

Eating Attitudes, Exercise Identity, and Body Alienation in Competitive Ultramarathoners

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This study examined the relationships among eating attitudes, exercise identity, and body alienation in ultramarathoners. Eighty-seven competitive ultramarathoners (73 males, 14 females) completed the Eating Attitudes Test-26, Exercise Identity Scale, and Body Alienation Scale as part of their pre-race registration. Correlation coefficients revealed that eating attitudes were positively related to exercise identity ($R = 0.31$) and injury tolerance ($R = 0.43$), and that exercise identity was positively related to injury tolerance ($R = 0.33$). MANOVA further indicated that subjects with high exercise identity reported more eating disorder behaviors [$F(2, 80) = 7.73, P < 0.001$] and higher injury tolerance [$F(2, 80) = 3.69, P < 0.05$] than persons with low exercise identity. Female ultramarathoners scoring high on exercise identity were more likely to report aberrant eating behaviors [$F(2, 80) = 3.39, P < 0.05$] and higher training intensity levels [$F(2, 80) = 3.91, P < 0.02$] than were average males and the low- or moderate-exercise identifying females.

Key Words: distance runners, eating disorders, injury tolerance

Considerable research has focused on the prevalence of eating disorders in a variety of populations. In particular, weight-dependent sports (e.g., distance running, dancing, and wrestling) in which aesthetic appeal and leanness are essential to competitive success have received much of the research attention (11, 12, 16, 37). Although the results are somewhat equivocal, it appears that male and female athletes who participate in sports requiring substantial levels of endurance and pain tolerance (known as grim asceticism; 41) might be at greater risk of developing disordered eating behaviors than nonathletes or athletes who participate in other sports (11, 12). This link between abnormal eating attitudes and athletic participation has been of particular interest in long-distance runners (e.g., 5, 18, 19, 40), revealing that distance runners have reported higher disordered eating scores especially when differentiating between obligatory and nonobligatory runners (e.g., 28, 32, 36). Thus, obligatory runners often demonstrate a compulsive need to exercise or to engage in activities believed to promote performance.

Given the obsessive-compulsive nature of obligatory runners, many researchers have focused on comparison studies with clinical patients to gain a better

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understanding of these behaviors. Some researchers found that these patients had significantly more evidence of psychopathology than male or female distance runners (31, 34), that high intensity or habitual female runners were similar to anorexics in their views of body image (34), preoccupations with food (13), and motivation to decrease percent body fat (13, 40). Moreover, 25% of the female participants who ran > 30 mi/wk had Eating Attitudes Test scores indicating a higher risk for anorexia (13, 36), and women runners displayed more disordered eating patterns than men (36, 40).

A 2nd avenue explored in disordered eating research has been identifying various psychological factors associated with eating disorders. These psychological factors include body image (26, 28, 32, 33), social physique anxiety (9, 22), and obsessive personality traits (10, 33). Overall, research seems to suggest that individuals with lower body image, higher social physique anxiety, and higher obsessive traits are more prone to eating disorders.

One subgroup of distance runners that has not received much attention in relation to eating attitudes is ultramarathoners. McCutcheon and Yoakum (25) have classified ultramarathons as races exceeding distances of traditional marathon length (26.2 mi), sometimes reaching distances of up to 100 mi. As such, ultramarathoners represent perhaps the ultimate in grim asceticism among distance runners. If the findings from previous research on other subgroups of distance runners can be accurately applied to ultramarathoners, it would seem that this group would be at an even greater risk for developing abnormal eating behaviors given the hyperendurance nature of their sport and their increased pursuit of leanness to facilitate performance. Furthermore, although the identification and findings of the previously mentioned psychological variables have provided significant insight into eating attitudes, several variables have yet to be explored regarding the disordered eating-athletic participation relationship. Two such variables are exercise identity and body alienation.

Exercise Identity

Exercise identity is a relatively recent construct introduced by Anderson and colleagues (1-3) based on the reciprocal relationship between behavior and role identity (7). As integral parts of one's self-concept, role identities give meaning and value to previous behaviors and influence future behaviors (1). Thus, according to Anderson and colleagues (1, 2, 4), role identities motivate or stimulate behaviors that support one's identification with a particular role and can be predictors of actual behavior. Further, when actual behaviors are consistent with one's role identity, those behaviors serve to reaffirm the individual's identity. Role identification might be best understood through Social Identity Theory, which suggests that identity development begins with the process of self-categorization (39). This process suggests that persons 1st identify themselves as a member of a specific group. Behaviors and values of the group are then learned and eventually acted out (21). Accordingly, self-categorization ultimately influences how one defines his or her place in society as well as provides self-esteem and a sense of purpose. For example, as running becomes an aspect of role identity, one could engage in specific behaviors or lifestyle changes defined by the exercise subculture (e.g., increased training volume or intensity, dietary behaviors, wearing fitness apparel) that reinforce and validate this role (1). As the exercise role becomes more salient,

these behaviors might become obsessive or deviant. For the distance runner, this might result in disordered eating or the adoption of excessive training volume levels to facilitate performance.

Body Alienation

A 2nd factor that might be linked to disordered eating in ultramarathoners is body alienation. Body alienation refers to the exploitation of the human body in sport and has been described as viewing one's body as a tool or instrument for use in human performance or production (6, 17). Brohm (6) has suggested that as athletes become more committed to their sport, they can become disassociated or isolated from their bodies, coming to view themselves as machines that, if constantly modified and trained, will be able to achieve maximal force or speed production. Thus, some athletes could become so obsessed with maximizing physical output and performance that they fail to consider the impact their behaviors have on their long-term health or their personal and social development (35). Even worse, harmful efforts towards maximizing performance, such as developing disordered eating or engaging in extreme training volumes, are often encouraged or insufficiently discouraged by others in the sport subculture (i.e., peers, coaches, media). Based on the previous discussion of Social Identity Theory, it would seem that persons who are highly identified with exercise might be at particular risk for developing body alienation given their desire to conform to the normative behaviors of the subculture.

Recent research by Adams, Anshus, and Lantz (unpublished data) identified 3 major body alienation components including injury tolerance, training through pain, and use of the body as a tool. According to these authors, injury tolerance is the persistence of an athlete to play through injury even if the effects are potentially harmful to the body. Several authors have noted the normalization and acceptance of injury in sport and a growing sport culture that encourages and pressures athletes both to accept and minimize injury tolerance as a routine part of sport (29, 30).

Training through pain refers to conditioning the body beyond the psychological limits of pain tolerance. Given that pain intensity is an important determinant of activity tolerance, individuals who are better able to minimize their pain experience might be able to persist longer in pain-inducing activities (24, 38). Indeed, research by Sullivan and colleagues (38) indicates that athletes might be particularly tolerant of pain, and although pain tolerances have not been determined to be sport specific, it would seem that ultramarathoners require particularly well-developed pain tolerance mechanisms given their need to manage significant pain intensity over extended time periods. Body as a tool refers to viewing the body as a mechanical device or instrument used to help a person achieve his or her performance goals in sport (6, 8, 27).

It would appear that body alienation, as represented by pain tolerance, body as a tool, and training through pain, might be related to eating attitudes and exercise identity levels because of the extreme demands placed on the body in highly selective sports requiring intense dedication. Therefore, the purpose of this study was to examine the relationship among eating attitudes, exercise identity, and the 3 dimensions of body alienation in competitive ultramarathoners. A secondary purpose was to examine the effects of gender and exercise identity on eating attitudes and body alienation. Based on previous research on distance runners (11, 12), 3 hypotheses were identified. First, it was anticipated that eating attitudes and the 3

Table 1 Demographic Characteristics of the Sample

Factor	Males (n = 73)		Females (n = 14)		Total (n = 87)		Range
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	
Age	45.51	10.06	37.64	7.92	44.23	10.13	17-68
Height (cm)	177.00	7.40	164.60	5.20	175.00	8.50	142-193
Weight (kg)	74.07	9.66	57.04	5.57	71.27	11.09	50-115
No. of ultramarathons	18.47	28.73	16.36	18.24	18.13	27.22	0-75
Years of training	16.65	9.44	14.93	6.65	16.37	9.04	0-5
Training volume (mi/wk)	48.38	25.15	34.58	28.88	37.74	25.57	0-100

dimensions of body alienation would be positively related to exercise identity such that those persons reporting higher identification with the exercise role would exhibit more aberrant eating behaviors and greater use of the body as a tool, injury tolerance, and training through pain. Second, it was hypothesized that eating attitudes would be positively related to the 3 dimensions of body alienation indicating that persons who engage in aberrant eating behaviors would be more likely to engage in other forms of deviant behaviors such as body alienation in an effort to improve performance. Lastly, it was hypothesized that persons with a high level of exercise identity would exhibit greater body alienation and abnormal eating behaviors than those with a low level of exercise identity.

Method

Participants and Procedures

Eighty-seven competitors (73 males, 14 females) from 2 separate sanctioned ultramarathons in 2 distinct geographical regions of the country participated in the study. One ultramarathon was 80 km and the 2nd was 160 km in length. To be included in the study, participants from the 80-km race must have previously completed at least 1 competitive ultramarathon and participants from the 160-km race must have completed a 100-km race in less than 13 h or a 160-km race in fewer than 24 h, depending on age. Participants in the 80-km race posted an average time of 13.1 h (range, 10.2 to 15.8) and those who completed the 160-km race (69%) posted an average time of 27.0 h (range, 20.3 to 29.9).

Approximately 90% of respondents completed the Eating Attitudes Test-26, Exercise Identity Scale, Body Alienation Scale, and a demographics sheet at the time of race registration. The number of participants who completed the questionnaire and completed the race is unknown. Participants' ages, height, weight, years of training, and the number of ultramarathons in which they have competed are presented, by gender, in Table 1. The Institutional Review Board for the Protection of Human Subjects approved the study prior to data collection.

Instrumentation

Eating Attitudes Test-26 (EAT). Eating attitudes were assessed using the EAT-26 (15), a shortened version of the EAT-40 introduced by Garner and Garfinkel (14). The EAT-26 is a widely used, self-report inventory that asks participants to indicate the degree to which each item applies to them using a 6-point Likert scale of *always, usually, often, sometimes, rarely, or never*. Each extreme response in the disordered eating direction was scored as 3 points and the adjacent alternatives were weighed as 2 points and 1 point, respectively. No score was assigned for nondisordered eating responses. The numerical values were then summed with values exceeding 20 indicative of populations at higher risk for developing eating disorders. The EAT-26 has been shown to be internally consistent and to have strong test-retest reliability (15, 23). Cronbach's alpha indicated the EAT-26 items to possess acceptable internal consistency with the current sample ($\alpha = 0.77$).

Exercise Identity Scale (EIS). The EIS is a 9-item, self-report inventory that measures the salience of one's identification with exercise as an integral part of the self-concept (1). Respondents were asked to indicate the level to which each

of the 9 statements is characteristic or true of themselves. Responses are based on a 5-point Likert-type scale, with a range from 1 (*strongly disagree*) to 5 (*strongly agree*) and were summed to produce a total EIS score ranging from 9 to 45 with higher scores reflective of greater identification with exercise behaviors. The validity of the EIS as a measure of exercise identity has been supported through correlations with training volume, levels of perceived exertion, and physiological functioning (3). Further, the EIS has been shown to discriminate between exercisers and nonexercisers (3). The EIS has demonstrated acceptable minimum internal consistency ($\alpha = 0.94$) across a variety of populations including college students (1) and police officers (3). The EIS items were shown to be internally consistent with the current sample ($\alpha = 0.86$).

Body Alienation Scale (BAS). The Body Alienation Scale is a relatively new 13-item, self-report inventory assessing 3 dimensions of body alienation including injury tolerance, training through pain, and use of the body as a tool (Adams, Anshus, and Lantz, unpublished data). Respondents indicate the degree to which each of 13 statements is characteristic or true of themselves on a 6-point Likert-type scale. A sample question from the injury tolerance dimension is "I see myself as a machine designed to perform a specific sport." A sample question from the training through pain subscale is "Coaches have pushed me to unhealthy intensity levels." A body as a tool dimension sample is "I have felt obligated to train even when I was injured." Adams and colleagues have established initial psychometric properties of the BAS through exploratory principal components analysis that identified 3 distinct factors accounting for 56.13% of the common variance. Further, the BAS items have demonstrated acceptable internal consistency (Cronbach's $\alpha \geq 0.80$) for each of the 3 subscales in a sample of college athletes (Adams, Anshus, and Lantz, unpublished data). The internal consistencies, however, failed to reach the widely accepted rating of 0.70 for the current sample as follows: use of body as a tool ($\alpha = 0.58$), injury tolerance ($\alpha = 0.58$), and training through pain ($\alpha = 0.68$). These alpha levels were considered when interpreting the results of this study.

Results

Means and standard deviations of participants' responses to each of the 3 inventories are shown in Table 2. The relationships among exercise identity, eating attitudes, and the 3 body alienation factors were determined through Pearson product-moment correlations. The 1st and 2nd hypotheses were supported through several significant relationships among the variables (see Table 3). Significant positive relationships were found among exercise identity, eating attitudes, and 1 of the 3 facets of body alienation (injury tolerance). A significant positive relationship was also found for eating attitudes and injury tolerance. The other 2 body alienation factors were not significantly related to eating attitudes or exercise identity in this study ($P > 0.05$).

To determine the influence of exercise identity on eating attitudes and the 3 body alienation dimensions, participants' responses regarding exercise identity were categorized as either low, medium, or high, based on the distribution of the total samples' responses. The low- and high-exercise identity groups reflected the lower and upper one-third of the exercise identity scores. The decision to base these categories on the current sample rather than normative data resulted from

Table 2 Means and Standard Deviation for Exercise

Factor	Exercise identity		Eating attitudes		Body as a tool		Training through pain		Injury tolerance	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Gender										
Male (n = 73)	51.89	8.57	3.99	0.58	7.87	0.43	5.66	0.31	9.05	0.48
Female (n = 14)	56.57	4.54	5.44	1.56	7.29	1.15	8.33*	0.81	8.44	1.28
Exercise identity										
Low (n = 29)	43.86	7.25	2.52	2.52	7.54	3.34	5.57	3.07	7.75	3.87
Med (n = 28)	52.25	1.58	3.92	3.99	8.46	4.24	6.65*	2.89	8.46	3.25
High (n = 30)	60.57	2.19	7.26*	7.34	7.37	2.74	5.51	1.80	10.81*	4.23
Range	15 - 63		0 - 34		5 - 21		4 - 19		4 - 19	

Note. * $P < 0.05$.

Table 3 Correlations Among Exercise Identity, Eating Attitudes, Body Alienation, and Selected Demographic Variables

Variable	Exercise identity	Eating attitudes	Body as a tool	Training through pain	Injury tolerance	Training volume	Age
1. Exercise identity							
2. Eating attitudes		0.31*					
3. Body as a tool			0.05				
4. Training through pain			-0.12				
5. Injury tolerance				0.11			
6. Training volume				0.16			
7. Age				0.54*			
					0.33*		
					0.43*		
					0.28*		
					0.17		
						0.12	
						0.11	
						0.25*	
						0.20	
						0.08	
							-0.09
							0.03
							-0.22*
							-0.18
							-0.04
							0.25*

Note. $n = 87$. * $P < 0.05$.

the lack of previous research on ultramarathon competitors with regard to normative values for exercise identity. Although Anderson and colleagues (4) have reported normative values for the Exercise Identity Scale for 3 different samples of adult exercisers, it is unlikely that any of those samples (college students, law enforcement personnel, and financial services corporate employees) reflected the dedication to exercise characteristic of ultramarathoners. A comparison of mean exercise identity scores between the current sample and those reported by Anderson and colleagues (4) appears to confirm this conclusion. These groups reported mean exercise identity scores ranging from a high of 48.7 (student exercisers) to a low of 36.5 (law enforcement officers over age 50). These scores were well below the average score of 54.23 reported by the current sample.

A 2×3 MANOVA (gender \times exercise identity levels) revealed a significant multivariate interaction of gender and exercise identity [Wilk's lambda = 0.76, $F(8, 144) = 2.62$, $P = 0.01$], and main effects for exercise identity [Wilk's lambda = 0.67, $F(8, 144) = 4.01$, $P = 0.001$] and gender [Wilk's lambda = 0.81, $F(4, 72) = 4.21$, $P = 0.004$]. Univariate follow-ups for the gender-exercise identity interaction indicated significant differences for eating attitudes [$F(2, 80) = 3.39$, $P < 0.05$] and training intensity [$F(2, 80) = 3.91$, $P < 0.02$] suggesting that female high exercise identifiers were more likely to report unhealthy eating behaviors and higher training intensity levels than were males or low- and moderate-exercise identifying females (see Table 4).

Univariate follow-ups for exercise identity indicated significant differences with eating attitudes [$F(2, 80) = 7.73$, $P < 0.001$]; training through pain [$F(2, 80) = 3.93$, $P < 0.05$], and injury tolerance [$F(2, 80) = 3.69$, $P < 0.05$]. Scheffe's post hoc analysis indicated that high exercise identifiers were more likely to report behaviors associated with eating disorders and tolerate injury more than low- or moderate-exercise identifiers (see Table 2). Moderate-exercise identifiers, however, were more likely to report higher training through pain than low- or high-exercise identifiers. It should be noted that although differences among the 3 exercise identifier groups were evidenced, none of the groups would be considered "at risk" of eating disorders according to the cut-off scores reported by Garner and Rosen (16). Univariate analysis for gender revealed significant differences only for training intensity [$F(1, 80) = 9.47$, $P < 0.01$]. Females were more likely to train at higher intensity levels than males.

Discussion

The results of the study tested several hypotheses. First, it was anticipated that eating attitudes and the 3 dimensions of body alienation (injury tolerance, body as a tool, and training through pain) would be positively related to exercise identity. The results indicated that exercise identity had a significant positive correlation with eating attitudes and injury tolerance. This suggests that the more a competitive ultramarathoner identifies with the exercise role the more likely he or she is to report unhealthy eating attitudes and injury tolerance. Thus, these results provide additional insight into the eating attitudes-exercise behavior relationship by suggesting that a strong exercise role identity could be associated with increasingly restrictive dietary behaviors and higher tolerance to injury. Previous researchers (11, 12, 16, 37) have commonly suggested that specific sports are more prone to these behaviors, but the findings of this study suggest that it is perhaps because

Table 4 Means and Standard Deviations for the Interaction of Gender and Exercise Identity with Dependent Variables

Dependent variable / gender	Exercise identity rank							
	Low		Moderate		High		Total	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Eating attitudes								
Male	2.64	2.61	4.08	4.08	5.26	3.18	3.88	3.46
Female	2.33	2.08	2.00	2.82	12.00*	11.74	8.23	10.32
Injury tolerance								
Male	7.92	3.89	8.50	3.33	10.74	3.91	8.91	3.83
Female	6.33	4.04	8.00	2.82	11.00	5.61	9.00	4.03
Training through pain								
Male	5.04	1.61	6.41	2.39	5.52	1.83	5.66	2.04
Female	10.00*	7.94	9.50*	7.77	5.50	1.85	7.15	4.72
Body as a tool								
Male	7.36	3.09	8.67	4.35	7.58	2.93	7.88	3.55
Female	9.00	6.08	6.00	1.41	6.88	2.36	7.23	3.27

Note. *Significant at 0.05 level. Significance is compared by dependent variable for interaction effect.

of a stronger exercise role identity rather than the sport itself. Further, as exercise identity increased so did the injury tolerance of ultramarathoners. This suggests that ultramarathoners who are highly identified with the exercise role might be more likely to experience 1 aspect of body alienation and risk greater injury or permanent damage by training or competing while injured. Future research should examine the dietary and training habits of ultramarathoners to a greater extent.

Second, it was hypothesized that eating attitudes, as measured by the Eating Attitudes Test (EAT) would be positively related to the 3 dimensions of body alienation. The EAT scores positively correlated with injury tolerance, but not the other 2 dimensions. This suggests that ultramarathoners who report higher abnormal eating behaviors also report a higher ability to tolerate injury to continue performing. The eating behavior scores were not high enough, on average, to raise concerns about the possibility of an eating disorder, although a study with so few females does warrant future research before any firm conclusions can be drawn.

With respect to the hypotheses concerning the effects of gender and exercise identity on abnormal eating behaviors and dimensions of body alienation, the data suggest that female ultramarathoners who are highly identified with the exercise role could be at greater risk of developing eating disorders than low-exercise identifiers. If this interaction effect were not taken into account, one might conclude that the ultramarathoners, in general, do not appear to represent an "at risk" population. Although the average scores for the total sample (Table 2) were very low, when the scores were examined by gender and exercise identity (Table 4), a slightly different picture was painted. The average eating attitudes score for the high-identifying female exercisers was 12 but the range of scores showed "at risk" status (>20) for 4 of the 14 females as defined by Garner et al. (15; see Table 4). Therefore, how a female views herself in connection with exercise might play an important role in unhealthy eating behaviors. One word of caution, however: the number of female ultramarathoners represented in this study was fairly low for each of the exercise identity groups. Additional research on at least 30 female ultramarathoners is undoubtedly needed before any firm conclusions can be drawn, especially because researchers have not examined exercise identity, disordered eating, and female athletes to the present.

Conversely, female ultramarathoners who are low or moderate identifiers with the exercise role are more likely to report higher levels of training through pain. It could be conjectured that the higher exercise identifiers would be more concerned with pushing the pain thresholds during training and competition for enhanced performance, but that was not the case. It could be that the female ultramarathoners who do not identify as closely with being an ultramarathoner have to push through pain because they are not as conditioned or comfortable with the higher training volume as the individuals who train for ultramarathons on a regular basis. This suggests that these persons might be willing to compromise long-term health for short-term performance.

The Body Alienation Scale (BAS) is a fairly new tool that measures 3 specific dimensions: body as a tool, injury tolerance, and training through pain. The 3 dimensions in this study showed a significant positive relationship to each other suggesting that each of these dimensions were necessary components of the body alienation concept, but not to the extent to be considered unidimensional. This suggests that when considering body alienation as a variable, one should consider all 3 dimensions, not just body alienation as 1 dimension. This study, however, showed

that only one of the dimensions (injury tolerance) played any role in connection with eating attitudes and exercise identity. One plausible explanation is that the internal consistencies for each of the dimensions were low ($\alpha < 0.70$). Although the BAS has demonstrated acceptable internal consistency ($\alpha > 0.70$) in previous research using a college athlete sample (Adams, Anshus, and Lantz, unpublished data), none of the 3 subscales in the current study produced internal consistency coefficients that exceeded this widely accepted standard.

Therefore, any conclusions regarding the body alienation findings in this study should be viewed with caution given the relatively low internal consistencies demonstrated for each subscale. Thus, it could be that the body alienation dimensions, although reflective of the experiences of collegiate athletes (Adams, Anshus, and Lantz, unpublished data), might not accurately capture the motivations and experiences of competitive ultramarathoners. One plausible explanation is that the sport experiences of college athletes are often influenced by authoritative figures including coaches and faculty. These persons serve to orchestrate the athletes' training, diet, leisure time, and other facets of their lives, perhaps leaving the athlete feeling they no longer possess ownership of their own sport experiences. Conversely, ultramarathoners participate of their own volition with complete control over their training and performance. Future research should consider these differences and continue to explore the psychometric properties of the BAS in a variety of sport and exercise populations.

In general, ultramarathoners do not seem to be as preoccupied with eating behaviors and body issues as other researchers have reported in connection with weight-dependent sports (12, 20, 32). When gender is taken into account, however, the findings suggest that females with a more pronounced exercise role identity are more prone to unhealthy eating behaviors and 1 aspect of body alienation. The role of exercise identity seems to play an important role in other psychological behaviors of athletes, and makes these findings worth exploring in other sports and with a larger sample of athletes.

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