Does the German version of the Exercise Dependence Scale measure exercise dependence?

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ABSTRACT

Objective: To examine the concordance of a questionnaire-based categorization as 'at-risk for exercise dependence' and an interview-based diagnosis of exercise dependence.
Design: One hundred thirty four subjects answered the German version of the Exercise Dependence Scale-21 (EDS-G). They were also assessed with a structured clinical interview for exercise dependence.
Method: The congruence between the questionnaire-based categorizations of 'at-risk for exercise dependence' and the diagnosis of exercise dependence based on the interview was examined using κ-coefficients.
Result: The agreement between questionnaire-based and interview-based diagnoses was fair to moderate with more false positive categorization based on the EDS-G.
Conclusion: Assuming that a structured clinical interview allows a more accurate diagnostic categorization, the EDS-G might overestimate the prevalence of exercise dependence.

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Even though exercising is associated with a positive and protective influence on health (e.g., Dishman & Buckworth, 1996) it is known that extreme forms of exercising can have negative effects. Exercise dependence refers to extreme exercise that leads to neglect of work or family and intense preoccupation with exercising. Typically, individuals with exercise dependence ignore exhaustion and continue to exercise despite persistent or recurrent physical distress, pain, or impairment (Adams, 2009; Bamber, Cockerill, Rodgers, & Carroll, 2003; Hausenblas & Symons Downs, 2002a; Veale, 1987). Two variants, primary and secondary exercise dependence, have been described (Bamber, Cockerill, Rodgers, & Carroll, 2003; Cook, Karr, et al., 2013; Veale, 1987). Primary exercise dependence occurs when exercise is the sole contributor to distress and is commonly observed in ambitious recreational athletes and professional athletes (McNamara & McCabe, 2012; Veale, 1987). Secondary exercise dependence is well known as a comorbid condition in patients with eating disorders, where exercising is a method to control weight (Bewell-Weiss & Carter, 2010; Bratland-Sanda et al., 2010; Cook & Hausenblas, 2008).

Exercise dependence has not been included in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (APA,

2013). Nevertheless, the strong association between exercise dependence and eating disorders has been demonstrated in several studies (Cook, Engel, et al., 2013; Meyer, Taranis, Goddwin, & Haycraft, 2011; Shroff, Reba, & Thornton, 2006). Also, impaired body consciousness (Hausenblas & Fallon, 2002), obsessive passion (Paradis, Cooke, Martin, & Hall, 2013) and personality traits such as perfectionism (Hausenblas & Giacobbi, 2004) have been linked to exercise dependence.

Several measurement tools exist that attempt to quantify problematic exercise patterns. The Exercise Dependence Scale-21 (EDS-21) is a widely used questionnaire to assess exercise dependence symptoms (Hausenblas & Symons Downs, 2002b, 2002c) which is based on the diagnostic criteria for substance dependence as defined in the 4th edition of the DSM (APA, 1994). Recent research has concluded that the EDS-21 is the 'gold standard' survey assessment for measuring problematic exercise (Mónok et al., 2012). The EDS-21 has been widely used in the U.S. and also in several European countries (Allegre & Therme, 2008; Costa, Cuzzocrea, Hausenblas, Larcan, & Oliva, 2012; Kern, 2007; Lindwall & Palmeira, 2009; Mónok et al., 2012; Parastatidou, Doganis, Theodorakis, & Vlachopoulos, 2012; Sicilia & González-Cutre, 2011).

The EDS-21 contains 21 items, three of which belong to each of the following seven subscales: 1) *tolerance* (e.g., I continually increase my exercise to achieve the desired effects/benefits.), 2) *withdrawal* (e.g., I exercise to avoid feeling irritable.), 3) *continuance*

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(e.g. I exercise despite recurring physical problems.), 4) *lack of control* (e.g., I am unable to reduce how long I exercise.), 5) *reduction in other activities* (e.g., I would rather exercise than spend time with family/friends.), 6) *time* (e.g., I spend a lot of time exercising.), 7) *intention effects* (e.g., I exercise longer than I intend.). The responses to the questions are based on a Likert-Scale from 1 (never) to 6 (always). Higher scores indicate a higher risk for exercise dependence. Hausenblas and Symons Downs (2002b, 2002c) proposed an algorithm to categorize people into three groups. Specifically, those who report scores of five to six on items for at least three subscales are categorized as 'at-risk for exercise dependence', scores of three to four on items for at least three subscales are categorized as 'non-dependent symptomatic', and scores of one to two items are categorized as 'non-dependent asymptomatic' (Hausenblas & Symons Downs, 2002b, 2002c).

Recently, a translated German version of the EDS-21 (EDS-G) was validated in a large population-based sample with 1611 adult participants (54% women) (Müller et al., 2013) confirming the factorial structure of the original version published by Hausenblas und Symons Downs (2002b, 2002c). Because the aforementioned scoring algorithm to define individuals as 'at-risk for exercise dependence' is complicated and time consuming, and the seven EDS-21 subscales were all highly correlated in the German study ($r = .79$ to $.94$ in different subsamples), a cut-off value of the total EDS-G score was proposed by using a receiver operating characteristic (ROC) curve. This ROC analysis, which was based on the diagnostic criteria for being 'at-risk for exercise dependence' (Hausenblas & Symons Downs, 2002b), revealed that a total EDS-G score above 77 defined individuals as "at-risk for exercise dependence" with a sensitivity of 1 and a specificity of .97 (Müller et al., 2013). Analyses of congruence between 'at-risk diagnoses' for exercise dependence based on the ROC analysis and the scoring algorithm proposed by Hausenblas and Symons Downs (2002b) suggested substantial agreement between the two approaches with κ-coefficients ranging from .66 to .73 in various samples (e.g., medical students, sport students, clients of fitness centers) (Müller et al., 2013).

Using the total score cut-off value of 77, 3.5% of the German representative sample was estimated to be 'at-risk for exercise dependence' (Müller et al., 2013). However, the clinical value of this categorization seems debatable. That is, the extent to which the questionnaire-based categorization of 'at-risk for exercise dependence' reflects a clinical diagnosis of exercise dependence is still not clear. The present investigation attempted to fill this gap by asking individuals who regularly exercise to complete the EDS-G and additionally to take part in a structured clinical interview for exercise dependence. We assumed that the interview-based method of determining exercise dependence diagnosis will provide a more accurate assessment than the EDS-G (Kendall, 2008). In order to assess individuals with different levels of exercise activity and to warrant a wide variety of sports, our sample consisted of recreational athletes, clients of fitness centers and sport studies students. Moreover, we have taken into account the high prevalence of secondary exercise dependence in individuals with eating disorders (Shroff et al., 2006) by including a group of patients with a diagnosed eating disorder in this study. The purpose of this study was to examine the congruence of the questionnaire derived categorization of 'at-risk for exercise dependence' and a clinical interview-based diagnosis.

Method

Procedure

The protocol was approved by an Institutional Ethics Committees and all individuals provided written informed consent. Data were collected between April 2010 and September 2011. Inclusion criteria were age between 16 and 60 years, sufficient German language skills, and engaging in sports at least one hour per week. Assessment was carried out by two trained doctoral level students (A. H. and V. M.). Specific training and regular supervision was provided by the first author.

Participants

The total sample consisted of 134 individuals (52.2% female, 47.8% male) and was divided into the following four subgroups: 1) 35 individuals who were recruited at three different fitness centers, 2) 42 University students who studied sport, 3) 25 recreational athletes, and 4) 32 inpatients with an eating disorder who were treated at the University Hospital of Erlangen; of those 14 women were diagnosed with bulimia nervosa and 18 with anorexia nervosa. The EDS-G results of the first two groups were already reported elsewhere (Müller et al., 2013).

Measures

Exercise Dependence Scale − German version (EDS-G)

All participants answered the German version (EDS-G) (Müller et al., 2013) of the EDS-21 (Hausenblas & Symons Downs, 2002b). The items of the EDS-G refer to the last three month and therefore assess the current tendency to problematically exercise. Cronbach's α for the total EDS-G score in the present sample ranged from .80 to .97 across the subgroups. Similarly, the internal consistency for 6 of 7 subscales was high with Cronbach's α from .80 to .92. The subscale *reduction in other activities* showed good consistency in patients with eating disorders ($\alpha = .86$) but was not acceptable in clients of fitness centers ($\alpha = .32$), sport studies students ($\alpha = .36$) and recreational athletes ($\alpha = .12$). Low scores on this subscale have been reported previously (e.g., Hausenblas, Symons Downs, & Nigg, 2004; Paradis et al., 2013).

Structured clinical interview for exercise dependence

All participants were assessed face-to-face by using a structured clinical interview that was developed for the present study. The interview targeted the same aspects of exercise dependence as the EDS-G. First, all participants were asked to describe their sport activities within the last three months. Then they were encouraged to describe their motivation for exercising, as well as the duration and frequency of exercise habits in as much detail as possible. Moreover, the interview explored if exercise is used to avoid negative feelings (e.g., tense, depression, anxiety), how much exercise interferes with social functioning (e.g., giving up social, occupational and/or recreational activities because of exercise), and if there is a need to permanently increase the amount they exercise or an inability to reduce exercise despite negative consequences, health problems, or injuries.

Data analysis

Data analysis was performed using IBM SPSS Statistics v.20. Participants were categorized as 'at-risk for exercise dependence' using both the scoring algorithm proposed by Hausenblas and Symons Downs (2002b) and the EDS-G total cut-off score of 77 (Müller et al., 2013). The congruence between the questionnaire-based categorizations of 'at risk for exercise dependence' and the diagnosis of exercise dependence based on the interview was examined using κ-coefficients. According to Landis and Koch (1977), a $\kappa < .20$ refers to slight agreement, $.21 < \kappa < .40$ to fair agreement, $.41 < \kappa < .60$ to moderate agreement, $.61 < \kappa < .80$ to substantial agreement, and $.81 < \kappa < 1.00$ defines an almost perfect agreement. Due to the lack of variance homogeneity (significant