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Dieting and body image in aesthetic sports: A comparison of Dutch female gymnasts and non-aesthetic sport participants

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Abstract

Objectives: To examine the relationship between dieting behavior and body image in female aesthetic athletes.

Methods: Seventeen elite gymnasts, 51 non-elite gymnasts and a control group of 85 schoolgirls, participating in non-elite, merely recreational non-aesthetic sports, completed self-report measures of dieting behaviors and body image.

Results: After controlling for BMI, the results showed that elite gymnasts dieted more often than controls, although they were not more negative about their body. Furthermore, non-elite gymnasts dieted as much as controls and had a more positive body image. Despite what general theories predict, the gymnasts' dieting was not so much related to a negative body image but rather to weight-related causal attributions or perceived weight-related coach pressure.

Conclusions: Whereas controls believe that 'thin is beautiful', gymnasts seem more convinced or persuaded that 'thin is going to win'. Future research should take into consideration that dieting and body image are likely to be developed differently in the context of aesthetic sports.

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Keywords: Adolescents; Body dissatisfaction; Causal attributions; Disordered eating; Weight control

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Introduction

There is quite some evidence that female athletes are at increased risk of developing eating disorders (Davis, 1992; Hausenblas & Carron, 1999) particularly when they are performing at the elite level (Smolak, Murnen, & Ruble, 2000). Because athletes often do not meet the exact criteria for clinical eating disorders, so-called sub-clinical eating disorders appear to be more common among them. Some authors even introduced ‘anorexia athletica’, a sub-clinical eating disorder with sport-specific diagnostic criteria (Sundgot-Borgen, 1993), or prefer to talk about the broader concept of disordered eating in this context.

The prevalence of eating disorder symptomatology seems to be different in various sports (Fogelholm & Hiilloskorpi, 1999) with significantly more symptoms in athletes in aesthetic, endurance and weight-dependent sports than in technical sports, ball games and power sports, or in non-athletes (Sundgot-Borgen, 1993). Problems are mainly found in sports that emphasize leanness, thinness and aesthetic aspects, such as gymnastics, dance, figure skating, synchronized swimming and diving (Byrne & McLean, 2002; DiBartolo & Shaffer, 2002). Particularly young gymnasts are often pointed out as the athletes most at risk (Sundgot-Borgen, 1994a). Pathogenic weight control was used most frequently by gymnasts in comparison to other athletes (Rosen, 1996; Sundgot-Borgen, 1993). Rosen and Hough (1988) found that 62% of the female college gymnasts in their sample used at least one method of pathogenic weight control, such as fasting, self-induced vomiting, or using laxatives, diuretics or diet pills. However, in a recent meta-analysis of eating problems in female athletes, elite gymnasts competing successfully at national or international level or as professional competitors did not significantly differ from non-athletes (Smolak et al., 2000).

Besides research on prevalence there are also a growing number of studies trying to detect so-called risk factors for developing eating disorders (see Jacobi, Hayward, De Zwaan, Kraemer, & Agras, 2004; Stice & Whitenton, 2002). A variety of risk-factor models for eating disorders have been proposed, including multiple putative individual, family and socio-cultural risk factors. Factors like body image dissatisfaction, weight concerns and actual dieting behavior are nearly always part of these models (Shisslak & Crago, 2001), and a negative body image is found to be a very potent, well-supported risk factor (Jacobi et al., 2004). Individuals with a negative body image often worry about their weight, are afraid to gain weight and therefore diet more often than persons who have less weight concerns (Killen et al., 1996).

In general, body image refers to “the mental image a person has of his or her physical appearance, as well as any positive or negative feelings one has about his or her body shape or size” (Rosen, 1996, p. 331) and should be considered a multi-dimensional concept (Gardner, 2001), in which actual body characteristics as well as perceived, ideal and social body images can be distinguished (Woertman, Verheul, & Wessels, 2006).

There is increasing evidence that body image disturbances often precede eating disorders (Gardner, 2001). Two components of disturbance have been distinguished, namely perceptual body-size distortion and a negative attitudinal or affective element. “Perceptual distortion consists of inaccurate judgments of one’s body size. The attitudinal component consists of dissatisfaction with one’s body size, shape or some other aspect of body appearance” (Gardner, 2001, p. 193). Both can serve as independent measures to predict eating disorders, although attitudinal measures have more clinical relevance and yield more consistent findings (Gardner, 2001). Among athletes

attitudinal body image disturbances also appeared to contribute to patterns of disordered eating and dieting (Berry & Howe, 2000; Fogelholm & Hiilloskorpi, 1999; Williamson et al., 1995).

Because of the presumably higher prevalence of disordered eating in athletes in weight-related sport types and the alleged presence of attitudinal body image disturbances in all individuals with eating disorder symptomatology, a more negative body image among these athletes might be expected. However, a recent meta-analytic review of 78 studies examining the general body image of athletes concluded that athletes have a slightly more positive body image than non-athletes (Hausenblas & Symons Downs, 2001). No differences were found among athletes in aesthetic, endurance and ball game sport types, indicating that even the aesthetic athletes who are most at risk for developing eating disorders, had a more positive body image and were more satisfied with their body.

Smolak et al. (2000) proposed that disordered eating in athletes might differ from that in non-athletes after finding an atypical combination of a high drive for thinness and a low rather than a high score on body dissatisfaction in athletes. Similarly, Ziegler et al. (1998) showed that junior elite figure skaters dieted despite being relatively satisfied with their body. In both studies, the athletes' desire for thinness or actual dieting did not appear to be associated with body dissatisfaction. Alternatively, it has been suggested that in weight-related sport types, it is especially the athletes' assumption that success is associated with low body weight or fat content, that might lead to weight concerns and subsequent attempts to reduce weight, either gradually (e.g., by dieting or exercising) or rapidly (e.g., by vomiting) (Fogelholm & Hiilloskorpi, 1999). Other studies pointed to weight-related pressures of the coach as a general explanation for the high prevalence of disordered eating in athletes (see Berry & Howe, 2000; Sundgot-Borgen, 1994b). In sum, the results of Smolak et al. (2000) and Ziegler et al. (1998) dispute common ideas in athletes of dieting being linked to body dissatisfaction. Instead of the 'negative body image explanation', relationships with weight-related causal attributions or coach pressure have been posited as alternative explanations for dieting behavior and disordered eating in athletes.

To get additional support for these proposed alternative explanations, it is important to replicate the 'atypical' findings of Smolak et al. (2000) and Ziegler et al. (1998) in a study that directly compares athletes to non-athletes. Next, evidence needs to be provided for the suggestions that weight-related causal attributions and coach pressure are alternative explanations for athletes' dieting behaviors. Finally, a more detailed distinction between the several elements of the multi-dimensional body image (such as actual, perceived and desired body weight, body size, body shape, and physical body appearance) is essential to gain more insight into the relationship between dieting and body image in the context of aesthetic sport participation.

Therefore, the present study compares female athletes in gymnastics at elite and non-elite levels (from now on referred to as elites and non-elites) to 'average' schoolgirls, participating in merely recreational or low-level competitive non-aesthetic sports (henceforth called controls) on several weight characteristics, dieting behaviors and multiple dimensions of the body image. More specifically, the study focuses on the relationships between dieting and body image. As large differences between gymnasts and controls in Body Mass Index (BMI) can be expected, BMI will be taken as a covariate, since it has been previously found to be related to all variables involved in this study. Nonetheless, it has not always been controlled for in other studies (Ingledeu & Sullivan, 2002). In addition, relevant background characteristics such as education and age were also taken into account as covariates.

First, it was hypothesized that gymnasts, specifically the elites, would demonstrate more symptoms related to disordered eating than the controls. More specifically, we expected a larger desire for weight loss of the gymnasts, particularly the elites. We also expected the gymnasts, particularly the elites, to show more frequent dieting and pathogenic weight control than controls.

Regarding body image, it was expected that gymnasts would be equally satisfied with their body or even have a more positive body image than controls. Nonetheless, it was uncertain whether this would apply to every dimension, i.e., perceived body shape [too thin–too fat], perceived body size [too small–too large], perceived body appearance [ugly–beautiful] and perceived opinion of others about one's body [negative–positive].

With respect to the relationships between dieting and body image, it was hypothesized that, in line with common ideas, the dieting behavior of controls would be related to a more negative body image. More specifically, we expected that frequent dieting would be related to a higher BMI, to a larger desire to lose weight, to a more negative (read: more fat) perceived body shape, as well as to a more negative (read: less beautiful) perceived appearance. The dimension perceived body size seemed to be less relevant for dieting and was put aside.

Furthermore, among controls we expected the weight characteristics and perceived body shape to be negatively correlated with perceived body appearance. This would indicate that the lower their BMI or the thinner their perceived shape, the more controls would perceive their body appearance as beautiful, corresponding with the common idea that 'thin is beautiful'.

Among gymnasts, we expected to find significant relationships between frequent dieting on the one hand and a higher BMI, and a more fat perceived body shape on the other hand, as these results have been found earlier (cf. [Berry & Howe, 2000](#); [Davis, 1992](#)). However, no relationships were expected between dieting and perceived body appearance (ugly–beautiful dimension). Furthermore, if dieting is indeed related to weight and shape, but not to appearance, perhaps weight and shape will not be significantly correlated with appearance either, which would indicate that the idea that 'thin is beautiful' will not apply to gymnasts. Alternatively, for the gymnasts' dieting we expected positive correlations with weight-related causal attributions of success and failure, as well as with the perceived weight-related pressure of the coach, which would indicate that their dieting behavior fits better with the idea that 'thin is going to win'.

Method

Participants

Participants were 153 adolescent girls, in the age between 13 and 20 years: 68 gymnasts and 85 schoolgirls (control group). The control group consisted of 85 schoolgirls of two separate secondary schools of which several classes of different levels and types of education were included.

Gymnasts

The group of gymnasts consisted of 17 elites competing internationally and 51 non-elites competing at the national level of competition. The elites spent 21–34 h on training and competition per week, with an average of 29.1 h (SD = 3.9). The non-elites spent 12.3 h on

average on gymnastics and other sport-activities together ($SD = 3.6$). The mean age of the elites as well as for the non-elites was 14.9 years ($SD = 1.8$ and 1.6 , respectively).

Controls

The mean age of the controls was 15.4 years ($SD = 1.8$), significantly different from the non-elites only, $t(134) = 2.11, p = .036$. The control group included only non-elite sport participants in non-aesthetic sport types, who participated in lower-level competitions or merely recreational. Their average time spent on sport activities was 3.9 h a week ($SD = 2.6$). No significant differences were found in education between the gymnasts and controls, $\chi^2(2, N = 152) = 3.185, ns$.

Measures

The present study was part of a larger study that aimed at gaining more insight into several general and sport-specific risk factors of dieting and weight control among aesthetic athletes. In this paper the focus is on multiple aspects of dieting, eating problem-related beliefs, and body image, while the other risk factors will be presented in a different paper.

As a questionnaire that included every aspect we wanted to study was not available in the Dutch language, (already translated and validated) parts of other questionnaires were used or new parts were constructed in cooperation with associated sport psychologists, and experts from the field of gymnastics. An important consideration in the selection process was limiting the total number of items to limit the time required to fill in the questionnaire as much as possible. The following questions and questionnaires were included in the present study:

Participant weight characteristics

Participants were asked to report their current height (in cm) and weight (in kg). Davis (1990) concluded that self-report is more accurate when the anonymity of the respondents is guaranteed, as we did in the present study. With the self-reported height and weight figures, the BMI was calculated ($BMI = \text{weight in kg}/\text{height in m}^2$). In addition to the actual weight, the girls were asked to report their desired (ideal) weight (in kg). Relative weight discrepancy was computed by subtracting the actual weight from the desired weight, divided by the actual weight, and acted as a measure for desired weight loss (or weight gain).

Dieting behaviors

As athletes often do not meet the exact psychological and psychiatric criteria for clinical eating disorders, behavioral measures of dieting and weight control practices were selected. First, dieting frequency was measured on a 9-point Likert scale, running from never (1) to always (9) (Woertman, 1994). Second, six items of the Bulimia Test-Revised (BULIT-R, Thelen, Farmer, Wonderlich, & Smith, 1991) measured the use of the following pathogenic dieting and eating practices: exercising in order to burn calories, fasting/strict dieting, self-induced vomiting, use of diet pills or diuretics, use of laxatives, and binge eating (see also Petrie & Stoeber, 1993). Validity data among adolescent girls have been extensively documented by Vincent, McCabe and Ricciardelli (1999) who report good reliability and adequate concurrent validity.

Body Image Questionnaire (short version)

The Body Image Questionnaire is a multi-dimensional self-report scale designed to measure actual, perceived, ideal and social components of body image. Items were measured on a 9-point Likert scale of which the score five could be regarded as ‘being satisfied’ according to test instructions (Woertman, 1994). Principal component analysis with Kaiser’s criterion (Eigenvalue over 1) and varimax rotation showed that three body-related items loaded strongly on one component, supporting the use of a separate scale ‘perceived body appearance’ (from negative to positive), replicating the original results of the author in adolescents. Cronbach’s α coefficient of this scale in this sample was .91. Two 9-point Likert items measured the separate social dimension of body image, in other words the perceived opinion (from negative to positive) of other girls and boys about one’s own body. Additionally, two 9-point Likert items measured perceived body shape (from too thin to too fat) and perceived body size (from too small to too large).

Weight-related causal attributions and coach pressure

Exclusively for the gymnasts, weight-related causal attributions of success and failure were measured with four 5-point Likert-scale items, running from totally disagree (1) to totally agree (5). Principal component analysis with Kaiser’s criterion (Eigenvalue over 1) and varimax rotation led to the scale ‘aesthetic-related success attributions’ that had an internal consistency of $\alpha = .88$, consisting of three items measuring the attributed importance of, respectively, one’s weight, body shape and physical appearance to success. The fourth separate item measured to what extent they agreed with their (alleged) overweight causing failure.

In addition, weight-related coach pressure was measured by four 5-point Likert-items, again running from totally disagree (1) to totally agree (5), asking about the gymnasts’ perceptions of the following behaviors of the coach towards the gymnasts in their training group: Making remarks about weight, judging on appearance, urging to diet, and attributing failure to their weight. Principal component analysis with Kaiser’s criterion (Eigenvalue over 1) and varimax rotation led to the scale ‘weight-related coach pressure’, which had a Cronbach’s α coefficient of .79.

Procedure

In collaboration with the Royal Dutch Gymnastics Union (KNGU), 14 of the 15 coaches working with elite gymnasts at the National Olympic Centers or with non-elites in national gymnastics associations agreed to cooperate. Participants were first approached through their teachers or coaches. They were asked to participate in a study on the effect of sports on body image to avoid selective response as much as possible. They were told that participation was voluntary and strictly anonymous; all the girls agreed to participate. In addition, they were requested to get written parental permission to participate and a written consent from the participants was obtained allowing the researchers to use the data for publication. Eighty-five percent of the data was collected in the presence of the researcher (first author) in groups during class or after training. Fifteen percent of the gymnasts received the test at home or filled in the questionnaire in groups in the presence of the coach after he or she had agreed to stick to the test instructions and privacy principles.

Data analysis

As our only interest was to compare gymnasts (elites and non-elites separately) with controls, a priori simple contrast tests were performed or separate χ^2 tests for elites versus controls and non-elites versus controls were conducted. Several χ^2 analyses and one-way analyses of variance (ANOVAs) were conducted to test whether gymnasts differed from the controls on the background variables education and age. If differences were found, these variables should be controlled for to eliminate their possible influence on weight characteristics, dieting behavior and body image. As was stated earlier, non-elites significantly differed from the control group on age. In addition, as expected, significant differences were found on BMI between elites and controls, $t(96) = 2.50$, $p = .014$, as well as between non-elites and controls, $t(130) = 2.19$, $p = .030$. Therefore, age and BMI were taken as covariates.

Average scores, calculated for the 9-point Likert items and scales, were analyzed in univariate analyses of covariance (ANCOVA) to analyze participant weight characteristics, dieting behaviors, and measures of body image, with age and BMI as covariates. Furthermore, χ^2 analyses were conducted to analyze differences in the number of participants using the different types of weight control methods.

Finally, Pearson's correlations were computed to examine the relationships between dieting and body image in order to test the idea that a negative body image is related to the controls' dieting, and not to the dieting of gymnasts. In addition, the alternative explanation that 'thin is going to win' was tested by computing Pearson's correlations between dieting and weight-related attributions and coach pressure for gymnasts only.

Results

Weight characteristics

In Table 1 the weight characteristics (BMI, relative weight discrepancy) of the groups are presented. An ANCOVA on relative weight discrepancy showed a significant effect for covariate BMI, $F(2, 142) = 84.8$, $p < .001$, but not for age ($p = .35$). Furthermore, the contrast analysis on relative weight discrepancy showed that both elites, $t(90) = 2.24$, $p = .027$, and non-elites, $t(124) = 2.15$, $p = .033$, differed from controls. Thus, in addition to their significantly lower BMI, both groups of gymnasts desired to lose more weight than controls.

Table 1
Average weight characteristics (SD in parentheses)

	Elite ($n = 17$)	Nonelite ($n = 51$)	Controls ($n = 85$)
BMI current weight	18.44 (1.47)*	19.08 (2.13)*	20.28 (2.77)
Relative weight discrepancy (% of actual weight)	-4.69 (6.35)*	-4.54 (5.80)*	-4.39 (5.33)

* $p < .05$.

Dieting behavior

As shown in Table 2, the average dieting frequency was the highest for elite gymnasts. An ANCOVA revealed that both BMI, $F(1, 146) = 32.775$, $p < .001$, and age, $F(1, 146) = 6.085$, $p = .015$, had an influence on dieting frequency. The contrast-analyses showed a significant result on dieting frequency for elites only, $t(95) = 2.85$, $p = .005$, while non-elites did not significantly differ from controls, $t(128) = .60$, $p = .548$.

Table 2 also presents the several methods that were used to lose weight. The average number of methods used did not differ significantly among the groups ($p = .209$), but significant effects were found for both covariates BMI ($p = .023$) and age ($p = .009$). When the method 'training' was removed, as exercise with the specific purpose to lose weight should probably be interpreted differently (and perhaps be taken as healthier) for controls than for the more intensively training gymnasts, a significant difference in the average number of pathogenic methods used was found for the elites-controls contrast, $t(130) = 2.32$, $p = .022$. Zooming in on the percentages of girls that have used these methods, 47.1% of the elites used one or more pathogenic methods like fasting, vomiting, use of diet pills, diuretics or laxatives, 25.5% of the non-elites and 32.1% of the controls admitted doing so. χ^2 analyses yielded only a very mild trend that elites have used self-induced vomiting more often (23.5%) than controls (8.3%), $\chi^2(1, N = 101) = 3.364$, $p = .086$. Another trend was found for training, but in the other direction: this method was practiced more by controls (47.1%) than by non-elite gymnasts (31.4%), $\chi^2(1, N = 136) = 3.238$, $p = .072$.

Body image

In Table 3, the average scores on all body image dimensions are shown. Covariate BMI had a significant influence on all variables except perceived size, $F_s(1, 141 \text{ to } 147) > 4.305$, $p_s < .05$, while

Table 2

Dieting frequency, average number of used methods with and without training (SD in parentheses), and different types of dieting methods used (percentages in parentheses)

	Elite ($n = 17$)	Nonelite ($n = 51$)	Controls ($n = 85$)
Dieting frequency	4.81 (2.93)*	3.04 (2.6)	4.01 (2.53)
Number of methods used	1.19 (1.22)	.70 (1.07)	.93 (1.12)
Number of pathogenic methods (without training)	.81 (.98)*	.39 (.76)	.45 (.82)
One or more pathogenic methods ever used	8 (47.1%)	13 (25.5%)	27 (32.1%)
Type of method used:			
Training	6 (35.3%)	16 (31.4%)	40 (47.1%)
Fasting	7 (41.2%)	11 (21.6%)	26 (30.6%)
Vomiting	4 (23.5%)	3 (5.8%)	7 (8.3%)
Diet pills	2 (11.8%)	2 (3.9%)	6 (7.1%)
Laxatives	0 (0%)	3 (5.9%)	1 (1.2%)
Bingeing	7 (41.2%)	18 (35.3%)	34 (40.5%)

* $p < .05$.

Table 3

Body image: Average perceived body shape, body size, body appearance, perceived opinion of boys, and perceived opinion of girls (SD in parentheses)

	Elite ($n = 17$)	Nonelite ($n = 51$)	Controls ($n = 85$)
Perceived body shape	5.75 (1.44)	5.58 (1.37)	6.05 (1.49)
Perceived body size	4.60 (1.35)	4.80 (1.51)	4.83 (1.54)
Perceived body appearance	6.41 (1.14)	6.69 (1.14)*	6.01 (1.44)
Perceived opinion boys	6.31 (1.30)	6.55 (1.65)*	5.88 (1.54)
Perceived opinion other girls	6.56 (1.32)	6.63 (1.38)	6.04 (1.53)

* $p < .05$.

age significantly affected on the perceived opinion of other girls and boys, respectively $F(1, 143) = 5.799$, $p = .017$ and $F(1, 141) = 7.115$, $p = .009$.

Contrast analyses did not reveal significant effects on perceived body shape, nor on perceived body size. However, on the remaining appearance variables several significant results were found for the contrast non-elites versus controls. More specifically, non-elites perceived their body appearance as more beautiful, $t(128) = 2.01$, $p = .046$, and were more positive about the perceived opinions of boys than controls, $t(123) = 2.31$, $p = .022$. In addition, a trend was found that non-elites perceived the opinion of girls more positive as well, $t(125) = 1.84$, $p = .069$. In conclusion, the body image of the elite gymnasts did not differ from that of the controls. Non-elites seemed to be more positive about their body appearance than controls; they perceived their own body appearance, as well as the opinion of boys about their body and to a lesser degree that of girls as more positive.

Correlations between dieting and body image

In Table 4a–c, correlations between dieting frequency and multiple dimensions of the body image are presented for, respectively, the elites (Table 4a), non-elites (Table 4b) and controls (Table 4c). Pearson's correlations were computed for the most relevant body image dimensions, namely for relative weight discrepancy (as measure of desire for weight loss), BMI (as measure of actual body shape), perceived shape and perceived appearance, as well as for the perceived opinion of boys and girls. Among all three groups significant correlations were found between dieting on the one hand and BMI and perceived body shape on the other, as we expected. In general, dieting frequency was higher when gymnasts and controls were actually heavier or perceived themselves as more fat. Additional significant negative correlations with relative weight discrepancy were found, for the controls a strong relationship, $r = -.58$ ($p < .01$), and for the non-elites a moderate relationship, $r = -.39$ ($p < .05$), indicating that they dieted more frequently if the percentage weight they desired to lose was larger.

In addition, we expected that the dieting behavior of controls would be related to a negative body image, whereas in gymnasts it would not. For the controls' dieting, significant negative moderate correlations were found with perceived body appearance, $r = -.43$ ($p < .01$) and perceived opinions of girls, $r = -.38$ ($p < .01$), and a weak negative correlation was found with perceived opinion of boys, $r = -.23$ ($p < .05$). The more negative controls perceived their own

Table 4
Pearson's correlations dieting and body image

	BMI	Perceived shape	Weight discrepancy	Perceived appearance	Opinion boys	Opinion girls	Success attribute	Failure attribute	Coach Pressure
<i>(a) Elite gymnasts</i>									
Dieting	.583*	.583*	-.052	-.407	.279	.151	.214	.145	.806**
BMI		.677**	-.438	-.282	-.103	-.175	.293	-.014	.487
Perceived shape			-.217	-.360	.187	.079	.224	-.205	.616*
Weight discrepancy				.251	.296	.037	-.431	-.085	-.127
Perceived appearance					.394	.451	.315	.318	-.081
Opinion boys						.825**	.415	.049	.465
Opinion girls							.437	-.129	.473
Success attributions								.379	.517*
Failure attributions									.126
<i>(b) Non-elite gymnasts</i>									
Dieting	.441**	.474**	-.386**	-.251	.093	.049	.361*	.486**	.313*
BMI		.405**	-.499**	-.256	.164	.053	.027	.375**	.248
Perceived shape			-.542**	-.272	-.007	.082	.105	.392**	-.036
Weight discrepancy				.148	-.059	-.065	.036	-.317*	-.022
Perceived appearance					.578**	.644**	-.005	-.406**	-.108
Opinion boys						.865**	-.039	-.027	-.304*
Opinion girls							-.044	-.052	-.407**
Success attributions								.291*	.392**
Failure attributions									.288*
<i>(c) Controls</i>									
Dieting		.536**	.560**	-.580**		-.430**		-.232*	-.384**
BMI			.623**	-.685**		-.438**		-.249*	-.358**
Perceived Shape				-.666**		-.567**		-.342**	-.419**
Weight Discrepancy						.460**		.235*	.444**
Perceived Appearance								.699**	.745**
Opinion boys									.794**
Opinion girls									

* $p < .05$.

** $p < .01$.

body appearance or the opinions of others, in particular that of other girls, the more frequently they dieted. On the other hand, the gymnasts' dieting was not significantly related to perceived body appearance, nor to the perceived opinions of girls and boys (see [Tables 4a and b](#)). All negative correlations here were smaller than $r = -.28$, indicating weak strength, except for a moderate correlation between the elites' dieting and perceived appearance $r = -.407$.

Furthermore, among the controls we expected the body weight characteristics (BMI and relative weight discrepancy) and perceived body shape to be significantly correlated to perceived body appearance, in contrast to the gymnasts. Results showed that the perceived body appearance of the controls was moderately related to BMI, $r = -.44$ ($p < .01$), and strongly to perceived body shape, $r = -.57$ ($p < .01$): The lower their actual body weight, or the thinner their perceived shape, the more beautiful controls perceived their body appearance. The moderate positive relationship between perceived appearance and relative weight discrepancy, $r = .46$ ($p < .01$) indicated that controls who wanted to gain weight, perceived their body as more beautiful, while the girls who desired weight loss perceived their body as less beautiful.

For elites and non-elites, correlations between perceived body appearance and BMI, perceived shape, or relative weight discrepancy were not significant and weak, except for a non-significant moderate relationship between perceived shape and appearance in elites, $r = .36$. A strong positive correlation was found between the gymnasts' dieting and perceived weight-related coach pressure for elites, $r = .81$ ($p < .01$) (see [Table 4a](#)), and a moderate positive correlation was found for non-elites, $r = .33$ ($p < .05$) (see [Table 4b](#)). The gymnasts' dieting frequency is higher when the perceived weight-related pressure of their coach is higher. For non-elites, a moderate positive correlation was also found between dieting and weight-related causal attributions of failure, $r = .49$ ($p < .01$), as well as a moderate positive relationship with weight-related causal attributions of success, $r = .36$ ($p < .01$). The stronger their own belief is that failure is caused by (alleged) overweight or that success is related to weight, shape and appearance, the more frequently non-elites dieted.

Discussion

The main purpose of the present study was to investigate the relationships among dieting behaviors and the multidimensional body image in gymnasts and 'average' schoolgirls. We hypothesized that gymnasts, particularly elites, would show more symptoms related to disordered eating. Even though gymnasts showed a significantly lower BMI than the controls, they seemed to desire weight loss at least as much as the controls did. After controlling for BMI, both elites and non-elites showed a significantly larger relative weight discrepancy. Bearing in mind that due to their greater lean-muscle mass athletes are in fact thinner than their BMI indicates ([Davis, 1992](#)), the gymnasts' desire for weight loss should be considered as extra unhealthy. Moreover, elites dieted more frequently than controls, and seemed to have used pathogenic dieting such as self-induced vomiting more often, especially when 'weight-related exercise' which is probably a healthier method to lose weight in controls, was put aside. The differences here were not always significant at the traditional $p < .05$ level, yet this can be expected in such small samples. Some authors who find it more probable that not finding significant differences is due to insufficient power of the statistical tests rather than the reflection of a real absence of differences, therefore

advise to adjust the significance level to .10 or even .15 when working with samples less than 20 participants (Pallant, 2001). In addition, χ^2 analyses do not allow controlling for variables such as BMI. As the gymnasts' BMI is smaller, less weight control should be the result. If the influence of BMI could have been taken into account, we would have likely found larger differences, as was seen before with relative weight discrepancy. Most important, as the overall pattern of results was consistent, our findings seem to be in agreement with those of other studies showing that aesthetic athletes, especially at the elite level, are more at risk for disordered eating and pathogenic dieting behaviors (see Smolak et al., 2000; Sundgot-Borgen, 1993, 1994a; Sundgot-Borgen & Torstveit, 2004).

Regarding body image, we assumed that gymnasts would have an equal or slightly more positive body image. Elites had higher scores than controls on all body image dimensions but none of the differences reached the significance level; therefore the conclusion seems justified that their body image is at the least equal to that of the controls. Non-elites appeared to be significantly more positive about their perceived appearance as well as about the perceived opinions of other girls and boys. Overall, these findings are in accordance with the meta-analysis of Hausenblas and Symons Downs (2001), revealing a more positive body image in athletes, narrowing it down to the dimension 'body appearance'.

Putting these results together, elites reported more actual dieting and weight control, in spite of the fact that they were not more dissatisfied with their body. These results are consistent with the findings of Smolak et al. (2000) and Ziegler et al. (1998), who disputed that disordered eating and frequent dieting in athletes are linked to body image dissatisfaction. The finding that both elite and non-elite gymnasts reported a larger relative weight discrepancy than controls without being more dissatisfied with their body could also be taken as support for Sands' (2000) conclusion that a drive for thinness is perhaps not as closely related to the concept of body image as is often assumed.

In the present study we distinguished multiple body image components and found that dieting behavior of gymnasts was related differently to their body image than the dieting of the controls. Among gymnasts dieting was notably related to actual (BMI) and perceived body shape. Among controls, additional significant relationships of medium strength were found between dieting and perceived body appearance as well as with the perceived opinion of other girls. Moreover, among controls the dimensions weight and shape were strongly correlated with appearance: The lower their BMI and thinner their perceived shape, the more positive and beautiful controls perceived their body, leading to the conclusion that the average schoolgirl seems to believe that 'thin is beautiful'. The corresponding correlations were not significant and weaker for the gymnasts, suggesting that this 'thin is beautiful' explanation may be less applicable to them.

Yet, it should be noted here that Pearson's correlations in small samples are generally less reliable, and that the absence of significant results again could be due to insufficient power of the statistical tests. When the focus is directed at the amount of shared variance (Pallant, 2001), it becomes apparent that 16.6% of the elites' dieting seems to be explained by perceived appearance compared to 18.5% of the controls' dieting. However, no less than 64% of the variance of the elites' dieting was explained by weight-related coach pressure. Also in non-elites, sport-specific variables such as causal attributions for failure (24%) and success (13%), as well as coach pressure (10%) seemed to explain more variance of their dieting behavior than perceived appearance (6%).

It would be good to confirm these relationships in future studies with larger samples and for instance with other athletes such as males or sport participants in other sports. In addition, the influence of other sport-specific factors, such as motivational climate, goal perspective, perceived competence and body image in and outside the sport arena should be investigated.

With respect to the current study, perhaps gymnasts realize they look good and thin enough in daily life, but believe they need a thinner body for their sport to enhance their physical ability. This idea would fit the multidimensional approach that considers physical appearance and physical ability as separate constructs (Marsh, 2001), and refers to the notion of transient body satisfaction ‘on and off the pitch’ (Russell, 2004). Indeed, significant correlations were found between the gymnasts’ dieting and weight-related causal attributions of success and failure and perceived weight-related coach pressure. The stronger their own belief or that of their coach that failure is caused by their (alleged) overweight, the more frequently gymnasts diet. It seems that gymnasts are rather convinced or persuaded that ‘thin is going to win’.

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