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Achievement goal theory and disordered eating: Relationships of disordered eating with goal orientations and motivational climate in female gymnasts and dancers

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ABSTRACT

Objectives: To examine the relationships between disordered eating in female gymnasts and dancers and their perspective towards achievement in sport and dance, respectively. With an emphasis on outperforming others (ego involvement), more disordered eating was expected than when personal progress (task involvement) was emphasized.

Methods: Ninety-four aesthetic performers from gymnastics ($n = 59$) and dance ($n = 35$) completed questionnaires measuring ego and task involvement (individual orientation and motivational climate), dieting, self-esteem, perfectionism and weight-related peer and coach pressure.

Results: Partial correlations indicated that a stronger ego orientation was related to more dieting, greater perfectionism, more weight-related peer pressure, and lower self-esteem. Similar relationships were found for performance climate. Mastery climate on the other hand was negatively related to dieting, and coach and peer pressure, suggesting that when performers perceived the motivational climate as mastery, less frequent dieting was reported and less weight-related coach and peer pressure was perceived. No relationships were found between task orientation and disordered eating. Most importantly, regression analysis showed that after controlling for BMI, both ego orientation and mastery climate made a unique significant contribution to explaining dieting variance.

Conclusions: Goal achievement theory is an important framework for explaining disordered eating in female aesthetic performers. Both ego orientation and mastery climate play a role in dieting of gymnasts and dancers. Aesthetic performers who are strongly ego-oriented tend to display more disordered eating correlates. Furthermore, it seems that to protect against disordered eating, coaches and teachers should create a mastery climate and target self-improvement and self-referenced comparisons over interpersonal competitiveness.

Female gymnasts and dancers are known as high-risk groups for the development of disordered eating patterns (Anshel, 2004; Hausenblas & Carron, 1999; Ringham et al., 2006; Smolak, Murnen, & Ruble, 2000; Sundgot-Borgen & Torstveit, 2004). Elevated rates of disordered eating are often found in these "aesthetic performers" who have in common that they participate in a weight-related subculture, where a certain (low) weight and shape are often overemphasised (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004). Disordered eating (DE) is described by the American College of Sports Medicine as: 'A wide spectrum of harmful and often ineffective eating behaviours used in attempts to lose weight or achieve a lean appearance. The spectrum of behaviours ranges in severity from restricting food intake to bingeing and purging…' (Otis, Drinkwater, Johnson, Loucks, & Wilmore, 1997, p. i; see also Nattiv et al., 2007). DE typically involves a wilful attempt to create a negative energy balance. In sports and dance, part of this attempt is based on the premise that a thinner/leaner body and appearance can enhance performance or render better judgments and scores (Sherman & Thompson, 2006a). Thus, disordered eating is at least partly related to the drive to perform well (De Bruin, Oudejans, & Bakker, 2007; Sangenis et al., 2005).

Although it may seem obvious what it means to perform well in sports, it turns out that the athletes' definitions of success can be very different (Roberts, 2001, 2006). Some see successful performance mainly in terms of winning and outperforming other competitors while for others success depends on their individual achievement such as setting a personal record (irrespective of the

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performance of other competitors). These different perspectives on success are identified in achievement goal theory (Nicholls, 1984, 1989), which has been a central framework within sport psychology over the past 20 years (Roberts, 2006). Given the apparent link in sport and dance between disordered eating and the performers' motivation for achievement, it may be fruitful to investigate the possible role of achievement goals in disordered eating, as more insight into this role can make prevention and counselling programs for athletes and dancers more effective.

Achievement goal theory (Nicholls, 1984, 1989), originally formulated for the educational context, was successfully adopted as a major theoretical framework in sport and exercise settings over the past decades (Duda & Nicholls, 1992; Duda & Whitehead, 1998). An assumption of achievement goal theory is that in achievement settings a major motivational drive is to demonstrate competence or ability. However, individuals differ in their perception of when this goal is achieved (Chi, 2004; Roberts, 2001). More specifically, achievement goal theory distinguishes between two different perspectives, also referred to as goal orientations, namely ego orientation and task orientation. With an ego orientation, the goal of action is to demonstrate ability relative to the ability of others. In this case, the definition of subjective success is other-referenced, that is, a highly ego-oriented individual feels competent when he or she has outperformed others. A task-oriented individual on the other hand sets self-referenced goals emphasizing learning, self-improvement and mastery of a particular skill. In this case, the individual feels competent when he or she has made personal progress (Duda, 1993; Roberts, 2006). Goal orientations are generally considered to be orthogonal, which implies that combinations of ego and task orientations exist at the same time, each being high or low (Roberts, 2001).

In addition to these more dispositional goal orientations towards success, achievement goal theory also distinguishes amongst situational influences on the perception of success. The achievement environment of the individual, within achievement goal theory labelled as motivational climate, can also be more ego-oriented or more task-oriented. When the motivational climate is more ego-oriented, also referred to as a "performance climate",[1] coaches, training staff, parents and/or teammates place their emphasis upon social comparison and outcome, and encourage athletes to exhibit competitive behaviours and beliefs (Ames, 1992; Duda, 1993). A task-oriented climate or "mastery climate" promotes learning and personal development, allows making mistakes as an essential part of learning, and stimulates peer interaction and cooperation (Ames, 1992; Duda, 1993). Whether the climate is performance or mastery affects the degree to which someone exhibits an ego or task-involved achievement pattern (Duda, 1993).

Ego involvement, whether due to individual orientation, the motivational climate or both, has been linked to several maladaptive behaviours (Duda, 1993; Roberts, 2001, 2006). Ego-involved athletes show, for example, less commitment to practice, they are less likely to maintain self-confidence, experience less enjoyment and satisfaction, and report more competitive anxiety when having low perceived ability (Chi, 2004; Roberts, 2001; Ryska, 2001; Van Yperen & Duda, 1999; Walling, Duda, & Chi, 1993). Moreover, ego involvement has induced both health-related and ethical concerns. For instance, ego-involved athletes seem to exhibit low levels of moral functioning (Kavussanu & Ntoumanis, 2003) as they believe that unfair play and potentially harmful tactics contribute highly to success (Duda, 1993, 2001). Preliminary evidence also showed relationships between ego orientation and unacceptable achievement strategies involving aggression (Roberts, 2001). The above findings suggest that athletes high in ego orientation may adopt the view that "winning at all costs" is justified (Roberts, 2001). If this is true, one would expect that ego involvement is also more closely related to other harmful behaviours such as using drugs, and several weight control and dieting behaviours (Chi, 2004; Duda, 2001). The results of Duda and her colleagues in several not fully published papers provided a first indication that a performance motivational climate could have a negative influence on female gymnasts' body image, weight concerns and other disordered eating correlates such as low self-esteem (Duda, 1999, 2001; Duda & Benardot, 1997 in Hausenblas & Carron, 2001; Duda & Kim, 1997).

Task involvement, on the other hand, establishes the basis for maximal motivation and adaptive behaviours (Duda, 1993; Roberts, 2001, 2006). Positive relationships have been found for task orientation with intrinsic motivation, perseverance and satisfaction, and a negative relationship has been found with certain task-avoidant behaviours (Roberts, 2001). Task orientation was also found to correspond with high levels of moral functioning (Kavussanu & Ntoumanis, 2003; Sage, Kavussanu, & Duda, 2006). As for mastery climate, negative relationships were found with phenomena such as self-handicapping (Kuczka & Treasure, 2005). In addition, some support was found for a task-involving climate positively predicting respect for the sports game (Gano-Overway, Guivernau, Magyar, Waldron, & Ewing, 2005). Moreover, Duda and her colleagues also reported that a mastery climate seemed to have a protective influence on physical and psychological correlates of disordered eating in female gymnasts (Duda, 1999; Duda & Benardot, 1997 in Hausenblas & Carron, 2001; Duda & Kim, 1997).

The present study focused on the relationships between goal orientations and perceived motivational climate and several correlates of disordered eating (DE) in female gymnasts and dancers. More specifically, dieting frequency, use of weight control methods, self-esteem, perfectionism and weight-related environmental pressures by coaches/teachers and weight-related peer pressure were chosen as DE correlates. The association between dieting and eating disorders is probably one of the most quoted in theories on how eating disorders are developed, indicating that frequent dieting and using weight control methods have often been considered to be important precursors of eating disorders (Jacobi et al., 2004; Thompson & Sherman, 1999). According to the "continuum hypothesis", dieting may lead to disordered eating which, in turn, may lead to a subclinical or clinical eating disorder (Beals & Manore, 1994; Fries, 1974). Other well-known risk correlates of disordered eating are low self-esteem and high perfectionism, in the general population as well as in athletes and dancers[2] (Anshel, 2004; Engel et al., 2003; Jacobi et al., 2004; Lindeman, 1994; Nordin, Harris, & Cumming, 2003). In addition, weight-related environmental pressures by coaches and peers were also found to be important contributors to DE in both athletes and dancers (Berry & Howe, 2000; De Bruin et al., 2007; Engel et al., 2003; Hausenblas & Carron, 2001; Thomas, Keel, & Heatherton, 2005).

We hypothesized that high ego involvement in female aesthetic performers would be positively related to disordered eating, meaning that the higher their ego involvement (i.e., ego orientation, performance climate) the more disordered eating they would display. More specifically, we expected positive relationships with dieting, weight control, perfectionism, weight-related coach and peer pressure, along with a negative relationship with self-esteem.

[1] Different terms are used in the literature. For instance, an ego-oriented motivational climate is also referred to as competitive climate or performance climate. A task-oriented climate is also known as a learning climate or mastery climate (Roberts, 2001).

[2] The present study was part of a larger one. Relationships between gymnasts' and non-gymnasts' dieting and risk correlate body image have been reported elsewhere (De Bruin et al., 2007).

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Secondly, negative relationships between task involvement and disordered eating were expected; that is, high task involvement was expected to correlate with less disordered eating. We hypothesized that there would be negative relationships with dieting, weight control, perfectionism, weight-related coach and peer pressure, and a positive relationship with self-esteem.

Method

Participants and procedure

In collaboration with the Royal Dutch Gymnastics Union (KNGU), all 15 coaches working with highly competitive female gymnasts at the National Olympic Centres or in national gymnastics associations were approached and 14 coaches agreed to cooperate. In addition, we contacted the coordinator of a high level Dance Academy who provided access to all female dance students. Participants were asked by their coach or teacher to participate in a study on the effect of physical activity on body image to avoid selective response as much as possible. They were told that participation was voluntary and strictly anonymous; all 94 gymnasts and dancers agreed to participate. The girls who were under 18 were requested to hand in a written parental permission allowing participation. In addition, a written informed consent was obtained from the participants. The data collection was scheduled around training or classes and occurred in groups in the presence of the researcher (first author); 76 of the 94 questionnaires (81%) could be collected this way. The remaining 18 participants, for whom the administration could not be arranged in group sessions, received the questionnaire by mail ($n = 10$), in person from the researcher ($n = 1$), or from the coach ($n = 7$) after he/she had agreed to stick to the ethical principals and research instructions of the present study.[3] It took the participants approximately 30–40 min to fill in the questionnaire. The research design was reviewed and approved by the Ethics Committee of the Faculty of Human Movement Sciences at the VU University Amsterdam.

In this study, only high level aesthetic performers who did not participate in additional competitive sport activities were included to rule out the possible influence of other motivational climates, as well as other coaches and peers. The present sample ($n = 94$) consisted of 59 female artistic gymnasts and 35 female modern dancers. The mean age of these aesthetic performers was 15.1 years (SD = 1.4) and their body mass index (BMI) varied between 14.61 and 23.67 with an average of 18.52 (SD = 1.86). No significant differences were found between gymnasts and dancers on age or BMI (see Table 1). On average, the participants spent 16.7 h (SD = 6.7) on gymnastics or dance per week. More specifically, the gymnasts spent 18.1 h (SD = 7.8) on training and competition, which was significantly more than the 14.4 h (SD = 3.28) that the dancers spent weekly on dance classes and performances, $F(1,92) = 7.196$, $p < .05$.

Measures

The following questionnaires were included in this study.

[3] Just before the actual data collection, the voluntary and anonymous character of the study was repeated, both orally and in writing, and it was explained to the participants that they could quit at any time without any consequences. Participants were asked to complete the entire questionnaire and to answer candidly and privately. They were informed that the added prepaid envelope could be used for returning the test and informed consent form(s), by handing it over to the researcher or by sending it back by mail. In addition, it was explained that the questionnaire would be separated from the consent form(s) on arrival to maintain the participants' anonymity.

Table 1
Average scores on background, achievement and disordered eating variables (SD in parentheses)

	Gymnasts ($n = 59$)	Dancers ($n = 35$)	Total ($n = 94$)
Age	14.88 (1.61)	15.46 (.82)	15.10 (1.39)
BMI	18.79 (1.85)	18.07 (1.82)	18.52 (1.86)
Dieting frequency	3.47 (2.68)	3.26 (2.45)	3.39 (2.59)
Weight control index	.80 (1.14)	.83 (1.15)	.81 (1.14)
Self-esteem	38.46 (5.81)	33.66 (8.17)*	36.67 (7.14)
Perfectionism	13.21 (4.64)	16.31 (5.14)*	14.41 (5.04)
Peer pressure	9.45 (3.58)	10.47 (3.8)	9.83 (3.68)
Coach/teacher pressure	9.26 (3.54)	7.79 (3.18)	9.72 (3.64)
Ego orientation	3.49 (1.04)[a]	3.65 (.66)[a]	3.55 (.92)[a]
Task orientation	4.03 (.59)[a]	4.13 (.61)[a]	4.07 (.60)[a]
Performance climate**	2.53 (.53)	2.80 (.57)*	2.63 (.56)
Mastery climate	3.86 (.40)	3.88 (.40)	3.87 (.39)

*Differences between dancers and gymnasts were tested at the significance level of $p < .05$.
**Bonferroni correction to $p < .00833$, $p < .0125$ resulted in significant differences in self-esteem ($p = .001$) and perfectionism ($p = .004$), but not in performance climate ($p = .025$).
[a] The TEOSQ does not have official norm scores. For comparison, consider the TEOSQ scores (mean, SD) of other female samples, such as soccer players ($n = 212$, ego = 2.50 (.96), task = 4.12 (.64); Stephens & Bredemeier, 1996); and middle-distance runners ($n = 80$, ego 3.0 (1.1), task = 4.4 (.5); Hall, Kerr, Kozub, & Finnie, 2007). The present sample seems comparable to these groups on task orientation, but higher on ego orientation.

Task and ego orientation in sport questionnaire

Individual differences in the emphasis placed on task and ego goal perspectives in sport were measured with the task and ego orientation in sport questionnaire (TEOSQ) (Duda & Nicholls, 1992). The TEOSQ is the only questionnaire measuring ego and task orientation that was already translated into Dutch and validated (Van Yperen & Duda, 1999). The questionnaire measures how individuals typically define success in sport with respect to normative (six items on ego orientation) and self-referenced criteria (seven items on task orientation). For 11 out of 13 items the exact same translations as in the original Dutch translation were used. For one item, the word "teammates" was replaced by "others", and for another, we chose to translate the original item "I score the most points" by Duda and Nicholls (1992) instead of the reworded item "I contribute most to the victory" of Van Yperen and Duda (1999) to be pertinent to gymnasts and dancers. In the present study, the TEOSQ begins with the words "I feel most successful in gymnastics/dance when" Examples of task-oriented items of the TEOSQ included "I work really hard" and "I do my very best". The ego-oriented scale for example contains such items as "The others can't do as well as me" and "I am the best". Responses on each item were recorded on a 5-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5). Mean scale scores were calculated for each of the two presumed orthogonal subscales and ranged from 1 (low) to 5 (high). The internal consistency of the TEOSQ is generally strong (Duda & Whitehead, 1998); in this study the ego scale had $\alpha = .91$ and the task scale had $\alpha = .83$.

Perceived motivational climate in sport questionnaire

To measure athletes' perceptions of the degree to which their coaches created mastery and/or performance climates the perceived motivational climate in sport questionnaire (PMCSQ) was used (Seifriz, Duda, & Chi, 1992). Acceptable construct and predictive validity have been reported for the PMCSQ (Walling et al., 1993). In the present study we used the Dutch translation of the 40 PMCSQ items (Vergers, 2001). The original translation from English to Dutch was done by three native Dutch speakers with expertise from the field of sport psychology and goal achievement theory. After this original translation, several unpublished studies were executed in various samples to establish validity and reliability of the Dutch PCMSQ, and the items were adjusted until a satisfactory

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version was developed (Vergers, 2001). For the present study, adjustments were made to the wording of the 20 mastery climate items and 20 performance climate items in cooperation with a sport psychologist, gymnastic trainer and dance teacher so that the measures showed face validity for gymnastics and dance. When filling out the PMCSQ gymnasts responded to the stem "in this training gym…" while dancers responded to "in this dance class…" by rating each item on a 5-point Likert-scale ranging from strongly disagree (1) to strongly agree (5). The mastery climate scale included items such as "gymnasts/dancers try to learn new skills" and "trying hard is rewarded". Examples of performance climate items for dancers were "only the best dancers get noticed" and "dancers are punished for mistakes". Reliability analyses in previous research showed good internal consistency for both scales (Seifriz et al., 1992; Walling et al., 1993). For the Dutch version, Cronbach's alphas were found ranging from .69 to .88 (Vergers, 2001). Internal consistency in the present study was $\alpha = .80$ for the mastery climate scale and $\alpha = .83$ for the performance climate scale. Mean scale scores were calculated for each of the two subscales ranging from 1 (low) to 5 (high).

Dieting behaviours and weight characteristics

Dieting and weight control frequency, from now on abbreviated with dieting frequency, was measured on a 9-point-scale running from 1 (never) to 9 (always) (Woertman, 1994) with the following item: "Are you trying to lose weight?" (Wardle, Haase, & Steptoe, 2006; Woertman, 1994). Based on Petrie and Stoever (1993), five items of the Bulimia Test-Revised (BULIT-R; Thelen, Farmer, Wonderlich, & Smith, 1991) were selected to measure the use of the following weight control practices: exercising in order to burn calories, fasting/strict diets, self-induced vomiting, use of diuretics/diet pills, and use of laxatives/suppositories. Participants were asked if they had ever used the particular weight control method, and if so, how often in the last three months. Good reliability and adequate concurrent validity have been reported for the BULIT-R among adolescent girls (Vincent, McCabe, & Ricciardelli, 1999). Comparable to Engel et al. (2003) who investigated disordered eating in collegiate athletes, we constructed a pathogenic weight control index score. This score was computed by adding up the number of weight control methods used in the last three months, varying from zero to five (De Bruin et al., 2007). The internal consistency of the weight control index in the present study was $\alpha = .65$.

Participants were also asked to report their current height (in cm) and weight (in kg). With the self-reported height and weight figures, the body mass index was calculated (BMI = weight in kg/height in m^2).

Rosenberg self-esteem scale

Self-esteem was measured with the Dutch translation by Van Son (Woertman, 1994) of the Rosenberg self-esteem scale (SES; Rosenberg, 1989). Ten items measured self-acceptance and self-worth, and are rated on a 5-point Likert-scale ranging from strongly disagree (1) to strongly agree (5). Studies have demonstrated both a one-dimensional and a two-factor (self-confidence and self-deprecation) scale structure (Rosenberg, 1989). Scoring procedures are generally executed by adding up all 10 items. This was followed in the present study with scores ranging from 10 to 50. A higher score means higher self-esteem. The scale generally has high reliability: test–retest correlations are in the range of .82–.88, and internal consistency for various samples is ranging from .77 to .88 (Blascovich & Tomaka, 1993). In the present study $\alpha = .89$.

Eating Disorder Inventory-2 (EDI-2) – subscale perfectionism

The official Dutch translation by Van Strien of the perfectionism subscale of the Eating Disorder Inventory-2 (EDI-2; Garner, 1991) was used to measure perfectionism (Schoemaker, van Strien, & van der Staak, 1994) as one of our disordered eating correlates. The items were rated on a 5-point scale ranging from strongly disagree (1) to strongly agree (5) to be in line with the other 5-point Likert-scale items. A higher score indicates higher perfectionism. The questionnaire has been used in various populations and has good internal consistency and test–retest reliability (Castro-Fornieles et al., 2007). In the present study, for the perfectionism subscale we found $\alpha = .79$.

Weight-related coach and peer pressure

Based on studies of Berry and Howe (2000) and Hausenblas and Carron (2001), the scale "weight-related peer pressure" was constructed. "Peer pressure" consisted of the following five items: "girls talk regularly about dieting", "girls judge each other on appearance", "girls take over each others bad eating habits", "girls are pestered about being unattractive or being fat", "team/classmates use unhealthy weight control methods". In addition to the scale peer pressure, the scale "weight-related coach pressure" was used (De Bruin et al., 2007). The coach pressure scale consists of four items, for example "coaches are urging girls to diet", and "coaches attribute failure to girls' weight". The 5-point Likert-items were constructed around the stem "in this training gym" and were running from totally disagree (1) to totally agree (5). For dancers, the stem was changed into "in this dance class…" and the word coach was replaced with "teacher". A higher score indicates more perceived weight-related pressure. In previous research in elite and non-elite female gymnasts, internal consistency of the scale weight-related coach pressure was .79 (De Bruin et al., 2007). In this study, for both scales "coach pressure" and "peer pressure" we found an internal consistency of $\alpha = .78$. A very strong relationship exists between coach and peer pressure, $r = .79$, $p < .01$.

Data analysis

Exploring the data and assessing normality revealed that the assumption of normality was violated for the variables dieting frequency, weight control, peer pressure and ego orientation. Whereas dieting frequency, weight control and peer pressure were positively skewed because most of the respondents reported low scores on the scale, ego orientation was negatively skewed with most scores at the high end. Subsequently, both parametric and non-parametric statistical analyses were performed to assure that the violation of normality did not lead to different results. According to Stevens (1996) with large enough samples (e.g., 30+) the violation of normality should not cause any major problems (Pallant, 2005). Indeed, the parametric and non-parametric analyses showed similar significant results and correlational strengths in the present study. Subsequently, we decided it was sound to present the results of parametric tests on the original untransformed variables for reasons of clarity, except for the regression analysis for which we used and presented transformed variables (see below).

To compare the female gymnasts and dancers on several background characteristics as well as on the achievement motivation variables and disordered eating correlates, several Mann–Whitney *U* tests and ANOVAs were performed. ANOVA results with Bonferroni adjustments are reported.

Correlation analysis was used to determine the relationships of the achievement variables and the selected disordered eating correlates. As the development of DE seems to be related to athletes' actual body composition (Berry & Howe, 2000; De Bruin et al., 2007), it is important to control for body characteristics. In addition to Pearson's correlations and Spearman's rank order correlations, we therefore computed partial correlations with body mass index (BMI) as a covariate. In determining the strength of the

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relationships, we followed Cohen (1988), who referred to medium strength when $r > .29$ and large strength when $r > .49$.

To explain which variables contributed most to the variance of dieting frequency, a hierarchical multiple regression analysis was executed. Tabachnick and Fidell (2007) give a formula for calculating sample size requirements taking into account the number of independent variables, $N > 50 + 8 \times m$ (where $m =$ number of independent variables). We statistically controlled for body mass index in step 1 whereas the four achievement motivation variables were included in step 2, leading to a required sample size of 90 cases. As the assumption of normality was violated for dieting frequency and ego orientation, the appropriate modification of these variables was executed according to the suggested transformation formulas by Tabachnick and Fidell (2007); more specifically, the "logarithm" transformation was used for dieting frequency and the "reflect and square root" transformation for ego orientation, both resulting in less skewed distributions. Before conducting the regression, other assumptions such as multicollinearity were also examined; no such problems with the data were found. Unlike the other statistical analyses, the regression analysis of the original untransformed variables differed from the analysis of the transformed variables. Therefore, the latter is reported (see Table 3).

Results

The average scores on the achievement variables and disordered eating of the entire sample of aesthetic performers, as well as of the gymnasts and dancers separately are presented in Table 1. Regarding the disordered eating correlates, no significant differences were found on dieting frequency, weight control, and coach and peer pressure, which suggests that female gymnasts and dancers exhibited similar dieting behaviours and experienced equal weight-related pressures from peers and their coaches or teachers. However, significant differences were found for self-esteem, $F(1,92) = 11.01$, $p < .05$, and perfectionism, $F(1,89) = 8.86$, $p < .05$. Dancers ($M = 33.66$, SD = 8.17) showed lower self-esteem than gymnasts ($M = 38.46$, SD = 5.81) and reported greater perfectionism (dancers: $M = 16.31$, SD = 5.14; gymnasts: $M = 13.21$, SD = 4.64).

Regarding the achievement variables, we found that the average scores for task orientation were higher than for ego orientation, indicating that the aesthetic performers perceived themselves as more task-oriented than ego-oriented. In addition, the motivational climate is also perceived more mastery-oriented than performance-oriented. In this respect, dancers scored higher on performance climate than gymnasts, $F(1,84) = 5.24$, $p < .05$, but when a Bonferroni adjustment was applied ($\alpha = .0125$), this result was not considered significant ($p = .025$). Furthermore, no significant differences were found between gymnasts and dancers, neither on mastery climate and ego and task orientation (see Table 1), nor on the high–low classifications of ego and task orientations combined.[4]

Pearson's correlations between the achievement variables were computed, resulting in moderate correlations in the entire sample between ego orientation and performance climate, $r = .46$, $p < .01$, between task orientation and mastery climate, $r = .35$, $p < .01$, and between ego and task orientation, $r = .36$, $p < .01$. The relationship between performance and mastery climate was weak and negative, $r = -.21$, $p =$ ns. In addition, partial correlations with covariate BMI were computed to explore the relationships between the achievement variables and disordered eating correlates.[5] As can be seen from Table 2, ego orientation was significantly and positively correlated with dieting frequency, weight control, perfectionism, and peer pressure. These relationships were in the expected directions and mainly of medium strength. For task orientation, only non-significant relationships were found. With respect to performance climate, significant relationships were found with all disordered eating variables, again in the expected directions. More specifically, strong relationships were found with coach pressure and peer pressure, in addition to moderate relationships with perfectionism and self-esteem, and weak relationships with dieting and weight control. For mastery climate, significant and negative relationships were found with dieting frequency, coach pressure and peer pressure, as we expected. In other words, when the motivational climate was perceived as mastery-oriented, less frequent dieting was reported and less weight-related peer and coach pressure was perceived. A positive relationship was found with self-esteem, indicating that performers in a mastery climate report higher levels of self-esteem.

The results of the hierarchical regression analysis of achievement motivation as a predictor of dieting frequency are presented in Table 3. Together, the four achievement motivation variables explained an additional 12% of the variance in dieting frequency, when the effect of body mass index was statistically controlled for, $F(5,75) = 6.48$, $p < .001$. Three variables made a statistically significant contribution, that is BMI (beta = .39), ego orientation (beta = −.24) and mastery climate (beta = −.24), uniquely explaining 15%, 4% and 5% of dieting frequency, respectively.

Discussion

As disordered eating among female athletes and dancers seems at least partly motivated by their drive for performance enhancement, we studied the links between disordered eating and achievement goals, a performance-related key concept. The present study showed that both ego orientation and performance climate were related to more frequent dieting, using more pathogenic weight control methods, greater perfectionism and perceiving more weight-related peer pressure. For performance climate, additional relationships were found with more coach pressure and lower self-esteem. Yet, it turned out that ego orientation and not performance climate appeared to significantly contribute to explaining the variance of dieting frequency. The present study, therefore, confirms that having a high ego orientation means that a female aesthetic performer is significantly more likely to report indices of disordered eating.

These results establish the suggestions and findings about relationships between ego orientation, performance climate and eating disorders symptomatology by Duda and colleagues (Chi, 2004; Duda, 1999, 2001; Duda & Kim, 1997; Roberts, 2001). The present study also gives empirical support to Powers' statement (1999) that performance-centred coaching has a negative implication for eating disorders.

[4] Participants' ego and task orientation were classified as high/low ($m \pm ½$ SD). For example, 27 participants were categorized as highly ego oriented, 30 as low ego oriented, while the remaining 37 scored in between, $m - ½\ SD < x < m + ½$ SD. No significant differences were found between gymnasts and dancers on these classifications, χ^2s(1, $N = 57, 59$) < .31, $ps =$ ns. Only three participants were classified as high ego/low task, making it impossible to pursue comparisons of high ego/high task and high ego/low task on disordered eating to explore the possible protective influence of a high task orientation. When comparing high versus low ego and task orientations separately, significant differences were found for ego orientation, $Fs(1,52–55) > 8.16$, $ps < .01$, showing more dieting and weight control, greater perfectionism and more peer pressure when highly ego-oriented, but not for task orientation, $Fs(1,55–57) < 2.67$, $ps =$ ns.

[5] In comparing the Pearson's and partial correlations, only small differences were found in the correlation strengths.

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Table 2
Partial correlations between achievement variables and disordered eating

Control variables		Dieting	Weight control	Self-esteem	Perfectionism	Weight-related coach pressure	Weight-related peer pressure
BMI	Ego orientation	.33*	.28*	−.11	.42**	.21	.33*
	Task orientation	.18	.17	−.06	.22	.10	.12
	Performance climate	.25*	.26*	−.37*	.37*	.54**	.63**
	Mastery climate	−.24*	−.13	.29*	−.23	−.26*	−.44**

Note. *$p < .05$; **$p < .01$.

According to Roberts (2001), the detrimental effects of ego involvement are related to the fact that ego-oriented athletes adopt the "win at all costs" philosophy and embrace the idea that the end of winning justifies all means. Strongly ego-oriented athletes not only believe that illegal advantage and harmful tactics contribute highly to success, but they also seem to act accordingly (Roberts, 2001). The present study adds disordered eating to these harmful behaviours.

The links between ego involvement and disordered eating can also be related to competitiveness and other-referenced comparisons that are inherent to ego involvement. Because highly ego-involved performers want to outperform others, they repeatedly compare themselves with opponents and teammates, as a result of which comparing and competing in terms of thinness is more likely to occur as well. "Competitive thinness" is an important risk factor for the development of disordered eating in athletes (Sangenis et al., 2005). If an athlete notices that someone who has defeated her looks thinner or leaner, she can become motivated to start dieting for performance enhancement or to copy pathogenic weight control behaviour even when that same person is exhibiting disordered eating patterns. Some athletes have suggested that their difficulties with eating occurred when coaches compared their bodies and performances to those of their teammates (Sherman & Thompson, 2006b). It is likely that such phenomena are more common in ego-oriented gymnasts and dancers and when performing in performance-oriented motivational climates.

In addition, the present study also shows that a mastery climate is negatively related to disordered eating. We found that mastery climate uniquely explained some of the variance of dieting frequency. Furthermore, partial correlations indicated that gymnasts and dancers reported less frequent dieting, they perceived less weight-related peer and coach pressure and experienced more self-esteem when they perceived the motivational climate as mastery. All relationships between mastery climate and the disordered eating correlates were in the expected "protective" directions. In sum, our results confirm the statements and results of Duda that a mastery climate seemed to have a protective influence on disordered eating in female gymnasts (Duda, 1999; Duda & Kim, 1997). Our results also confirm Powers' suggestion (1999) that person-centred (read: mastery) coaching could act as a protective factor for eating disorders.

Table 3
Summary of hierarchical regression analysis for predicting dieting frequency

Variable	*B*	SE *B*	*β*	Sig.	R^2	ΔR^2	SP^2 [a]
Step 1				.00*	.19	.19	
Body mass index	.08	.71	.39	.00*			.15
Step 2				.02*	.30	.12	
Ego orientation	−.30	.14	−.24	.04*			.04
Task orientation	.05	.07	.08	.47			.00
Performance climate	.01	.07	.02	.89			.00
Mastery climate	−.23	.10	−.24	.03*			.05

Note. This regression analysis is conducted with transformed variables for dieting frequency and ego orientation. Therefore, the interpretation of ego orientation differs from the original scale, with lower scores indicating higher ego orientation and higher scores implying lower ego orientation. Subsequently, the minus sign for ego orientation indicates a relationship with dieting in the opposite direction of that of dieting with mastery climate. Analysis of the untransformed variables also led to significant contributions of BMI (beta = .38, $SP^2 = .14$) and ego orientation (beta = .25, $SP^2 = .05$) ($ps < .05$), in addition to a trend for mastery climate (beta = −.20, $SP^2 = .03$) ($p = .064$), $F(5,75) = 6.39$, $p < .001$.
*$p < .05$.
[a] SP^2 = squared semi-partial or part correlation coefficients.

While our expectations about negative relationships between task involvement and disordered eating could be confirmed for mastery climate, only non-significant correlations were found between task orientation and the disordered eating correlates. These results seem to be in line with the fact that no explicit suggestions about links between task orientation and disordered eating have been made before. In addition, it seems to fit with other studies that did not find a protective role of task orientation on other maladaptive behaviours either (e.g., Sage et al., 2006). In conclusion, having a high task orientation does not always seem to be protective in and of itself (see footnote 4).

A limitation in the present study was that we used a relatively crude measure for pathogenic weight control with limited reliability (Nunnally, 1978). In future studies focusing exclusively on relationships between eating disorders or disordered eating with achievement motivation, full versions of general or sport-specific measures could be administered such as the Eating Disorder Inventory-2 (EDI-2) (Garner, 1991) or the Female Athlete Screening Tool (FAST) for disordered eating (McNulty, Adams, Anderson, & Affenito, 2001).

Another limitation was that we had to confine ourselves to self-reported height and weight because objective measurement of body composition was perceived as too threatening for some aesthetic performers. Self-report holds the risk of both under- or overestimation. Davis (1990) concluded that self-report is more accurate when the anonymity of the respondents is guaranteed, as we did in the present study. For eight gymnasts, we were able to check the congruence between the self-reported data and recent objective measurements and found a strong correlation of $r = .88$. This gave us some indication that the reliability of self-reported measures could be satisfactory, but at the same time this correlation may not be representative of what would be observed in the whole sample. Future studies should continue in making an effort to include objective measurements by the researchers or recent actual data provided by medical staff members.

Another constraint in the present study was the composition of our sample. As the number of high level competitive gymnasts in the Netherlands is limited, we also investigated a group of high level female dancers. Significant group differences were observed for self-esteem and perfectionism, indicating that dancers score higher on perfectionism and lower on self-esteem when compared with gymnasts. These results are in agreement with previous research among dancers (e.g., Anshel, 2004; Ringham et al., 2006), yet, as far as we know, the present study is unique in comparing dancers with a comparable group of female artistic gymnasts. Apart from that, since gymnasts and dancers did not differ on most of the included variables, we concluded that our sample of female aesthetic performers was quite homogeneous. Nevertheless, the observed relationships of this study should be replicated in future studies using larger samples of various athletes at risk for disordered eating.

In conclusion, aesthetic athletes' and performers' eating attitudes and dieting behaviours seem to be specifically connected to their drive for performance enhancement (De Bruin et al., 2007; Sangenis et al., 2005; Sherman & Thompson, 2006a). The present

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study shows that the performance-related achievement goal theory seems to be a useful framework in explaining disordered eating in female gymnasts and dancers. Regression analysis indicated that the four achievement goal variables significantly predicted dieting frequency. Together they explained an additional 12% of the overall variance, after controlling for BMI. It turned out that both ego orientation and mastery climate made a statistically significant unique contribution in the present study.

Roberts (2001) stated that a high ego orientation is particularly detrimental if it is accompanied by a low task orientation. Future research should further investigate if this is also true for disordered eating (see also footnote 4). To gain a more complete understanding of the relationship between ego orientation and disordered eating, future studies could also include the more recent 2×2 framework which not only distinguishes between ego and task orientation but also between approach and avoidance achievement goals (Elliott & McGregor, 2001).

As a final remark, the present study provided some evidence that a mastery climate may exert a protective influence on disordered eating. We therefore recommend that coaches and teachers should create a mastery climate with its emphasis on personal development and interpersonal cooperation. Female aesthetic performers need to be discouraged from interpersonal comparisons and competing in terms of weight and thinness to prevent the development of disordered eating patterns. Naturally, coaches and teachers should refrain from putting weight-related pressure on their pupils. It has been advised that in order to maximize performance and well being, a mastery environment rather than a performance climate should be fostered (Duda, 1993). That this also holds for the prevention of disordered eating seems evident from the present study.

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