



## Personality characteristics and psychological distress associated with primary exercise dependence: An exploratory study

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### ABSTRACT

The aim of this study was to assess personality characteristics and psychological distress associated with primary exercise dependence (ExeDepl) in a mixed gender sample. A cross-sectional study was carried out with adult habitual physical exercisers. A total of 79 participants voluntarily completed a package of self-report questionnaires including the Exercise Dependence Questionnaire (EDQ), the Eating Disorder Inventory II (EDI-2), the Temperament and Character Inventory (TCI), the Attitude Toward Self scale (ATS), and the Symptom Questionnaire (SQ). Significant differences were found on the EDQ *exercise for weight control* subscale with regard to gender, as well as on the EDI-2 total score and five of its subscales, with higher scores for females compared to males. Participants reporting primary exercise dependence ( $N = 32$ ) were more likely to present with disordered eating patterns than controls ( $N = 47$ ). They also showed higher levels of *harm avoidance* and *persistence* on the TCI, but lower *self-directness* and less mature character. Furthermore, ExeDepl group scored higher on the ATS *dysmorphophobia* subscale, as well as on the *anxiety* and *hostility* subscales of the SQ compared to the control group. These findings provide support to the idea that primary exercise dependence can be considered as a clinical syndrome associated with certain personality characteristics and psychological symptoms that might be accurately assessed in clinical settings.

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### 1. Introduction

The physical and psychological benefits of regular exercise are well documented (Scully et al., 1998; Fox, 1999; Ogden, 2004), as well as its role in the prevention and treatment of both physical disorders – such as coronary heart disease, hypertension and obesity – and psychological problems – such as depression (McCann and Holmes, 1984; Dimeo et al., 2001) and anxiety (Morgan, 1979; Szabo et al., 1998; Rosa et al., 2004).

However, excessive exercise can become a compulsive behaviour, where individuals feel compelled to exercise despite injuries, obligations or attempts to reduce their activity (Hausenblas and Downs, 2002b). Exercise dependence is considered to reflect a craving for physical activity characterised by a multidimensional and maladaptive pattern of exercise that can lead to both clinical impairment and psychological distress (Veale, 1987, 1995; Bamber et al., 2000a, 2003; Hausenblas and Downs, 2002a, 2002b; Hausenblas and Giacobbi, 2004).

*Abbreviations:* ExeDepl, primary exercise dependence; TCI, Temperament and Character Inventory; EDQ, Exercise Dependence Questionnaire; EDI-2, Eating Disorders Questionnaire II; ATS, Attitude Toward Self scale; SQ, Symptom Questionnaire; MANOVA, Multivariate Analysis of Variance.

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A prevalence rate of 42% was found for exercise dependence among clients of a Parisian fitness centre (Lejoyeux et al., 2008), whereas in a study on occurrence of exercise dependence among college students a prevalence of 45.9% was found (Zmijewski and Howard, 2003). Results from other studies suggested that levels of exercise dependence and body dissatisfaction are even higher among marathon runners and body builders (Hausenblas and Downs, 2002a, 2002b; McCabe and Ricciardelli, 2004). Blaydon and Lindner (2002) found that 28% of nonprofessional athletes presented exercise dependence. Other studies conducted in college-aged populations found that 21.8% of participants displayed obligatory or dysfunctional activity patterns (Garman et al., 2004) and 18.1% reported compulsive exercise (Guidi et al., 2009).

Specific diagnostic criteria for assessing exercise-dependence symptoms have been proposed by Veale (1987), with particular interest for the distinction between primary and secondary exercise dependence. In individuals with primary exercise dependence, physical activity is an end in itself, and persons are intrinsically motivated to exercise. In contrast, secondary exercise dependence corresponds to an associated feature of an underlying eating disorder, where individuals are extrinsically motivated to exercise in attempt to control or change their body size and shape (Veale, 1987, 1995).

Several theories have been proposed in order to explain the mechanisms by which physical activity can become an addiction (Carron et al., 2003). These theories involve the physiological (i.e., the endorphin and sympathetic arousal hypothesis) (Thompson and

Blanton, 1987; Pierce et al., 1993; Goldfarb and Jammurtas, 1997), the psychobiological (i.e., the general theory of addiction) (Jacobs, 1986) or the psychological domains (i.e., the theory of personality traits, or the anorexia analogue hypothesis) (Yates et al., 1983; Crossman et al., 1987; Chapman and DeCastro, 1990).

According to the personality traits explanation (Carron et al., 2003), exercise dependent individuals tend to present personality characteristics such as obsessive–compulsiveness, neuroticism, low self-esteem, perfectionism and high trait anxiety. Although Iannos and Tiggerman (1997) did not find any relationship between physical activity and dysfunctional personality (e.g., lower self-esteem, greater obsessive–compulsiveness and external locus of control) in exercise dependents, most of the studies confirmed a positive association between exercise dependence and obsessive–compulsiveness (Davis et al., 1993, 1995, 1999; Spano, 2001; Thome and Espelage, 2007), trait anxiety (Rudy and Estok, 1989; Cohen and Ogles, 1993; Spano, 2001), perfectionism (Cohen and Ogles, 1993; Hausenblas and Downs, 2002b; Hagan and Hausenblas, 2003; Hall et al., 2007, 2009), and extraversion (Yates et al., 1983). In addition, a negative association has been reported between exercise dependence and self-esteem (Rudy and Estok, 1989; Hall et al., 2009).

In 1987, a psychobiological model for the assessment of personality features was proposed by Robert Cloninger (Cloninger, 1987). In his seven-factor model of temperament and character (Cloninger et al., 1993; Svrakic et al., 1993), four dimensions correspond to temperament factors (i.e., *novelty seeking*, *harm avoidance*, *reward dependence*, and *persistence*), whereas three character dimensions (i.e., *self-directness*, *cooperativeness*, and *self-transcendence*) are concept-based and correspond to personality traits.

The main purpose of this exploratory study was to examine the relationship between personality, according to Cloninger's psychobiological model, and primary exercise dependence among habitual exercisers. We expected that individuals presenting with primary exercise dependence would display more dysfunctional personality characteristics (i.e., less mature character and higher persistence) compared to control subjects.

The second aim was to assess symptoms of psychological distress (e.g., disordered eating patterns, dysmorphophobia, anxiety, depression, and hostility) associated with primary exercise dependence. We hypothesised that primary exercise dependents would show significantly higher levels of psychological distress than controls, with particular reference to eating behaviour, body dissatisfaction and affective symptomatology.

## 2. Method

### 2.1. Participants and procedures

A cross-sectional study was carried out with 180 volunteer habitual exercisers recruited at five fitness clubs located in central Italy. All subjects (a) 18 years and older, (b) speaking Italian language, and (c) practising physical activity at least 3 h/week were invited to participate in the study. Participants did not receive any payment for the enrolment. They were given a written consent form along with a package of self-report measures. Questionnaires were returned by 120 (67%) respondents but 13 (11%) were uncompleted, and then were excluded. Thus a total sample of 107 subjects (61% female) was considered for subsequent analyses. According to previous studies (Bamber et al., 2000a, 2003), exercise dependence was defined as reaching a total score equal to or greater than 116 on the Exercise Dependence Questionnaire (EDQ) (Ogden et al., 1997), whereas the presence of an eating disorder was identified by scores higher than mean values (weighted for gender) on the Eating Disorders Questionnaire II (EDI-2) (Garner, 1991). As suggested by Veale (1987), primary exercise dependence was defined as presenting with exercise dependence (EDQ  $\geq$  116) in the absence of an underlying eating disorder.

To eliminate the potential confounding effects of secondary exercise dependence (Veale, 1995) or eating disorders, participants who met criteria for both exercise dependence and eating disorders ( $N=7$ ) or eating disorders alone ( $N=21$ ) were excluded from further analyses. Thus, a final sample of 79 habitual exercisers (mean age =  $30 \pm 7.93$  years; 57% female) was considered for the current study. The average body mass index was as high as  $21.6 \pm 2.4$  and the average duration of exercise was equal to  $6.6 \pm 3.5$  h/week (range 3 h to 25 h). Selected socio-demographic characteristics of participants are presented in Table 1.

**Table 1**  
Sample demographics ( $N=79$ ).

	N (%)
Gender	
Males	34 (43.03)
Females	45 (56.96)
Social status	
Single	40 (50.63)
Cohabited	19 (24.05)
Married	15 (18.98)
Divorced	5 (6.32)
Education	
Primary school	6 (7.59)
Secondary school	49 (62.02)
College graduated	24 (30.37)

### 2.2. Measures

The following questionnaires were considered for the assessment:

- Exercise Dependence Questionnaire (EDQ) (Ogden et al., 1997). The EDQ is a 29-item inventory where responses are rated on a 7-point Likert-type scale (from 1 = *strongly disagree* to 7 = *strongly agree*) and it has been designed to examine possible relations between exercise dependence and eating disorders and to discriminate between primary and secondary exercise dependence. The EDQ contains 8 subscales that are considered to reflect the multidimensional nature of the construct. The first subscale assesses the experience of withdrawal symptoms following a period of abstinence from exercise ( $\alpha=0.80$ ) (e.g., "If I cannot exercise I feel irritable"). The second subscale reflects the positive reward to be gained from exercise ( $\alpha=0.80$ ) (e.g., "After an exercise session I feel that I am a better person"). Two further subscales measure awareness of abnormal exercise behaviour. These can be defined as insight to the problem ( $\alpha=0.76$ ) (e.g., "My exercise is ruining my life") and interference with social and family life ( $\alpha=0.81$ ) (e.g., "Sometimes I miss time at work to exercise"). Three subscales are considered to reflect different forms of motivational regulation that sustain exercise behaviour. The first measures the degree to which an individual is motivated to exercise because of a desire to control his or her weight ( $\alpha=0.78$ ) (e.g., "I exercise to control my weight"). The second assesses social reasons for exercise ( $\alpha=0.75$ ) (e.g., "I exercise to meet other people"). The third measures physical health reasons to exercise ( $\alpha=0.70$ ) (e.g., "I exercise to prevent heart disease and other illnesses"). The remaining subscale evaluates the belief that the behaviour is rigid, stereotyped and excessive ( $\alpha=0.52$ ) (e.g., "My weekly pattern of exercise is repetitive"). According to the authors (Ogden et al., 1997), exercise dependence can be conceptualised as a continuum, and can be measured by calculating the total score ( $\alpha=0.84$ ). Bamber et al. (2000a, 2003) suggested that a total score equal to or greater than 116 on the EDQ may be sufficient to identify individuals as exercise dependents. The Italian version of the EDQ (Clementi, personal communication, October 1, 2008) showed good internal consistency ( $\alpha=0.92$ ), and Cronbach's alpha ranged from 0.45 to 0.89 for each subscale.
- Eating Disorder Inventory II (EDI-2) (Garner, 1991). The EDI-2 is a 91-item self-report measure of cognitive and behavioural characteristics commonly associated with eating disorders. It may also be used as a screening instrument in non-clinical population to indicate which individuals are likely to be concerned of their weight and appearance. Responses are rated on a 6-point Likert-type scale (from 1 = *never* to 6 = *always*), where higher scores are suggestive of the presence of disordered eating patterns. The Italian version of the EDI-2 (Rizzardi et al., 1995) showed good internal consistency when administered in clinical settings (Cronbach's alpha 0.78 to 0.84), whilst in a non-clinical population Cronbach's alpha ranged from 0.38 through 0.88. It is composed of 8 subscales: *drive for thinness* measures preoccupation with weight loss and avoiding weight gain; *bulimia* assesses symptoms of bingeing and purging; *body dissatisfaction* evaluates dissatisfaction with the overall shape and size of particular body regions. A composite measure of *weight and diet concern* is formed by summing their collective items, as reported by Davis et al. (1990). The remaining subscales are related to *ineffectiveness*, characterised by feelings of inadequacy, insecurity, worthlessness and lack of control over one's life; *perfectionism*, which reflects the extent to which an individual believes that only superior personal achievements are acceptable and that outstanding achievements are expected by others; *interpersonal distrust*, that involves feelings of alienation and the reluctance to form close relationships with others; *enteroceptive awareness*, which corresponds to the individual's lack of confidence in recognising emotional states and feelings of hunger and satiety; and *maturity fears*, that can be conceptualised as the desire to stop growing and return to the safety of preadolescence years. Three subsequent subscales were considered provisional at the time of the study, but has been subsequently validated (Garner, 2004; Giannini et al., 2008): *asceticism*, defined as the tendency to find value by reaching spiritual ideals such as self-discipline, self-neglect-fulness, self-limitation, self-immolation and control of own body needs; *impulse regulation*, which corresponds to the tendency to impulsiveness, drug abuse,

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