Perfectionism, body dissatisfaction, and bulimic symptoms: The intervening role of perceived pressure to be thin and thin ideal internalization

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Abstract

Mounting evidence suggests that perfectionism contributes to the development and maintenance of eating disorder (ED) symptoms. Research adopting a multidimensional conceptualization of perfectionism has shown evaluative concerns (EC) perfectionism to be more strongly associated with ED pathology compared to personal standards (PS) perfectionism. However, less research has addressed the underlying mechanisms accounting for these relations. Based on the sociocultural theory, the aim of this study was to examine perceived pressure to be thin and thin ideal internalization as intervening variables through which PS and EC perfectionism could relate to body dissatisfaction and bulimic symptoms. A total of 559 adolescents (59% female; mean age = 13.9 years) participated in a three-wave longitudinal study. Structural equation modeling (SEM) analyses showed that EC perfectionism and PS perfectionism were related differentially to the intervening variables, with EC perfectionism being primarily related to perceived pressure to be thin and with PS perfectionism being primarily related to thin ideal internalization. Further, whereas EC perfectionism was related to increases in bulimic symptoms both directly and indirectly, PS perfectionism was only indirectly related to body dissatisfaction and bulimic symptoms through the sociocultural variables.

Key Words: Perfectionism, Eating Disorder Symptoms, Sociocultural Theory; Adolescence

Mounting evidence suggests that perfectionism contributes to the development and maintenance of eating disorder (ED) symptoms (Fairburn, Cooper, & Shafran, 2003). Research adopting a multidimensional conceptualization of perfectionism (Hamachek, 1978; Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000) has shown evaluative concerns (EC) perfectionism to be more strongly associated with ED pathology compared to personal standards (PS) perfectionism (Bardone-Cone et al., 2007). In spite of the increasing interest in associations between perfectionism and ED symptoms, a thorough understanding of the mechanisms underlying the differential influence of PS versus EC perfectionism on ED symptoms is still missing. Based on the sociocultural theory (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), the aim of this study was to examine perceived pressure to be thin and internalization of the thin-ideal as possible intervening variables in associations between perfectionism, body dissatisfaction, and bulimic symptoms.

Perfectionism as a Multidimensional Construct

In current research on perfectionism, a multidimensional conceptualization of perfectionism is widely prevailing. This conceptualization harkens back to a distinction made by Hamachek (1978) between normal and neurotic perfectionism. Both forms of perfectionism are characterized by the setting of high standards for performance. However, whereas 'normal perfectionists' can derive a real sense of pleasure from achievement and may cope well with a less than perfect performance, 'neurotic perfectionists' would never be satisfied with their achievements. Instead, neurotic perfectionists would always feel as if they could and should do better (Hamachek, 1978).

Following Hamackek (1978), different scholars have introduced multidimensional models of perfectionism. Hewitt and Flett (1991) introduced an interpersonal model of perfectionism, thereby distinguishing between 'self-oriented perfectionism' (SOP; i.e.,

striving for perfection in one's own behavior), 'other-oriented perfectionism' (OOP; i.e., demanding perfection from others), and 'socially prescribed perfectionism' (SPP; i.e., having the perception that others demand perfection from oneself). Around the same time, the research group of Frost and colleagues (1990) also developed a multidimensional model of perfectionism, distinguishing between six facets of perfectionism (Frost, Marten, Lahart, & Rosenblate, 1990): high personal standards (PS), concerns over mistakes (CM), doubt about actions (DA), parental expectations (PE), parental criticism (PC), and organization (O). In their conceptualization, Frost et al. (1990) emphasized that some features of perfectionism may be positive and contribute to performance and well-being whereas other features may be detrimental to well-being and adjustment. Specifically, they argued that the setting of high standards is not maladaptive per se: "The setting of and striving for high standards is certainly not in and of itself pathological" (Frost et al., 1990, p. 450). In contrast, 'concerns over mistakes' and 'doubts about actions' would represent instantiations of neurotic or maladaptive perfectionism because these features reflect a self-critical and negative self-evaluative orientation.

Factor analytic research, using a variety of multidimensional perfectionism measures in different populations, supported a distinction between two broad dimensions of perfectionism, which have been referred to as personal standards (PS) perfectionism and evaluative concerns (EC) perfectionism (Dunkley et al., 2000; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993). Whereas PS perfectionism was primarily defined by the setting of high standards per se, EC perfectionism was primarily defined by self-critical features such as concern over mistakes and doubts about actions. Testifying to the validity of this distinction, PS perfectionism has been found to be largely unrelated to psychopathology and, when controlling for the variance shared with EC perfectionism, has even been found to be related

to positive adjustment outcomes. In contrast, EC perfectionism has been found to be associated positively with a variety of manifestations of psychopathology (Dunkley et al., 2000; Frost et al., 1990; Stoeber & Otto, 2006).

Perfectionism and Eating Disorder Symptoms

Both clinical accounts and empirical studies suggest that perfectionism is strongly involved in the development and maintenance of eating disorder (ED) symptoms. The association between ED and perfectionism has long been studied from a unidimensional perspective, for instance using the Perfectionism subscale of the Eating Disorders Inventory (EDI; Garner, Olmstead, & Polivy, 1983). Case control studies showed elevated levels of perfectionism among patients with anorexia nervosa (Bastiani, Rao, Welzin, & Kaye, 1995; Pike et al., 2008), bulimia nervosa (Lilenfeld et al., 2000), and binge eating disorder (Striegel-Moore, Fairburn, Wilfley, Pike, Dohm, & Kraemer, 2005) compared to general psychiatric or healthy controls.

Increasingly, however, studies on perfectionism and ED are following the general trend in perfectionism literature to adopt a multidimensional approach. This fairly recent line of research deals with the intriguing question how PS and EC perfectionism are related to ED symptoms. Do both PS and EC perfectionism have unique relations with ED symptoms? Or is only EC perfectionism uniquely associated with ED symptoms? Research found support for an elevation in both PS and EC perfectionism in anorexia nervosa (Bastiani et al., 1995) and bulimia nervosa (Lilenfeld et al., 2000) compared to healthy controls. Also, some studies in community samples did not show a clear distinction between PS and EC perfectionism in terms of their associations with ED symptoms (e.g. Sherry, Hewitt, Besser, McGee, & Flett, 2004; Bardone-Cone, 2007).

On the basis of such and other findings, some have argued for a return to a unidimensional definition of perfectionism (Shafran, Cooper, & Fairburn, 2002). Shafran and colleagues argue that clinical perfectionism is unidimensional: the setting of personal standards would be closely intertwined with individuals' tendency to hinge their self-worth on the achievement of these standards and with their subsequent tendency to engage in negative self-evaluations. Basically, Shafran and colleagues' argument is that in clinical perfectionism it is difficult, if not impossible, to disentangle the tendency to set high standards from the tendency to engage in negative self-evaluations.

However, other studies do suggest a differential role for PS perfectionism and EC perfectionism in their associations with ED symptoms. Specifically, studies where the shared variance of PS and EC perfectionism was taken into account, typically did not confirm that both dimensions are elevated in ED patients (e.g., Dunkley, Blankstein, Masheb, & Grilo, 2006; Sassaroli, Lauro, Ruggiero, Mauri, Viani, & Frost, 2008; Soenens et al., 2008) or that both dimensions contribute independently to the prediction of ED symptoms (e.g., Boone, Soenens, Braet, & Goossens, 2010; DiBartolo, Li, & Frost, 2008). Instead, these studies typically found that only EC perfectionism (and not PS perfectionism) was associated with diagnosis of ED or with severity of ED symptoms.

These inconsistent findings fueled the ongoing debate concerning the differential role of PS and EC perfectionism. In this study, we aimed to add to this debate (a) by further examining prospective associations of both perfectionism dimensions with body dissatisfaction and bulimic symptoms and (b) by examining the possible role of two intervening variables in these associations (i.e., perceived pressure to be thin and thin ideal internalization). To date, few studies examined intervening variables in the association between perfectionism and ED symptoms. This is unfortunate because such an examination

is necessary to gain a better understanding of the underlying mechanisms through which perfectionism affects eating-disordered behaviors and attitudes. One notable exception is a recent study by Sherry and Hall (2009) in which a mediation model was introduced entailing interpersonal discrepancies, low interpersonal esteem, depressive affect, and dietary restraint as possible mediating variables between socially prescribed perfectionism and binge eating. Results of this study suggest that socially prescribed perfectionism serves as a risk factor for binge eating through its effect on each of the four tested mediators. A further improvement of our knowledge about the mechanisms underlying associations between PS and EC perfectionism ED symptoms is important because this information can inform researchers and practitioners about the design of treatment and preventive programs, and may facilitate the identification of high-risk individuals. To develop hypotheses about the possible role of perceived pressure to be thin and thin ideal internalization as intervening variables between perfectionism and ED symptoms, we draw from sociocultural theory.

The Sociocultural Theory

The sociocultural theory mainly focuses on the role of sociocultural factors in the development of body image problems and bulimic behaviors (Striegel-Moore, Silberstein, & Rodin, 1986; Thompson et al., 1999). The sociocultural model posits that in current Western culture, messages highlighting the importance of thinness are omnipresent. Although the ideal figure has become thinner, the body shape of the average woman increased during the last decades. The internalization of the message that one should adhere to this thin beauty ideal and the possible subsequent experience of discrepancy between one's body and the thin ideal is supposed to lead to body dissatisfaction.

Possibly as a consequence of the increasing societal demands for thinness, body dissatisfaction is said to be normative in the West, especially among young adolescent girls

(Striegel-Moore et al., 1986; Kelly, Wall, Eisenberg, Story, & Neumark-Sztainer, 2005). Body dissatisfaction contains affective, cognitive and behavioral features, and is broadly defined as the dissatisfaction experienced with one's body (Thompson et al., 1999). Body dissatisfaction has increased over the past few decades (Cash, Morrow, Hrabosky, & Perry, 2004) and is associated with a heightened risk for the development of subthreshold ED symptoms (see Smolak & Thompson, 2009). Longitudinal research has shown that body dissatisfaction predicts the onset and maintenance of bulimic symptoms in particular (e.g. Stice & Agras, 1998).

According to the sociocultural model, internalization of the thin ideal represents one important determinant of body dissatisfaction. Thin ideal internalization refers to the extent to which an individual accepts socially-defined ideals of attractiveness and engages in behavioral attempts to adhere to these ideals (Thompson et al., 1999). Thin ideal internalization would result from a confrontation with images of thin and attractive persons (Stice, 2002). Individuals who internalize the thin ideal buy into the idea that thinness and attractiveness are important ways of achieving success and happiness in life (Levine & Murnen, 2009; Striegel-Moore et al., 1986).

Further, it has been suggested that thin ideal internalization is, in turn, fostered by perceived pressure to be thin. Individuals would be more likely to internalize the thin ideal and to experience body dissatisfaction when they encounter pressuring messages (e.g., from parents, peers, dating partners, and the media) that they are not thin enough (Cafri, Yamamiya, Brannick, & Thompson, 2005; Stice & Whitenton, 2002; Thompson et al., 1999; Stice & Shaw, 2002).

An extensive body of research indeed revealed that perceived pressure to be thin and thin ideal internalization are related to body dissatisfaction and to subsequent

manifestations of disordered eating, such as restraint and bulimic symptoms (see Grabe, Ward, & Hyde, 2008; Stice, 2002). Experimental research even demonstrated that a reduction in thin ideal internalization led to a decrease in body dissatisfaction and bulimic symptoms (Stice, Mazotti, Weibel, en Agras, 2000), thus suggesting that thin ideal internalization is a causal risk factor for body dissatisfaction and bulimic symptoms. Similarly, it has been found that experimental exposure to images of thin models (which might elicit perceived pressure to be thin) increase the likelihood of thin ideal internalization and body dissatisfaction (Grabe et al., 2008; Groetz, Levine, & Murnen, 2002).

Perfectionism, Perceived Pressure to be Thin, and Thin Ideal Internalization

Although virtually all adolescents are confronted with similar sociocultural messages, adolescents differ in terms of how strongly they experience a sense of pressure to be thin and in terms of how strongly they adopt the thin ideal (Striegel-Moore & Bulik, 2007). Such findings suggest that specific risk factors may determine adolescents' tendency to experience pressure to be thin and to internalize the thin ideal. Herein we argue that perfectionism may represent such a risk factor.

Perfectionistic people are characterized by a tendency to strive for excellence (Hamachek, 1978; Frost et al., 1993) and typically try to set high standards for performance in different domains of life. In a culture where the thin ideal is promoted as a highly desirable goal, it can be expected that perfectionism, and the tendency to set high personal standards in particular, is related to thin ideal internalization. In other words, the adoption of the thin ideal as a self-imposed standard could be seen as a domain-specific expression of a more general tendency to set high standards and to be sensitive to societal norms . Thus, we expected that PS perfectionism would be related to thin ideal internalization.

We also considered the possibility the EC perfectionism would relate to thin ideal internalization. To cope with the deep-seated feelings of uncertainty and incompetence following from EC perfectionism, individuals high on EC perfectionism may adopt the thin ideal as a way to restore self-control and to experience a sense of competence. Although we considered the possibility that EC perfectionism would relate to thin ideal internalization, we expected that this dimension of perfectionism would be particularly strongly related to perceived pressure to be thin. People with high levels of EC perfectionism are characterized by a self-critical tendency and by pervasive concerns about their performance. This self-critical orientation, which is rooted in the dependency of their self-evaluation on the attainment of self-imposed standards (Shafran et al., 2002), typically goes hand in hand with the belief that other people will disapprove and criticize them for not achieving perfection (Hewitt & Flett, 1991). Thus, individuals scoring high on EC perfectionism are likely to not only pressure themselves into achievement but also to perceive their environment as pressuring them to meet particular standards for achievement. This mechanism is consistent with the notion of a reactive person–environment interaction (Caspi & Roberts, 2001), where individuals perceive their environment in ways consistent with their personality orientation. Similarly, from a cognitive perspective perfectionism can be seen as a cognitive-affective schema that directs individuals' perception of the environment (e.g., Shafran et al., 2002). Thus, because of their self-critical attitude and their concern with evaluations by others, we expected that people high on EC perfectionism would be hypervigilant to cues and evaluations in the domain of thinness and beauty. As such, they would be more likely to perceive their environment as highly pressuring to adhere to the thin ideal.

To the best of our knowledge, only a few studies assessed the role of perfectionism as a potential risk factor for the development of body dissatisfaction and bulimic symptoms

within the sociocultural perspective (e.g. Tissot & Crowther, 2008; van den Berg, Thompson, Obremski-Brandon, & Coovert, 2002). For instance, Tissot and Crowther (2008) found support for a model where self-oriented perfectionism (SOP) mediated the relation with socially prescribed perfectionism (SPP) and thin ideal internalization which, in turn, was related to body dissatisfaction. Although these studies revealed some interesting findings, the present study is the first to relate PS perfectionism and EC perfectionism simultaneously to two central constructs in sociocultural theory, that is, thin ideal internalization and perceived pressure to be thin.

The Present Study

The general aim of this study was to examine concepts derived from the sociocultural theory as possible intervening variables through which perfectionism could relate to body dissatisfaction and bulimic symptoms. In examining this integrated model, we explicitly focused on the distinction between PS and EC perfectionism. We relied on a prospective design, where each of the constructs in the hypothesized sequence was measured at a different point in time. Specifically, perfectionism, the sociocultural factors (i.e., perceived pressure to be thin and thin ideal internalization), and the ED outcomes (i.e., body dissatisfaction and bulimia) were measured at Wave 1, 2, and 3, respectively, with each wave separated by a one-year interval. This spacing of the assessments across three waves ensured temporal precedence of perfectionism to the sociocultural factors and of the sociocultural factors to the ED outcomes. To provide an additionally conservative test of our hypotheses, we decided to control for initial levels of the ED outcomes measured at Wave 1. This procedure allowed us to examine whether perfectionism and the sociocultural factors would predict increases in ED symptoms rather than just levels of ED symptoms at Wave 3.

We examined these hypotheses in a sample of adolescent boys and girls. Although it has been shown that girls display higher levels of pressure to be thin, internalization, body dissatisfaction, and bulimic symptoms compared to boys (Eisenberg, Neumark-Sztainer, & Paxton, 2006; McCabe & Ricciardelli, 2004; Halliwell & Harvey, 2006), it is relatively less clear whether the same mechanisms apply across gender (e.g. Jones, Vigfusdottir, & Lee, 2004). Thus, we also aimed to examine whether the structural associations between the constructs in our integrated model would be moderated by gender.

Method

Participants and Procedure

Initially, a total of 708 adolescents were recruited from two Flemish high schools in Belgium. At initial assessment, 57 % were female and 43% were male with an overall mean age of 13.9 years (*SD* = 0.92). The mean adjusted BMI was 99.52 (*SD* =13.27; range: 72.37–178.23). This sample was followed on two subsequent measurement occasions, each separated by a one-year interval. A total of 559 adolescents (59% female) participated at least twice in the study. This group of adolescents was the sample of interest in this study. For this longitudinal study, approval from the local ethics committee of Ghent University was obtained. At each wave data collection, we followed the same procedure. One week prior to data collection, a passive informed consent for parents together with an information letter were provided during school hours. Parents who were not willing to let their adolescent participate were asked to fill out the letter and give it with the adolescent to school. From the adolescents whose parents did allow them to participate, an active written consent was obtained. As such, adolescents also got the opportunity to withhold participation. The survey was organized during a class hour, which took approximately 50 minutes.

Missing Data

Binary logistic regression. To examine sample attrition, we performed a logistic regression analysis. Adolescents who participated in all three waves were dummy coded as 1 ("retention"), whereas adolescents who participated only once or twice were coded as 0 ("drop-out"). First, demographic variables, such as age, gender, and adjusted BMI, were entered in Step 1 to predict sample attrition. Gender (dummy coded as male = 1, female = 2), was defined as categorical variable and the last category was indicated as reference category. In a second step, Time 1 measures of PS perfectionism, EC perfectionism, body dissatisfaction, and bulima were entered in the prediction. Model chi-square for Step 1 was significant $\chi^2(3) = 18.55$, $p < .001$. Further inspection at individual level indicated that age [*Wald*(1) = 13.53, $p < .001$; *exp(β)* = .707] and gender [*Wald*(1) = 4.67, $p < 0.01$; *exp(β)* = .689], but not adjusted BMI, added significantly to the prediction of attrition. Older participants and male participants were less likely to participate in all three waves. In Step 2, the model chi-square was not significant $\chi^2(4) = 10.127$, $p > .01$, indicating that, overall, the substantive study variables were unrelated to sample attrition.

Estimation of the missing data. Participants with and without complete data were compared using Little's (1988) Missing Completely At Random (MCAR) test. A nonsignificant χ^2 test statistic or a χ^2/df ratio value of 2 or less, suggests that missing values can be estimated reliably. Comparison of means and covariances of all variables for participants who engaged in at least two measurement waves, revealed a χ^2/df ratio of 1.08, suggesting that the data were missing completely at random. Therefore, for participants who participated at least at two time points, missing values were estimated using maximum likelihood estimation (Schafer, 1997) and the expectation maximization (EM) algorithm

available in SPSS. This procedure resulted in a complete sample of 559 participants (59% female; 41% male).

Measures

Body mass index. Each participant provided self-reports of current weight (kg) and height (m). The body mass index was calculated as weight (in kg) / height (in m)^2. This study used the adjusted BMI [(actual BM / percentile 50 of BMI for age and gender) x 100] to allow for comparisons with children of the same age and gender. The 50th percentiles of the BMI for age and gender are based on normative data in a Dutch sample (Fredriks, van Buuren, Wit, & Verloove-Vanhorick, 2000). An adjusted BMI ≤ 85% is considered as underweight. An adjusted BMI ≥ 120% is considered as overweight. In the current sample, 52 adolescents (9%) were underweight, 474 adolescents (85%) had normal weight, and 33 adolescents (6%) were overweight.

Perfectionism (Time 1). The Multidimensional Perfectionism Scale (MPS-F; Frost et al., 1990, 1993) was designed to assess different dimensions of perfectionism. For this study, we only used the subscales tapping into intrapersonal perfectionism, that is, Personal Standards (PS; e.g. I have extremely high goals), Concern over Mistakes (CM; e.g. I should be upset if I make a mistake), and Doubts about Actions (DA; It takes me a long time to do something 'right'). Consistent with previous research (e.g., Dunkley et al., 2000; Frost et al., 1993), we used the Personal Standards scale as an indicator of Personal Standards (PS) perfectionism and we computed a mean score of the items for Concern over Mistakes and Doubts about Actions as an indicator of Evaluative Concerns (EC) perfectionism. To obtain a pure measure of PS perfectionism, 2 items from the PS subscale that have been shown to cross-load on the EC perfectionism factor were removed (e.g. Boone et al., 2010; DiBartolo, Frost, Chang, La

Sota, & Grills, 2004). Cronbach's alpha for PS perfectionism was .77 and Cronbach's alpha for EC perfectionism was .91.

Perceived pressure to be thin (Time 2). The perceived sociocultural pressure scale (Stice, Nemeroff, & Shaw, 1996) was used to assess perceived pressure to be thin. This scale contains 10 items reflecting participants' degree of pressure to be thin perceived from family, friends, dating partners, and media (e.g. "I've felt pressure from my friends to lose weight"). Items were rated on a 5-point likert scale, ranging from 0 (*"none"*) to 4 (*"a lot"*). This scale has been shown to be valid and psychometrically sound (e. g. Stice & Whitenton, 2001). Cronbach's alpha in this study was .87.

Internalization of the thin ideal (Time 2). We used two scales measuring internalization of the thin ideal. First, the Sociocultural Attitudes Towards Appearance Scale–3 (SATAQ-3; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004) assesses women's recognition and acceptance of societally approved standards of appearance. An example item is : "I would like my body to look like the models who appear in magazines". Second, we administered the Ideal-Body Stereotype Scale-Revised (IBSS-R; Stice, Ziemba, Margolis, & Flick, 1996; as used in e.g. Stice & Agras, 1998), which measures individuals' endorsement of stereotypes about the ideal body. For the present study, the items of the IBSS-R were slightly adopted to be applicable for both boys and girls. An example item is: "Slender women and muscled men are more attractive". As has been done in previous research (e.g., Stice et al., 2000), we combined both scales into a composite score for internalization of the thin ideal. The internal consistency of the combined scale was .89.

Eating disorder symptoms (Time 1 and Time 3). Participants were administered the Eating Disorder Inventory-II (EDI-II; Garner, 1991) which is an adaptation of the original EDI (Garner et al., 1983). The EDI-II is one of the most widely used standardized self-report

questionnaires assessing psychological and behavioral characteristics associated with eating disorders, such as anorexia nervosa (AN) and bulimia nervosa (BN). The original questionnaire contains 64 items, rated on a 6-point likert-type scale ranging from "*never*" to "*always*", and contains eight subscales. For the purpose of this study, we used only two subscales, that is, (a) the Bulimia subscale (EDI-B), which includes seven items that assess binge eating and purging (e.g. " I stuff myself with food", " I have the thought of trying to vomit to lose weight") and (b) the Body Dissatisfaction subscale (EDI-BD), which contains nine items reflecting participants' dissatisfaction with specific parts of their body (e.g. "I think my hips are too big"). Cronbach's alpha for bulimia was .77 and .81 at T1 and T3, respectively. Cronbach's alpha for body dissatisfaction was .93 at both T1 and T3.

Results

Descriptive Statistics

To examine associations between a number of relevant background variables (i.e., adjusted BMI, age, and gender) and the study variables [i.e., PS and EC perfectionism (T1), body dissatisfaction (T1 and T3), bulimia (T1 and T3), pressure to be thin (T2) and internalization (T2)], we conducted a multivariate analysis of covariance (MANCOVA) with gender as an independent variable and with age and adjusted BMI as covariates. The main effect of adjusted BMI and gender was significant [Wilk's λ = .722, p < .001; F(8,544) = 26.19, η^2= .28 and [Wilk's λ = .663, p < .001; F(8,544) = 34.54, η^2= .34, respectively]. The effect of age was not significant [Wilk's λ = .972, p >.01; F(8,544) = 1.96, η^2= .03]. Gender differences were significant for all independent measures, except for bulimia (T1 and T3), with boys reporting significantly higher levels of PS and EC perfectionism and lower levels of body dissatisfaction, internalization of the thin ideal, and perceived pressure to be thin compared

to girls. Adjusted BMI was positively related to EC perfectionism, bulimia (T1), body dissatisfaction (T1 and T3), and perceived pressure to be thin.

Table 1 shows correlations among all study variables. EC perfectionism was positively and significantly related to both body dissatisfaction (T1) and bulimia (T1 and T3). PS perfectionism was positively related to bulimia (T1 and T3). Both PS and EC perfectionism were significantly related to perceived pressure to be thin and to thin-ideal internalization.

Primary Analyses

Structural equation modeling (SEM) was used to examine the main hypotheses, using Lisrel 8.72 (Jörgeskog & Sörbom, 1996). Solutions were generated on the basis of maximum-likelihood estimation. Data screening indicated univariate and multivariate non-normality. Therefore, the asymptotic covariance matrix was used as input and we inspected the Satorra-Bentler scaled chi-square (SBSχ^2, Satorra-Bentler, 1994). A number of fit indices were used to evaluate the model (see Hu and Bentler, 1999): the comparative fit index (CFI; Bentler, 1990), the root mean square error of approximation (RMSEA; Steiger & Lind, 1980), and the standardized root mean squared residuals (SMSR; Bentler, 1995). CFI values of .90 or above, RMSEA values of .06 or below, and SRMR values of .08 or below were used as indicators of acceptable fit (Byrne, 2001; Hu & Bentler, 1999). Because of the large sample size, our analyses attained high power. To avoid that small effects would be flagged as significant, we considered effects to be significant when *p* was smaller than .01.

To control for the possible confounding effects of the background variables, residual scores were computed for each study variable. Each study variable was regressed on adjusted BMI, age and gender, and the residual scores were used as variables in all subsequent analyses. Moreover, to control for initial levels of the eating disorder symptoms, scores for body dissatisfaction and bulimic symptoms at Time 3 were additionally regressed

on the initial (Time 1) scores for body dissatisfaction and bulimic symptoms. By doing so, the residual scores for the eating disorder symptoms reflect relative change in these symptoms from Time 1 to Time 3 rather than absolute levels of these symptoms at Time 3.

We addressed our hypotheses in three steps, thereby following the guidelines of Holmbeck (1997). First, we tested a direct effects model, which does not include the intervening variables and which includes PS and EC perfectionism as direct predictors of increases in body dissatisfaction and subsequent increases in bulimic symptoms. Second, a full mediation model was tested, with pressure to be thin and thin ideal internalization (measured at Time 2) as intervening variables. In the full mediation model, PS and EC perfectionism did not have direct associations with the ED symptoms and were only related to those symptoms indirectly through the intervening variables. Third, a partial mediation was tested and compared to the second model. In this partial mediation model, PS and EC perfectionism were related to the symptoms both directly and indirectly (i.e., through the intervening variables).

The first model, (i.e., the direct effects model) included paths from PS and EC perfectionism to both body dissatisfaction and bulimic symptoms. Additionally, we allowed a path between body dissatisfaction and bulimic symptoms. This direct model was fully saturated because it included all possible paths. As such, it yielded a perfect fit. We found that EC perfectionism was significantly related to increases in bulimic symptoms (β = .41, p <.001) but not to body dissatisfaction (β = .09, *ns*). PS perfectionism did not significantly predict body dissatisfaction (β = -.11, *ns*) nor bulimic symptoms (β = -.11, *ns*). The path between body dissatisfaction and bulimic symptoms was significant (β = .30, p <.001).

Estimation of the second model (i.e., the full mediation model) yielded a less than optimal fit (SBS-$\chi^2(7)$= 90.39; SRMR = .11; RMSEA = .15; CFI= .87). EC perfectionism was

related significantly to perceived pressure to be thin (β = .28, p < .001) but was unrelated to thin-ideal internalization (β = .08, *ns*). In contrast, PS perfectionism was significantly related to thin-ideal internalization (β = .14, p < .01) but was unrelated to perceived pressure to be thin (β = .02, *ns*). The path from pressure to be thin to thin-ideal internalization (β = .38, p < .001) was significant. The path from thin-ideal internalization to increases in body dissatisfaction (β = .24, p < .001) was significant. The path from body dissatisfaction to bulimic symptoms (β = .32, p < .001) remained significant.

Finally, a partial mediation model was tested by adding a direct path from EC perfectionism to bulimic symptoms We added only this path because this was the only significant path in the first ('direct effects') model. Adding this path to the model (β = .34, p <.001) improved the model fit substantially (SBS-χ^2(8)= 37.83; SRMR = .06; RMSEA = .098; CFI= .95). In addition, a comparison of the full mediation model and the partial mediation model revealed a significant scaled difference test (SBS-χ^2diff (1) = 38.00, p < .001). The partial mediation model, which includes a direct path from EC perfectionism to bulimic symptoms, was selected as the final model.

To further improve the overall fit of the final model, non-significant paths were trimmed and we also inspected the modification indices. The modification indices suggested to add a path from perceived pressure to be thin to bulimic symptoms. Adding this path to the model (β = .18, p < .001), combined with the trimming of non-significant paths, indeed resulted in a better fit (SBS-χ^2(7) = 23.39; SRMR = .043; RMSEA = .065; CFI= .98). The final model is depicted in Figure 1. To examine whether EC perfectionism and PS perfectionism are indirectly related to the ED outcomes through the intervening variables, we inspected the Sobel test (Sobel, 1982). The indirect effects of EC perfectionism on body dissatisfaction (z = 3.90; p < .001) and bulimia (z = 3.61; p < .001) were significant. Similarly, also the indirect

effects of PS perfectionism on body dissatisfaction (z = 3.80; p < .001) and bulimia (z = 3.32; p < .001) were significant. [1]

The Moderating Role of Gender: Multigroup Analysis

To examine whether gender would moderate the relations in the final model, multigroup analyses were used to compare a constrained model (i.e. a model where the structural coefficients are not allowed to vary across gender) with an unconstrained model (i.e. a model where these coefficients are allowed to vary across gender). A chi-square difference test comparing both models was non-significant (SBS-χ^2diff(11) = 12.402, p = .334), indicating that the relationships in the model were not moderated by gender.

Discussion

Research addressing the differential associations of PS and EC perfectionism with eating disorder symptoms has yielded inconsistent results (Bardone-Cone et al., 2007). As a consequence, debate remains about the question whether PS perfectionism can be called 'adaptive' and whether only EC perfectionism is maladaptive and serves as a risk factor for psychopathology. Against the background of this debate, the aim of this study was (a) to further illuminate the relation between PS and EC perfectionism and ED symptoms and (b) to examine the role of intervening variables, thereby drawing on the sociocultural theory (Thompson et al., 1999).

In line with previous research demonstrating the role of EC perfectionism as a risk factor for eating disorder symptoms (DiBartolo et al., 2008; Soenens et al., 2008) and for bulimic symptoms in particular (Sherry & Hall, 2009), we found only EC (and not PS) perfectionism to predict increases in bulimic symptoms. This finding suggests that being overly critical of one's own behavior and performance increases the risk to experience bulimic symptoms two years later. Because of the differential relation of PS and EC

perfectionism to bulimic symptoms, our results seem to provide evidence for a multidimensional conceptualization of perfectionism where only EC perfectionism is related directly to ED psychopathology.

In addition to the direct association between EC perfectionism and increases in bulimic symptoms, we found that EC perfectionism also had an indirect association with increases in bulimic symptoms through perceived pressure to be thin and body dissatisfaction. The latter finding suggests that people characterized by evaluative concerns and self-criticism also tend to perceive others as critical (Caspi & Roberts, 2001). In other words, because of their own self-evaluative and self-critical orientation, they also tend to feel pressured by others to meet certain high standards, and standards dealing with the male or female beauty ideal in particular. This perceived pressure to be thin was related both directly and indirectly (i.e., through thin ideal internalization and body dissatisfaction) to bulimic symptoms. The direct pathway between pressure to be thin and bulimic symptoms is consistent with previous research (e.g., Shomaker & Furman, 2009) as well as with assertions from the escape from self-awareness theory (Heatherton & Baumeister, 1991). In this theory, it is claimed that binge eaters are typically characterized by a high sensitivity to demanding ideals and subsequent feelings of perceived pressure to be thin. When people fall short of the perceived pressuring standards to be thin, an aversive state of self-awareness is likely to result. Binge eating would then represent one way to escape from these aversive feelings and self-awareness (Heatherton & Baumeister, 1991). The indirect pathway of pressure to be thin to increases in bulimic symptoms through thin ideal internalization and body dissatisfaction is consistent with the model of Stice and Shaw (2002) and also received support in other sociocultural models (e.g. Halliwell & Harvey, 2006). According to these models, perceived pressure to be thin leads to acceptance of the

perceived norm to be thin as a personally important standard. Consequently, if an adolescent believes that he or she should attempt to achieve slimness, but is confronted with the fact that this is virtually unattainable, dissatisfaction with the own body is likely to occur, resulting in binge eating or other compensatory behaviors in an attempt to diminish the gap between the ideal body and one's actual body (Cafri et al., 2005; Stice & Whitenton, 2002; Thompson & Stice, 2001).

In sum, our findings indicate that EC perfectionism is related to increases in bulimic symptoms both directly and indirectly, that is, through a complex chain of events involving perceived pressure to be thin, thin-ideal internalization, and body dissatisfaction. These findings underscore the status of EC perfectionism as a maladaptive personality feature with potential risk for the development of ED symptoms.

In contrast, at first sight it may seem as if PS perfectionism is relatively harmless because it was initially unrelated to ED symptoms. However, some of our findings do point to a potential maladaptive role for PS perfectionism in the development of ED symptoms. Specifically, PS perfectionism was found to be indirectly related to increases in bulimic symptoms, through internalization of the thin ideal and body dissatisfaction. Apparently, adolescents who set high standards in general also set high standards specifically in the domain of weight and shape, thereby internalizing the sociocultural messages from media, parents, or peers. When the portrayed media ideals and the standards set by parents and peers are experienced as unattainable and unrealistic, adolescents are likely to feel incompetent to reach this internalized goal and to experience dissatisfaction with their body. Bulimic behavior may then represent a compensatory attempt to still adhere to the internalized thin ideal in order to reach perfection, thus further reinforcing the thin-ideal internalization across time.

The notion that PS perfectionism is not harmless in the context of ED symptoms is not entirely new. For instance, Tissot and Crowther (2008) also found internalization of the thin ideal and body dissatisfaction to mediate the relationship between PS perfectionism and bulimic symptoms. In addition, a number of other studies have also shown associations between PS perfectionism and ED symptoms (e.g., Bardone-Cone, 2007; Boone et al., 2010). Boone et al. (2010), for instance, have shown that a combination of high PS perfectionism and high EC perfectionism was more strongly related to ED symptoms than the presence of EC perfectionism alone. One reason why some other studies failed to find direct associations between PS perfectionism and ED symptoms may be that the intervening variables responsible for the negative influence of PS perfectionism on ED symptoms were overlooked.

Collectively, our results suggest that EC perfectionism is both a direct and an indirect predictor of increases in bulimic symptoms. In contrast, although PS perfectionism did not appear to have a direct effect on increases in body dissatisfaction or bulimic symptoms, it did have an indirect effect on increases in bulimic symptoms through internalization of the thin ideal and subsequent body dissatisfaction. This finding dovetails with previous research suggesting that PS perfectionism may be a relatively more latent risk factor for ED symptoms and for psychopathology in general than EC perfectionism (Boone et al., 2010; Bardone-Cone, 2007; McVey, Pepler, Davis, Flett and Abdolell, 2002).

A final interesting finding is that gender did not appear to moderate the relations in our final model. Although we did find significant mean-level gender differences, with boys reporting significantly lower levels of perceived pressure, internalization, and body dissatisfaction, the lack of moderation by gender suggests that the same underlying mechanisms to clarify the relation between PS and EC perfectionism and bulimic symptoms

are at work among adolescent boys and girls (Ricciardelli & McCabe, 2004). This is consistent with previous research that revealed more similarities than differences between boys and girls in terms of sociocultural risk factors for disordered eating (Shomaker & Furman, 2009).

Research, Prevention, and Treatment Implications

This study confirms previous research showing that perceived pressure to be thin and thin ideal internalization increase risk for body dissatisfaction and bulimic symptoms. In addition, this study identified perfectionism as an antecedent of perceived pressure to be thin and thin-ideal internalization. These findings may inform selective prevention programs tackling the impact of the sociocultural variables. It has been shown that selective programs, targeting adolescents at elevated risk for EDs, are more effective in reducing bulimic symptoms as a result of reducing their perceived pressure to be thin, thin-ideal internalization, and body dissatisfaction than universal programs offered to all adolescents (Stice & Shaw, 2004). The findings of his study suggests that adolescents high on both PS and EC perfectionism are at higher risk for developing bulimic symptoms because they are particularly vulnerable to perceived pressure to be thin and thin-ideal internalization. Perfectionism thus appears to be a key variable to identify adolescents at risk for body dissatisfaction on ED symptoms.

Another implication of our findings is that intervention programs may want to address perfectionist thinking and behavior in adolescents in order to obtain long-lasting change. By focusing exclusively on a reduction of perceived pressure to be thin and thin-ideal internalization, the source of these harmful socio-cultural orientations may not be addressed such that these orientations and their related symptoms reappear later. We argue that the long-term effectiveness of interventions may be increased by specifically addressing the role of PS and EC perfectionism. Programs could, for instance, incorporate modules to

diminish evaluative concerns and self-criticism to lower the tendency to set very high standards in general and standards in the domain of weight and shape in particular (Fairburn, 2008).

Limitations and Directions for Future Research

Although this study had several strengths, such as the large community sample consisting of both adolescents boys and girls and the use of a prospective design with a 3-year interval, there were also some limitations. A first limitation is the use of self-report data, which might have inflated the magnitude of some associations. Second, because the present study involved mainly well-adjusted Caucasian adolescents, the homogeneity of our sample limits our possibility to generalize our findings across samples, such as other ethnic groups, older or younger groups, and clinical groups. Research among ED patients is particularly important to address the validity of our model and to examine whether the same mechanisms also apply to the development or maintenance of full-blown eating disorders. Third, although it is a strength of this study that we used a three wave prospective design, we did not measure each of the variables at all waves. As a consequence, we were not able to control for initial levels of perceived pressure to be thin and thin ideal internalization. Also, we were not able to examine possible reciprocal associations between ED symptoms, perfectionism, and the sociocultural variables. To provide a more conservative test of our hypotheses and to examine dynamic and bidirectional processes, future research should replicate this model with all variables measured at all time points.

Conclusion

Our results, together with those from previous studies, suggest that EC perfectionism represents a risk factor for eating pathology. EC perfectionism was related to bulimic symptoms both directly and indirectly (through perceived pressure to be thin, thin-ideal

internalization, and body dissatisfaction). In contrast, although PS perfectionism sometimes has been portrayed as an adaptive feature of perfectionism and although it was initially unrelated to ED symptoms, it was indirectly related to ED symptoms through thin-ideal internalization. The incorporation of sociocultural theory in the ongoing debate on the multidimensionality and adaptive value of perfectionism proved fruitful in this study and may guide future research efforts in the domain of perfectionism and eating disorders.

Footnote

[1] We also administered the EDI-II at Time 2, yet did not include the Time 2 scores for eating disorder symptoms in the main analyses in order not to complicate the presentation of the findings. However, we did test our model (see Figure 1) controlling for scores for body dissatisfaction and bulimic symptoms at Time 2 instead of controlling for scores at Time 1. Virtually the same results were obtained, with one exception. The path from pressure to be thin to bulimic symptoms was not significant when controlling for the Time 2 ED-symptoms. Generally speaking, the results did not differ substantially depending on whether we controlled for ED symptoms at Time 1 or at Time 2, thus testifying to the stability and replicability of the model depicted in Figure 1.

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Table 1

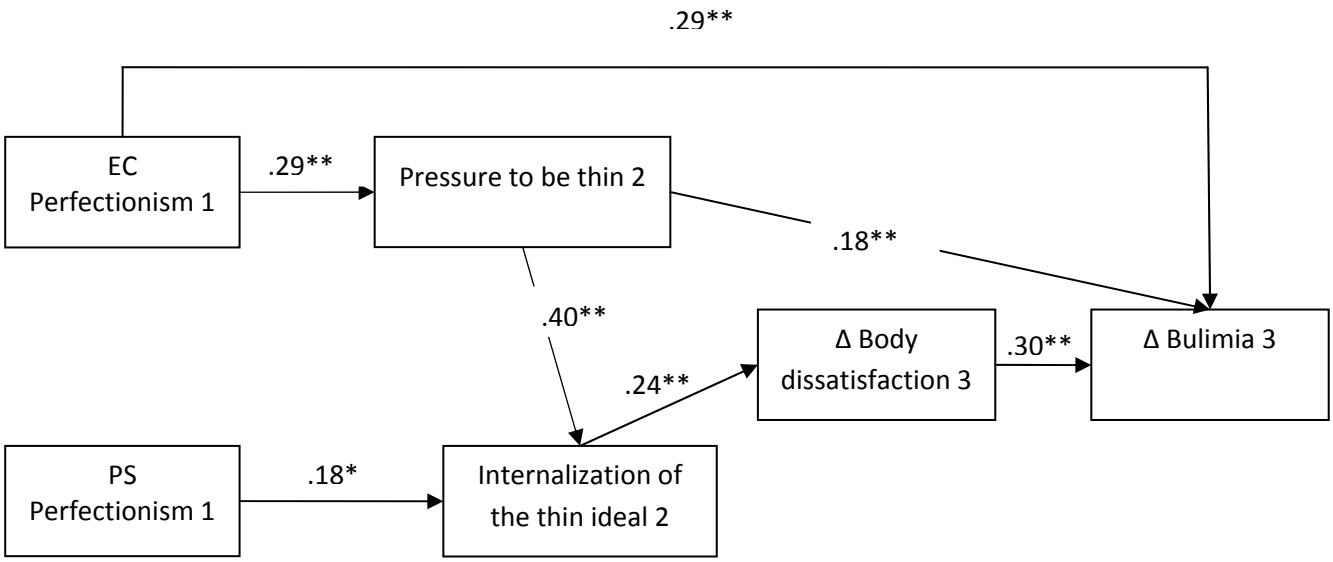
Means, Standard Deviations, and Correlations among Study Variables

	1	2	3	4	5	6	7	8	9	10
1. Age										
2. Adjusted BMI	.07									
3. PS perfectionism T1	.04	.02								
4. EC perfectionism T1	.07	.12*	.58**							
5. Bulimia Nervosa T1	.15**	.13*	.11*	.29**						
6. Body dissatisfaction T1	.13**	.33**	.00	.19**	.23**					
7. Internalization T2	.09	.09	.21**	.25**	.21**	.37**				
8. Pressure to be thin T2	.08	.34**	.12*	.27**	.32**	.47**	.47**			
9. Bulimia T3	.13**	.03	.11*	.36**	.50**	.23**	.28**	.25**		
10. Body dissatisfaction T3	.11**	.20**	-.07	.11*	.23**	.65**	.42**	.34**	.36**	
Mean	13.88	99.40	2.50	1.93	1.71	2.88	2.81	1.62	1.90	3.01
SD	0.94	12.97	0.77	0.73	0.70	1.27	0.64	0.63	0.72	1.19

Note. N = 559. PS = Personal Standards; EC = Evaluative Concerns

* $p < .01$. ** $p < .001$ (2-tailed).

Figure 1. Final structural model of the link between dimensions of perfectionism, sociocultural variables, and eating disorder symptoms. Coefficients shown are standardized path coefficients, * p < .01. ** p < .001.



Note. SBS-χ^2 = Satorra-Bentler Scaled Chi-Square; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Squared Residuals . SBS-χ^2 (7)= 23.391; RMSEA = .065; CFI = .975; SRMR = .0425