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**Research article**

# Big Five Personality Traits and Eating Attitudes in Intensively Training Dancers: The Mediating Role of Internalized Thinness Norms

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**Abstract**

Dancers are at high risk of developing disordered eating attitudes, notably because of internalized thinness norms. Although the big five personality traits have been shown to be associated with eating attitudes in daily life, in dancers where eating issues and thinness norms internalization could be salient little is known about these associations and the role of the internalization of thinness norms in this relationship. The main objectives of this study were thus to examine the relationships between the personality traits defined in the big five model and the self-regulation of eating attitudes, and to assess the role of internalized thinness norms in this association. The study included 180 intensively training dancers with an average age of 15.6 years (SD = 2.8). Dancers completed questionnaires measuring the big five personality traits, internalization of thinness norms and self-regulation of eating attitudes in sport. Bootstrapped mediation analyses showed that neuroticism was negatively associated with self-regulation of eating attitudes, both directly and indirectly through the mediating role of internalized thinness norms. This study suggested that: (a) neuroticism is a vulnerability factor for self-regulation of eating attitudes in dancers, as already evidenced in the general population, and (b) the internalization of thinness norms is a pathway through which neuroticism affects self-regulation of eating attitudes. The big five model is therefore partially related to the internalization of thinness norms and eating attitudes in dancers.

**Key words:** Disordered eating, dance, big five model, neuroticism.

## Introduction

Young elite dancers seem to be at high risk for disordered eating, particularly as leanness and weight are often considered to be important factors of performance (Cresswell and Eklund, 2006; Cumming and Duda, 2012). Eating disorders are serious diseases because they lead to detrimental somatic changes, including reduced physical fitness, altered body weight and body fat percentage, and poor bone health (Mitchell and Crow, 2006). In contrast, disordered eating attitudes are unhealthy attitudes and behaviors, ranging from strict dietary habits in order to lose or maintain weight to the severe food restriction observed in anorexia (Hobart and Smucker, 2000). Dancers are at high risk of developing disordered eating attitudes because of both the aesthetic demands of dance and the intensive training they undergo (Arcelus et al., 2014; Smolak et al., 2000).

In dancers, where eating issues could be salient, most of them might feel the need to self-regulate eating attitudes. The self-regulation of eating attitudes has been defined as the attempt to manage dietary intake in a mindful, voluntary, and self-directed way within the context of other physiological and environmental constraints (Herman and Polivy, 2004). This construct was adapted to the sports context in terms of self-efficacy to manage food temptation, negative effects, social pressure, and compensatory dietary strategies, and was found to be negatively related to eating attitudes (Scoffier et al., 2010a; 2010b), as assessed by the EAT-26 (Garner and Garfinkel, 1979; Lane et al., 2004) a test often used to screen for individuals at risk of disordered eating behavior and to assess abnormal, disturbed, or exaggerated eating patterns in nonclinical samples (Rosendahl et al., 2009). These results suggest that the more athletes control eating attitudes, the less apt they are to develop disordered eating strategies.

Although many psychological predictors of eating disorders in athletes have been identified in the literature (e.g., Petrie and Greenleaf, 2007), research pertaining to the self-regulation of eating attitudes is scarce and the role of psychological factors such as personality traits remains unexplored (Scoffier et al., 2010a). The relationship between personality traits and disordered eating attitudes has essentially been evidenced in the general population (e.g., Cassin and von Ranson, 2005; Diaz-Marza et al., 2000; Ellickson-Larew et al., 2013), and little is known about how the big five model of personality (McCrae and Costa, 1990) applies to eating attitudes in athletes. For many athletes and dancers—who have much in common with athletes, given their rigorous physical training—the internalization of thinness norms might also be affected by individual factors. Numerous studies have focused on the effects of social influences (i.e., media, parents or peers) on eating variables through the mediating role of internalized thin-ideal standards (e.g., Stice, 1994; Schroff and Thompson, 2006), and a few studies have reported that personal factors such as self-esteem (Fingeret and Gleaves, 2004) or dispositional self-determination (Mask and Blanchard, 2009) are associated with the internalization of thinness norms. For this reason, we suspected that personality traits might be associated to internalizing thinness norms, but this issue is never been explored in athletes or dancers. Yet, the existing literature suggests that personal responses to the thin-deal and the self-regulation of eating attitudes reflect underlying differ-

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ences in personality traits. The present study was therefore designed to gain insight into the associations among personality traits, the internalization of thinness norms and the self-regulation of eating attitudes in female dancers.

Individuals can be described in terms of their personality traits, which are defined as characteristic patterns of thinking, feeling and behaving (Caspi et al., 2005). Personality is nowadays predominantly studied within the framework of the big five model of traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (McCrae and Costa, 1990). According to Rolland (2004), the big five model is a complete model because it covers most of the descriptions of personality, and it has often been used to examine disordered eating attitudes in daily life contexts (e.g., Diaz-Marsa et al., 2000; Ellickson-Larew et al., 2013; Ghaderi and Scott, 2000; Miller et al., 2006; Wade et al., 2000). These studies have notably shown that neuroticism (i.e., high anxiety and poor emotion stability) is the personality trait most consistently associated with eating disorder diagnosis (Cassin and von Ranson, 2005; Diaz-Marza et al., 2000; Ellickson-Larew et al., 2013; Ghaderi and Scott, 2000) and disordered eating attitudes in nonclinical samples (MacLaren and Best, 2009; Miller, et al., 2006; Wade et al., 2000). Furthermore, the combination of high neuroticism with low extraversion (Miller et al., 2006) or low conscientiousness (Ellickson-Larew et al., 2013; Ghaderi and Scott, 2000) is a risk factor for disordered eating. Low agreeableness and high openness to experience are also risk factors for disordered eating (Ghaderi and Scott, 2000).

In the specific context of sport, research focused on the influence of personality on eating attitudes is scarse. A few studies have suggested that perfectionism is a risk factor for disordered eating attitudes in aesthetic sports athletes like synchronized swimmers (Ferrand et al., 2007) and dancers (Penniment and Egan, 2012). To our knowledge, however, the big five model has never been applied to the variables of eating attitudes in sports contexts. Specifically, little is known about the associations between personality traits and the self-regulation of eating attitudes. Furthermore, the psychological variables that could mediate these relationships are still to be identified. In the present study, we assume that internalization of thinness norms could be a pathway through which personality traits affect self-regulation of eating attitudes.

The internalization of thinness norms may also influence eating attitudes in aesthetic sports (Galli and Reel, 2009; Sherman and Thompson, 2009). Thinness is part of the current sociocultural standards of beauty and is strongly related to body image dissatisfaction and disordered eating (Shroff and Thompson, 2006). According to Harrison and Hefner (2006), the "thin-ideal media" present thinness as a desirable trait, and the thin protagonists in the media are perceived as exceptionally beautiful, desirable, and successful. Furthermore, thin-ideal internalization consists of the incorporation of specific values in societal norms of size and appearance, to the extent of modifying one's behavior in an attempt to approximate these standards (Thompson and Stice, 2001). Several studies have shown that the degree of thin-ideal internalization is correlated with the severity of disordered eating pathologies (e.g., Hawkins et al., 2004). In addition, other studies have indicated that the internalization of thinness norms mediates the associations between sociocultural factors, such as the media, parents and peers, and eating disturbances (e.g., Keery, Van Den Berg, and Thompson, 2004; Shroff and Thompson, 2006). Yet, the impact of individual factors on the internalization of thinness norms has received less attention, with a few correlational studies finding support for the role of a nonconformist attitude (Twamley and Davis, 1999), the endorsement of feminist beliefs (Murnen and Smolak, 2009), self-esteem (Fingeret and Gleaves, 2004), and self-concept clarity (Vartanian, 2009). Research has also indicated that nonconformity, self-esteem, perceived shape (Twamley and Davis, 1999) and self-compassion (Tylka, Russell and Neal, 2015) moderate the relationship between exposure to thinness norms and disordered eating. Nevertheless, the influence of the big five personality traits on the internalization of thinness norms and eating attitudes is still unknown, specifically in aesthetic endeavors like dance.

Prior research has indicated that both the big five personality traits and the internalization of thinness norms are associated with eating attitudes in the general population. However, little is known about these associations in at-risk athletes and dancers. The research also suggests that individual responses to the thin-ideal and the self-regulation of eating attitudes may reflect underlying differences in personality traits. In the current study, we sought to examine the relationships between the personality traits defined in the big five model and the self-regulation of eating attitudes, and to assess the potential mediating role of internalized thinness norms in this relationship. Our investigation focused on the population of intensively training dancers, who seem to be particularly at risk of internalizing thinness norms and developing disordered eating attitudes (e.g., Arcelus et al., 2014). Due to the lack of data for sports populations, our hypotheses were based on the literature regarding non-athlete populations. We hypothesized that neuroticism and openness to experience would be negatively associated with self-regulation of eating attitudes (Ghaderi and Scott, 2000; MacLaren and Best, 2009; Miller et al., 2006), whereas conscientiousness and agreeableness would be positively related to the self-regulation of eating attitudes (Ghaderi and Scott, 2000). Based on the studies reporting that personal factors are associated with the internalization of thinness norms (e.g., Fingeret and Gleaves, 2004), we also hypothesized that this last variable would mediate the relationship between personality traits and self-regulation of eating attitudes in dancers.

## Methods

### Participants and procedure

Dancers were eligible to participate in the study if they met the following criteria: women with (a) a minimum age of 14 years, (b) more than 10 hours of physical training per week, and (c) more than 5 years of dance experience. The sample was composed of 180 voluntary French

female dancers with ages ranging from 14 to 26 years ($M_{age}$ = 15.62; SD = 2.84). All dancers were training intensively, with an average of 16.20 hours of physical training per week (*SD* = 3.52) and an average of 10.97 years of experience (*SD* = 3.16). The research project was elaborated in collaboration with a pre-professional vocational dance school. As part of this collaboration, a researcher first met the dancers in the dance school to introduce the study and then sent them an e-mail invitation to complete the online questionnaire. The invitations contained a link to a webpage providing details on the research, a confidentiality agreement, and a notification that proceeding to the next webpage was an expression of informed consent to participate. If they chose to continue, participants were asked to provide baseline characteristics and then to complete a series of questionnaires measuring personality traits, internalization of thinness norms, and self-regulation of eating attitudes; we insisted on the importance of completing each question of the survey. We obtained parental consent for minor dancers before sending them the email invitation. Questionnaire completion did not take more than 20 minutes. The local ethics committee of the University approved the protocol.

### Measures

*Big five personality traits.* The five dimensions of personality were measured using the Big Five Inventory (BFI) developed by John and Srivastava (1999) and validated in French (BFI-Fr) by Plaisant et al. (2010). This questionnaire consists of 45 items divided into five subscales: (a) eight items measure extraversion (e.g., "I am talkative"); (b) ten items measure agreeableness (e.g., "I tend to find fault with others"); (c) nine items measure conscientiousness (e.g., "I do a thorough job"); (d) eight items measure neuroticism (e.g., "I am depressed, blue"), and (e) ten items measure openness to experience (e.g., " I see myself as someone who is creative, full of original ideas"). Participants rated to what extent they agreed with each of the items on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). A mean score was calculated for each subscale. A high subscale score indicated that the individual rated high on that personality dimension, and the inverse was true for a low score.

*Internalization of thinness norms.* Internalization of thinness norms was measured with the five items of the *Sociocultural Internalization of Appearance Questionnaire-Adolescents* (SIAQ-A; Keery et al., 2004), which was translated into French, adapted to the dance context, and validated. For example, the original SIAQ-A item, "I would like my body to look like the bodies of people in the movies," was adapted as follows: "I would like to resemble the athletes that I see in televised events"; and "Looking at magazines makes me want to change the way I look" was adapted as follows: "Looking at famous athletes on television makes me want to change by losing or gaining weight." These adaptations were made in collaboration with professional dancers to define the significant items related to the dance context. Participants were asked to answer on a 6-point Likert scale, ranging from 1 (*do not agree at all*) to 6 (*entirely agree*). A mean score was calculated for the five items. A high score indicated a high level of internalization of thinness norms and the inverse was true for a low score. Confirmatory factor analyses were performed with AMOS 21.0 (Arbuckle, 2006) to test the factorial structure of the adapted scale. The results from the CFA exhibited significant bootstrapped $\chi^2$ values ($\chi^2$= 23.6/ df = 5; $p < .05$) and acceptable goodness of fit indices: CFI = .92, TLI = .85, and RMSEA = .06. In addition, the internal consistency of the items was satisfactory ($\alpha = .88$).

*Self-Regulation of Eating Attitudes*. We used the *Self-Regulation of Eating Attitudes in Sports Scale* (SREASS; Scoffier et al., 2010a) to assess self-regulation of eating attitudes in dancers. The scale is composed of five subscales measuring the control of eating attitudes in contexts of: (a) food temptation, (b) negative affects, (c) social interaction, (d) lack of compensatory strategy, and (e) lack of anticipation of consequences on performance. A global index of self-regulation of eating attitudes was calculated by averaging the responses to the items of the five subscales. Participants were asked to answer on a 6-point Likert scale ranging from 1 (*not at all capable)* to 6 (*completely capable*). A mean score was calculated for each subscale. A high subscale score indicated a high level of self-regulation of eating attitudes and the inverse was true for a low score.

### Data analyses

Means, standard deviations, coefficient alphas, and bivariate correlations were calculated for the main study variables.

In order to test the hypothesized mediating role of the internalization of thinness norms, mediation analysis was conducted following the bootstrap procedure outlined by Preacher and Hayes (2004) and using the 'PROCESS' macro model 1 in SPSS (Hayes, 2013). In the present study, the bootstrap procedure resampled the data 5000 times and calculated the indirect effect for each sample. Bootstrapping involves repeatedly randomly sampling observations with replacement from the data set. The bias corrected (BC) 95% confidence interval (CI) indicates significant indirect effects if it does not contain zero (Preacher and Hayes, 2004).

## Results

### Descriptive analyses

Means, standard deviations, coefficient alphas, and bivariate correlations for all variables are presented in Table 1. In line with the theoretical position developed in the introduction, several relationships are worth noting: (a) neuroticism (one of the independent variables, IV under study) was significantly and positively related to internalization of thinness norms (the mediating variable, MV) and negatively related to self-regulation of eating attitudes (the dependent variable, DV), (b) agreeableness (another IV) was significantly and positively related to self-regulation of eating attitudes (DV), and (c) internalization of thinness norms in sport (MV) was significantly and negatively related to self-regulation of eating attitudes (DV).

**Table 1. Means (M), Standard Deviations (SD), Coefficient Alphas (α), and Bivariate Correlations for all Study Variables.**

| | M | SD | α | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1. Extraversion** | 3.05 | .62 | .81 | | | | | | | |
| **2. Agreeableness** | 3.29 | .34 | .76 | .00 | - | | | | | |
| **3. Conscientiousness** | 3.47 | .40 | .89 | -.16* | -.16* | - | | | | |
| **4. Neuroticism** | 3.35 | .63 | .89 | -.04 | -.04 | .16* | - | | | |
| **5. Openness** | 3.08 | .40 | .88 | -.27 | -.27* | .01 | .01 | - | | |
| **6. ITN** | 2.40 | .99 | .88 | .05 | .05 | -.08 | .28* | .05 | - | |
| **7. SREA** | 4.31 | .80 | .86 | -.03 | .17* | -.01 | -.31* | -.02 | -.45* | - |

ITN: Internalization of thinness norms; SREA: Self-regulation of eating attitudes; M: Mean; SD: Standard deviation; α: Coefficient alphas; * p < .05.

**Table 2. The Relationship between Personality Traits and Self-Regulation of Eating Attitudes in Dancers and the Indirect Effect of Internalization of Thinness Norms**

| Predictor | Mediator | Outcome | a path coef | b path coef | c' path coef | Mean indirect effect | SE | BC 95% CI mean effect |
|---|---|---|---|---|---|---|---|---|
| **Neuroticism** | ITN | SREA | .41*** | -.22*** | -.32*** | -.09 | .04 | -.18, -.03 |
| **Agreeableness** | ITN | SREA | -.35 | -.25*** | .29 † | .09 | .05 | -.00, .21 |
| **Extraversion** | ITN | SREA | .20 | -.26*** | -.02 | -.05 | .04 | -.13, .01 |
| **Conscientiousness** | ITN | SREA | -.01 | -.26*** | -.11 | .00 | .05 | -.12, .09 |
| **Openness** | ITN | SREA | .08 | -.26*** | -.10 | -.02 | .05 | -.13, .08 |

ITN: Internalization of thinness norms; SREA: Self-regulation of eating attitudes; SE: Standard error; BC 95% CI: Bias corrected 95% confidence interval; † p = .07; * p < .05, ** p < .01; *** p < .001.

## Main analyses

The bootstrap mediation analyses revealed a significant indirect effect of the IV, neuroticism, on the DV, self-regulation of eating attitudes, through the MV, internalization of thinness norms (see Table 2). Specifically, (a) the path from neuroticism to internalization of thinness norms was significant (a-path), (b) the path from internalization of thinness norms to self-regulation of eating attitudes was significant (b-path), and (c) the direct effect of neuroticism on self-regulation of eating attitudes was significant (c'-path). Internalization of thinness norms explained 24% of the variance in self-regulation of eating attitudes.

The direct effect of the IV, agreeableness, on the DV, self-regulation of eating attitudes, tended to be significant (c'-path; p = 0.07). However, no indirect effect of agreeableness on self-regulation of eating attitudes through the MV, internalization of thinness norms, reached significance.

Last, no direct or indirect effects of the IV, extraversion, conscientiousness and openness, on the DV, self-regulation of eating attitudes, through the MV, internalization of thinness norms, reached significance.

## Discussion

This study examined the relationships between the personality traits defined in the big five model and the self-regulation of eating attitudes in dancers, and the potential mediating role of internalized thinness norms in this relationship. The findings highlighted some significant relationships between personality traits and the self-regulation of eating attitudes in sports, as well as the significant mediation of internalized thinness norms.

We found that neuroticism was directly and negatively related to the self-regulation of eating attitudes. This result is consistent with previous studies reporting that high neuroticism, which is characterized by a predisposition toward negative effects (i.e., anxiety, depression, worry), is closely related to disordered eating (MacLaren and Best, 2009; Miller, et al., 2006; Wade et al., 2000) and eating disorders such as anorexia nervosa and bulimia nervosa (Cassin and von Ranson, 2005). We also noted that agreeableness tended to be directly and positively associated with the self-regulation of eating attitudes. This finding provides support to earlier studies on disordered eating (Ghaderi and Scott, 2000). No significant relationships were found between the three other personality traits (i.e., conscientiousness, extraversion and openness to experience) and the self-regulation of eating attitudes in sports. The relationships between personality factors and the symptoms of disordered eating are complex and difficult to determine because a single abnormal eating behavior may have different etiologies and symptoms. In fact, Claes et al. (2006) identified three subtypes of eating disordered personalities: (a) those with no elevated five factor scores; (b) an under-controlled group with high neuroticism, low conscientiousness and low agreeableness; and (c) an over-controlled group showing high neuroticism, high conscientiousness and low openness. The prediction of the exact symptomology may thus be aided by close examination of other personality characteristics (MacLaren and Best, 2009).

The bootstrap analyses revealed that the relationship between neuroticism and the self-regulation of eating attitudes was mediated by the internalization of thinness norms. Essentially, this finding suggests that the higher the neuroticism scores of female dancers, the more they internalize the thinness norms and the less they self-regulate eating attitudes. Neuroticism thus emerges as a risk factor for disordered eating attitudes because of its effect on the vulnerability to thin-ideal internalization. As this study is the first demonstration of the relationship between neuroticism and internalization of thinness norms, it enriches the literature that has suggested the role of individual factors such as self-esteem (Fingeret and Gleaves, 2004) or self-concept clarity (Vartanian, 2009) on thin-ideal internalization. This result also adds to the literature reporting the association between depression and the drive for thinness (Anna Keski-Rahkonen et al.,

2013; Grossbard et al., 2013) and the association between the disposition to act in self-determined ways and exposure to thin-ideal media (Mask and Blanchard, 2011). Together, these findings suggest that individuals with high emotional instability (because of neuroticism or depression) or a lack of perceived control are more vulnerable to internalizing thinness norms. Furthermore, our study, by demonstrating that certain personality factors are related to eating attitudes directly or through the internalization of thinness norms, complements Schroff and Thompson's (2006) tripartite model of the influential sociocultural factors of parents, peers and the media.

### Limitations and perspectives

Despite the new data gained from this study, some limitations need to be taken into consideration when interpreting the results and planning future research. First, self-report measures are subject to social desirability bias, and future research should include more implicit types of measures to overcome this bias. This study was cross-sectional, which limits the stability across time of the relationships between variables. Second, the generalizability of the results is limited to the female dancer population. The study could thus be replicated in samples of other aesthetic athletes and males. Third, we did not control the level of disordered eating attitude in our population. In future research, it would be interesting to control the EAT-26 (Garner and Garfinkel, 1979; Lane et al., 2004) scores of participants and their eating disorder history. Last, the study was cross-sectional, and this limits the discussion of the causal effects between variables. More research should thus be conducted to expand the present findings. For example, it would be interesting to examine eating attitudes and the internalization of thinness norms in relation to personality stability and change (e.g., Vecchione et al., 2012) in a longitudinal study. Moreover, in line with Mask and Blanchard's (2011) experimental study, it would be of interest to examine the effects of different emotional contexts (e.g., stress) on 'thin-ideal' and eating variables.

Finally, based on previous research on the relationship between personality and coping skills (Connor-Smith and Flachsbart, 2007), it might be relevant to examine whether coping skills play a moderating role in the association of neuroticism and the internalization of thinness norms.

### Practical implications

Our study provides interesting data suggesting that neuroticism is related to the self-regulation of eating attitudes, especially through the internalization of thinness norms and could be considered as a risk factor this variable. Better insight into these mechanisms would be helpful in developing optimal strategies to prevent or resolve dancers' eating disorders. First, we might think about how to regulate neuroticism through the development of affective self-regulatory skills and how to teach dancers to better resist the specific norms for thinness in dance. Interventions aimed at correcting normative misperceptions about what constitutes an attractive body image have shown promising results in the general population (Bergstrom and Neighbors, 2006). Intervention strategies based on correcting (mis)perceptions of the norms in aesthetic sports contexts may also prove to be a fruitful endeavour. Dance instructors as well would benefit from greater awareness of the process of norm internalization that their dancers may undergo, as they would then be better positioned to develop educational strategies to enhance their dancers' health without exacerbating the thinness norms in their highly athletic art.

## Conclusion

To conclude, this study expands our understanding of the psychological mechanisms of self-regulation of eating attitudes in dancers. Consistent with previous work focused on disordered eating in daily life, the results indicated that neuroticism was directly related to the self-regulation of eating attitudes in these dancers. Furthermore, the present study is the first to provide evidence that the internalization of thinness norms might explain the relationship between neuroticism and the self-regulation of eating attitudes. Further research should simultaneously consider personality traits and significant social influences to better explain norm internalization and eating attitudes in aesthetic sports.

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## Key points

- The big five model relates to the internalization of thinness norms and eating attitudes in dancers.
- Neuroticism is negatively related to the self-regulation of eating attitudes.
- The internalization of thinness norms is correlated to the relationship between neuroticism and self-regulation of eating attitudes.

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