

# Maladaptive Perfectionism as a Mediator and Moderator Between Adult Attachment and Depressive Mood

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This study examined maladaptive perfectionism (concern over mistakes, doubts about one's ability to accomplish tasks, and failure to meet high standards) as both a mediator and a moderator between adult attachment (anxiety and avoidance) and depressive mood (depression and hopelessness). Survey data were collected from 310 undergraduates and analyzed using structural equation modeling (SEM) methods. Results indicated that maladaptive perfectionism partially mediated the relationship between attachment anxiety and depressive mood and fully mediated the relationship between attachment avoidance and depressive mood. Bootstrap methods were used to assess the magnitude of the indirect effects. Significant moderator effects were also found with SEM methods. The association between attachment anxiety and depressive mood was stronger as perfectionism increased. Perfectionism was not a significant moderator for attachment avoidance and depressive mood.

Throughout the past decade, there has been a growing interest among counseling psychologists in applying Bowlby's (1973, 1980, 1988) attachment theory to understanding adult development and the counseling process (Lopez, 1995; Lopez & Brennan, 2000; Mallinckrodt, 2000). The initial formulations of adult attachment posited four qualitative categories of attachment based on combinations of positive and negative working models of self and others (e.g., Bartholomew & Horowitz, 1991). However, research has failed to confirm the existence of qualitative cutoff points, and instead supports two continuous dimensions as the best way to model adult attachment (Fraley & Waller, 1998). In a factor analysis of data gathered from over 1,000 undergraduates, Brennan, Clark, and Shaver (1998) included all of the extant self-report measures of adult attachment (14 measures, 60 subscales, 323 items) and identified two relatively orthogonal dimensions of Anxiety and Avoidance. Adult attachment anxiety is characterized as an excessive need for approval from others and fear of interpersonal rejection or abandonment. Adult attachment avoidance involves an excessive need for self-reliance and fear of interpersonal closeness or dependence. People with high levels of either dimension or both dimensions in combination are assumed to have

an insecure adult attachment orientation. By contrast, people with low levels of attachment anxiety and avoidance have the capacity for secure adult attachment, a positive sense of personal competence, and the ability to maintain supportive attachments (Brennan et al., 1998; Lopez & Brennan, 2000; Mallinckrodt, 2000).

Previous empirical research has provided strong evidence for a link between insecure attachment and various forms of psychological distress (for reviews, see Lopez & Brennan, 2000; Mikulincer & Shaver, 2003). For example, relative to their secure counterparts, people with insecure attachment reported greater distress and hostility during a laboratory problem-centered discussion (Simpson, Rholes, & Phillips, 1996), greater affective intensity and emotionality in their daily life (Pietromonaco & Barrett, 1997), more depressive symptoms (Roberts, Gotlib, & Kassel, 1996), greater interpersonal problems (Mallinckrodt & Wei, 2003), and more emotional distress (Collins, 1996). Thus, the link between various forms of insecure attachment and indices of psychological distress (e.g., depressive mood) has been fairly well established. More recently, research linking attachment insecurity and distress (e.g., depressive mood) has been shifting from an examination of simple bivariate linear relationships to multivariate interactional models that examine the roles of mediators and moderators of these relationships (Collins, 1996; Lopez, Mitchell, & Gormley, 2002; Roberts et al., 1996; Wei, Heppner, & Mallinckrodt, 2003).

One example of this new emphasis on multivariate models is recent research that has examined the relationships among attachment, perfectionism, and adjustment (Rice & Mirzadeh, 2000). Perfectionism has been conceptualized as a multidimensional construct, with both adaptive and maladaptive aspects (Flett & Hewitt, 2002). Adaptive perfectionism involves setting high (but achievable) personal standards, a preference for order and organization, a sense of self-satisfaction, a desire to excel, and a motivation to

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achieve positive rewards. Maladaptive perfectionism involves unrealistically high standards, intense ruminative concern over mistakes, perceived pressure from others to be perfect, a perceived large discrepancy between one's performance and personal standards, compulsive doubting of one's actions, and motivation to avoid negative consequences (Enns & Cox, 2002).

Theorists suggest that maladaptive perfectionism results when a child's need for acceptance and love from parents is accompanied by a parent's failure to provide the needed acceptance and positive regard (Hamachek, 1978). Observational research has shown that if caregivers are inconsistent and unreliable in responding to the emotional or physical needs of young children, anxious attachment is frequently the result (Ainsworth, Blehar, Waters, & Wall, 1978). Serious interpersonal problems may develop in adults whose parents used a love withdrawal style of discipline involving threats to withhold affection as a means of control (Mallinckrodt & Wei, 2003). Children with attachment anxiety may quickly learn that if they are "perfect" boys or girls, they may be more likely to gain their parents' love and acceptance. This pattern of striving for perfection as a way to earn acceptance that was only intermittently available in childhood may persist as a maladaptive pattern in adults.

A different dynamic may underlie the connection between perfectionism and attachment avoidance. Attachment avoidance is believed to involve a negative working model of others along with a positive working model of self (Bartholomew & Horowitz, 1991). However, striving to be "perfect" in the view of others may be an outward defense that masks a deeply wounded inner sense of self resulting from the inadequate emotional responsiveness of caregivers early in development (Lapan & Patton, 1986; Robbins & Patton, 1985). Children with avoidant attachment tend to describe themselves as perfect (Cassidy & Kobak, 1988), but they may drive themselves to attain perfection to avoid others' rejection and to manage their own hidden sense of imperfections. For example, a child may think, "If I am perfect, no one will hurt me" (Flett, Hewitt, Oliver, & Macdonald, 2002). Thus, initially striving to be perfect may be a positive coping mechanism for children whose caregivers are unresponsive or inconsistent in their responsiveness to the child's needs. However, if striving to be perfect is overused as a coping strategy, it may lead to depressive mood in adulthood. Therefore, the specific form that the maladaptive striving for perfection may take might depend on the particular mixture of attachment avoidance or attachment anxiety experienced in adulthood.

Although several theorists have suggested that the origins of perfectionism are related to problematic attachment in the parent-child relationship, until recently there were very few empirical studies of perfectionism and attachment. Among the small number of available studies, Rice and Mirzadeh (2000) reported that maladaptive perfectionism was related to insecure attachment, whereas adaptive perfectionism was related to secure attachment in college students. Similarly, Andersson and Perris (2000) found that perfectionism was positively associated with insecure attachment. Additionally, Flett et al. (2001) found that persons with high attachment anxiety and avoidance reported higher perceived pressure from others to be perfect. Thus, previous studies have provided tentative evidence that attachment avoidance and attachment anxiety are positively associated with maladaptive perfectionism.

Several studies have shown that perfectionism is positively associated with depression or hopelessness. For example, perfectionism in college students was associated with greater depressive symptoms (e.g., Chang, 2002; Chang & Sanna, 2001; Cheng, 2001; Hewitt & Flett, 1991) and suicidal preoccupation (Adkins & Parker, 1996; Chang, 1998). In longitudinal studies, perfectionism has been linked to both depression and hopelessness over time (Chang & Rand, 2000; Flett, Hewitt, Blankstein, & Mosher, 1995). Also, Hewitt and Flett (2002) reported that perceived pressure from others to be perfect was associated with hopelessness across different studies and populations (e.g., Chang & Rand, 2000; Dean, Range, & Goggin, 1996). On the basis of these previous studies, in the present study we chose to represent the latent variable of depressive mood with indicators of depression and hopelessness.

It is possible that adults with high attachment anxiety or avoidance are likely to develop maladaptive perfectionism and, in turn, experience significant depressive mood. Some studies have examined how maladaptive perfectionism might serve as a mediator between parent-child interactions and depressive mood. Randolph and Dykman (1998) found that perfectionism fully mediated the relationship between critical parenting and depression-proneness and partially mediated the relationship between perfectionistic parenting and depression-proneness in undergraduate students. Enns, Cox, and Clara (2002) reported that maladaptive perfectionism mediated the relationship between harsh parenting (e.g., critical parenting, parental overprotection, and parental lack of care) and depression. However, our search of the literature could not locate any previous study that examined perfectionism as a mediator between attachment and depressive mood. If maladaptive perfectionism does serve as a mediator, interventions could be targeted at adults with attachment anxiety or avoidance to help decrease their maladaptive perfectionism and in turn decrease their depressive mood.

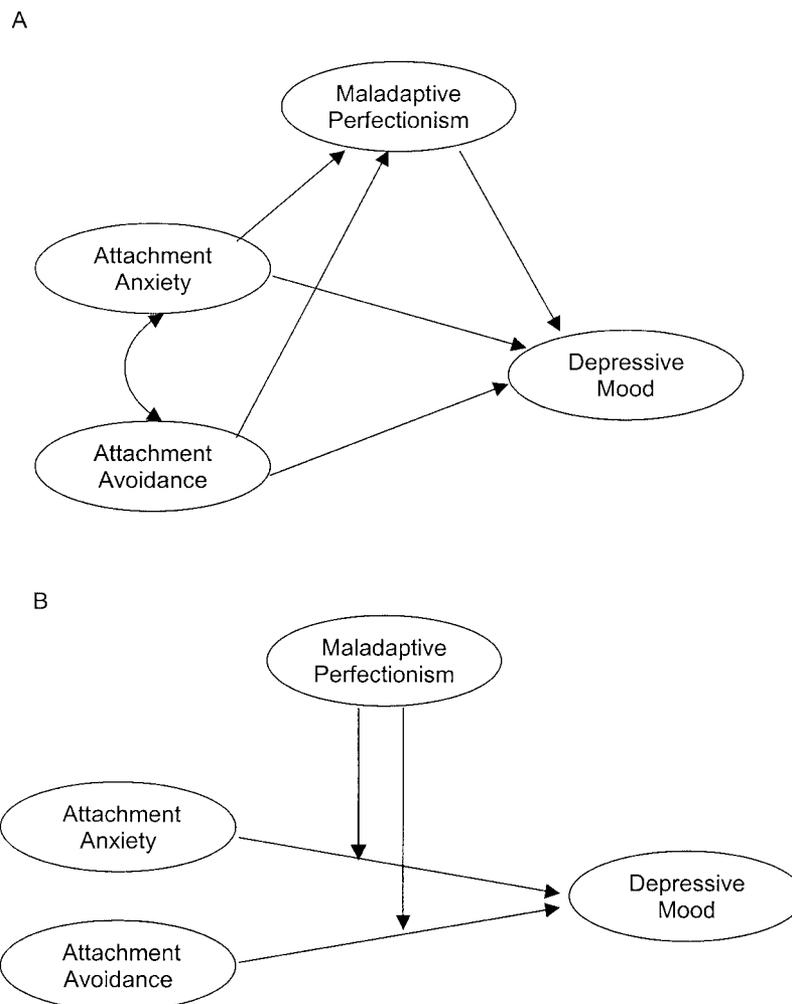
Hewitt and Flett (2002) argued that perfectionism could serve as a moderator (as well as a mediator) between insecure attachment and depressive mood. Several studies have found that specific dimensions of perfectionism (e.g., pressure from others to be perfect) interacted with general stress (e.g., major life stress or self-appraisal stress) to predict increased depression symptoms or negative affect (e.g., Chang & Rand, 2000; Cheng, 2001; Dunkley, Zuroff, & Blankstein, 2003; Flett et al., 1995). That is, greater depression or negative affect was reported by participants with higher combined levels of perfectionism and perceived stress. In addition, other studies reported that specific dimensions of perfectionism interacted with specific stressors to predict higher levels of depression. Hewitt and Flett (1993) found that perfectionism, particularly in the form of perceived pressure from others to be perfect, interacted with interpersonal stressors (e.g., relationship problems or lack of intimacy) to predict depression. It appears that maladaptive perfectionism could serve as a potential moderator of the relationship between general or specific stressors and psychological distress.

Attachment anxiety or attachment avoidance could be viewed as a source of chronic interpersonal stress. Perfectionism may lead to depressive mood because it generates core interpersonal needs that are difficult to satisfy (i.e., the need for others' approval, or the need to be perfect to avoid others' rejection). Maladaptive perfectionism might interact with attachment anxiety or attachment

avoidance to worsen depressive mood (Hewitt & Flett, 2002). From the standpoint of putative causal links, in a mediating scenario attachment insecurity ( $x_1$ ) is believed to cause higher levels of maladaptive perfectionism ( $x_2$ ), which in turn causes higher levels of depressive mood ( $y$ ). If the mediation is partial rather than complete, there would also be a significant direct link between ( $x_1$ ) attachment insecurity and ( $y$ ) depressive mood (Baron & Kenny, 1986; Holmbeck, 1997). By contrast, in a moderating scenario there is no requirement that  $x_1$  causes  $x_2$  and, in fact, the two variables may be uncorrelated. However, the strength of association between  $x_1$  (in this case, attachment insecurity) and  $y$  (depressive mood) is believed to vary for differing levels of  $x_2$  (maladaptive perfectionism). Unfortunately, there has been no empirical research studying how maladaptive perfectionism might interact with attachment to predict depressive mood.

Because it is possible for maladaptive perfectionism to serve as both an intermediate link in the causal chain leading from attachment insecurity to depressive mood (i.e., as a mediator) and as a

variable that alters the strength of association between attachment insecurity and depressive mood (i.e., as a moderator), both types of relationships were explored in this study. Specifically, the purpose of the present study was to examine whether the maladaptive aspects of perfectionism (e.g., concern over mistakes, doubts about actions, and perceived discrepancy between one's standards and performance) serve as a mediator, as a moderator, or as both in the context of the relationship between adult attachment insecurity (anxiety and avoidance) and depressive mood (depression and hopelessness). Figures 1A and 1B depict both of these hypothesized relationships. Structural equation modeling (SEM) was used to test the models depicted in this figure. Slaney, Rice, Mobley, Trippi, and Ashby (2001) argued that the discrepancy between high standards and perceptions of performance was a defining feature of maladaptive perfectionism, whereas high standards without perceived discrepancy could indicate adaptive perfectionism. Therefore, measures of discrepancy between standards and performance, concern over mistakes, and doubts about one's ac-



*Figure 1.* Hypothesized mediating effects (A) and moderating effects (B) of maladaptive perfectionism on the links between attachment anxiety and attachment avoidance with depressive mood. The moderating effects (B) of maladaptive perfectionism on the links between attachment anxiety and attachment avoidance with depressive mood were examined separately.

tions served as the indicators for the construct of maladaptive perfectionism, in addition to measures of depression and hopelessness, which served as indicators of the latent variable depressive mood.<sup>1</sup>

## Method

### Participants

Participants were 310 undergraduate students enrolled in introductory psychology classes at a large midwestern university. The participants were told that the purpose of the research was "to learn about factors affecting college students' adjustment." The sample included 225 (73%) women and 85 (27%) men. Their mean age was 19.27 years ( $SD = 1.88$ , range = 18–30 yrs.). Approximately 53% of the participants were freshmen. Ethnic identification was predominantly White/Caucasian (84%), followed by international students of various ethnicities (4.8%), Asian American (4.2%), African American (2.3%), Hispanic American (2.3%), multiracial American (1.0%), and others (1.3%). Most participants (98.0%) indicated they were single or never married. Students received partial credit toward their course grade for participating in this study. The amount of credit varied depending on their particular section of the course.

### Instruments

*Experiences in Close Relationships Scale (ECRS; Brennan et al., 1998).* The ECRS is a 36-item self-report measure of adult attachment containing two 18-item subscales derived from the factor analysis by Brennan et al. (1998) described previously. The subscales assess dimensions of adult attachment, Anxiety and Avoidance. Participants use a 7-point Likert-type scale (1 = *disagree strongly*, 7 = *agree strongly*) to rate how well each statement describes their typical feelings in romantic relationships. The Anxiety subscale taps fears of abandonment and rejection. The Avoidance subscale assesses discomfort with dependence and intimate self-disclosure. Brennan et al.'s reported coefficient alpha was .91 and .94 for the Anxiety and Avoidance subscales, respectively. In the present study, coefficient alpha was .90 for the Anxiety subscale and .91 for the Avoidance subscale. Brennan et al. also reported that scale scores were correlated in expected directions with scores on self-report measures of touch aversion and postcoital emotions. Measured indicators for the two latent variables of attachment anxiety and attachment avoidance were created from three 6-item parcels for each subscale. Following the recommendation of Russell, Kahn, Spoth, and Altmaier (1998), exploratory factor analyses were conducted using maximum-likelihood extraction for the two factors (Anxiety and Avoidance) separately. The items were then rank-ordered on the basis of the magnitude of the factor loadings and successively assigned pairs of the highest and lowest items to each parcel to equalize the average loadings of each parcel on its respective factor.

*Almost Perfect Scale-Revised (APS-R; Slaney et al., 2001).* The APS-R is a 23-item self-report measure designed to assess levels of perfectionism. Respondents use a 7-point Likert-type scale (1 = *strongly disagree*, 7 = *strongly agree*) in responding to the items. The APS-R is made up of three subscales: High Standards, Order, and Discrepancy. In this study only the 12-item Discrepancy subscale was used. This subscale measures the degree to which respondents perceive themselves as failing to meet personal standards for performance. Slaney et al. reported a coefficient alpha of .92 for the Discrepancy subscale, whereas coefficient alpha was .94 in the present sample. Slaney et al. reported evidence of construct validity in the form of significant correlations between the Discrepancy subscale and other perfectionism measures such as Concern Over Mistakes ( $r = .55$ ) and Doubts About Actions ( $r = .62$ ).

*Multidimensional Perfectionism Scale (FMPS; Frost, Marten, Lahart, & Rosenblate, 1990).* The FMPS is a 35-item instrument designed to measure perfectionism. Each item uses a 5-point Likert-type scale (1 =

*disagree strongly*, 5 = *agree strongly*). Consistent with Dunkley, Blankstein, Halsall, Williams, and Winkworth (2000), only two of the six FMPS subscales were used as indicators of perfectionism in this study: (a) Concern Over Mistakes (9 items) taps a tendency to interpret mistakes as failures and to believe that one will lose the respect of others when one fails; and (b) the Doubts About Actions (4 items) subscale, which measures the tendency to doubt one's ability to accomplish tasks or the quality of one's performance. In the present study, coefficient alphas were .89 and .74 for Concern Over Mistakes and Doubts About Actions, respectively. Frost, Heimberg, Holt, Mattia, and Neubauer (1993) found that Concern Over Mistakes and Doubts About Actions not only reflected maladaptive evaluative concerns of perfectionism, but were also the subscales most strongly related to depression. Criterion-related validity is evidenced by correlations between FMPS subscales and measures of psychological symptoms (e.g., Brief Symptom Inventory) and adjustment such as compulsiveness, self-esteem, procrastination, and depression (Frost et al., 1993, 1990).

*Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).* The BDI is a widely used 21-item self-report measure of depressive symptoms. Each item consists of a depression symptom cluster scored on a 0–3 response scale based on the severity of the symptom. Scores across the items are summed to obtain a total BDI score, with higher scores indicating more severe depression. Internal consistency for the BDI for undergraduates ranges from .78 to .92, with a mean coefficient alpha of .85. In the present study, coefficient alpha was .86. Test-retest reliabilities for nonpsychiatric participants ranged from .60 (7 days) to .83 (1–6 hr), with reports of .78 for a 2-week and a 3-week period. Considerable evidence of validity has been demonstrated for the BDI as a measure of depressive symptoms (Beck, 1967; Bumberry, Oliver, & McClure, 1978).

*Beck Hopelessness Scale (BHS; Beck, Weissman, Lester, & Trexler, 1974).* The BHS is a 20-item inventory that assesses the degree to which an individual's cognitive schemata are characterized by pessimistic expectations. The scale uses a true-false response format. Scores can range from 0 to 20, with higher scores indicating a greater degree of hopelessness. Internal consistency of .93 has been reported, along with concurrent validity of .74 with clinical ratings of hopelessness and .60 with other scales of hopelessness (Beck et al., 1974). In the present study, coefficient alpha for the BHS was .78.

### Procedure

The questionnaires were administered to small groups of 3–25 students who signed up for one of several data collection times. Participants were guaranteed anonymity of their responses and confidentiality of the data, given that no personal identifying information was solicited on the questionnaires. Completing the entire packet of instruments typically required 25–40 min.

## Results

### Descriptive Statistics

Means, standard deviations, and zero-order correlations for the 13 measured variables are shown in Table 1. Data were checked for normality, which is a critical assumption underlying the

<sup>1</sup> One issue raised by reviewers concerned the fact that we only used one measure, the ECRS, to operationalize the attachment variable. Because the ECRS was developed on the basis of a factor analysis of existing measures of attachment (see Brennan et al., 1998), we felt that this measure adequately represented the nature of the construct. Indeed, it is very likely that items on any other measure of adult attachment would be redundant with items on this measure. Therefore, we did not feel it was necessary to use other measures of adult attachment in this investigation.

Table 1  
Means, Standard Deviations, and Zero-Order Correlations Among 13 Observed Variables

	<i>M</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Anxiety 1	21.88	6.17	.76	.77	.19	.12	.08	.38	.37	.32	.38	.34	-.05	-.13
2. Anxiety 2	23.66		6.59	.73	.10	.08	-.02	.39	.34	.33	.39	.28	-.03	-.13
3. Anxiety 3	20.17			6.52	.22	.18	.10	.41	.33	.32	.38	.33	-.06	-.21
4. Avoid 1	16.78				6.60	.87	.85	.32	.27	.34	.18	.24	-.13	.07
5. Avoid 2	17.05					6.70	.85	.24	.21	.27	.12	.17	-.12	.04
6. Avoid 3	15.62						6.55	.21	.20	.23	.07	.19	-.15	.03
7. DIS	43.58							14.83	.58	.61	.53	.36	-.10	.06
8. CM	22.62								7.33	.54	.43	.33	-.10	.04
9. DA	10.76									3.30	.43	.29	-.14	.17
10. BDI	8.36										6.71	.60	.06	.05
11. BHS	1.71											0.81	.07	-.03
12. Anxiety 1 × DIS	34.85												98.25	.14
13. Avoid 1 × DIS	31.45													104.78

*Note.*  $N = 310$ . Standard deviations are shown on the diagonal. Anxiety 1, Anxiety 2, Anxiety 3 = Anxiety Parcel 1, Anxiety Parcel 2, Anxiety Parcel 3 from the Anxiety subscale of the Experiences in Close Relationship Scale; Avoid 1, Avoid 2, Avoid 3 = Avoid Parcel 1, Avoid Parcel 2, Avoid Parcel 3 from the Avoidance subscale of the Experiences in Close Relationship Scale; DIS = Discrepancy subscale of the revised Almost Perfect Scale; CM = Concern Over Mistakes subscale from the Frost Multidimensional Perfectionism Scale; DA = Doubts About Actions subscale from the Frost Multidimensional Perfectionism Scale; BDI = Beck Depression Inventory; BHS = Beck Hopelessness Scale (after square root transformation); Anxiety 1 × DIS = the interaction between Anxiety Parcel 1 and Discrepancy (after centering Anxiety 1 and DIS); Avoid 1 × DIS = the interaction between Avoid Parcel 1 and Discrepancy (after centering Avoid 1 and DIS). Absolute values of correlations greater than .17 were significant at  $p < .01$ .

maximum-likelihood procedure used in this study. Results indicated univariate normality for all measured variables except the BHS (Beck et al., 1974; skew  $Z = 1.87$ , and kurtosis  $Z = 4.47$ ). We therefore conducted a square root transformation for the BHS variable. The skew and kurtosis for the transformed BHS were  $Z = .16$  and  $.75$ , respectively, indicating a normal distribution. The BHS and the transformed BHS were highly correlated ( $r = .94$ ). Therefore, we used the transformed BHS variable in subsequent analyses.<sup>2</sup>

#### Measurement Model for Testing Mediation Effects

The analysis of the proposed mediation model followed the two-step procedure recommended by Anderson and Gerbing (1988). First, we used a confirmatory factor analysis to develop a measurement model with an acceptable fit to the data. Once an acceptable measurement model was developed, the structural model was tested. The measurement model was estimated using the maximum-likelihood method in the LISREL 8.50 program. As suggested by Hu and Bentler (1999) and Quintana and Maxwell (1999), three indices were used to assess goodness of fit for the models: the comparative fit index (CFI; values of .95 or greater are desirable), the standardized root-mean-square residual (SRMR; values of .08 or less are desirable), and the root-mean-square error of approximation (RMSEA; values of .06 or less are desirable). Finally, we used the chi-square difference test to compare nested models. An initial test of the measurement model resulted in a relatively good fit to the data,  $\chi^2(38, N = 310) = 72.60, p < .001$ , CFI = .98, SRMR = .04, and RMSEA = .05 (95% confidence interval [CI]: .03, .07).<sup>3</sup> All of the loadings of the measured variables on the latent variables were statistically significant ( $p < .001$ ; see Table 2). Therefore, all of the latent variables appear to have been adequately measured by their respective indicators. In addition, the correlations among the independent (exogenous) latent variables, the mediator latent variable, and dependent latent variable were statistically significant ( $p < .05$ ; see Table 3)

#### Structural Model for Testing Mediation Effects

A number of methods have been suggested in the literature for testing mediation effects. Recently, MacKinnon, Lockwood, Hoffman, West, and Sheets (2002) evaluated 14 methods with regard to

<sup>2</sup> We also tested the multivariate normality of the observed variables as a set, including the transformed BHS (Beck et al., 1974) variable, based on the test developed by Mardia (see Bollen, 1989). The significant result,  $\chi^2(2, N = 310) = 114.05, p < .001$ , indicated that the data were not multivariate normal. Therefore, we used the procedure developed by Satorra and Bentler (1988) to adjust the chi-square statistics and standard errors of the parameter estimates for the impact of nonnormality. In the mediation model, the results after adjusting for the impact of nonnormality did not differ from the results when we did not adjust for nonnormality. In the moderation model, the results for the path coefficients were identical whether or not we adjusted for the impact of nonnormality. However, the standard error of the latent interaction term became very large following the adjustment for nonnormality. This problem associated with interaction terms and the Satorra-Bentler adjustment for nonnormality has been noted by others (e.g., Yang-Wallentin & Joreskog, 2001). Therefore, we report results for the moderation model without adjusting for the impact of nonnormality.

<sup>3</sup> We examined whether the results would be equivalent for men and women in the measurement model, structural model, and the models with interaction effect. A series of multiple-group analyses were conducted using LISREL 8.50 to examine whether female and male groups differed from one another in terms of the measurement model, the structural model, and the models with interaction effects (Byrne, 1998). Results suggested that the measurement model and structural model were equivalent for the male and female groups. However, the models comparing men and women that included the interaction effect did not converge. This was likely because of the relatively small number of men ( $n = 85$ ) included in the sample. Therefore, we conducted a hierarchical regression analysis to examine whether the interaction effect varied for men and women. Results of the regression analysis indicated that the three-way interaction (Attachment Anxiety × Maladaptive Perfectionism × Gender) predicting depressive mood was not significant ( $\beta = .002, t(302) = 0.55, p > .05$ ). Thus, it appears that the interaction effect was equivalent for male and female participants.

Table 2  
Factor Loadings for the Measurement Model

Measure and variable	Unstandardized factor loading	SE	Z	Standardized factor loading
Attachment Anxiety				
Anxiety Parcel 1	5.52	0.26	21.08	.89***
Anxiety Parcel 2	5.59	0.30	18.87	.85***
Anxiety Parcel 3	5.61	0.29	19.06	.86***
Attachment Avoidance				
Avoidance Parcel 1	6.15	0.29	21.14	.93***
Avoidance Parcel 2	6.25	0.30	21.17	.93***
Avoidance Parcel 3	5.97	0.33	18.35	.91***
Maladaptive Perfectionism				
Discrepancy	12.27	0.71	17.33	.83***
Concern Over Mistakes	5.23	0.38	13.67	.71***
Doubts About Actions	2.42	0.18	13.60	.73***
Depressive Mood				
BDI	6.08	0.43	14.00	.90***
BHS	0.54	0.05	10.93	.66***

Note.  $N = 310$ . Discrepancy = one subscale from the revised Almost Perfect Scale; Concern Over Mistakes = one subscale from the Frost Multidimensional Perfectionism Scale; Doubts About Actions = one subscale from the Frost Multidimensional Perfectionism Scale; BDI = Beck Depression Inventory; BHS = Beck Hopelessness Scale (after square root transformation).

\*\*\*  $p < .001$ .

Type I error and statistical power. They found that the commonly used method recommended by Baron and Kenny (1986) for testing mediation had the lowest statistical power of the 14 methods examined. Instead, MacKinnon et al. (2002) recommend testing for mediation using the test of the indirect effect of the causal variable through the hypothesized mediator reported by the LISREL program. However, MacKinnon et al. (2002) have shown that the method used by LISREL to calculate the standard error of the indirect effect tends to yield incorrect estimates. To develop more accurate estimates of standard errors of the indirect effects, Shrout and Bolger (2002) suggested a bootstrap procedure. In general, bootstrap methods offer an empirical method of determining the significance of statistical estimates (Efron & Tibshirani, 1993). A standard error is the expected variability of an estimate if the estimation was repeated a large number of times. Therefore, in the present study, we used the bootstrap procedure to test the statistical significance of the indirect effects (Shrout & Bolger, 2002)

We tested the structural model (see Figure 1A) using the maximum-likelihood method in the LISREL 8.50 program. The results showed a very good fit of the model to the data,  $\chi^2(38, N = 310) = 72.60, p < .001, CFI = .98, SRMR = .04, RMSEA = .05$  (CI: .03, .07). However, the path coefficient from attachment

avoidance to depressive mood ( $\beta = -.07$ ) was not statistically significant. Therefore, we constrained this path to zero to see whether doing so worsened the fit of the model to the data. The results for this modified model also showed a very good fit to the data,  $\chi^2(39, N = 310) = 74.05, p < .001, CFI = .98, SRMR = .04, RMSEA = .05$  (CI: .03, .07; see Figure 2). A chi-square difference test used to compare the initial model with the modified model suggested no difference in the fit for the two models,  $\chi^2(1, N = 310) = 1.45, p > .05$ . This result indicates that the direct path from attachment avoidance to depressive mood did not make a significant contribution to the model. Therefore, we used the modified model without this path in the bootstrap procedure.

Following the recommendations of Shrout and Bolger (2002), in the first step we created 1,000 bootstrap samples ( $N = 310$ ) from the original dataset by random sampling with replacement. Next, we ran the modified structural model described above 1,000 times with these bootstrap samples to yield 1,000 estimations of each path coefficient. The third step was to use the output of the 1,000 estimations of each path coefficient to calculate an estimate of the indirect effect of attachment anxiety on depressive mood by multiplying 1,000 pairs of path coefficients from (a) attachment anxiety to maladaptive perfectionism, and (b) maladaptive perfectionism to depressive mood. Similarly, the indirect effect of attachment avoidance on depressive mood was calculated by multiplying 1,000 pairs of path coefficients from (a) attachment avoidance to maladaptive perfectionism and (b) maladaptive perfectionism to depressive mood. The final step was to conduct a  $t$  test comparing the two mean indirect effects to zero. The results from 1,000 bootstrap samples indicated that the mean indirect effect for attachment anxiety on depressive mood was .32, which was significantly greater than zero,  $t(999) = 140.82, p < .0001$ ; the 95% CI ranged from .31 to .32. The mean indirect effect for attachment avoidance on depressive mood was .16, which was also significantly greater than zero,  $t(999) = 122.98, p < .0001$ ; the 95% CI

Table 3  
Correlations Among Latent Variables for the Measurement Model

Latent variable	1	2	3	4
1. Attachment anxiety	—	.16*	.54***	.49***
2. Attachment avoidance		—	.36***	.18*
3. Maladaptive perfectionism			—	.68***
4. Depressive mood				—

Note.  $N = 310$ .

\*  $p < .05$ . \*\*\*  $p < .001$ .

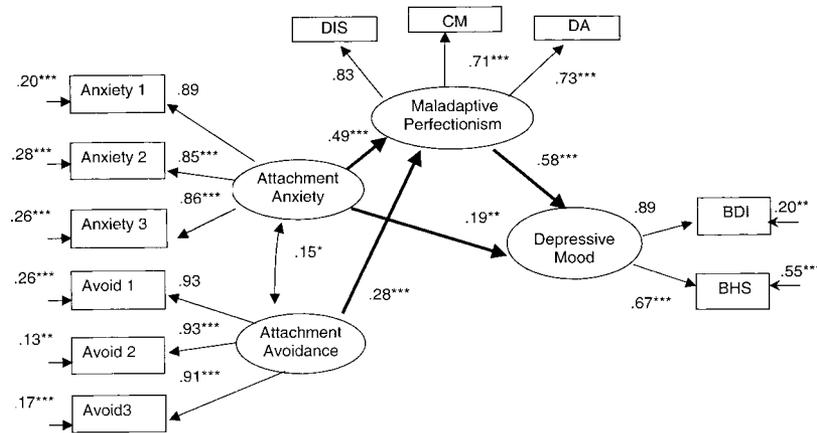


Figure 2. The mediated model.  $N = 310$ . DIS = Discrepancy subscale; CM = Concern Over Mistakes subscale; DA = Doubts About Actions subscale; BDI = Beck Depression Inventory; BHS = Beck Hopelessness Scale (after square root transformation). \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

ranged from .15 to .16.<sup>4</sup> In addition, the direct effect from attachment anxiety to depressive mood was .19, which was also significant ( $Z = 2.75$ ,  $p < .01$ ; the 95% CI ranged from .06 to .34). It is also important to note that 36% of the variance in maladaptive perfectionism was explained by attachment anxiety and attachment avoidance, and 49% of the variance in depressive mood was explained by attachment anxiety and maladaptive perfectionism.

#### Structural Equation Model Testing for Moderation

Before testing for interaction effects, we centered all the predictors to control for possible multicollinearity among the predictor variables (Aiken & West, 1991). To examine the interaction effects with continuous variables using a latent variable analysis, one may assume that all possible products of the measured indicators could be computed as indicators of an interaction latent variable (Holmbeck, 1997). For example, in the present study there were three 6-item parcel indicators of attachment anxiety (or attachment avoidance), and three indicators of the maladaptive perfectionism latent variable (discrepancy, concern over mistakes, and doubts about actions). Thus, there would be nine indicators for each of the two latent variables representing interactions between maladaptive perfectionism and attachment anxiety (or avoidance). However, Joreskog and Yang (1996) argued that only one product variable is necessary, but that several constraints must be imposed to test the significance of the interaction effects. The reason is that the model is identified with just one product variable. The addition of more product variables simply adds more manifest parameters without adding new parameters to be estimated. In addition, the model using only one product variable is parsimonious (see Joreskog & Yang, 1996, for a discussion of these issues as well as programming examples using LISREL 8).

In the present study, we tested two models that included interaction effects, one for attachment anxiety and the other for attachment avoidance. We followed Joreskog and Yang's (1996) recom-

mendations to examine the interaction effects using the maximum-likelihood estimation method with one product variable. For the attachment anxiety model, we selected the observed variable with the largest factor loading from the attachment anxiety latent variable (Anxiety Parcel 1) and the observed variable with the largest factor loading from the maladaptive perfectionism latent variable (Discrepancy) to create the interaction latent variable with one indicator, Anxiety Parcel 1  $\times$  Discrepancy (see Figure 3). The results indicated that the model provided a very good fit to the data,  $\chi^2(27, N = 310) = 67.25$ ,  $p < .0001$ , CFI = .97, SRMR = .05, RMSEA = .07 (CI: .05, .09). The path from the interaction latent variable to the depressive mood latent variable was .38, which was statistically significant ( $Z = 5.36$ ,  $p < .001$ ).<sup>5</sup> Similarly, we selected the observed variable with the largest factor loading from the attachment avoidance latent variable (Avoidance

<sup>4</sup> We also used the bootstrap procedure to test the statistical significance of the indirect effects from the initial mediation model. The results from 1,000 bootstrap samples indicated that the mean indirect effect for attachment anxiety on depressive mood was .34, which was significantly greater than zero,  $t(999) = 147.42$ ,  $p < .0001$ ; the 95% CI ranged from .33 to .34. The mean indirect effect for attachment avoidance on depressive mood was .17, which was also significantly greater than zero,  $t(999) = 111.96$ ,  $p < .0001$ ; the 95% CI ranged from .17 to .18. It therefore appears that eliminating the nonsignificant path from the initial mediation model did not greatly alter the estimates of these two indirect effects.

<sup>5</sup> We also examined the interaction effects with four product variables, following Joreskog and Yang's (1996) programming in LISREL 8. The path from the interaction latent variable to depressive mood was still significant ( $\beta = .33$ ,  $Z = 5.10$ ,  $p < .001$ ) for the attachment anxiety model, but was not significant for the attachment avoidance model ( $\beta = -.09$ ,  $Z = -1.38$ ,  $p > .05$ ). In addition, we examined the interaction effects with nine product variables by adapting Joreskog and Yang's (1996) programming in the LISREL 8. Similarly, the path from the interaction latent variable to depressive mood was still significant ( $\beta = .22$ ,  $Z = 3.71$ ,  $p < .01$ ) for the attachment anxiety model, but was not significant for the attachment avoidance model ( $\beta = .09$ ,  $Z = 0.92$ ,  $p > .05$ ).

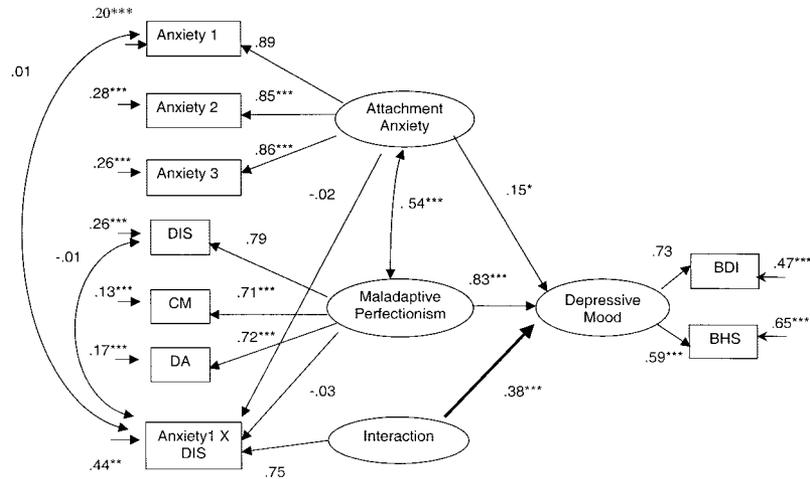


Figure 3. The moderation model for attachment anxiety.  $N = 310$ . Anxiety 1 = Attachment Anxiety Parcel 1, the biggest factor loading from the attachment anxiety latent variable; DIS = Discrepancy subscale (the biggest factor loading from the maladaptive perfectionism latent variable). This interaction indicator was created by multiplying Attachment Anxiety Parcel 1 by Discrepancy. The interaction latent variable has one indicator. Detailed results can be obtained from Meifen Wei upon request; CM = Concern Over Mistakes subscale; DA = Doubts About Actions subscale; BDI = Beck Depression Inventory; BHS = Beck Hopelessness Scale. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

Parcel 1) and the biggest loading from the maladaptive perfectionism latent variable (Discrepancy) to create the interaction latent variable with one indicator, Avoidance Parcel 1  $\times$  Discrepancy for the attachment avoidance model.<sup>6</sup> The results indicated that the model provided a very good fit to the data,  $\chi^2(27, N = 310) = 109.60, p < .01, CFI = .94, SRMR = .06, RMSEA = .10$  (CI: .08, .11). However, the path from the interaction latent variable to the depressive mood latent variable ( $\beta = -.10$ ) was nonsignificant ( $Z = -1.32, p > .05$ ).

To visualize the nature of the significant interaction effect, plots were constructed on the basis of forming equal-sized groups of high-, medium-, and low-maladaptive perfectionism. The group assignment was accomplished by using a single-factor model of latent maladaptive perfectionism with three indicators (discrepancy, concern over mistakes, and doubts about actions) to produce unstandardized factor loadings for the three indicators. We then multiplied these unstandardized factor loadings by the raw score of their corresponding indicator and summed to create a composite index of maladaptive perfectionism. The distribution of these scores was used to form three equally sized groups of high-, medium-, and low-maladaptive perfectionism. A multiple-group model was tested for these three groups, using attachment anxiety as a predictor of depressive mood. In testing this model, the loadings of the measured variables on the latent variables of attachment anxiety and depressive mood were constrained to be equal for the three groups. The path from attachment anxiety to depressive mood was allowed to vary across the groups, as was the structured mean on the depressive mood latent variable. The results are plotted in Figure 4. The results show that when maladaptive perfectionism is high, there is a greater increase in depressive mood for each unit increase in attachment anxiety, whereas when maladaptive perfectionism is low, the increment in depressive mood for each unit increase in attachment anxiety is relatively

smaller. Also, means on the depressive mood latent variable were found to vary across the three groups, with the highest level of depressive mood found for the group that was high in perfectionism.

## Discussion

Past research has suggested links between adult attachment and depressive mood. The present study was aimed at extending this research by exploring possible mediators of the bivariate links suggested in this growing body of research. Specifically, we examined whether maladaptive perfectionism serves as a mediator in the link between adult attachment anxiety or avoidance and depressive mood. Our results support the hypotheses that maladaptive perfectionism partially mediated the relation between attachment anxiety and depressive mood and fully mediated the relation between attachment avoidance and depressive mood. The significant path coefficients shown in Figure 2 suggest that both attachment anxiety and attachment avoidance were significantly positively associated with maladaptive perfectionism. Of the two types of insecure attachment, attachment anxiety exhibited the stronger link with perfectionism. In turn, maladaptive perfectionism was positively associated with depressive mood. These results are consistent with previous findings suggesting that maladaptive perfectionism mediates the relationships between the quality of early childhood parenting and vulnerability to depression (Enns et al., 2002; Randolph & Dykman, 1998).

Interestingly, the direct relationship between attachment avoidance and depressive mood was not statistically significant and did

<sup>6</sup> The figure for the moderation model for attachment avoidance can be obtained from Meifen Wei upon request.

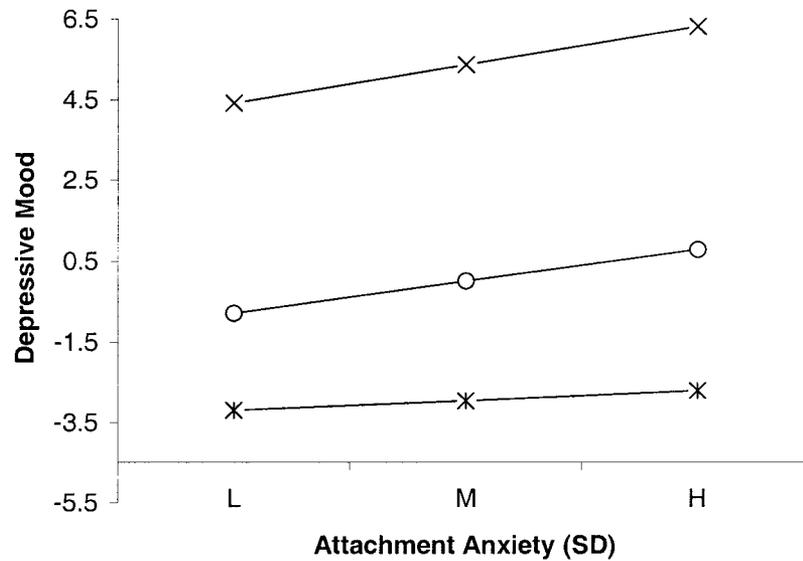


Figure 4. Relationship of attachment anxiety with depressive mood at high (H; solid ex), medium (M; open circle), and low (L; cross-hatched ex) levels of maladaptive perfectionism. L is  $-2$  standard deviations (SD) from the mean of attachment anxiety; M is the mean of attachment anxiety; H is 2 standard deviations from the mean of attachment anxiety.

not add to the explanatory power of the model predicting depressive mood. In other words, the link between attachment avoidance and depressive mood can be described exclusively in terms of the indirect (e.g., mediated) effects of maladaptive perfectionism. This finding suggests that if this type of perfectionism can be reduced in college students with high-attachment avoidance, their depressive mood may be reduced as well. In contrast to attachment avoidance, the direct relation between attachment anxiety and depressive mood remained statistically significant even after controlling for the indirect effects mediated through maladaptive perfectionism. This finding suggests that other variables unrelated to maladaptive perfectionism may also be important factors in the depressive mood experienced by college students with high-attachment anxiety. However, it is important to note that the direct path from attachment anxiety to depressive mood was decreased significantly from .50 to .19 after maladaptive perfectionism was added to the model. Also, the magnitude of the indirect effect ( $\beta = .32$ ) was moderate in magnitude. Thus, we conclude that an important component of depressive mood experienced by persons with high-attachment anxiety may be due to their maladaptive perfectionism.

In addition to the mediation effects described above, we also found evidence of moderating (e.g., interaction) effects in connection with perfectionism and attachment anxiety. Depression and hopelessness were significantly positively associated with attachment anxiety, but the magnitude of the increase in depressive mood for each unit of increase in attachment anxiety was greater as maladaptive perfectionism increased. This finding is consistent with other studies reporting that perfectionism interacted with interpersonal stressors to predict depression (Hewitt & Flett, 1993). Our findings suggest that a combination of high-attachment anxiety and high-maladaptive perfectionism is especially likely to be associated with depressive mood. However, it should also be

noted that the interaction of attachment avoidance and maladaptive perfectionism was not statistically significant in the present study.

Thus, we observed different patterns with respect to attachment avoidance and attachment anxiety. For attachment anxiety, maladaptive perfectionism apparently serves as both a moderator and a partial mediator of connections with depressive mood. By contrast, for attachment avoidance, maladaptive perfectionism is not a significant moderator, but rather serves as a complete mediator in the connection with distress. An explanation for these differences may be found in findings of other studies reporting that persons high in attachment avoidance tend to deactivate normal attachment responses, mainly through cognitive and affect regulation processes that divert attention from both distress-evoking stimuli and attachment-related thoughts and feelings (Fraley, Davis, & Shaver, 1998). By contrast, persons with high levels of attachment anxiety tend to fix their attention on distress-evoking stimuli and magnify their expressions of distress in an attempt to maintain proximity and solicit comfort from attachment figures (Kobak, Cole, Ferenz-Gillies, Fleming, & Gamble, 1993). Perhaps in our study, attachment deactivation typical of persons with high avoidance was manifested as a denial of distress (or reluctance to report symptoms even on an anonymous survey). A positive working model of self is also associated with attachment avoidance, but theorists have speculated that it contrasts with the positive model of self held by persons with secure adult attachment, in that persons with avoidant attachment have a "brittle" or "defensively maintained" positive sense of self (Fraley et al., 1998). Our study suggests that this precarious balance may be more likely to be disturbed for persons with maladaptive perfectionism. Avoidance per se is not associated with depressive mood for these persons, but if they judge that they have fallen short of the high standards they set for themselves, a sense of despair and hopelessness results. By contrast, perhaps students with high-attachment anxiety in our study

magnified their reports of depressive mood. For them, maladaptive perfectionism was only one of several possible sources of depressive mood, but when present, perfectionism may tend to exacerbate the depressive mood that resulted from a chronic negative working model of self.

There are a number of limitations to this study. First, the sample consisted mostly of White college students, limiting the generalizability of the findings to other populations. Chang (1998) found that Asian Americans (who typically define themselves in relation to others) reported more pressure from others to be perfect than did White Americans (who typically define themselves independently of others). The norm of maladaptive perfectionism for Asians or Asian Americans may be quite different from the norm for White samples. Second, the fact that participants were predominantly women is another limitation. The skewed gender balance further limits conclusions drawn from this sample, especially for men. Third, the present study's results are based entirely on self-report measures. In addition to the possible confounds with tendencies to report distress noted previously in connection to attachment, correlations may be inflated because of common method effects, students' mood, or other sources of monomethod bias. Thus, replication with other methods of data collection (e.g., observer ratings or friend report) would be beneficial. Finally, even though this study used a sophisticated data analytic procedure, a longitudinal study or a design featuring direct manipulation of variables could provide more conclusive evidence of causal relationships.

Maladaptive perfectionism partially mediated the relationship with attachment anxiety and depressive mood. This implies that there are other potential mediators (e.g., emotional reactivity) that may contribute to the link between attachment anxiety and depressive mood. Moreover, Dunkley and colleagues (2000, 2003) found multiple mediators (e.g., perceived coping effectiveness and perceived social support) between perfectionism and depression, anxiety, or negative affect. Future research is needed to develop a more complete model with potential mediators of the connection between adult attachment and depressive mood or other forms of psychological distress. One fruitful possibility might be to simultaneously test the relative impact of multiple mediators (e.g., perfectionism, perceived coping effectiveness, and perceived social support). Studies are also needed that examine how dimensions of attachment insecurity contribute to maladaptive perfectionism patterns, and whether these patterns influence subsequent coping effectiveness and social competencies (e.g., perceived social support) that in turn contribute to depressive mood or other forms of distress.

In terms of counseling applications, if the results of this study are confirmed in future studies, interventions could be designed to reduce maladaptive perfectionism in situations in which it may not be feasible to attempt changing basic attachment insecurities. Hewitt, Flynn, Mikail, and Flett (2001) suggested focusing on the motivations and precursors to perfectionistic behavior, in an attempt to deal with the source of perfectionism. Thus, one approach might involve efforts to identify the roots and psychological needs (e.g., excessive need for approval from others or excessive need for self-reliance) associated with maladaptive perfectionism. Another approach might involve helping perfectionistic college students to distinguish between maladaptive (e.g., concern over mistakes) and adaptive (e.g., order or achievable personal standards) perfectionism. A third approach is to develop interventions to help

college students identify automatic thoughts related to the need to be perfect, examine these destructive thoughts, and then reframe or eliminate these thoughts to decrease the harmful consequences (e.g., depression and hopelessness) of maladaptive perfectionism.

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