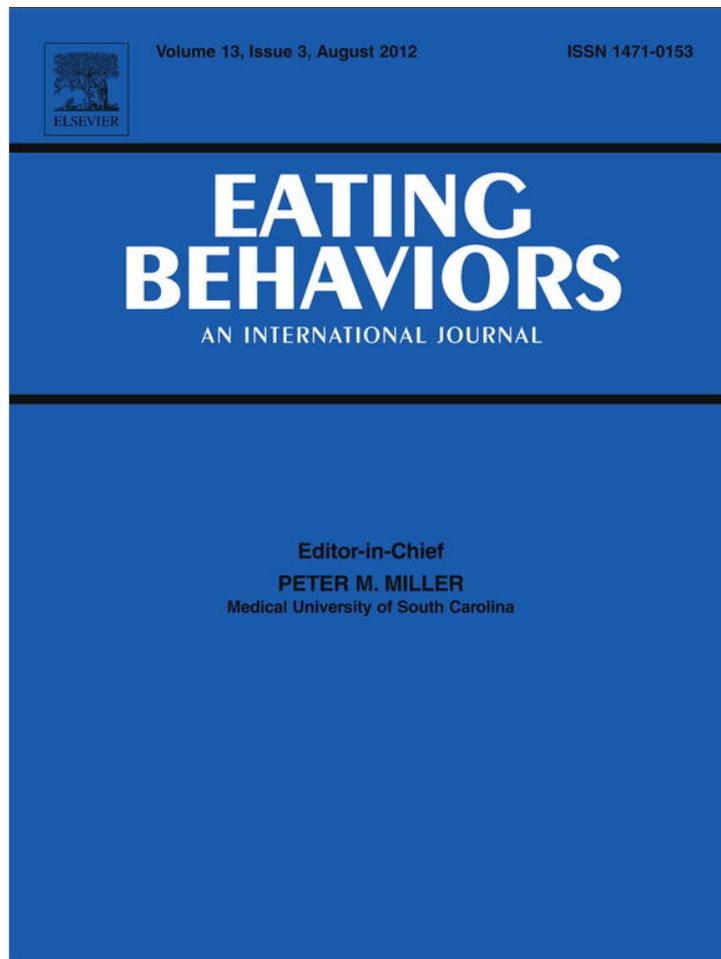


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## Body esteem and eating disorder symptomatology: The mediating role of appearance-motivated exercise in a non-clinical adult female sample <sup>☆</sup>

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### ABSTRACT

**Objectives:** Low body esteem poses a risk for the development of eating disorder symptomatology. Appearance-motivated exercise, as opposed to health-motivated exercise, has been associated with both low body esteem and eating disorder symptomatology. The aim of this study was to investigate the mediating role of appearance-motivated exercise in the link between body esteem and eating disorder symptomatology.

**Method:** Female fitness club members ( $N = 81$ ) reported their body esteem, eating disorder symptomatology and exercise motives.

**Results:** Appearance-motivated exercise partially mediated the link between low body esteem and eating disorder symptomatology. In contrast, health-motivated exercise was unrelated to both body esteem and eating disorder symptomatology.

**Conclusion:** Results indicate that the motives underlying exercise in response to low body esteem have differential consequences for the potential development of eating disorders, signifying the clinical relevance of considering motives behind exercise.

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### 1. Introduction

Many women, no matter what size or shape, experience a discrepancy between what they look like and what they want to look like, leaving them with negative feelings about their body or appearance (Frederick, Peplau, & Lever, 2006), i.e., low body esteem (Mendelson, Mendelson, & White, 2001). Such low body esteem may have detrimental consequences: it puts women at risk for a variety of psychological disturbances, most notably disordered eating patterns (Stice & Shaw, 2002). Although prior research demonstrated the link between low body esteem and eating disorder symptomatology (Stice & Shaw, 2002), research into the underlying mechanisms explaining the relation between body esteem and eating disorder symptomatology is relatively limited and mainly focuses on the role of (dieting) behavior rather than psychological processes, such as (exercise) motives. Although exercise may seem a healthier strategy to change appearance than dieting, it has, similar to dieting, also been implicated in the development of eating disorders (Davis, 1990). More specifically, while exercise per se may not necessarily increase the risk for developing eating disorders, one's motives for exercise may do so (Mond, Hay, Rodgers, & Owen,

2006; Prichard & Tiggemann, 2008). Surprisingly, exercise motives are rarely considered in conjunction with eating disorder symptomatology and body esteem, despite its association with both (see McDonald & Thompson, 1992 for an exception). We therefore examine whether the motives underlying exercise offer an additional explanation for the link between low body esteem and maladaptive eating behavior. Specifically, we hypothesize that appearance-motivated exercise, as opposed to health-motivated exercise, mediates the relation between body esteem and eating disorder symptomatology, as we will substantiate next.

Previous research has shown that the type of exercise motives that people endorse is differentially associated with both low body esteem (Strelan, Mehaffey, & Tiggemann, 2003) and pathological eating behavior (Mond et al., 2006). The distinction in exercise motives most relevant to body esteem and eating disorder symptomatology (cf. Tiggemann & Williamson, 2000) is motives related to appearance/weight reasons and to health/fitness (e.g., Cash, Novy, & Grant, 1994; Prichard & Tiggemann, 2008). Studies show that appearance-motivated exercise, as opposed to exercising for health, is associated with a host of adverse psychological factors, with negative feelings about one's body as the most prominent one (Cash et al., 1994; McDonald & Thompson, 1992; Strelan et al., 2003). Additionally, appearance-motivated exercise is related to disturbed eating patterns, whereas health-motivated exercise is associated with less eating disorder symptomatology (e.g., Cash et al., 1994; McDonald & Thompson, 1992; Mond et al., 2006). Though studies have investigated these three factors simultaneously (e.g., McDonald & Thompson, 1992), none have examined the mediating role of appearance-motivated exercise, despite its theoretical plausibility.

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To understand the role of appearance-motivated exercise in the link between low body esteem and eating disorder symptomatology, Self-determination theory (SDT; Ryan & Deci, 2000) provides a useful framework. According to SDT, behavior varies in the extent to which it is intrinsically or extrinsically motivated, or in other words, whether it is self-determined or engaged in because of external rewards or pressures. Research showed that appearance vs. health-motivated exercise may be paralleled with extrinsically vs. intrinsically motivated behavior (Ingledeu & Markland, 2008). We argue that people with low body esteem who endorse extrinsic exercise motives may miss out on the intrinsically rewarding properties of exercise, and therefore may maintain or increase the focus on external reinforcement, i.e., their appearance. Indeed, studies have shown that women who exercised to improve appearance worried more about others' opinions of their body than those who exercised for health reasons (e.g., Crawford & Eklund, 1994). Heightened importance attached to physical appearance may evoke rigorous eating patterns to further improve appearance, such as extreme food restriction, leaving women vulnerable to develop an eating disorder. In line with this suggestion, Hubbard, Gray, and Parker (1998) found that women who exercised primarily to work off food or change their appearance were not only more preoccupied with their weight and attached greater importance to their appearance, but also showed more eating disorder symptomatology than those whose reasons to exercise were unrelated to weight control or appearance.

Thus, we propose that aside from the "dietary pathway" between body dissatisfaction and eating disorder symptomatology (Stice & Shaw, 2002), appearance-motivated exercise poses another route to maladaptive eating behavior in response to low body esteem. Importantly, we posit that *why* people exercise, rather than how frequent or long they exercise, is associated with eating disorder symptomatology. A clearer understanding of the interrelations among these variables may have clinical value for eating disorder prevention. For instance, health professionals may use motives behind exercise as an additional screening tool for detecting people who are at risk for eating disorder symptomatology.

## 2. Method

### 2.1. Sample

Women ( $N = 81$ ), aged 17–50 years ( $M = 32.88$ ,  $S.D. = 9.86$ ), were recruited from seven fitness centers. Participants had a mean Body Mass Index (BMI; Seidell & Flegal, 1997) of 22.03 ( $S.D. = 2.15$ ).

### 2.2. Procedure

After fitness centers gave consent to recruit among their members, aerobic class instructors distributed the questionnaires among aerobic class attendees. Instructors informed these attendees that they could voluntarily participate in a study concerning exercise behavior, and explicitly ensured that answers would be anonymous and strictly confidential. To exclude possible effects of exercise on filling out the questionnaire, such as fatigue or mood alterations, participants were asked to take the questionnaire home after the aerobics class and hand them in at the next class. Alongside the questionnaire, a printed form was handed out informing participants of the purpose of the study, confidentiality, and researcher contact details. Questionnaires were, upon receipt, sealed in a box to ensure confidentiality.

### 2.3. Measures

#### 2.3.1. Exercise frequency and duration

Two items assessed participants' exercise frequency and duration: "How many days per week do you exercise on average?", rated on a 7-point scale, and "What is the average duration of each workout session?", rated on a 4-point scale (0–30 min, 30–45 min, 45–60 min,

more than 60 min). A composite score of average exercise frequency and duration per week was created by multiplying the average amount of days with the high-end average minutes per session (30, 45, 60, and 75 min, respectively).

#### 2.3.2. Reasons for exercise

The Reasons for Exercise Inventory (REI; Silberstein, Striegel-Moore, Timko, & Rodin, 1988) as adapted by Cash et al. (1994) was used. The different exercise reasons were rated on 7-point scales ranging from 1 (*not at all important*) to 7 (*extremely important*) and two subscales were created: appearance motives (9 items, e.g., "I exercise to be slim";  $\alpha = 0.90$ ) and health motives (8 items, e.g., "I exercise to improve my stamina";  $\alpha = 0.82$ ). As the most relevant motives for the present study aims were appearance and health motives, items assessing exercise for enjoyment and mood improvement (7 items) were not included in the analyses.

#### 2.3.3. Body esteem

Body esteem was measured by the Body Esteem Scale for Adolescents and Adults (BESAA; Mendelson et al., 2001). The BESAA includes 23 statements (e.g., "I am satisfied with how I look in photographs";  $\alpha = 0.92$ ) which were rated on 7-point scales ranging from 1 (*completely disagree*) to 7 (*completely agree*).

#### 2.3.4. Eating disorder symptomatology

Eating disorder symptomatology was measured using the Eating Disorder Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000). The EDDS consists of 22 items reflecting DSM-IV diagnostic criteria for Anorexia Nervosa, Bulimia Nervosa, and Binge Eating Disorder. Example items include: "In the past three months, has your weight influenced how you think about yourself as a person?" and "In the past six months, have there been times when you felt you have eaten what other people would consider as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances?" The EDDS has been shown to be a reliable and valid scale for the assessment of eating disorder symptomatology (Stice, Fisher, & Martinez, 2004; Stice et al., 2000). A composite score ( $\alpha = 0.74$ ) assesses the severity of eating disorder symptomatology and can be used to identify individuals with eating disorder symptomatology (see Stice et al., 2004, for the computation of the composite score).

## 3. Results

### 3.1. Sample characteristics

On average, participants exercised 2.93 times per week ( $S.D. = 1.57$ ), and most (66.7%,  $N = 54$ ) exercised between 45 and 60 min per workout session. The mean score on the composite exercise frequency and duration score was 189.44 min (3.16 h) per week ( $S.D. = 109.11$ , range 60–525). This mean is comparable to the average of women from the general population (approx. 4 h per week; Tiggemann & Williamson, 2000) and the Dutch population (46% of the Dutch population exercises 1–4 h a week; CBS, 2008). Participants rated the importance of appearance motives on average 4.44 ( $S.D. = 1.35$ ), and health motives 4.92 ( $S.D. = 1.03$ ). As shown in Table 1, appearance and health motives were moderately but significantly correlated. The mean score for body esteem was 4.85 ( $S.D. = 1.02$ ) and for eating disorder symptomatology 25.68 ( $S.D. = 10.22$ ; range 13–74). Scores for the two exercise motives (e.g., Prichard & Tiggemann, 2008; Strelan et al., 2003) as well as for body esteem (e.g., Prichard & Tiggemann, 2008) and eating disorder symptomatology ( $M = 22.55$ – $0.00$ , Mitchell, Mazzeo, Rausch, & Cooke, 2007;  $M = 22.32$ , DiBartolo, Li, & Frost, 2008) are comparable to previous research among female samples. There is no cut-off score available to categorize people according to their scores on the composite measure of eating disorder symptomatology, rendering it difficult to assess the

**Table 1**  
Correlations between motives for exercise, body esteem, and eating disorder symptomatology (N = 81).

	1.	2.	3.	4.	5.	6.	7.
1. Appearance motives							
2. Health motives	0.37**						
3. Body esteem	-0.32**	-0.01					
4. Eating Disorder Symptomatology	0.48**	0.09	-0.59**				
5. BMI	0.10	0.23*	-0.43**	0.04			
6. Age	-0.38**	0.01	-0.04	-0.23*	0.12		
7. Exercise frequency and duration	0.29**	0.20	-0.03	0.33**	-0.03	-0.28*	
M (S.D.)	4.44 (1.35)	4.92 (1.03)	4.85 (1.02)	25.68 (10.22)	22.03 (2.15)	32.88 (9.86)	189.44 (109.11)

\*  $p < 0.05$ .  
\*\*  $p < 0.01$ .

clinical significance (E. Stice, personal communication, September 30, 2010).

3.2. Body esteem, reasons for exercise and eating disorder symptomatology

To test whether eating disorder symptomatology was associated with appearance-motivated, but not health-motivated exercise, we conducted a multiple regression analysis with the two domains of exercise motives as predictors (appearance and health) to examine the relation between exercise motives and eating disorder symptomatology<sup>1</sup>. The predictors explained 23.8% of the variance in eating disorder symptomatology,  $F(2, 78) = 12.15, p < 0.01$ , Cohen's  $f^2 = 0.31$ . As can be seen in Table 2, appearance-motivated exercise significantly predicted eating disorder symptomatology,  $\beta = 0.52, p < 0.01$ , whereas health-motivated exercise was not associated with eating disorder symptomatology,  $\beta = -0.10, p = 0.34$ .

To analyze the mediating role of appearance motives for exercise in the link between body esteem and eating disorder symptomatology, we conducted a test of the indirect effect in a mediator model with bias-corrected bootstrapping (Preacher & Hayes, 2008; Shrout & Bolger, 2002). Bootstrapping is a statistical method that resamples the original sample 5000 times, thereby creating a sampling distribution and associated 95% confidence intervals of the indirect effect. Bootstrapping is considered to be the most powerful method of obtaining accurate confidence intervals for indirect effects, and is superior to the Sobel test in terms of power and Type I error rates, even when sample sizes are small to moderate (20–80 cases; MacKinnon, Lockwood, & Williams, 2004), which is the case in the present study. Prior to analysis, variables were Z-transformed in order to facilitate interpretation of coefficients<sup>1</sup>.

The analysis revealed that the total effect of body esteem (predictor) on eating disorder symptomatology (outcome) was significant,  $\beta = -0.59, p < 0.01$ , indicating that body esteem has a unique association with eating disorder symptomatology. Body esteem (predictor) was significantly related to appearance-motivated exercise (mediator),  $\beta = -0.32, p < 0.01$ . Appearance-motivated exercise, in turn, was significantly associated with eating disorder symptomatology (outcome),  $\beta = 0.32, p < 0.01$ .

The indirect effect of body esteem on eating symptomatology via appearance-motivated exercise was significant,  $\beta = -0.10, p < 0.05$ , with a bias-adjusted and accelerated 95% confidence interval of  $-0.2144$  to  $-0.0283$ . The absence of the value of zero in the confidence interval signifies the mediator's statistical significance. The direct effect of body esteem on eating disorder symptomatology remained significant after including the mediator,  $\beta = -0.48, p < 0.01$ , indicating partial

mediation. The model explained 44% of the variance in eating disorder symptomatology,  $R^2 = 0.44, F(2, 78) = 30.31, p < 0.01$ , Cohen's  $f^2 = 0.78$ .

As can be seen in Table 1, exercise motives and the composite score of exercise frequency and duration showed a moderate positive correlation. As noted in the Introduction, we propose that it is exercise motives, rather than exercise frequency or duration that mediates between body esteem and eating disorder symptomatology. We tested this proposition by including exercise frequency and duration as an additional mediator in addition to appearance motives in the model. The indirect effect of body esteem on eating disorder symptomatology through exercise frequency and duration, however, was not significant,  $\beta = -0.008$ , with a CI from  $-0.1287$  to  $0.0346$ . Together, these results provide converging evidence that the negative association of body esteem with eating disorder symptomatology occurred partially through appearance-motivated exercise.

4. Discussion

The current study sought to examine the relations between body esteem, exercise motives, and eating disorder symptomatology in an adult female community sample. Confirming our hypothesis, the results show that appearance-motivated exercise partially mediated the link between body esteem and eating disorder symptomatology. In contrast, health-motivated exercise was unrelated to both body esteem and eating disorder symptomatology.

Results are in line with previous studies showing that exercising to improve appearance is associated with eating disturbance (e.g., Mond et al., 2006) and low body esteem (e.g., Strelan et al., 2003). The mediation was partial, yet body esteem and appearance-motivated exercise accounted for almost half of the variance in eating disorder symptomatology, which is substantial. Our study extends prior research indicating that dietary restriction and negative affect provide explanatory pathways (Stice & Shaw, 2002), by demonstrating that motives for exercise may serve as an additional route to eating disturbance.

The positive correlations between appearance and health-motivated exercise indicate that many people exercise for appearance and health at the same time. Indeed, in the present sample a substantial number of participants (33.3%) scored high (above the median) on both health and appearance motives. This renders it difficult to disentangle these two motives' effects on eating disorder symptomatology. It is likely, though, that the risk for developing eating problems in response to low body esteem is greatest for those whose

**Table 2**  
Multiple regression analysis with motives for exercise as predictors for eating disorder symptomatology.

	$\beta$	$R^2$
1. Appearance motives	0.52**	
2. Health motives	-0.10	0.238

\*\*  $p < 0.01$ .

<sup>1</sup> Because EDDS scores were not normally distributed all of the analyses were initially performed on the log-transformed scores for the EDDS scale. However, as the direction and significance of all of the results were similar using either the log-transformed or non-logtransformed scores, we chose to report results of analyses with the untransformed EDDS scale to facilitate interpretation of the regression coefficients.

appearance-related motive for exercise outweighs their health motive. This suggestion parallels Self-determination Theory's tenet that when the balance between extrinsic and intrinsic motives tips in favor of extrinsic motives, it leads to negative consequences for well-being (Ryan & Deci, 2000). Nonetheless, the interplay between different exercise motives, and how these interact to determine psychological health warrants further investigation.

Also from a broader perspective, our results are in accord with Self-determination Theory, which posits that when the basic need for autonomy is thwarted, i.e., when behaviors are extrinsically motivated, it increases the risk for developing psychopathology (Ryan & Deci, 2000). We demonstrated that appearance-related, extrinsic motives may partly explain why some body dissatisfied women may develop maladaptive eating patterns deleterious to psychological well-being, rather than ameliorate negative feelings about their body. The more intrinsic motive, health, was not associated with eating disturbance, suggesting that it is indeed solely appearance-motivated exercise that contributes to eating disorder symptomatology. By considering motives behind exercise, we shed light on prior findings that for some women, physical activity does not improve negative body image (cf. Tiggemann & Williamson, 2000), and is associated with eating disorder symptomatology (Davis, 1990). The results therefore contribute to literature in the health domain, which increasingly recognizes the importance of motivation in understanding antecedents and consequences of exercise behavior.

The present study is not without limitations. The cross-sectional correlational design does not allow any conclusions about the direction of causality of the variables. It is thus possible that low body esteem results in appearance-motivated exercise and disturbed eating. That is, appearance-motivated exercise and eating disorder symptomatology may independently share the common cause of being dissatisfied with one's body. The most plausible interlink, however, is that the relations between exercise motives, low body esteem, and eating disorder symptomatology are mutually reinforcing and reciprocal over time. Therefore, future studies should employ a longitudinal design in order to disentangle causes and effects. Another limitation concerns the small sample size. Although the bootstrapping method was employed to counteract this limitation (MacKinnon et al., 2004), replication of the present results in a larger sample is needed. Also, the procedure employed in this study may have led to a selective sample. Specifically, participants who returned the questionnaire may have been particularly motivated or personally involved in the problem, or displayed relatively few or many eating disorder symptoms. It therefore seems prudent for future studies to assess baseline measures for all participants to examine differences between responders and non-responders. Although the current procedure was deemed most appropriate as some of the questions were sensitive in nature and thus confidentiality and anonymity were of utmost importance, it is important for future research to employ a procedure that results in a clearer response rate, such as providing reply-paid envelopes. Relatedly, the procedure prohibited us from assessing the exact response rate.

Finally, results of our study are limited in generalizability as they can be applied only to women who regularly exercise in a fitness center. Prior research suggests that such women may be a selective group. Prichard and Tiggemann (2008) showed, for instance, that time spent exercising within the fitness center environment, compared to time spent exercising outside the gym, was more positively related to appearance-motivated exercise and disordered eating behavior, and more negatively related to body esteem. Although fitness centers are a common exercise environment for many women in the general population (Slater & Tiggemann, 2006; Social and Cultural Planning Office, 2007), further research is needed to examine the current research's topic in populations of exercisers other than fitness club members. Moreover, future research should replicate results in males, and people involved in other sports than aerobics.

In addition to addressing the above mentioned limitations, another avenue for further research is to examine other reasons for exercise not measured in the present study. Although health and appearance seem to be the most obvious and common motivation to engage in exercise, it is possible that people exercise for several other reasons, such as obsessivity–compulsivity (Davis & Kaptein, 2006), which may also be important to consider when it comes to (the detrimental consequences of) exercise. Despite the above outlined limitations, it is important to note that a strength of the present study is that we investigated a non-clinical adult sample, making our results useful for a group that is vulnerable to eating disorder symptomatology but avoiding problems of interpretation associated with clinical samples.

To summarize, this study has extended prior work by investigating the role of exercise motives in the link between low body esteem and eating disorder symptomatology. Also, our findings highlight the role of exercise motives as a promising avenue for future research on the potentially harmful effects of exercise and low body esteem. These results not only have implications for preventive interventions for eating disorders, but also for programs for overweight adults and public health policies that promote exercise primarily as a means to lose weight or change appearance. Although exercise often does entail weight loss and changes appearance, it may be beneficial to emphasize the intrinsic value of exercise to mitigate possible negative consequences of exercise in response to low body esteem.

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#### Contributors

Vinkers conducted the statistical analyses, literature searches, and wrote the first draft of the manuscript. Evers designed and supervised the study, and contributed to the writing and refinement of further drafts of the manuscript. Adriaanse and De Ridder contributed significantly to data analysis, proof-reading and writing of the manuscript. All authors have contributed to and have approved the final manuscript.

#### Conflict of interest

The authors declare no conflict of interest.

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