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Body Dissatisfaction and Eating Disorder Symptomatology: A Latent Structural Equation Modeling Analysis of Moderating Variables in 18-to 28-Year-Old Males

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ABSTRACT. Although body dissatisfaction is recognized as the strongest risk factor for eating disturbances, a majority of young males are body dissatisfied, but do not concomitantly report severe levels of eating disorder symptomatology. The present investigation was

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designed to examine five theoretically relevant variables (i.e., body checking, emotional dysregulation, perfectionism, insecure-anxious attachment, and self-esteem) as potential moderators of the relationship between body dissatisfaction and two critical components of male eating disorder symptomatology: drive for muscularity and bulimic behaviors. Data collected from 551 Italian males between 18 and 28 years old were analyzed using latent structural equation modeling. The authors found that emotional dysregulation, body checking, insecure-anxious attachment and perfectionism intensified the relationship between body dissatisfaction and each criterion variable representing male eating disorder symptomatology; the interactions accounted respectively for an additional 2%, 7%, 4% and 5% of variance in drive for muscularity and for an additional 6%, 4%, 5%, and 2% of the variance in bulimic behaviors. By contrast self-esteem weakened this relationship and the interactions accounted for an additional 3% of the variance in both drive for muscularity and bulimic behaviors. Implications of these findings for prevention and treatment of male eating disturbances are discussed.

Keywords: body dissatisfaction, bulimia, drive for muscularity, moderators, young males

Historically, research on eating disorders (EDs) and their determinants has primarily focused on adolescent girls and young women and their desire to control weight and shape (Cohn & Lemberg, 2013), reinforcing the “erroneous” society belief of eating and body-related disorders as a “female” issue (Dakanalis et al., 2012). However, recent studies revealed that males and females are more similar than dissimilar in terms of core ED behaviors (i.e., comparable binge eating rates; Dakanalis, Zanetti, Clerici, et al., 2013; Hudson, Hiripi, Pope, & Kessler, 2007; Lavender, De Young, & Anderson, 2010) although they differ in the frequency of certain compensatory behaviors, such as purging (e.g., Striegel-Moore et al., 2009).

Gender differences on purging rates may be interpreted as the result of the perception among young males who desire to increase their muscularity as counter-productive to muscle-gain (e.g., Cafri et al., 2005; Frederick et al., 2007; Grogan, 2007; McCabe & Ricciardelli, 2004; Ricciardelli & McCabe, 2004; Thompson & Cafri, 2007), whereas binge eating and weight gain may not be viewed as troublesome (Dakanalis & Riva, 2013; Lavender et al., 2010). Like the established female “drive for thinness,” the male preoccupation with enhancing musculature (“drive for muscularity”; DM) reflects the increasing societal pressure that assumes boys and men should possess a muscular physique (e.g., Cafri, Yamamiya, Brannick, & Thompson, 2005; Daniel & Bridges, 2010; McCreary, 2007). DM is closely associated with rigid dietary regimens and inflexible rules regarding the type and amount of food to be consumed (i.e., taking food supplements and a meal every couple of hours regardless of hunger), over-exercise, use of anabolic-androgenic steroids, and related appearance and performance-enhancing substances (e.g., Cafri, van den Berg, & Thompson, 2006; Chittester & Hausenblas, 2009; Dakanalis, Timko, et al., 2013; Litt & Dodge, 2008; McCreary, 2007; Olivardia, Pope, Borowiecki, & Cohane, 2004; Parent & Moradi, 2011; Thompson & Cafri, 2007). It has been suggested that until more attention is paid to the evaluation of the cardinal features

of EDs, which differentiate males from females, such as DM, in addition to binge eating issues, boys and men will continue to be misunderstood, under-diagnosed and undertreated (Striegel-Moore, Bedrosian, Wang, & Schwartz, 2012; Strother, Lemberg, Stanford, & Turberville, 2012).

Multivariate etiological models of EDs, extensive reviews and meta-analytic data have established body dissatisfaction (BD) as the most consistent and robust causal risk factor for all forms of EDs in both genders (e.g., Blashill, 2011; Fairburn, Cooper, & Shafran, 2003; Grogan, 2007; Riva, Gaudio, & Dakanalis, 2013, 2014; Stice, 2002; Stice, Ng, & Shaw, 2010), despite male body concerns being qualitatively different from females' (e.g., Fuller-Fuller-Tyszkiewicz et al., 2012; McCabe et al., 2012; Riva, Gaggioli, & Dakanalis, 2013; Yean et al., 2013). Yet it has also been documented that the prevalence of male BD has markedly increased over the past thirty years (i.e., 57–80% of adolescent boys and young adult men are body dissatisfied; Al Sabbah et al., 2009; Dakanalis & Riva, 2013; Frederick, Peplau, & Lever, 2006; Jaeger et al., 2002) to the extent that dissatisfaction with overall body size and particular upper body parts (i.e., shoulders, arms, chest) has been aptly described as “normative” (Gray & Ginsberg, 2007). However, the actual incidence and prevalence of full-blown clinical EDs remains relatively low (e.g., Weltzin et al., 2005; Freeman, 2005), and for every ten individuals with EDs, only one male meets criteria for a formal ED diagnosis (American Psychiatric Association, [APA], 2000). Thus, BD may be necessary for the onset of an ED, but it is not sufficient (e.g., Juarascio, Perone, & Timko, 2011).

It seems reasonable to argue that additional variables may interact with BD to influence its relation to ED symptoms (i.e., moderators), and their examination would address why only a minority of males report severe levels of ED symptomatology, when so many report substantial BD (MacKinnon, 2011). Indeed, several ED scholars and professionals declared that an investigation of such variables that either intensify (i.e., in the case of a risk factor) or weaken (i.e., in the case of a protective factor) the strength of the relationship between BD and ED symptomatology would be useful to inform the design and delivery of tailored prevention and treatment interventions for EDs (Stice et al., 2010; Strother et al., 2012). However, no empirical studies have to date addressed this issue amongst male samples; in fact, all prior studies have investigated moderators of BD effects exclusively on female samples (see Brannan & Petrie, 2011; Dakanalis, Zanetti, Riva, & Clerici, 2013; Juarascio et al., 2011; Tylka, 2004).

Hence, this study aimed at examining for the first time potential moderators of the BD-ED symptom relationship among young males, using the enhanced cognitive behavioral (E-CB) model of EDs as a framework (Cooper & Fairburn, 2011), which has been proposed as the most comprehensive theoretical framework for understanding how a particular confluence of risk factors places individuals at increased risk for eating pathology (e.g., Dakanalis & Riva, 2013; Lampard, Byrne, McLean, & Fursland, 2011; Murray, Rieger, Karlov, & Touyz, 2012). Essentially

this model, which aims at supplementing rather than replacing the earlier CB conceptualizations and treatment of EDs (see Murphy, Straebler, Cooper, & Fairburn, 2010; Williamson, White, York-Crowe & Stewart, 2004), highlights how self-esteem, perfectionism, body checking, long-term interpersonal difficulties (i.e., attachment insecurities), and emotional dysregulation, interact with each other and with BD to predict the onset and/or persistence of ED symptomatology (see Cooper & Fairburn, 2011). In the next sections we define the five variables that we examined as potential moderators of BD and discuss the theoretical mechanisms why such moderation might occur among males.

Body Checking

According to earlier and E-CB conceptualization of EDs (Cooper & Fairburn, 2011; Shafran, Fairburn, Robinson, & Lask, 2004; Williamson et al., 2004), body checking, defined as repetitive attempts to evaluate or scrutinize one's appearance, is a direct expression of BD and recognized as core behavioral feature of EDs. It includes any behavior aimed at gaining information about one's shape/size, such as mirror checking, pinching one's fat or feeling muscles for size/density, social comparison, and seeking reassurance from others about one's body (Hildebrandt, Walker, Alfano, Delinsky, & Bannon, 2010; Dakanalis, Clerici et al., 2014). The frequency of body checking has been found to discriminate between normal controls and patients with EDs (Reas, Whisenhunt, Netemeyer, & Williamson, 2002; Shafran et al., 2004). Shafran et al. (2004) argued that paradoxically excessive body shape monitoring can magnify perceived imperfections and may thereby serve to develop and/or maintain EDs. In support of this hypothesis, a recent experimental study found that male body checking resulted in increased selective attention to disliked body parts (Walker, Murray, Lavender, & Anderson, 2012). Therefore, amongst males with substantial BD, those who constantly check their body may be more likely to minimize the dangers of using harmful eating and shape control practices and use them to change their body shape/size.

Perfectionism

Perfectionism has received considerable attention as a dispositional tendency that underlies EDs (Cassin & von Ranson, 2005). It is observed in the context of weight and shape concerns and differentiates individuals with an ED and healthy controls (e.g., Bardone-Cone et al., 2007; Egan, Wade, & Shafran, 2011; Wade & Tiggemann, 2013). According to E-CB theory of EDs, perfectionistic tendencies play a critical role in the onset of all forms of EDs (Cooper & Fairburn, 2011), as perfectionism may promote a relentless pursuit of the gendered body shape ideal (Davis, Karvinen, & McCreary, 2005; Dickie, Wilson, McDowall, & Surgeno, 2012); in turn, this fosters restrained eating that perpetuates the binge-compensatory behavior cycle (Stice et al., 2010; Dakanalis, Timko et al., 2014a, 2014b). Therefore, among body-dissatisfied males, those who are

perfectionistic may be more driven to engage in behavioral features to shape their bodies and getting near to the muscular body ideal.

Emotional Dysregulation

Deficiencies in the ability to regulate negative and shifting emotional states followed by dysfunctional emotional-modulating behaviors are implicated in different forms of psychopathological states—EDs included (e.g., Aldao, Nolen-Hoeksema, & Schweizer, 2010; Gross, 2007). Although the construct of emotional dysregulation has been recently incorporated in the ED assessment tools, it has been found to discriminate individuals with EDs and normal controls (Garner, 2004). In addition, research showed its unique contribution in muscle-enhanced and binge eating behaviors, as well as strong associations with BD (Dakanalis, Timko, et al. 2013; Garner, 2008; Stice et al., 2010). Based on this evidence as well as on E-CB conceptualizations of EDs (Cooper & Fairburn, 2011), which suggest the interactive contribution of emotional dysregulation with BD in predicting ED symptoms, males who display higher levels of emotional dysregulation may react with more negative affect to their BD and, as a result, may be more likely to engage in maladaptive eating and shape behaviors to cope with their negative feelings.

Self-Esteem

In the E-CB model of EDs (Cooper & Fairburn, 2011) low self-esteem has been described as one of the most important psychopathological characteristics of EDs, as patients' tendency to judge (negatively) their self-worth exclusively in terms of their body shape/size severely impacts on the effectiveness of treatment outcome (Murphy et al., 2010). By contrast, the relation between BD and ED symptoms appears to be reduced in adolescent girls and college-aged women who are "protected" by high self-esteem (Brannan & Petrie, 2011; Dakanalis, Zanetti, Riva, et al., 2013). A reasonable interpretation of these results is that individuals with higher self-esteem might be more motivated to preserve their self-image by rejecting consciously comparisons with media standards of attractiveness than their low esteem counterparts (Aubrey, 2006). In addition, Twamley and Davis (1999) have argued that if high self-esteem individuals regardless of gender tried to change their bodies, they might be more likely to rely on healthy methods. In line with previous findings and scholars' suggestions (Aubrey, 2006; Brannan & Petrie 2011; Dakanalis, Zanetti, Riva, et al., 2013; Twamley & Davis, 1999), it is possible that also males who are body dissatisfied but generally feeling positive about themselves are more able to dismiss their BD because of their other perceived strengths, thus decreasing the psychological need and related behaviors in attempt to reach the muscular ideal as a means of enhancing their overall self-worth.

Long-Term Interpersonal Difficulties (i.e., Attachment Insecurities)

Attachment theory represents an important theoretical perspective for understanding an individual's interpersonal difficulties in establishing and/or maintaining supportive relationships (Mikulincer & Shaver, 2007; Tasca, Ritchie, & Balfour, 2011), that according to numerous studies and the success of interpersonal psychotherapy in treatment trials for EDs are involved in the developmental and maintenance process of EDs (see Garner, 2004; Stice et al., 2010; Murphy, Straebl, Basden, Cooper, & Fairburn, 2012). Bowlby's (e.g., 1988) attachment theory posits that the quality of infant-caregiver relationship shapes how one views and feels about oneself and others, and how comfortable a person is with independence, closeness, and separation. The systematic pattern of relational expectations, emotions, and behavior that results from one's early experiences with parental figures is theorized to provide the prototypes for interpersonal relationships across the life span (Mikulincer & Shaver). Individuals with EDs have been found to score significantly higher than people without EDs on insecure attachment, characterized by either anxiety (i.e., fear of rejection by others, intense need for approval, and keeping others in close proximity in relationships) or avoidance (i.e., excessive need for self-reliance and fear of interpersonal dependence; see Kuipers & Bekker, 2012; Zachrisson & Skarderud, 2010).

In the context of the E-CB of EDs (Cooper & Fairburn, 2011), attachment insecurity in the form of anxiety or avoidance (Mikulincer & Shaver, 2007) could fall under the domain of long-term interpersonal difficulties (see Tasca et al., 2011; Dakanalis, Timko et al., 2014b) and, therefore, interact with BD to predict ED symptoms (Cooper & Fairburn, 2011). However, prior research employing ED and community samples of both genders indicates significant associations only between the anxious dimension of insecure attachment and BD (e.g., Abbate-Daga, Gramaglia, Amianto, Marzola, & Fassino, 2010; Cheng & Malinkrodt, 2009; Elgin & Pritchard, 2006; Hardit & Hannum, 2012). Indeed, among insecure attached individuals, only those who by definition are not inclined to exert protective behaviors by distancing themselves from others (i.e., insecure anxious attached individuals; Mikulincer & Shaver), were found to be extremely sensitive to societal expectations and cultural ideals of beauty (e.g., Bamford & Halliwell, 2009; Eggert, Levendosky, & Klump, 2007; Koskina & Giovazolias, 2010), probably as they deem physical appearance and attractiveness as important to avoid interpersonal rejection (Abbate-Daga et al., 2010; Shomaker & Furman, 2010). Therefore, among body-dissatisfied males, those who report high attachment anxiety may be more likely to engage in harmful eating and related body shape strategies as the changing of their body size/shape could be an attempt to gain others' acceptance and fulfill the intense desire of closeness. The other insecure attachment dimension (i.e., avoidance) was not investigated as moderator of BD because no theoretical rationale has been offered for arguing why it would moderate the BD-ED symptomatology.

Current Study

The purpose of the current study was to build upon the extant research literature by examining through structural equation modeling (SEM) whether body checking, perfectionism, emotional dysregulation, insecure anxious attachment, and self-esteem moderate the relation between BD and ED symptomatology among late adolescent boys and young men. This may be a particularly relevant population in light of the evidence that this age group is recognized as a “high” risk group for the onset of behavioral ED symptomatology (e.g., Hudson et al., 2007), and male BD rates seem to remain quantitatively invariant from late adolescence to young adulthood (e.g., Bucchianeri, Arikian, Hannan, Eisenberg, & Neumark-Sztainer, 2013; Eisenberg, Neumark-Sztainer, & Paxton, 2006; Holsen, Kraft, & Roysamb, 2001; von Soest & Wichstrom, 2009). In addition, the prevalence rates of BD and of the spectrum of EDs among Italian and young males from other European countries are comparable (Preti et al., 2009; Jaeger et al., 2002).

In this study ED symptomatology was operationalized as DM and Bulimic behaviors (BB), as these components are critical in defining male ED symptomatology (e.g., Dakanalis & Riva, 2013; Strother et al., 2012). Because of extremely limited knowledge of the main effects of male BD and each proposed moderator, as well as on their interactions on DM and BB, separate analyses were conducted for each criterion variable representing male ED symptomatology. For each test of moderation we expected that self-esteem would lessen the deleterious effects of male BD, whereas each of the remaining variables (i.e., body checking, perfectionism, emotional dysregulation, and insecure anxious attachment) would exacerbate its effects.

Method

Participants and Procedure

Participants were 557 Italian males, aged 18–28 years ($M = 20.82$, $SD = 4.43$), recruited via announcements posted in the departments of Psychology, Communication, Social, and Humanistic Studies of four large universities in Northern, Central, and Southern Italy. The racial/ethnic background of participants mirrored that of the universities where the data were collected: 95% White/European, 2% Multiracial, 2% Hispanic/Latino, and 1% Africans. Most geographic regions of Italy were represented: 38% indicated living in North Italy, 32% in Central Italy, and 30% in South Italy. In terms of years in university, freshmen were the largest group of participants (41%); of the remaining men, 29% were sophomores, 16% were juniors, 12% were seniors, 2% were 5th year or above. The majority self-identified as heterosexual (93%). Regarding the socioeconomic family status, most participants reported middle class (69%), but 13% and 18% reported upper and working class, respectively.

The research announcements directed interested participants to a webpage that provided a brief description of the study, details regarding informed consent

and efforts taken to ensure anonymity. After providing their consent, participants were immediately redirected to the survey webpage, where the measures were hosted and counterbalanced in attempt to offset possible ordering effects. After completing the measures, participants provided socio-demographic information, and then were directed to a thank-you page where they were debriefed. All procedures were approved by the appropriate ethics board.

Several strategies were used to detect duplicate and erroneous data, as recommended (Gabbiadini, Mari, & Volpato, 2011): a) a validity question was embedded into each of the survey measures, each of which instructed participants to choose certain responses (e.g., “To ensure that you are paying attention, please choose agree for this item”), b) the IP address of every participant was checked, and c) an multivariate outlier analysis was conducted, since the presence of outliers on a combination of two or more variables could yield changes in model parameter estimates (Kelava et al., 2011). Six cases were excluded and data from 551 men were analyzed.

Measures

Perfectionism

The Italian validated version (Garner, 2008) of Eating Disorders Inventory 3 (EDI-3; Garner, 2004) is a 91-item self-report measure containing 12 scales; ten of which assess psychological features associated with EDs and the remaining two (drive for thinness and bulimia) are eating disorder-specific scales. Items are rated on a 6-point Likert scale ranging from 1 (*never*) to 6 (*always*), with higher scores indicating higher manifestation of the specific variable measured. The 6-item Perfectionism scale was used to measure the extent to which a person focuses on achieving high standards of personal achievement (“I hate being less than best at things”). Among Italian adolescent boys and male undergraduates, this scale demonstrates good internal consistency reliability ($\alpha = .92-.93$; Garner, 2008; Lombardo, 2008), test-retest reliability over a 3-week period ($r = .90$; Garner, 2008) and is related to measures similar in content (i.e., personal standard items on the Frost Multidimensional Perfectionism Scale and Burns Perfectionism Scale; $r = .68$ and $.76$, respectively; Garner, 2008; Lombardo). Alpha was $.93$ in this sample.

Emotional Dysregulation

This construct was measured by the corresponding scale of the Italian validated version (Garner, 2008) of EDI-3 (Garner, 2004). It consists of 8 items that assess individual’s tendency toward emotional instability, anger, impulsive, and self-destructive acts (e.g., “Other people would say that I am emotionally unstable” and “I am prone to outbursts of anger or rage”). Its internal consistency reliability ($\alpha = .92$) and test-retest reliability over a 3-week period ($r = .88$) have been examined and supported among Italian adolescent boys and college-aged men

(Garner, 2008). In the current study, alpha was .90. Correlations among this scale and other constructs, such as impulsivity, distress tolerance, and negative affect, support the construct validity of the EDI-3 emotion dysregulation scale (Garner, 2008).

Bulimic Behaviors

The 8-item Bulimia scale of the Italian validated version (Garner, 2008) of EDI-3 (Garner, 2004) was used to assess the tendency to engage in episodes of uncontrollable overeating (e.g., “I have gone on eating binges where I felt that I could not stop”). Among Italian adolescent boys and college-aged men, scores on this scale have garnered evidence of test-retest reliability over a 3-week period ($r = .92$; Garner, 2008) and internal consistency reliability ($\alpha = .91-.93$; Dakanalis et al., 2012; Garner, 2008), and are strongly related to other measures of binge eating (Bulimia Test-Revised; $r = .74$; Garner, 2008). Alpha was .92 in this sample.

Body Dissatisfaction

The Modified Body Dissatisfaction Scale (MBDS; Hallsworth, Wade, & Tiggemann, 2005) of the EDI-3 consists of 9 items adapted to assess male body concerns: items were reversed in polarity, and references to body parts were adapted to incorporate the upper body in order to enhance the sensitivity of indexing male concerns (e.g., “I think my chest is too small”). The uni-dimensional factor structure, internal consistency reliability ($\alpha = .92$) and test-retest reliability over a 4-week period ($r = .88$) of the Italian validated version of MBDS used in the current study (Dakanalis, Timko, et al., 2013) have been examined among a large Italian community male sample between 12 and 35 years old. Alpha was .93 in this sample. Significant correlations in the expected directions between MBDS and other constructs, such as internalization of sociocultural standards of beauty, self-esteem, positive and negative affectivity, and ED symptomatology, support the construct validity of the MBDS (Dakanalis, Timko, et al., 2013).

Drive for Muscularity

The Italian validated version (Dakanalis, Timko, et al., 2013) of the Yelland and Tiggemann’s Drive for muscularity scale (YT-DM; Yelland & Tiggemann, 2003) was used to assess motivation and engagement in behaviors designed to increase muscularity. The YT-DM (Yelland & Tiggemann) was developed as a parallel to the Drive for Thinness scale of EDI-2 (Garner, 1991), with each of 7 items replacing the focus on pursuit of muscularity (e.g., “I think about building up my muscles” and “I lift weights to become more muscular”). Items are rated and scored in the same way as EDI-3 scales, with high score indicating stronger drive. Among Italian adolescent boys and adult men (Dakanalis, Timko, et al., 2013), it demonstrates good test-retest reliability over a 4-week period ($r = .89$) and internal

consistency reliability ($\alpha = .93$) and is related to measures similar in content (i.e., Desire For Size items of the Muscle Dysmorphia Disorder Inventory; $r = .67$). Correlations among this scale and other measures, such as athletic internalization, training frequency and muscle-building supplement consumption, further support the construct validity of the YT-DMS (Dakanalis, Timko, et al., 2013). Alpha was $.92$ in this sample.

Self-Esteem

The Italian validated version (Prezza, Trombaccia, & Armento, 1997) of Rosenberg Self-Esteem Scale (Rosenberg, 1965) was used to assess global self-esteem (e.g., "I am a person of worth"). It consists of ten items rated on a four-point scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*), with higher scores indicating higher self-esteem. Its internal consistency reliability ($\alpha = .87-.89$; Dakanalis, Timko, et al., 2013; Prezza et al.) and test-retest reliability over a 3-week period ($r = .88$; Prezza et al.) have been examined and supported among Italian adolescent boys and young adult men. Evidence of convergent validity of the scale was demonstrated by the significant correlations in the expected directions with other constructs, such as depression, state and trait anxiety, anxiety perception of social support, and life satisfaction (Prezza et al.). Alpha was $.88$ in this sample.

Insecure-Anxious Attachment

The Italian validated version (Fossati et al., 2003) of the Attachment Style Questionnaire (ASQ) is a 40-item, Likert-type self-report questionnaire (Feeney, Noller, & Hanrahan, 1994) with individual items being scored on a 6-point scale from 1 (*totally disagree*) to 6 (*totally agree*). It contains five scales that assess a) adult secure attachment (via the Confidence scale), b) insecure-avoidant attachment (via the Discomfort with closeness and Relationships as secondary scales), and c) insecure-anxious attachment (via the Need for approval and the Preoccupation with relationships scales). For more information, see Feeney et al. (1994) and Mikulincer and Shaver (2007). ASQ's factor structure was also reproduced among Italian community male and female samples and various psychiatric samples (Fossati et al.). Consistent with the factor analytic findings reported above the 7-item Need for Approval ("It's important to me that others like me" and "It's important to me to avoid doing things that others won't like") and the 7-item Preoccupation with relationships ("I worry that others won't care about me as much as I care about them" and "I find that others are reluctant to get as close as I would like") scales, which assess excessive need for other's acceptance and confirmation and an anxious and dependent approach to relationships, were used to assess insecure anxious attachment. Evidence of internal consistency reliability (α for NA $.89-.92$ and for PR $.89-.91$; Fossati et al.; Troisi et al., 2001) and test-retest reliability over a 3-week period ($r = .86-.89$; Fossati et al.; Troisi et al.) for both scales has been garnered amongst Italian community male samples. For

the current sample, the internal consistency reliabilities (alphas) for NA and PR were: .91, and .90. The validity of the ASQ is indicated by a number of findings: the pattern of associations with previous measures of attachment and retrospective parent bonding, the predictable patterns of correlations with measures of personality, experiences of peer close relationships, and family functioning (Fossati et al.; Troisi et al.).

Body Checking

The Male Body Checking Questionnaire (MBCQ; Hildebrandt et al., 2010) is a 19-item self-report measure assesses the extent to which men regularly check their muscularity, and includes subscales on overall muscle appearance (e.g., “Flex my muscles in the mirror”), specific upper body parts (e.g., “Check my biceps”), social comparison (e.g., “Compare muscle mass to athletes/celebrities”), and idiosyncratic body checking (e.g., “I pinch or grab my muscles”), as well as a total score. In this study the total scale score of the Italian validated version of the MBCQ (Dakanalis & Riva, 2013) was used. Each item is rated on a 5-point scale (1 ~~Never~~, 5 ~~Very often~~), with higher scores indicating a greater body checking degree. Among Italian adolescent boys and young adult men (Dakanalis & Riva, 2013), the total MBCQ score has garnered evidence of test-retest reliability over a 3-week period ($r = .88$) and internal consistency reliability ($\alpha = .92$). Alpha was .91 in this sample. Correlations between MBCQ and other constructs, such as, body surveillance, appearance control beliefs, body shame, muscle dissatisfaction, eating disorder and muscular dysmorphic symptomatology, support the validity of the scale (Dakanalis & Riva, 2013).

The original versions of all measures [i.e., Eating Disorders Inventory-3 (Garner, 2008), Modified Body Dissatisfaction Scale (Dakanalis, Timko, et al., 2013), Yelland and Tiggemann’s Drive for Muscularity Scale (Dakanalis, Timko, et al., 2013), Rosenberg Self-Esteem Scale (Prezza et al., 1997), Attachment Style Questionnaire (Fossati et al., 2003), and Male Body Checking Questionnaire (Dakanalis & Riva, 2013)] used in this study were initially translated from English to Italian and then back translated by bilingual researchers with experience in conducting translations for health surveys. These forms were compared with the original one and any inconsistencies highlighted and removed in a further translation and back-translation comparison process until the two versions were identical.

Creation of Observed Variables as Indicators of Latent Variables

For the insecure-anxious attachment latent variable the NA and PR scale of ASQ were used as indicator variables, whereas for each of the seven remaining latent variables the recommendation of Russell, Kahn, Spoth, and Altmaier (1998) were followed to create three parcels (i.e., observed indicators): a) for each of the measures, an exploratory factor analysis using the maximum likelihood (ML) method with a single factor extraction was performed, b) items were rank-ordered

TABLE 1. Descriptive Statistics of Observed Study Variables ($N = 551$)

Measures	<i>M</i>	<i>SD</i>	Possible Scale Range	Skewness	Kurtosis
1. MBDS	40.87	16.25	9–54	-.500	-.663
2. YT-DM	21.43	12.10	7–42	-.777	-.299
3. EDI3-B	33.43	19.99	8–48	.390	-.448
4. EDI3-P	19.15	9.47	6–36	-.597	-.380
5. EDI3-ED	35.89	14.88	8–48	-.665	-.591
6. ASQ-NA	21.59	9.65	7–42	-.444	-.555
7. ASQ-PR	22.20	9.55	7–42	.352	-.460
8. RSES	30.12	10.04	10–40	-.665	-.471
9. MBCQ	44.74	22.13	19–95	.612	-.328

Note. MBDS = Modified Body Dissatisfaction scale; YT-DM = Yelland and Tiggemann's Drive for Muscularity scale; EDI3-B, P and ED = Eating Disorder Inventory-3, Bulimia scale, Perfectionism scale, and Emotional Dysregulation scale, respectively; ASQ-NA and PR = Attachment Style Questionnaire, Need for Approval scale and Preoccupation with relationships scale, respectively; RSES = Rosenberg Self-Esteem scale, MBCQ = Male Body Checking Questionnaire.

according to the magnitude of the factor loadings and successively assigned to one of three parcels in order to equalize the average loadings of each parcel on its respective latent factor, c) for each parcel, items were averaged to arrive at a total parcel score, and d) the three total-parcel scores were used to estimate the respective latent variable within the SEM analyses (see Figures 1 and 2).

Results

Descriptive statistics, skewness, and kurtosis values for all measures (i.e., total scale scores) previously described are presented in Table 1. Multivariate analyses of variance were conducted to examine whether scores in Table 1, differed with regard to geographic region, age (i.e., adolescents vs. adults [> 19 years; White, Livesey, & Hayes 2012]), years at university, racial/ethnic identification, socioeconomic identification, and sexual orientation identification status. No significant group differences were found with regard to geographic region [$F(9,540) 0.24, p > .05$], age [$F(9,541) 0.21, p > .05$], years at university [$F(9,538) 0.11, p > .05$], racial/ethnic [$F(9,539) 0.36, p > .05$], socioeconomic [$F(9,540) 0.51, p > .05$], and sexual orientation identification [$F(9,540) = 0.47, p > .05$].

Using the two-step procedure recommended by Anderson and Gerbing (1988) the measurement model (i.e., relationships between a set of latent variables and a set of observed variables) was first evaluated to ensure an acceptable fit to the sample data using confirmatory factor analysis and then the structural moderated

TABLE 2. Correlations Between Latent Variables on the Basis of the Measurement Model (N = 551)

Latent Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. Drive of Muscularity	–							
2. Bulimic Behaviors	.41***	–						
3. Body Dissatisfaction	.48***	.49***	–					
4. Insecure-Anxious Attachment	.42***	.48***	.36***	–				
5. Body Checking	.53***	.44***	.47***	.15*	–			
6. Emotional Dysregulation	.37***	.50***	.33***	.11*	.05	–		
7. Perfectionism	.47***	.39***	.46***	.08	.20**	.02	–	
8. Self-Esteem	-.46***	-.47***	-.49***	-.18*	-.21**	-.10	.09	–

* $p < .05$. ** $p < .01$. *** $p < .001$.

model (i.e., relationships between latent variables) was examined. To analyze the data we used Mplus version 6.1 (Muthén & Muthén, 2010) with a ML method that estimated the model parameters and incorporated the full information maximum likelihood approach—allowing data from all cases to be included regardless of their pattern of missing data. In the present study, the average percentage of missing data was 0.5%.

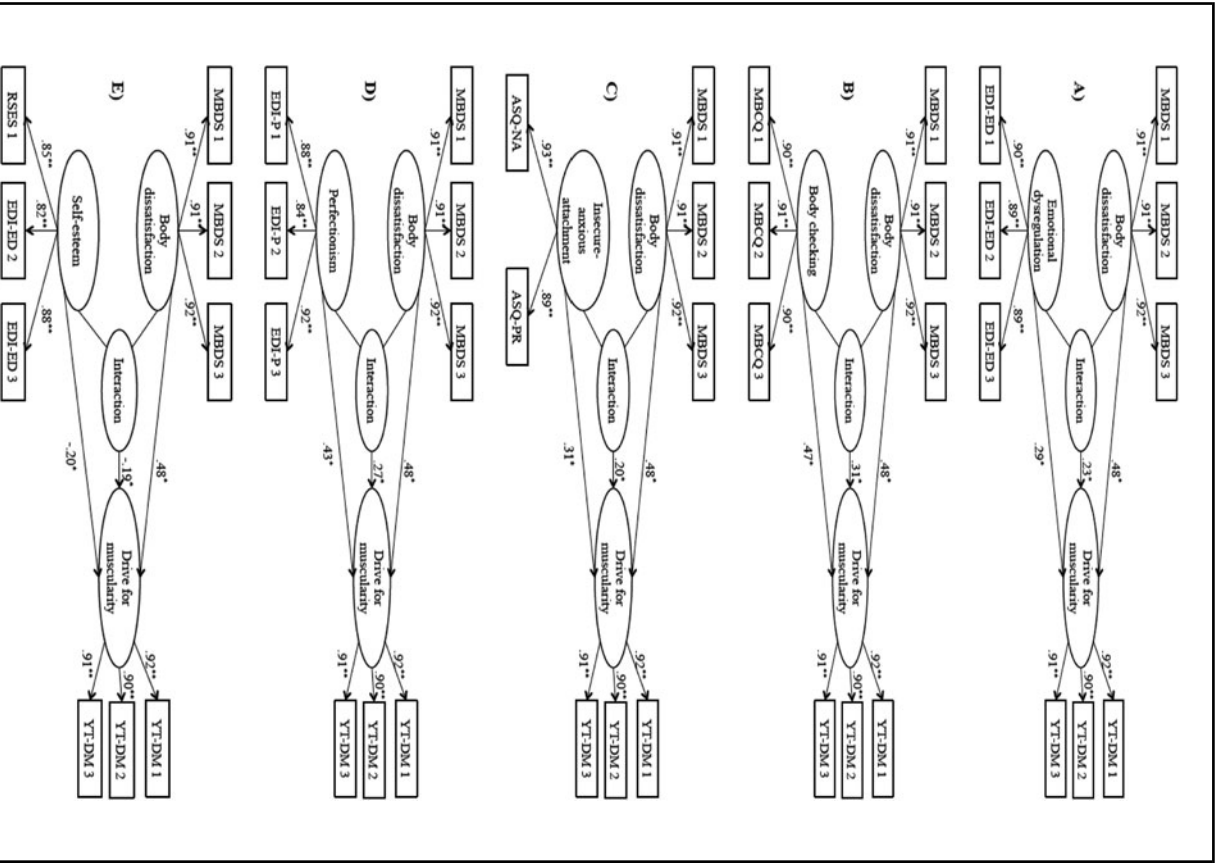
Measurement Model

As suggested by Hu and Bentler (1999) the following indexes were used to assess goodness of fit for the measurement model: the comparative fit index (CFI), the Tucker–Lewis index (TLI), the standardized root-mean square residual (SRMR), and the root mean square error of approximation (RMSEA) with a 90% confidence interval (CI); CFI and TLI values $\geq .95$, SRMR values $\leq .08$ and RMSEA values $\leq .06$ indicate a good representation of data.

The results indicated that model, fit the data very well: CFI = .97, TLI = .97, SRMR = .05, RMSEA = .04 (90% CI: .03; .05). For all latent variables, the factor or parcel-factor loadings were statistically significant (all $ps < .001$; see Figures 1 and 2). Thus, all latent variables were adequately measured by their respective indicators. Table 2 presents the correlations among the latent variables.

Structural Model

To estimate the main and interaction effects of BD and each potential moderator variable on ED symptoms, latent moderated structural equation modeling (LMS) method implemented in Mplus was used (Dimitruk, Schermelleh-Engel,

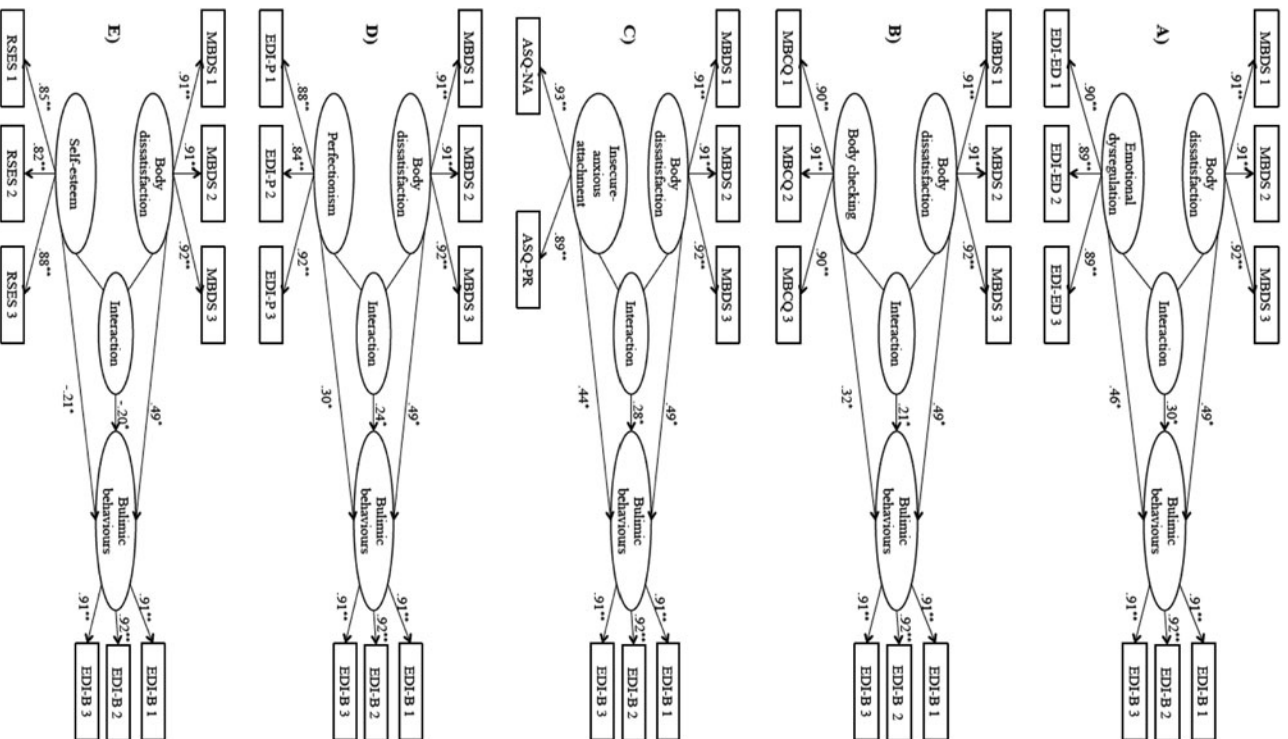


Kelava, & Moosbrugger, 2007; Kelava et al., 2011). This novel approach directly estimates the interaction latent variable without requiring the tedious and somewhat arbitrary manual specification of product terms of the indicators and (see Kelava et al., 2011). As multicollinearity and its severe effects on parameter estimations are increased when more than one interaction term are specified simultaneously (Dimitruk et al.; Kelava et al., 2011), for each criterion variable representing male ED symptomatology (i.e., DM and BB) five separate moderated SEMs were examined—one for each proposed moderator variable (see Figure 1 and 2). As LMS does not provide conventional fit indices, the log-likelihood difference test ($\Delta 2LL$) was applied to validate the improvement in model fit of the moderated SEM (i.e., latent interaction effects) in comparison to a linear SEM (i.e., main linear latent effects), as recommended (Dimitruk et al.).

The LMS parameter estimates of each potential moderator on DM and on BB are presented in Table 3 and depicted graphically in Figures 1 and 2. For each criterion variable, the $\Delta 2LL$ -test showed that the five nonlinear SEMs had a significant improvement in data approximation compared to the respective linear SEMs (Table 3). Consistent with expectations, after controlling for the main latent effects, emotional dysregulation, body checking, insecure-anxious attachment and perfectionism strengthened the primary BD-ED symptomatology relationship (Figures 1 and 2); the interactions accounted respectively for an additional 2%, 7%, 4% and 5% of variance in DM and for an additional 6%, 4%, 5%, and 2% of the variance in BB (Table 3), supporting the appropriateness of our purpose to investigate separately for each criterion variable representing male ED symptomatology the interaction effects. Self-esteem has been found to buffer the BD-ED symptomatology relationship (Figures 1 and 2) and the

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FIGURE 1. Latent moderated structural equation modeling analyses predicting drive for muscularity. The moderation models for emotional dysregulation (a), body checking (b), insecure-anxious attachment (c), perfectionism (d), and self-esteem (e). Ellipses and rectangles represent unobserved latent factors and observed variables, respectively. MBDS 1,2,3 = three parcels from the modified body dissatisfaction scale; YT-DM 1,2,3 = three parcels from the Yelland and Tiggemann's drive for muscularity scale; EDI-ED 1,2,3 = three parcels from the emotional dysregulation scale of the eating disorder inventory-3; MBCQ 1,2,3 = three parcels from the male body checking questionnaire. ASQ-NA and PR = attachment style questionnaire, need for approval scale and preoccupation with relationships scale, respectively; EDI-P 1,2,3 = three parcels from the perfectionism scale of the eating disorder inventory-3; RSES 1,2,3 = three parcels from the Rosenberg self-esteem scale. * $p < .01$. ** $p < .001$.



interaction accounted for an additional 3% and 3% of the variance in DM and BB, respectively (Table 3). Thus all moderating hypothesis were supported.

Last, to facilitate the interpretation of LMS findings the specific form of the significant interactions were analyzed using the method outlined by Aiken and West (1991): for each latent criterion variable, the interactions were plotted by inserting high (1 *SD* above the mean) and low (1 *SD* below the mean) values for the two latent predictors into the respective structural equations (Kelava et al., 2011).

Testing the significance of the simple slopes (see Table 4) indicated the relation of BD-each criterion variable representing male ED symptoms was stronger with higher levels of emotional dysregulation, body checking, insecure-anxious attachment and perfectionism than when levels of moderators were lower, whereas therelationship between BD and each criterion variable representing male ED symptoms was weaker with higher levels of self-esteem than when levels of self-esteem were lower.

Discussion

The present study investigates a perplexing question raising in the scientific literature: given that BD is recognized as the strongest risk factor of all forms of EDs, why only a minority of young males report severe levels of ED symptoms, when so many are body dissatisfied? Curiously, even though researchers have begun to investigate variables thought to accentuate or reduce the primary BD-ED symptomatology in female samples (e.g., Dakanalis, Zanetti, Riva, et al., 2013; Juarascio et al., 2011), to our knowledge no empirical studies have to date investigated potential moderators among males. The purpose of this study was to build upon the extant literature by examining whether body checking,

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FIGURE 2. Latent moderated structural equation modeling analyses predicting bulimic behaviours. The moderation models for emotional dysregulation (a), body checking (b), insecure-anxious attachment (c), perfectionism (d), and self-esteem (e). Ellipses and rectangles represent unobserved latent factors and observed variables, respectively. MBDS 1,2,3 = three parcels from the modified body dissatisfaction scale; EDI-B 1,2,3 = three parcels from the bulimia scale of the eating disorder inventory-3; EDI-ED 1,2,3 = three parcels from the emotional dysregulation scale of the eating disorder inventory-3; MBCQ 1,2,3 = three parcels from the male body checking questionnaire; ASQ-NA and PR = attachment style questionnaire, need for approval scale and preoccupation with relationships scale, respectively; EDI-P 1,2,3 = three parcels from the perfectionism scale of the eating disorder inventory-3; RSES 1,2,3 = three parcels from the Rosenberg self-esteem scale. * $p < .01$. ** $p < .001$.

TABLE 3. Summary of Latent Moderated Structural Equation Modeling Analyses Predicting Drive for Muscularity and Bulimic Behaviors ($N = 551$)

Outcome: Drive For Muscularity	Main (γ) /Interaction (ω) Effects	Cumulative R^2	Incremental R^2 (ΔR^2)	Δ -2LL (df_{diff})
Body dissatisfaction (BD)	.48*	.22	.22	
Insecure-Anxious Attachment (IAA)	.31*	.30	.08	
BD x IIAS	.20*	.34	.04	7.20(1)*
Body Checking (BC)	.47*	.36	.14	
BD x BC	.31*	.43	.07	13.01(1)*
Emotional Dysregulation (ED)	.29*	.26	.04	
BD x ED	.23*	.28	.02	5.77(1)*
Perfectionism (P)	.43*	.33	.11	
BD x P	.27*	.38	.05	9.20(1)*
Self-Esteem (SE)	-.20*	.25	.03	
BD x SE	-.19*	.28	.03	6.59(1)*
Outcome: Bulimic Behaviors				
Body dissatisfaction (BD)	.49*	.23	.23	
Insecure-Anxious Attachment (IAA)	.44*	.34	.11	
BD x IIAS	.28*	.39	.05	8.99(1)*
Body Checking (BC)	.32*	.31	.08	
BD x BC	.21*	.35	.04	7.47(1)*
Emotional Dysregulation (ED)	.46*	.36	.13	
BD x ED	.30*	.42	.06	11.56(1)*
Perfectionism (P)	.30*	.27	.04	
BD x P	.24*	.29	.02	5.65(1)*
Self-Esteem (SE)	-.21*	.26	.03	
BD x SE	-.20*	.29	.03	6.68(1)*

Note. The main effects (values) of BD are the same for each latent moderated structural equation model and thus are not presented for subsequent model within the table.

* $p < .01$.

emotional dysregulation, perfectionism and insecure-anxious attachment intensify the relationship between BD and two indicators of male ED symptoms (DM and BB). We further investigated self-esteem as potential buffer of these relationships.

Based on the CB conceptualizations of EDs (Cooper & Fairburn, 2011; Shafran et al., 2004; Williamson et al., 2004), we hypothesized that young males

TABLE 4. Summary of Simple Slopes Analyses (*N* = 551)

	Drive for Muscularity		Bulimic Behaviors	
	β	<i>t</i> (550)	β	<i>t</i> (550)
BD x IAA				
1 Standard Deviation below the Mean	.22*	3.51	.29*	6.00
1 Standard Deviation above the Mean	.53*	6.83	.61*	10.10
BD x BC				
1 Standard Deviation below the Mean	.33*	8.60	.23*	3.72
1 Standard Deviation above the Mean	.62*	10.94	.54*	6.99
BD x ED				
1 Standard Deviation below the Mean	.24*	4.16	.31*	7.72
1 Standard Deviation above the Mean	.50*	6.50	.63*	11.09
BD x P				
1 Standard Deviation below the Mean	.28*	5.52	.24*	4.31
1 Standard Deviation above the Mean	.60*	9.90	.51*	6.71
BD x SE				
1 Standard Deviation below the Mean	.48*	5.51	.49*	5.70
1 Standard Deviation above the Mean	.24*	2.12	.25*	2.26

Note. BD = Body Dissatisfaction; IAA = Insecure-Anxious Attachment; BC = Body Checking; ED = Emotional Dysregulation; P = Perfectionism; SE = Self-Esteem.

**p* < .01.

who are perfectionistic, spending a considerable amount of time and energy to scrutinize their muscle appearance by using a wide range of behaviors (i.e., mirror checking, feeling muscles for size/density, social comparison; Hildebrandt et al., 2010), and highly dissatisfied with their body, may be more driven to engage in behavioral features of male ED symptomatology. In our hypothesis this process should represent an attempt to change their body shape/size and achieve the desired muscular-ideal stereotype and findings supported them.

Emotion dysregulation was positively related to DM and BB (Dakanalis, Timko, et al., 2013; Garner, 2008; Stice et al., 2010). The significant emotional dysregulation-BD interaction is consistent with the assertions (Cooper & Fairburn,

2011; Gross, 2007) that individuals with high levels of emotional dysregulation may react with more negative affect to their BD and, as a result, be more likely to engage in harmful eating and shape behaviors to cope with their negative feelings. However it should be noted that Gross (2007) described four antecedent-focused stages and a response-focused stage where negative emotional states may be regulated. The EDI-3 emotional dysregulation scale used in the current study (Garner, 2004, 2008) is more closed to the response-focused stage (Gross, 2007) that is, the modulation of emotional response through impulsive and self-destructive acts, but the results may have differed if the antecedent-focused emotion regulation strategies had been measured. Further research is needed to clarify the role of antecedent-focused emotion regulation strategies (i.e., avoiding or modifying situations, deploying attention, and cognitive change) in male ED symptoms.

Consistent with our expectations we found that males who are highly dissatisfied with their body and report high attachment anxiety are more likely to engage in behavioral features of male EDs—possibly because they deem body appearance and attractiveness as being important to form or sustain close relationships and therefore the changing of their body size/shape could be a way to gain other's acceptance and reduce the fear of rejection (Abbate-Daga et al., 2010; Eggert et al., 2007; Hardit & Hannum, 2012; Shomaker & Furman, 2010). These findings deserve further study given that anxiety in the interpersonal arenas is believed to maintain eating disordered behaviors (Swinbourne et al., 2012).

Interestingly, in this study the effects of the $BD \times$ Self-esteem interaction replicate and extend with Italian late adolescent boys and young adult men previous studies conducted on American and Italian late adolescent girls and young adult women (Brannan & Petrie, 2011; Dakanalis, Zanetti, Riva, et al., 2013). This highlights the stable key role of self-esteem as buffer. The findings across these studies showed that among young body dissatisfied individuals regardless of gender, those who display higher levels of self-esteem appear to be more readily able, to dismiss their negative body image because of their other perceived strengths, thus decreasing the psychological need and related maladaptive eating and body shape control behaviors in attempt to reach the societal body shape ideal as a means of enhancing their overall self-worth (Aubrey, 2006; Twamley & Davis, 1999).

Although this study was the first to evaluate potential moderators of the BD-ED symptomatology in young males, the aforementioned summary of findings should be considered in the light of the following several limitations. First, even though the racial/ethnic background of participants mirrored that of the universities where the data was collected the sample mainly consisted of White heterosexual late adolescent boys and young men; potentially impacting findings' generalizability. Future research should ascertain whether these findings exist among other groups of males (e.g., early and middle adolescent boys, older men, gay men) and across cultures (Dakanalis et al., 2012; McCabe et al., 2012). Second, even if only self-report measures with established psychometric proprieties among Italian

young males of community and several strategies to detect erroneous data were used, the findings of this study are susceptible to possible reporting bias. Thus, replication with other methods of data collection (such as semi-structured interview) would be beneficial. Future research needs also to examine other potential risk and protective factors (i.e., coping skills, appearance control beliefs, social physique anxiety, social support; Dakanalis, Zanetti, Riva, et al., 2013; Stice et al., 2010).

In term of practical implications, the results suggest that during screening programs, it may be particular useful to professionals to assess males' levels of body checking, emotional dysregulation, perfectionism and attachment anxiety, in order to identify those males, out of the many body dissatisfied males, who are more likely to report severe levels of ED symptoms. In fact, these variables intensified the primary BD-male ED symptomatology relation, such that male BD was strongly related to DM and BB when levels of each moderator were higher. Many extant ED prevention programs (i.e., media education, cognitive dissonance-based educational approach) focus on lowering levels of BD and factors closely associated with BD such as internalization of body shape ideal (Stice & Shaw, 2004). In order to use these approaches that have demonstrated effectiveness with adolescent girls and young women (Stice, Shaw, & Marti, 2007), they should be tailored to address male body concerns with focus on generating a new understanding of masculinity with more value on personal qualities rather than physical appearance (Dakanalis & Riva, 2013). Results from this study suggest that such interventions might even be more effective if they also focused on preventing high levels of body checking behaviors, emotional dysregulation, perfectionism, and attachment anxiety. They should also strive to increase protective factors, such as self-esteem, which according to our findings buffer the deleterious effects of male BD, such that when levels of the moderator were higher, the relationship between male BD and each criterion variable representing male ED symptomatology was weaker.

AUTHOR NOTES

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