

# Body Images of 4–8-Year-Old Girls at the Outset of Their First Artistic Gymnastics Class

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**Abstract: Objective:** *The primary objective of this investigation was to compare body images of 54 girls (4–8 years old) who were beginning their first gymnastics class to 54 age-matched ( $\pm 1$  year) and % body fat-matched ( $\pm 3\%$ ) girls not participating in gymnastics. **Method:** Ratings of actual and ideal body size and a computed measure of body dissatisfaction (actual minus ideal) were obtained. Body composition was measured with dual-energy x-ray absorptiometry. **Results:** Girls beginning gymnastics did not differ significantly from controls on (mean  $\pm$  SD) actual ( $2.2 \pm 1.4$  vs.  $2.1 \pm 1.4$ ), ideal ( $1.8 \pm 1.3$  vs.  $1.8 \pm 1.5$ ), or body dissatisfaction ( $0.39 \pm 1.8$  vs.  $0.26 \pm 1.4$ ) scores. **Discussion:** Body images of 4–8-year-old girls beginning their first artistic gymnastics class do not differ from non-gymnast controls matched on age and % body fat. This observation casts doubt on the idea that young girls who are dissatisfied with their body and want to be smaller are more likely to enroll in gymnastics classes than girls without this type of body dissatisfaction. © 2003 by Wiley Periodicals, Inc. *Int J Eat Disord* 34: 244–250, 2003.*

**Key words:** *body composition; body dissatisfaction; body fat; body figure rating; children gymnast*

## INTRODUCTION

The sport of artistic gymnastics is often promoted for the health and fitness benefits known to be associated with increased physical activity (Virus & Smirnova, 1995). It has been estimated that more than 52,000 girls in the United States alone participate in artistic gymnastics (O'Connor, Lewis, & Boyd, 1996). Despite known health benefits of gymnastics, some reviewers contend that the sport contributes to an increased risk for the development of an eating disorder (Ponton, 1995). Indeed, it has been suggested that

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unequivocal pressure to be lean may lead to body image dissatisfaction and restricted eating among female child gymnasts (Tofler, Stryer, Micheli, & Herman, 1996).

Body image dissatisfaction is one of several reasonably well-established risk factors for the development of eating disorders (Leon, Fulkerson, Perry, & Cudeck, 1993; Thompson, Coovert, Richards, Johnson, & Cattarin, 1995). A few studies have examined body dissatisfaction among gymnasts, and some (O'Connor, Lewis, Kirchner, & Cook, 1996; Petrie, 1993), but not all (Harris & Greco, 1990; O'Connor, Lewis, & Kirchner, 1995), of the evidence indicates that body dissatisfaction is present among college-aged female gymnasts. It is unclear, however, whether body dissatisfaction among gymnasts suggests psychopathology or if it represents a rational, healthy approach toward the goal of achieving athletic success. It is also unknown whether body dissatisfaction, when it occurs, is a consequence of participating in gymnastics or if girls who tend to be dissatisfied with their body gravitate toward the sport. This latter possibility can be addressed only by studying girls at the outset of their participation in gymnastics. Research into body images of gymnasts has focused largely on college-aged women, and there seems to be no published research on this topic conducted with very young girls at or near the outset of gymnastics participation.

Researchers have examined body images of girls between the ages of 8 and 13 years (Rolland, Farnill, & Griffiths, 1996; Thompson, Corwin, & Sargent, 1997; Vander Wal & Thelen, 2000; Veron-Guidry & Williamson, 1996); however, only recently has there been interest in learning about the body images of very young girls younger than the age of 8 years. One replicated observation with very young girls (aged 5–7 years) is that most select a body figure to represent their ideal body size that is smaller than the body figure they select to represent their actual body size (Ambrosi-Randic, 2000; Williamson & Delin, 2000). The inference from this observation is that even at a very young age, girls often are dissatisfied with their body size and desire to be smaller. No studies have examined associations between body figure ratings made by very young girls and objective measures of body composition.

The primary purpose of this study was to determine whether girls who enroll in gymnastics classes differ in body dissatisfaction at the outset of their participation in gymnastics compared with age- and % body fat-matched girls not enrolled in such classes. The matching procedure was used to minimize group differences in maturation or body composition that could confound the interpretation of the body image results. An ancillary purpose was to describe relationships between body figure ratings and selected anthropometric measures, including % body fat, in a sample of very young girls.

## METHOD

### Participants

The participants were recruited as part of a longitudinal investigation into the determinants of bone health in young girls. The investigation was approved by the Institutional Review Board at the University of Georgia, and all participants and their parents read and signed an informed consent form.

Recruitment occurred over 3 years. Flyers, mailed announcements, newspaper, and television advertisements were used to recruit children from Athens-Clarke County, Georgia, and the surrounding area. The total number of volunteers was 105 girls who elected to enroll in their first gymnastics class and 98 girls who elected to not enroll in gymnastics classes (controls).

This article compares those girls who enrolled in gymnastics who also could be individually matched on age ( $\pm 1$  year) and % body fat ( $\pm 3\%$ ) to controls. The racial composition of the 54 gymnasts versus the 54 matched controls was: Asian (3.7% vs. 3.7%), Black (18.5% vs. 33.3%), White (68.5% vs. 55.6%), and other (9.4% vs. 7.5%).

## Materials and Procedures

### Anthropometrics

Standing height was measured to the nearest 0.1 cm using a direct-reading stadiometer. Weight was measured using a calibrated double-beam balance scale and recorded to the nearest 0.1 kg. Body mass index was calculated as body weight (kg) divided by height ( $m^2$ ).

### Body Composition

Total body bone mineral content, fat-free soft tissue mass, and fat mass were measured by dual-energy x-ray absorptiometry (DXA; QDR-1000W, Hologic Inc., Waltham, MA) using the Experimental Pediatric Whole Body Analysis software. Percent body fat was based on the relative ratio of fat to fat-free tissue values. Fat-free mass was determined by adding total body bone mineral content and fat-free soft tissue mass.

### Body Images

Body images were measured using the children's Body Figure Rating Scale (BFRS) of Collins (1991). This BFRS consists of seven female child figures that differ in the degree of body weight and leanness illustrated, ranging from very thin to obese. This BFRS has been widely used to assess body images of children (Abramovitz & Birch, 2000; Ambrosi-Randic, 2000; Lucero, Hill, & Ferraro, 1999; Thompson et al., 1997; Veron-Guidry & Williamson, 1996). There is evidence that children can reliably rate their actual size using this scale. In a study of more than 1000 children a test-retest reliability statistic of  $r = 0.71$  was reported (Collins, 1991). Data supportive of the validity of this BFRS include statistically significant correlations between ratings of actual size and the measured body mass index ranging between  $r = 0.37$  and  $r = 0.51$  in large samples of children with mean ages of 8 to 10 years of age (Collins, 1991; Rolland et al., 1996).

Each participant was shown the BFRS and asked orally: "Which picture looks the most like you?" (actual), and "Which picture shows the way you want to look?" (ideal). Scores were assigned to each figure with the number 0 assigned to the smallest figure and the number 6 to the largest. An index of body dissatisfaction was calculated by subtracting ideal from actual scores. When this "discrepancy" score yielded a positive number, it was interpreted as indicating that the participant was dissatisfied with the size of her body and wanted to be smaller; a negative score indicated that she was dissatisfied and wanted to be bigger. A score of zero indicated body satisfaction and no desire for change.

## RESULTS

By design, the 54 beginning gymnasts did not differ from the 54 controls in (mean  $\pm$  SD) age ( $5.95 \pm 1.3$  vs.  $5.93 \pm 1.3$  years) or % body fat ( $23.2 \pm 5.9$  vs.  $23.3 \pm 6.0$ ). The groups also did not differ significantly in height ( $114 \pm 9$  vs.  $116 \pm 10$  cm), weight ( $21.0 \pm 3.9$  vs.  $22.0 \pm 4.4$  kg), or body mass index ( $16.1 \pm 1.9$  vs.  $16.1 \pm 1.5$ ).

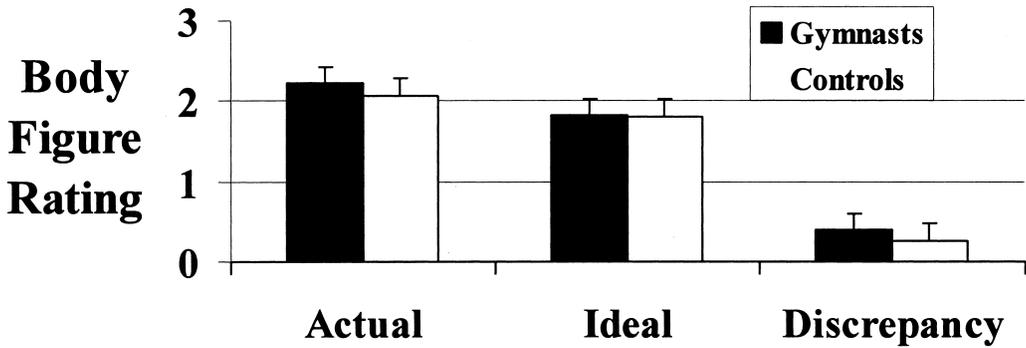


Figure 1. Mean ( $\pm$ SE) ratings for the gymnast and control group for actual and ideal body size, as well as the body dissatisfaction score (actual minus ideal).

Figure 1 shows the mean ( $\pm$ SE) body image data for the two groups. Paired samples *t* tests revealed that the beginning gymnastics group did not differ significantly from the control group on the ratings of actual body size ( $t_{53} = -0.551, p = 0.588$ ), ideal body size ( $t_{53} = -9.066, p = 0.948$ ), or the body dissatisfaction scores ( $t_{53} = -0.442, p = 0.660$ ).

Forty-four percent of the beginning gymnasts and 43% of the controls chose an ideal figure that was smaller than the one selected to represent their actual size. Twenty-eight percent of both the beginning gymnasts and the controls chose the same figure to represent their actual and ideal self. Twenty-eight percent of the beginning gymnasts and 29% of the controls chose an ideal figure that was larger than the one chosen to represent their actual size.

Table 1 presents the Pearson correlations between the subjective body image measures and the objective anthropometric measures. When considering both groups

Table 1. Pearson correlations between the body image measures and age, height, weight, body mass index (BMI), and % body fat

	Actual	Ideal	Discrepancy
<b>Gymnasts (<i>n</i> = 54)</b>			
Age	0.25*	0.14	0.10
Height	0.23*	0.30*	-0.03
Weight	0.20	0.02	0.14
BMI	-0.05	-0.40**	0.24
% body fat	0.13	-0.11	0.18
<b>Controls (<i>n</i> = 54)</b>			
Age	0.40***	0.28*	0.09
Height	0.46***	0.33**	0.10
Weight	0.36**	0.20	0.14
BMI	-0.06	-0.17	0.12
% body fat	-0.10	-0.06	-0.04
<b>Combined (<i>n</i> = 108)</b>			
Age	0.33***	0.22*	0.10
Height	0.34***	0.31***	0.02
Weight	0.28**	0.12	0.13
BMI	-0.06	-0.28**	0.20*
% body fat	0.02	-0.08	0.09

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Because a positive correlation was expected between ratings of actual size and objective measures of body size, the *p* values shown in the column labeled "actual" are one-tailed. Other *p* values are two-tailed.

combined, significant moderate, positive correlations were found between ratings of actual body size and age, height, and weight. Older and taller girls tended to select a larger ideal body figure. Girls with a larger body mass index tended both to select a smaller ideal body figure and have a larger body dissatisfaction score.

When correlations were computed for the beginning gymnasts and controls separately, ratings of actual body size were most strongly associated with height and age. Body weight was significantly related to actual body size ratings among the controls but not among the beginning gymnasts. After statistically controlling for both age and height, a significant partial correlation was found for the beginning gymnastics group between ideal self and body weight ( $r_{12.34} = -0.39$ ;  $p = 0.005$ ). Ratings of ideal body size were most strongly associated with body mass index for the gymnasts and height for the controls. Body fat was weakly and nonsignificantly related to the body image measures in both groups before and after statistically controlling for age and height.

## DISCUSSION

The major finding of this investigation is that 4–8 year old girls beginning their first gymnastics class did not differ in body image dissatisfaction compared with age- and % body fat–matched controls. This finding does not support the idea that young girls who are dissatisfied with their body and want to be smaller are more likely to enroll in gymnastics classes than girls without this type of body dissatisfaction. This finding suggests that when older children or adolescent gymnasts possess elevated body dissatisfaction scores, it is not due to elevated body dissatisfaction scores present at the outset of participation in gymnastics.

The body image results for both the beginning gymnasts and controls were consistent with prior investigations reporting that a substantial percentage of young girls prefer a smaller body size (Ambrosi-Randic, 2000; Williamson & Delin, 2000). The mean discrepancy scores in this study ( $-0.26$  for the controls and  $-0.39$  for the gymnasts) were on the low end of the range of mean values ( $-0.30$  to  $-0.77$ ) reported based on large samples of older girls (mean age of  $\sim 8$  years) using an identical body figure rating scale or a similar instrument (Collins, 1991; Lucero et al., 1999; Roland, Farnill, & Griffiths, 1996; Thompson et al., 1997; Williamson & Delin, 2001). The girls who participated in this investigation had body mass index scores within the 50th–75th percentile, indicating average size for their age (Kuczmarski et al., 2000), possibly explaining the somewhat lower discrepancy score compared with other studies.

This investigation also extends available data both by considering the relationships between body figure ratings and several anthropometric measures and by studying very young girls. If the actual body figure ratings are valid, then they should correlate positively with objective measures of body size as well as age, because girls increase in body size from age 4–8 years. These expectations were confirmed for age, height, and weight but not for body mass index or % body fat. It is not clear why % body fat was unrelated to ratings of actual body size. The body mass index results were inconsistent with prior studies that found significant correlations between body mass index and ratings of actual body size (Collins, 1991; Rolland et al., 1996). The prior studies were conducted with a larger group of girls, of a wider age range, who on average were several years older than our sample.

Height, body mass index, and age were significantly related to ratings of ideal body shape. For the group of beginning gymnasts, body mass index was most strongly related

to ratings of ideal body shape. Those beginning gymnasts with a larger body mass index tended to select a smaller ideal body shape. The correlation between body weight and ratings of ideal self increased and became statistically significant after controlling for age and height. These findings suggest that researchers interested in understanding the biological basis for body images among young girls may benefit from separately analyzing and reporting different body size measures (e.g., height, weight, % fat, body mass index), because they are not equally related to measures of body image.

This investigation had several limitations that should be considered when evaluating the findings. The measurement of body image in children poses more difficulties than in adolescents or adults, because children of this age have not fully developed cognitively (Ricciardelli & McCabe, 2001). Interviews, although not conducted in this investigation, could have provided more specific information about body image dissatisfaction (e.g., dissatisfaction with a specific body area). Interviews also could have inquired about the participants' motivations for enrolling in gymnastics classes. For instance, it would have been of interest to know whether any of the girls enrolled in gymnastics to lose weight or lower % body fat. It has been suggested that data from interviews might provide additional insight into the body images of very young girls beyond that obtained from body figure rating scales (Collins, 1991). Nonetheless, we are unaware of empirical evidence demonstrating the advantage of data obtained from interviews over rating scale data for the assessment of body images among young girls. Another potential limitation was that the girls were not asked to complete the body figure rating scale using a scrambled version that might have minimized potential bias in which participants simply choose figures toward the middle of the scale, rather than choose the figure that best represents their actual and ideal body sizes. Published data, however, show similar results between scrambled and nonscrambled body image assessment tools used with children (e.g., Lucero et al., 1999). Furthermore, these results indicate that actual body image ratings were significantly related to age, height, and weight. A final limitation is that we were unable to match controls to the beginning gymnasts on other factors, such as race and socioeconomic status, which are known to be associated with body dissatisfaction among older girls (Striegel-More, Schreiber, Lo, Crawford, Obarzanek, & Rodin, 2000).

The preponderance of evidence from this investigation indicates that 4–8-year-old girls starting in their first gymnastics class do not differ in body image dissatisfaction compared with similar girls not involved in gymnastics.

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