistically significant for the girls in the third grade ( $t = 4.97$ ;  $p < .05$ ), girls in the fourth grade ( $t = 5.98$ ;



$p < .05$ ), boys in the fourth grade ( $t = 5.21$ ;  $p < .05$ ) as well as for all the girls ( $t = 7.78$ ;  $p < .05$ ) and boys ( $t = 5.12$ ;  $p < .05$ ) (Table 3). In this respect, the perceived BMI of the third-grade girls, fourth-grade girls, fourth-grade boys, besides the girls and boys regardless of grade level is higher than the BMI they aim/want to have. In other words, it can be said that they want to be thinner. No significant difference was found between the perceived BMI and the desired BMI of the boys in the third grade ( $p > .05$ ). When the relationship between perceived and desired BMI was examined, it was determined that there was a high-level, positive and significant relationship between the perceived and desired BMI of children in all grade levels and for both gender ( $p < .05$ ).

The relationship between body satisfaction (difference between perceived and desired BMI) and physical appearance ( $r = -.40$ ;  $p < .05$ ) of the third-grade girls was found to be negative and significant (Table 4). The physical appearance perception profile of the girls in the third grade who have low body satisfaction (the difference between their perceptions and their desired BMI is high) is low. No significant relationship was found between body satisfaction (the difference between perceived and desired BMI) and the general self-worth of the girls in the third grade ( $p > .05$ ).

As demonstrated in Table 4, no significant relationship ( $p > .05$ ) was detected between body satisfaction, general self-worth and physical appearance of the boys in the third grade. A negative and significant relationship was found between the body satisfaction, general self-worth ( $r = -.47$ ;  $p < .05$ ) and physical appearance ( $r = -.48$ ;  $p < .05$ ) of the girls in the fourth grade. The general self-worth and physical appearance perception profile of the fourth-grade girls who had low body satisfaction were low.

A negative and significant relationship was found between the body satisfaction, general self-worth ( $r = -.16$ ;  $p < .05$ ) and physical appearance ( $r = -.32$ ;  $p < .05$ ) profile of the fourth-grade boys (Table 4). The general self-worth and physical appearance perception profile of the fourth-grade boys with low body satisfaction (the difference between their perceptions and their desired body shape is high) were low. In addition, there was a negative and significant relationship between the body satisfaction, general self-worth ( $r = -.35$ ;  $p < .05$ ) and physical

**TABLE 3** The difference between the averages (standard deviations) of the perceived and desired BMI categories for each gender and class group and the relationship between the perceived and desired BMI categories.

Grade	Perceived BMI average (standard deviation)	Desired BMI mean (standard deviation)	Difference between perceived and desired BMI (standard deviation)	$t$ ( $p$ )	Correlation between perceived and desired BMI	Power
Third-grade girls ( $n = 76$ )	3.30 (1.30)	2.47 (1.01)	0.83 (1.45)	4.97** (.000)	0.25*	0.951
Third-grade boys ( $n = 89$ )	2.89 (1.35)	2.62 (1.14)	0.27 (1.59)	1.60 (.114)	0.26*	0.950
Fourth-grade girls ( $n = 135$ )	3.36 (1.37)	2.61 (1.08)	0.75 (1.45)	5.98** (.000)	0.33**	0.951
Fourth-grade boys ( $n = 173$ )	3.32 (1.45)	2.71 (1.03)	0.61 (1.54)	5.21** (.000)	0.32**	0.952
All girls ( $n = 211$ )	3.34 (1.34)	2.56 (1.06)	0.78 (1.45)	7.78** (.000)	0.30**	0.953
All boys ( $n = 262$ )	3.18 (1.43)	2.68 (1.07)	0.50 (1.57)	5.12** (.000)	0.29**	0.950

\* $p < .05$ .

\*\* $p < .01$ .

**TABLE 4** The relationship between body satisfaction (difference between perceived and desired) and Self-Perception Profile (general self-worth and physical appearance subscales of the CBIS).

Grade		General self-worth (power)	Physical appearance (power)
Third-grade girls ( $n = 76$ )	CBIS difference between perceived and desired BMI	-0.19 (0.720)	-0.40** (0.957)
Third-grade boys ( $n = 89$ )	CBIS difference between perceived and desired BMI	-0.04 (0.515)	-0.10 (0.588)
Fourth-grade girls ( $n = 135$ )	CBIS difference between perceived and desired BMI	-0.47** (0.998)	-0.48** (0.998)
Fourth-grade boys ( $n = 173$ )	CBIS difference between perceived and desired BMI	-0.16* (0.801)	-0.32** (0.981)
All girls ( $n = 211$ )	CBIS difference between perceived and desired BMI	-0.35** (0.994)	-0.45** (0.999)
All boys ( $n = 262$ )	CBIS difference between perceived and desired BMI	-0.13* (0.799)	-0.27** (0.983)
All sample ( $n = 473$ )	CBIS difference between perceived and desired BMI	-0.21** (0.986)	-0.34** (0.999)

\* $p < .05$ .

\*\* $p < .01$ .

appearance ( $r = -.45$ ;  $p < .05$ ) profile of the girls. Girls with low body satisfaction had low general self-worth and physical appearance perception profile in both groups.

Boys' body satisfaction (the difference between their perceived and desired BMI), general self-worth ( $r = -.13$ ;  $p < .05$ ) and physical appearance ( $r = -.27$ ;  $p < .05$ ) were found to have a negative and significant relationship (Table 4). Regardless of the grade level, boys with low body satisfaction (whose perceptions and desired body shapes are different) had low general self-worth and physical appearance perception profile.

As shown in Table 4, in both grade level and gender, children's body satisfaction, general self-worth ( $r = -.21$ ;  $p < .05$ ) and physical appearance ( $r = -.34$ ;  $p < .05$ ) were found to have a negative and significant relationship. Also, children with low body satisfaction (with a high difference in their perceptions and desired body shapes) have low general self-worth and physical appearance perception in the self-perception profile.

Table 5 shows that no significant difference was observed between the perceived body mass indices of the girls and boys in both tests ( $p > .05$ ). A high level of positive and significant ( $p < .05$ ) relationship was found between the BMIs perceived by the girls on the first and second tests. Similarly, there was a high level of positive and significant ( $p < .05$ ) relationship between the BMIs perceived by boys in the first and second tests. In other words, the visual body image scale gave consistent results about the perceived BMI of both boys and girls in measurements at different times.

As demonstrated in Table 5, no significant difference was found between the desired BMIs of girls and boys in both tests ( $p > .05$ ). A high level of positive and significant ( $p < .05$ ) relationship was identified between the desired BMIs of the girls in the first and second tests. Accordingly, there was a high level of positive and significant ( $p < .05$ ) relationship between the desired BMIs of boys in the first and second tests. The visual body image scale provides consistent results about the desired BMI of both boys and girls in measurements at different times.

TABLE 5 Test-retest reliability of CBIS for boys and girls.

	First test Girl N: 30 Boy N: 25	Second test Girl N: 30 Boy N: 25	Correlation between first and second test <i>r</i>	Power
Perceived BMI				
Girls' mean (standard deviation)	3.43 (1.35)	3.47 (1.33)	0.94**	0.988
Boys' mean (standard deviation)	3.72 (1.37)	3.88 (1.45)	0.94**	0.951
<i>t</i> ( <i>p</i> )	−0.78 (.44)	−1.10 (.276)		
Desired BMI				
Girls' mean (standard deviation)	3.20 (0.99)	3.23 (0.90)	0.84**	0.950
Boys' mean (standard deviation)	2.80 (1.04)	2.84 (0.80)	0.93**	0.950
<i>t</i> ( <i>p</i> )	1.45 (.152)	1.70 (.095)		
Difference between desired and perceived				
Girls' mean (standard deviation)	0.23 (1.65)	0.23 (1.04)	0.88**	0.950
Boys' mean (standard deviation)	0.92 (1.68)	1.04 (1.62)	0.94**	0.950
<i>t</i> ( <i>p</i> )	−.78 (.080)	−2.23* (.030)		

\* $p < .05$ .\*\* $p < .01$ .

The results of the first test ( $p > .05$ ) revealed no significant difference between the body image satisfaction of girls and boys (Table 5). A high level of positive and significant relationship ( $p < .05$ ) was found between the body image satisfaction of girls in the first and second tests. Similarly, a high level of positive and significant relationship ( $p < .05$ ) was observed between the body image satisfaction of boys in the first and second tests. The visual body image scale yields consistent results regarding body image satisfaction of both boys and girls at different times.

As shown in Table 5, the second test revealed a significant difference between the body image satisfaction of girls and boys ( $t = -2.23$ ;  $p < .05$ ). In the second test, girls' body image satisfaction was significantly higher than that of boys. On the other hand, the second test showed that there was a high level of positive and significant relationship ( $p < .05$ ) between the body image satisfaction of the girls in the 1st and 2nd tests. Similarly, a high level of positive and significant relationship ( $p < .05$ ) was found between the body image satisfaction of boys in the first and second tests. In sum, administered at varying times, the visual body image scale gave consistent results regarding the body image satisfaction of both boys and girls.

## DISCUSSION, CONCLUSION AND IMPLICATIONS

The first aim of this study is to find out the psychometric properties of the CBIS administered with a sample of Turkish children. The validity analysis results clearly show that the original version of the CBIS, developed by Truby and Paxton (2002), showed good construct validity for the Turkish sample and remained reliable after a three-week interval. The child figures in the scale are correctly ordered based on their BMI and show that there is an identifiable increase in the body measurements of these figures (Truby & Paxton, 2002). Specifically, figures rated as thin were located at the bottom of the scale, while obese body images were located at the top of the scale.

The difference between actual BMI and perceived BMI in girls participating in the study was found to be statistically significant. It can be said that girls do not have a realistic BMI and they perceive themselves as thinner than they actually are. While this result is consistent with other studies that girls desire for thinness (Scime et al., 2006), no significant differences were observed in another study (Sifers & Shea, 2013). Moreover, this result was found to be consistent especially for girls compared to other cultural studies that used CBIS and BMI scores. For example, Ling et al. (2015) found that 55% of Chinese girls preferred to be thinner in their study.

In this study, we also found that several girls and boys who are actually in the overweight category do not perceive themselves as overweight. In the study of Maximova et al. (2015) with Canadian fifth-grade students, it was found that although most children were in the overweight category, they did not perceive themselves as overweight. Also, body image dissatisfaction is often accompanied by body size misperception that is common in overweight and normal-weight children (Evans et al., 2013).

The related research indicates that Turkish children develop negative attitudes by being exposed to too much prejudice against obese people, and accordingly, they tend to evaluate their perceived body images as lean (Erkol & Khorshid, 2004), and accordingly, they might tend to evaluate their perceived body images as lean. Contrary to the girls, no significant difference was found in the actual and perceived BMIs of the boys participating in the current study. Culturally, there are differences in body perception by gender. For example, while men's physical strength and abilities are emphasized, women's beauty is foregrounded in Turkish culture (Gürsel, 2005). In addition, the increase in the BMIs of girls may conflict with their culturally desired body shapes and lead them to perceive themselves as thinner than they are (Davison et al., 2003; Pesa et al., 2000). Accordingly, the participants who have differences in their real and perceived BMIs are thought to choose the figures that are viewed as ideal by society. These differences between girls and boys are similar to those in the original version of the scale and other studies (Ling et al., 2015; Maximova et al., 2015; Truby & Paxton, 2002).

Another important finding shows that girls and boys generally want to be included in the desired body index categories of thin (F: 47.9%, M: 42.1%) and normal (F: 50.7%, M: 55.4%). These results are consistent with the values observed in previous studies, especially regarding girls (Hill et al., 1992; Schur et al., 2000; Truby & Paxton, 2002). The validity analyses in our study revealed a positive significant relationship between real, perceived and desired BMIs at all grade and gender levels. In addition, the structural validity analyses revealed negative significant differences between the male and female CBIS, general self-worth and physical appearance subscales. The related research literature has reported that children with a large difference between perceived and desired body shape (low body satisfaction) have low general self-worth and physical appearance perception (Cohane & Pope, 2001; Kusan, 2017; Mendelson & White, 1982). This finding shows that the scale provides good concurrent validity.

In addition to the validity analyses performed to test the reliability of the Children's Body Image Scale, test-retest analysis was performed to confirm the consistency of the answers received at different times (Aksayan & Gözüm, 2002). For this analysis, the scale was administered again to 55 participants 3 weeks later. The results of the analysis found no difference in the perceived and desired BMIs and body image satisfaction of girls and boys, and the consistency of the answers taken at different times from the test confirm its reliability (Büyükozturk, 2014). Accordingly, based on the test-retest results, the reliability of the scale was found to be sufficient.

This study has a few limitations, the first of which is that the sample consisted of only third- and fourth-grade students. Although the pre-adolescence period is considered a critical period in terms of body image, the narrow age range has limited the generalization of the results and

obtaining information about the development of body image satisfaction. Puberty has also been found to be associated with body dissatisfaction (Grabe & Hyde, 2006). Future studies might focus on the relationship between BMI and other variables that can be examined by considering the characteristics of this period. The second limitation of the study is that the study was carried out in a city in Turkey. This might limit the generalizability of the results. Thus, future studies should include children from different cities in Turkey.

When all the findings are considered together, it can be said that the Children's Body Image Scale (CBIS) adapted to the Turkish culture is a valid and reliable measurement tool that can be used to evaluate the body image and satisfaction of children between the ages of 7–12 with other evaluation and diagnostic methods. In today's world, multidimensional approaches should be exhibited both in the identification and treatment of childhood obesity, which has been increasing due to changing eating habits (Truby & Paxton, 2008). Thus, using the standardized BMIs together is recommended (Truby & Paxton, 2008), and the characteristics of the scale need to be further analysed through future studies by including a sample of students from different age and ethnic groups.

Although many silhouette scales for younger children have been developed, the psychometric properties of these surveys have not been much studied in the Turkish population. According to the results of the validity and reliability analyses, the CBIS used in this study was confirmed as a useful and practical instrument to evaluate body size, perception and satisfaction among Turkish children. Numerous studies have demonstrated a high prevalence rate of obesity and mental health problems due to body dissatisfaction among children. In order to screen and prevent problems related to body dissatisfaction, body image evaluation scales must be used. However, scale items may be incomprehensible for younger children. This figure rating scale can be answered easily and quickly among children and disadvantaged groups as well. It may therefore assist mental and medical health professionals including but not limited to child psychiatrists, psychologists, paediatricians and school counsellors to evaluate body image perceptions and dissatisfaction. Eating disorders were associated with body dissatisfaction and children with greater levels of body dissatisfaction are at risk of physiological problems as well as psychological problems (Parkinson et al., 2012). In order to prevent misdiagnosis and to enable early detection, CBIS can be used in conjunction with other body indexes and commonly used self-report measures of eating-disordered attitudes and behaviours such as the Eating Disorder Inventory (Garner et al., 1983) and the Eating Attitudes Test (Garner & Garfinkel, 1979). In conclusion, this study conducted an examination of the validity and reliability of the CBIS and further supported the measure's usefulness regarding body image literature for future research.

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## **CONFLICT OF INTEREST STATEMENT**

The authors have indicated that they have no potential conflicts of interest to disclose.

## **DATA AVAILABILITY STATEMENT**

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## ETHICS STATEMENT

This study was approved by the Institutional Review Board of Recep Tayyip Erdogan University (protocol number 2021140).

## PARTICIPANT CONSENT STATEMENT

Parental consent and participant assent (under age 14) were obtained from all participants.

## PERMISSION TO REPRODUCE MATERIAL FROM OTHER SOURCES

All necessary permissions have been obtained by the developer to adapt and use the Children's Body Image Scale.

## ORCID

Çiğdem Keven Akliman  <https://orcid.org/0000-0003-4837-9972>

Mehmet Avcı  <https://orcid.org/0000-0002-8298-8985>

İlknur Kiraz Avcı  <https://orcid.org/0000-0002-6800-9437>

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## AUTHOR BIOGRAPHIES

**Çiğdem Keven Akliman**, Ph.D., is a counselor in the Counseling and Research Center in the Ministry of National Education in Ankara. Her research interests lie in the area of body image, child and adolescent development, and positive psychology. Email: [keven.akliman@gmail.com](mailto:keven.akliman@gmail.com)

**Mehmet Avcı**, Ph.D., is a research assistant in the Department of Guidance and Counseling at Recep Tayyip Erdogan University in Turkey. His research interests lie in the area of wellness, multicultural counseling, and play therapy. Email: [mehmet.avci@erdogan.edu.tr](mailto:mehmet.avci@erdogan.edu.tr)

**İlknur Kiraz Avcı**, M.D., is a medical doctor in the department of Psychiatry at Rize State Hospital. Her research interests lie in the area of psychosis, bipolar disorders, and depression. Email: [kiraz\\_ilknur@outlook.com](mailto:kiraz_ilknur@outlook.com)

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