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Compulsive exercise as a mediator between clinical perfectionism and eating pathology

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ABSTRACT

The aim of this study was to examine whether compulsive exercise mediates the relationship between clinical perfectionism and eating pathology, based on the cognitive behavioral model of compulsive exercise. Participants were 368 adults who participated regularly in sport/exercise and completed online measures of perfectionism, compulsive exercise and eating disorders. In support of the well-established link between perfectionism and eating disorders, clinical perfectionism predicted eating pathology both directly and indirectly mediated by compulsive exercise. In addition, there were also direct effects of clinical perfectionism on the avoidance/rule-driven behavior, weight control, and mood improvement subscales of the Compulsive Exercise Test (CET). There was a direct effect of the CET weight control subscale on eating pathology and a negative direct effect of the CET subscale mood improvement on eating pathology. Findings lend support to the cognitive behavioral model of compulsive exercise in which clinical perfectionism is conceptualized as related to eating disorders directly and indirectly through the mediation of compulsive exercise. Compulsive exercise was also found to have a direct effect on eating disorders. Compulsive exercise may be a symptom of eating pathology, rather than an antecedent, however causal inferences could not be established given the correlational design. Longitudinal research using cross-lagged panel designs to examine a bidirectional relationship between compulsive exercise and eating disorders is needed.

1. Introduction

Exercise increases prior to and during an eating disorder (Davis, Kennedy, Ravelski, & Dionne, 1994), and is a method of weight and shape control (Fairburn, Cooper, & Shafran, 2003a). Prevalence of eating disorders in athletes ranges from 18% in non-leanness (Sundgot-Borgen, 1993) to 47% in leanness sports (Torstveit, Rosenvinge, & Sundgot-Borgen, 2008), relative to 0.5 to 3% in the general population (Hagger & Chatzisarantis, 2005). A construct which is relevant to eating pathology is compulsive exercise, which is defined as continual rigid and extreme urges to exercise, and difficulty stopping, despite negative consequences, such as injury (Taranis, Touyz, & Meyer, 2011). Compulsive exercise is multidimensional and incorporates several domains including exercise to regulate emotions, compulsivity towards exercise, weight and shape driven exercise, and exercise rigidity (Meyer, Taranis, Goodwin, & Haycraft, 2011; Taranis et al., 2011). While some research has investigated compulsive exercise in competitive athletes (e.g., Plateau et al., 2014) others have used community samples (e.g., McLaren, Gauvin, & White, 2001). We were interested in examining compulsive exercise in a broad range of individuals who participate in sport and exercise, rather than only competitive athletes, as the psychological commitment to exercise, rather than time devoted to exercise, is the more salient feature (Adkins & Keel, 2005), and there is little agreement as to how much exercise is considered to be excessive (Shroff et al., 2006).

Compulsive exercise is important to understand given the links that have been demonstrated with eating pathology. The Compulsive Exercise Test (CET; Taranis et al., 2011) is correlated with the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) in competitive athletes (Plateau et al., 2014) and regular exercisers (Bodill, Watson, Kane, Hagger, & Egan, 2016). These findings support the link between compulsive exercise and eating pathology. Understanding compulsive exercise is important as it has been associated with higher eating disorder symptoms in both non-clinical (Elbourne & Chen, 2007; Goodwin, Haycraft, Taranis, & Meyer, 2011; Lipsey, Barton, Hulley, & Hill, 2006) and clinical eating disorder samples (Formby, Watson, Hilyard, Martin, & Egan, 2014; Shroff et al., 2006). Further, compulsive exercise is a risk factor for relapse in anorexia nervosa,

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and linked with higher suicidal behavior, treatment drop-out and longer hospital admissions (Formby et al., 2014; Meyer et al., 2011).

A cognitive behavioral model of compulsive exercise was put forward by Meyer et al. (2011) which suggests that compulsive exercise is more than a mere symptom of an eating disorder. Meyer et al. (2011) argued that compulsive exercise is associated with both perfectionism (Meyer et al., 2011; Taranis & Meyer, 2010) and eating disorders (Boyd, Abraham, & Luscombe, 2007; Davis, Blackmore, Katzman, & Fox, 2005). In the model, a link between perfectionism and eating pathology is proposed to be mediated by compulsive exercise, although a direct link is also proposed. Meyer et al. (2011) suggest that compulsive exercise and perfectionism are theoretically linked due to the relationship between compulsive exercise, rigidity and self-criticism, which are central components of perfectionism.

Perfectionism has a strong association with eating disorders (Egan, Wade, & Shafran, 2011). Clinical perfectionism involves striving to achieve high standards despite adverse consequences and judging self-worth on achievement (Shafran, Cooper, & Fairburn, 2002). Clinical perfectionism is one of four key maintaining factors in the transdiagnostic model of eating disorders (Fairburn et al., 2003a). Perfectionism has also been measured on the Multidimensional Perfectionism Scales (FMPS; Frost, Marten, Lahart, & Rosenblate, 1990; HMPS; Hewitt & Flett, 1991) which are linked to eating pathology (Egan et al., 2011). Perfectionism has been found to be associated with compulsive exercise (Taranis & Meyer, 2010). Specifically, a range of studies have found individuals engaging in exercise with elevated perfectionism have higher eating pathology than those with lower perfectionism (e.g., Penniment & Egan, 2012). Perfectionism has been found to be the risk factor with the strongest effects on disordered eating attitudes in female athletes (Hopkinson & Lock, 2004). Further, increases in eating psychopathology in athletes have been found to be a result of increases in perfectionism (Shanmugam & Davies, 2015).

There has been little research examining the validity of Meyer et al.'s (2011) model. Only one study to date (McLaren et al., 2001) has examined whether compulsive exercise mediates the relationship between perfectionism and eating pathology. McLaren et al. (2001) found in a sample of female university students that compulsive exercise did not moderate the relationship between perfectionism and eating pathology and concluded both perfectionism and compulsive exercise are associated with eating pathology. When controlling for body mass index, the relationship between perfectionism and dietary restraint was partially mediated by compulsive exercise, accounting for some, but not all, of the relationship between perfectionism and eating pathology (McLaren et al., 2001). Further, only some of Meyer et al.'s dimensions of compulsive exercise have been associated with eating pathology, particularly, exercise driven by rigid rules, avoidance of affective withdrawal symptoms, and exercise to control weight. The mood improvement factor has not received consistent support (Goodwin et al., 2011; Meyer et al., 2011; Plateau et al., 2014; Taranis et al., 2011; Taranis & Meyer, 2011).

The aim of this study was to examine whether compulsive exercise mediates the association between perfectionism and eating pathology. Mediation analysis is important as it provides formative evidence to inform interventions by identifying key targets for intervention and the pathways by which those interventions work (Hagger, Chan, Protogerou, & Chatzisarantis, 2016). This study will build on McLaren et al.'s (2001) findings by using measures which may account for more variance in eating pathology and a measure of clinical perfectionism. The rationale for examining the mediating role of compulsive exercise between perfectionism and eating disorders is based on the association between compulsive exercise and eating pathology (Elbourne & Chen, 2007; Formby et al., 2014; Goodwin et al., 2011; Lipsey et al., 2006; Shroff et al., 2006), perfectionism and compulsive exercise (Hopkinson & Lock, 2004; Penniment & Egan, 2012; Shanmugam & Davies, 2015; Taranis & Meyer, 2010) and perfectionism and eating disorders (Egan et al., 2011).

Our proposed model is presented in Fig. 1. We predicted that a partial mediation model (Fig. 1, solid lines) in which perfectionism predicted eating pathology directly and indirectly through compulsive exercise will better fit the data than a full mediation model in which the direct effect of perfectionism on eating pathology was fixed to be zero. Specifically, we hypothesized that the effects of clinical perfectionism and concern over mistakes on the compulsive exercise dimensions of avoidance and rule-driven behavior and weight control exercise will be positive and statistically significant. We also predicted that two of the subscales from the CET subscales, avoidance and rule driven behavior and weight control exercise, will have positive, statistically significant direct effects on eating pathology. We expected positive and significant indirect effects of perfectionism on eating disorders through the avoidance and rule driven behavior and weight control exercise dimensions of the CET. We anticipate that the direct effect of mood improvement on eating pathology will not be statistically significant (Fig. 1, broken line).

2. Method

2.1. Participants

The population was adults over the age of 18 years who participated in a diverse range of sport and exercise. The inclusion criterion of exercise twice or more per week was chosen to include people who exercised regularly but the criterion was relatively low as amount of exercise is not the defining feature of compulsive exercise (Adkins & Keel, 2005). Our definition of regular exercise was more stringent than Taranis et al. (2011) who defined regular exercise as some form of sport or exercise over the past 4 weeks.

The sample comprised 368 participants; 50% females, 37% males (gender was not reported by 13% of the sample), aged 18–65 years ($M = 32.24$, $SD = 10.49$). Participants engaged in a mean of 1.63 sports ($SD = 1.14$, range 1–9 sports). For participants who reported engaging in more than one sport, the first sport that they reported was recorded as the sport that they engaged in. Table 1 demonstrates the sport participation in the current sample.

2.2. Procedure

Participants were recruited online through non-random sampling via sporting organizations, for example triathlon and marathon running clubs and social networking. Once participants had consented to take part in the study, they were provided an online link the questionnaires. Participants were debriefed after the completion of the survey and provided with referral details for consumer information on eating disorders websites.

2.3. Measures

2.3.1. Compulsive exercise

The 24-item CET (Taranis et al., 2011) consists of five original subscales: Avoidance and rule-driven behavior (e.g. “I feel guilty if I miss an exercise session”); Weight control exercise (e.g. “I exercise to burn calories and lose weight”); Mood improvement (e.g. “I feel less anxious after I exercise”); Lack of exercise enjoyment (e.g., “I find exercise a chore”) and Exercise rigidity (e.g. “I follow a set routine for my exercise”). In line with previous research (Bodill et al., 2016; Plateau et al., 2014), the two originally proposed CET subscales, lack of exercise enjoyment and exercise rigidity, were excluded.

2.3.2. Eating pathology

The EDE-Q (Fairburn & Beglin, 1994) is a widely used reliable and valid measure of eating pathology with four subscales: Restraint, Eating Concern, Weight Concern, and Shape Concern.