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**Athletic identity, compulsive exercise and eating psychopathology in long-distance runners**

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## **Abstract**

Having a high athletic identity is thought to increase vulnerability for compulsive exercise and Eating Disorder (ED) psychopathology. This study examined whether there is an association between athletic identity and levels of compulsive exercise and ED psychopathology in long-distance runners. A sample of 501 long-distance runners completed the Athletic Identity Measurement Scale (AIMS), Compulsive Exercise Test (CET) and Eating Disorders Examination Questionnaire (EDEQ). There was a significant positive association between participants' AIMS and total CET scores (moderate effect size;  $r = .34$  for males and  $.33$  for females). BMI did not influence the relationship between AIMS and CET scores in males. However, for females, AIMS scores were positively associated with levels of weight control exercise when covarying for BMI (small to medium effect size,  $r = .22$ ). No significant associations with EDEQ scores were found (negligible to small effect sizes;  $r = .06$  for males and  $r = .14$  for females). Following replication, coaches might need to be vigilant to the welfare of endurance runners that have a strong athletic identity, since this could be linked to them exercising compulsively. Future work should examine whether having a strong athletic identity predicts ED psychopathology when this identity is challenged (e.g., due to injury).

## **Keywords**

Eating disorders; Athletic Identity; Compulsive exercise; Long-distance runners.

## Introduction

Various factors have been implicated in the high prevalence rates of eating disorders among athletes. One is sporting type; with greater Eating Disorder (ED) prevalence rates in sports that emphasise leanness relative to sports where leanness is not a performance requirement (e.g., long-distance running versus American football) (Kong & Harris, 2015; Petrie, 1996). Another is level of competition (e.g., sport participation at a national versus recreational level) (Picard, 1999). However, research into both of these factors is inconsistent (e.g., Chapman & Woodman, 2016; Gomes, Martins, & Silva, 2011; Hausenblas & McNally, 2004). Therefore, rather than focusing on sporting type or, level of competition it might be more appropriate for research to focus on psycho-social factors that could contribute towards an increased risk of eating psychopathology. One possible factor that should be considered is the athlete's level of *athletic identity*. Since, having a high athletic identity could increase the likelihood of an athlete exercising in a compulsive manner. This crucially can be regarded as a direct risk factor for EDs (Davis, 1994).

Brewer, Van Raalte and Linder (1993) define athletic identity as being the, “degree to which an individual identifies with the athlete role” (p. 237). This may be considered the most widely used and accepted definition of athletic identity. Brewer et al., (1993) hypothesised that having a high athletic identity might limit an individual from possessing a multi-dimensional self-concept and increase vulnerability towards negative health-related outcomes (Hughes & Leavey, 2012).

In keeping with this theory, athletic identity may be a risk factor for ED psychopathology. Jones, Glimmeyer and McKenzie (2005) reported on the case of a female swimmer who described sport as being central to her life (e.g., her goals, achievements, and self-esteem). This high athletic identity was accompanied with a positive body image.

However, during a meeting with her coach a critical comment was made regarding her weight and shape. This comment was experienced as a direct challenge towards her self-worth and was a trigger for the development of ED psychopathology (i.e., dieting, bingeing and purging). Hence, having a high athletic identity may increase an individual's vulnerability to ED triggers (e.g., low self-esteem, weight/ shape concerns, critical comments from others) and the development of psychopathology.

Indeed, athletic identity has been linked to ED psychopathology in studies with larger sample sizes (Busanich, McGannon, & Schinke, 2014; Gapin & Petruzzello, 2011). However, there is a paucity of research that has directly examined the relationship between athletic identity and ED psychopathology in athletes. In the few studies to date, it has been found that level of athletic identity is positively correlated with levels of ED psychopathology among runners (Gapin & Petruzzello, 2011) and figure skaters (Voelker, Gould, & Reel, 2014).

When trying to establish the role of athletic identity in relation to eating psychopathology, it is important to consider the role of compulsive exercise. This multi-dimensional construct involves, “an association with weight and shape concerns, and persistent continuation in order to: (a) mitigate the experience of extreme guilt and/or negative affect when unable to exercise; and (b) avoid the perceived negative consequences of stopping” (Meyer, Taranis, Goodwin, & Haycraft, p. 184). Specific to sport, many athletes may exercise with a high degree of commitment, but not feel the same level of negative affect when unable to exercise in comparison to those with high levels of compulsive exercise. Thus, it is unclear why some athletes develop compulsive exercise, whilst others do not.

Research has highlighted that compulsive exercise symptoms may develop in an individual whose identity is already tied into their exercise and/or sporting environment (Groves, Biscomb, Nevill, & Matheson, 2008). Furthermore, athletes with high athletic identities have been found to continue to undertake physical activity whilst injured (Brewer et

al., 2010), suffer from depression following an injury (Brewer et al., 1993) and have difficulties coping with retirement from sport (e.g., Grove, Lavallee, & Gordon, 1997; Lavallee, Gordon, & Grove, 1997; Park, Tod, & Lavallee, 2012; Webb, Nasco, Riley, & Headrick, 1998). These findings suggest that there is a compulsive element to the way in which people with high athletic identities exercise. Therefore, it may be postulated that having a high athletic identity may also be a predictor of compulsive exercise.

The aim of this study is to examine whether athletic identity is linked to levels of compulsive exercise, and ED psychopathology in long-distance runners. It is hypothesised that there will be significant associations between athletic identity and levels of compulsive exercise and ED psychopathology in long-distance runners

## **Methods**

### ***Participants***

Long-distance runners were recruited from University-based and community running clubs from across England. Running clubs were contacted by email and were invited to partake in the study. Participants were eligible to take part if they were between 18 and 65 years of age and competed in or trained for events that require the athlete to run 1500m or further. They were informed that the study was looking to learn more about the exercise and eating attitudes of runners. The study received ethical approval from Loughborough University Ethics Committee.

## Measures

### Athletic Identity Measurement Scale (AIMS; Brewer & Cornelius, 2001)

The AIMS is a 7-item questionnaire measuring participants' levels of athletic identity. It employs a 7-point Likert scale (anchored with 1= strongly disagree and 7= strongly agree), with scores summed to form a total AIMS score. Higher scores are indicative of a higher degree of identification with the athletic role. The AIMS has been found to be a reliable and valid measure (Visek, Hurst, Maxwell, & Watson, 2008). Within this sample the Cronbach's alpha was .84.

### Compulsive Exercise Test (CET; Taranis, Touyz, & Meyer, 2011)

The CET measures participants' levels of compulsive exercise. The CET utilises a 6-point scale (anchored by 0 = never true and 5 = always true) with higher levels of compulsive exercise indicated by higher scores on the CET. Plateau et al. (2014) reported that there is a three-factor structure for the CET in athletes. The three subscales are: Avoidance of Negative Affect, Weight Control Exercise and Mood Improvement. A total score for the CET is calculated by adding together the mean scores for the subscales. Taranis et al. (2011) have found support for the convergent and concurrent validity of the CET among female exercisers. In this study the CET generated satisfactory internal consistency (Cronbach's alpha for Avoidance of Negative affect = .86; Weight Control Exercise = .82; Mood Improvement = .72; total CET = .86).

### Eating Disorders Examination Questionnaire (EDEQ; Fairburn & Beglin, 1994)

The EDEQ measures participants' eating psychopathology based upon their eating attitudes and behaviours over the previous four weeks. The questionnaire utilises a 7-point

rating scale, with higher scores representing greater eating psychopathology. The EDEQ has been found to be an internally consistent measure (Panelo, Villarroel, Portell, & Raich, 2012). Within this sample the Cronbach's alpha was .94.

### *Procedure*

Participants could complete an online version of the questionnaires ( $n = 471$ ) or a visit was arranged by a researcher to the running club to hand out a paper version of the questionnaires at a training session ( $n = 30$ ). For both the online and paper questionnaire formats, participants were asked to read an information sheet that informed them of the nature of the research. Consent was given at the start of the study. Participants then completed a demographics questionnaire, which asked participants to report their age, height, weight, the main event that they train for and their current level of competition. Following this the AIMS, CET and EDEQ were completed. Data were analysed using IBM SPSS Statistics 22.

### *Data Analysis*

Participants' demographics were analysed to examine if there were differences between males and females scores on the AIMS, CET and EDEQ. Partial correlations of were then used to analyse the association between participants' total AIMS score and their scores on the CET and EDEQ. BMI was included as a covariate to examine if this influenced the relationship between the AIMS, CET and EDEQ. As multiple comparisons were completed the Bonferonni correction was used. Results were interpreted as being statistically significant when  $p < .01$ . Effect sizes were interpreted based on the guidelines of Cohen (1988) as small ( $\Rightarrow .1$ ), moderate ( $\Rightarrow .3$ ) and large ( $\Rightarrow .5$ ).



## Results

### Participant characteristics

Five hundred and one distance runners (male  $n = 279$ , female  $n = 222$ ) participated in the study. The mean age of participants was 38.77 years ( $SD = 12.14$ ; range = 18-65 years) and the mean body mass index was 23.07 ( $SD = 3.09$ , range = 17.67-54.67) for males and 21.94 ( $SD = 3.87$ , range = 15.09-55.18) for females.

Participants competed in the following events: 1500m ( $n = 27$ ), 3000m ( $n = 12$ ), 5000m ( $n = 37$ ), 10,000m ( $n = 110$ ), half-marathon ( $n = 130$ ), marathon ( $n = 130$ ), cross-country ( $n = 11$ ), ultra marathon ( $n = 16$ ), fell running ( $n = 12$ ) and other ( $n = 16$ ). Participants' current levels of competition were: national level or above ( $n = 33$ ), county level ( $n = 51$ ), club level ( $n = 292$ ) or recreational ( $n = 125$ ). There were significant differences on the majority of study variables between males and females (see Table 1); therefore subsequent analyses were conducted separately.

INSERT TABLE ONE ABOUT HERE

*The relationship between athletic identity, compulsive exercise and ED psychopathology in long-distance runners*

#### Males

Zero-order correlations indicated that AIMS scores were significantly positively associated with the avoidance of negative affect ( $p < .001$ ,  $r = .46$ ), mood improvement ( $p < .001$ ,  $r = .23$ ) and total CET scales ( $p < .001$ ,  $r = .34$ ). There was not a significant

association between AIMS scores and weight control exercise ( $p = .3$ ,  $r = .06$ ) or EDEQ total ( $p = .67$ ,  $r = .03$ ).

When covarying for BMI, AIMS scores were significantly positively associated with the avoidance of negative affect ( $p < .001$ ,  $r = .46$ ), mood improvement ( $p < .001$ ,  $r = .23$ ) and total CET scales ( $p < .001$ ,  $r = .35$ ). There was not a significant association between AIMS scores and weight control exercise ( $p = .093$ ,  $r = .1$ ) or EDEQ total ( $p = .38$ ,  $r = .05$ ). Therefore, BMI had a negligible influence on the associations between AIMS, CET and EDEQ scores in males.

### Females

Zero-order correlations showed that AIMS scores were significantly positively associated with the avoidance of negative affect ( $p < .001$ ,  $r = .43$ ), mood improvement ( $p = .004$ ,  $r = .19$ ) and total CET scales ( $p < .001$ ,  $r = .33$ ). AIMS scores were also positively associated with weight control exercise ( $p = .04$ ,  $r = .14$ ) however; this finding did not survive correction for multiple comparisons. There was not a significant association between AIMS scores and EDEQ total ( $p = .55$ ,  $r = .04$ ).

Covarying for BMI, AIMS scores were significantly positively associated with the avoidance of negative affect ( $p < .001$ ,  $r = .43$ ), weight control exercise ( $p = .001$ ,  $r = .22$ ), mood improvement ( $p = .001$ ,  $r = .23$ ) and total CET scales ( $p < .001$ ,  $r = .38$ ). There was not a significant association between AIMS scores and EDEQ total ( $p = .096$ ,  $r = .11$ ).

## Discussion

This study aimed to examine the relationship between athletic identity, compulsive exercise and ED psychopathology in long-distance runners. Specifically, it was hypothesised that there will be a significant association between athletic identity and levels of compulsive exercise and eating psychopathology. Partial support for this hypothesis was found, as a significant positive association between athletic identity and compulsive exercise was found (moderate effect size;  $r = .34$  for males and  $.33$  for females). However, no association with ED psychopathology were found.

The lack of any significant association with ED psychopathology is interesting as it contradicts prior research (e.g., Gapin & Petruzzello, 2011; Voelker et al., 2014). However, this must be viewed with caution, as the negative effects of having a sole athletic identity may only occur when the identity is challenged, such as after a long-term injury (Manuel et al., 2002) or following a critical comment from coaches (Jones et al., 2005). Therefore, these results should be replicated longitudinally, in order to identify the level of ED psychopathology risk over time in those individuals who attain uniquely to the athletic ideal.

The link between having a high athletic identity and compulsive exercise is in line with previous research (e.g., Gapin & Petruzzello, 2011). The present study built upon these findings by suggesting that endurance runners, whose self-worth is tied into their athletic behaviours, potentially continue to exercise for fear of negative consequences (e.g., reduced performance) (moderate to large effect size;  $r = .46$  for males and  $.43$  for females). This desire to continue to exercise to avoid feeling bad could be further reinforced by the corresponding positive feelings after exercise, as it was also found that athletic identity positively predicted the mood improvement aspect of compulsive exercise (small effect size;  $r = .23$  for males and  $.19$  for females).

Interestingly, within this sample, males with a higher athletic identity do not seem to be exercising for weight management purposes and this was not influenced by their BMI. This finding is still in line with the suggestion that sport may actually play a protective role from ED psychopathology due to athletes exercising for reasons other than for weight and appearance reasons, such as for health and enjoyment (DiBartolo & Shaffer, 2002). When covarying for BMI, there was a significant positive association between athletic identity and weight control exercise in females (small to medium effect size,  $r = .22$ ). This suggests that some female athletes with a high athletic identity may exercise in order to burn calories and lose weight.

The cross-sectional nature of the design prevents cause and effect being established between the constructs, and also temporal precedence being identified. It is unknown whether a distance runner whose self-worth is wrapped up in their ability to train and compete as a runner is at greater risk of developing compulsive exercise, or whether the individual who already has compulsive exercise cognitions subsequently extends this compulsivity, with exercise becoming tied into their self-worth.

It would be of interest for future research to examine whether athletic identity and compulsive exercise could increase vulnerability for Relative Energy Deficiency in Sport (RED-S). The International Olympic Committee has published a recent consensus statement describing this syndrome as impaired physiological functioning due to insufficient energy availability for healthy functioning and sporting participation (Mountjoy et al., 2014; Mountjoy et al., 2015). This energy deficit is also thought to contribute to the development of a range of mental illnesses such as: eating disorders, depression and anxiety. It may be speculated that athletes with a high athletic identity may be at a greater risk of RED-S due to their propensity to compulsively exercise.

In conclusion, the results suggest that the extent to which a distance runner holds the athletic identity is predictive of compulsive exercise cognitions and behaviour. This relationship is influenced by both the sex and BMI of the athlete. Coaches should be vigilant to the level of compulsive exercise in athletes with a high athletic identity.

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## **Table captions**

Table 1: Descriptive statistics and tests of difference (Mann Whitney) between males and females for the study variables.

**Table 1:**

	Males	Females	Test statistic
	Median (IQR)	Median (IQR)	<i>z</i> score, <i>p</i> value, <i>r</i>
<i>AIMS Total</i>	32 (26-37)	30.5 (23-36)	-1.6, <i>p</i> = .110, <i>r</i> = .07
<i>CET Total</i>	8.08 (6.67-9.47)	9.18 (7.55-11.17)	-5.44, <i>p</i> < .001, <i>r</i> = .24
Avoidance of Negative Affect	2.5 (1.83-3.17)	2.5 (1.83-3.67)	-1.99, <i>p</i> = .046, <i>r</i> = .09
Weight Control Exercise	2 (1-2.75)	2.75 (1.75-3.5)	-6.4, <i>p</i> < .001, <i>r</i> = .29
Mood improvement	3.8 (3.2-4.2)	4 (3.4-4.6)	-4.15, <i>p</i> < .001, <i>r</i> = .18
<i>EDEQ Total</i>	.406 (.09-1.08)	1.01 (.45-2.21)	-7.11, <i>p</i> < .001, <i>r</i> = .32

Note: AIMS = Athlete Identity Measurement Scale; CET = Compulsive Exercise Test; EDEQ = Eating Disorders Examination Questionnaire.