REGULAR ARTICLE

Relationships Among Attachment Styles, Personality Characteristics, and Disordered Eating

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ABSTRACT

Objective: Insecure attachment styles and certain personality characteristics (i.e., high levels of neuroticism) have been associated with eating pathology. However, previous research has not examined these variables simultaneously and has not examined possible mediating relationships between attachment and personality characteristics for disordered eating. Because personality characteristics have emerged as some of the most robust predictors of disordered eating, it was predicted that the link between attachment and disordered eating might be through personality styles.

Method: Participants included 85 female twins and triplets who took part in the Michigan State University Twin Study. Disordered eating, attachment style, and personality characteristics were assessed. Hierarchical linear models were used to examine relationships among the variables.

Results: Overall, neuroticism, and extraversion to a lesser extent, mediated the relationship between insecure-resistant attachment and disordered eating. Specifically, higher scores on the neuroticism scale predicted more disordered eating and explained the relationship between insecure-resistant attachment and disordered eating.

Conclusion: These results suggest that relationships between attachment style and disordered eating are indirect, in that neuroticism fully mediates associations between insecure-resistant attachment and disordered eating. © 2006 by Wiley Periodicals, Inc.

Keywords: attachment; personality; disordered eating

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Introduction

Attachment styles have been previously linked to eating disorders, including anorexia nervosa (AN), bulimia nervosa (BN), and non clinical levels of disordered eating.[1–7] Hazan and Shaver[8,9] described three adult attachment styles. These include secure attachment (a healthy form of attachment characterized by comfort with independence and closeness in relationships), and two types of insecure attachment: avoidant and resistant attachment. Avoidant attachment is characterized by preferring extreme distance from others in relationships, while resistant attachment is characterized by having an intense need to keep others in close proximity in relationships. Research has shown that adult attachment styles are related to early parent–child relationships and show continuity across time.[8,10,11]

Insecure attachment has been associated with a number of negative outcomes, such as low self-esteem, lower academic achievement, and psychopathology,[11] including eating disorders. Using measures of adult attachment, research shows that individuals with eating disorders are more likely to be insecurely attached than individuals without eating pathology.[1,2,6] For example, Armstrong and Roth[1] found that 96% of the adult eating disorder sample in their study showed insecure attachment, which was significantly greater than the control group without eating pathology. Similar results have been found examining individuals with subclinical levels of disordered eating.[2]

Nonetheless, many of the aforementioned studies have not discriminated between the two types of insecure attachment (i.e., avoidant and resistant). The few studies that have found that the insecure-resistant attachment style shows stronger associations with eating pathology than insecure-avoidant attachment.[12–14] These findings make sense in light of the processes that underlie these different styles. Specifically, individuals with resistant attachment have an increased need for external

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approval.[10] Therefore, they may attempt to alter their body weight/shape by controlling their food intake in order to meet external standards of beauty and to gain approval from others. By contrast, individuals with avoidant attachment tend to protect themselves by engaging in distancing behaviors.[10] These distancing behaviors may make them less sensitive to societal expectations and cultural ideals of beauty. Thus, they may be less likely to focus on their physical appearance in developing and maintaining relationships.

Importantly, studies have not examined variables that could influence the relationship between insecure attachment and disordered eating. Identifying potential mediating variables could lead to a deeper understanding of the association between attachment and eating pathology and inform treatment efforts aimed at their amelioration. A potentially important variable to consider is personality. Several personality characteristics have been associated with both eating pathology and insecure attachment.[15] Specifically, higher levels of neuroticism (i.e., negative affect, affective instability, anxiety) have been associated with all types of eating pathology, as well as with insecure attachment styles. [16–23] These findings suggest that individuals who tend to be anxious and dysphoric are more likely to display disordered eating symptoms and insecure attachment styles. Ironically, both lower (i.e., having less positive affect, being less social and gregarious) and higher (i.e., having more warmth and positive affect) levels of extraversion have also been associated with insecure attachment styles. [16–21] It is unclear why both poles of extraversion show significant associations. It is possible that individuals with high levels of extraversion may be more sensitive to cultural ideals of beauty given their tendency to be people oriented and seek reinforcement through social situations. Alternatively, individuals with low levels of extraversion have less positive affect which may make them more vulnerable to developing disordered eating symptoms in an attempt to regulate these affects. Importantly, studies have shown inconsistent results for the relationships between other personality characteristics (i.e., agreeableness, openness to experience, and conscientiousness) and eating pathology and attachment.

The current study will be the first to investigate relationships among attachment styles, personality characteristics, and disordered eating. Insecure-resistant attachment is hypothesized to be related to disordered eating. Further analyses will test the mediating role of personality characteristics in the relationship between insecure-resistant attachment and disordered eating. Because personality characteristics other than neuroticism and extraversion have not been consistently linked to eating pathology and attachment, we focused our analyses on relationships between attachment and neuroticism and extraversion only.

Method

Participants

Participants included a subsample of female twins and triplets ($n = 85$ individuals) between the ages of 18 and 30 ($M = 20.6$, SD $= 2.7$), who previously took part in the Adult Study of Behavioral Adjustment and Development project within the Michigan State University Twin Registry (MSUTR[24]). Importantly, research shows that the distribution of attachment styles does not differ significantly among families with twins versus families with singletons,[25,26] and thus our use of a convenience sample of twins is unlikely to have significantly affected our results.

Participants were recruited through newspaper advertisements and flyers that advertised for same-sex twins between the ages of 18 and 30, who would be interested in taking part in a study about health and behavior. In addition, recruitment letters to twins attending the university were distributed through the university registrar offices (see Ref. 24 for further details). The ethnic breakdown of the sample was as follows: 86% Caucasian, 5% African-American, 2.5% Hispanic, and 6.5% "Other.". Co-twins completed the assessment materials in separate rooms, to ensure independent responses. The assessments were conducted by trained graduate and undergraduate students and lasted approximately 2 hours. Participants were compensated $50 for completing the study. ID numbers were assigned to each participant to ensure that the data remained anonymous. This study was reviewed and approved by the Michigan State University Institutional Review Board.

Measures

Minnesota Eating Behavior Survey. Participants completed the 30-item Minnesota Eating Behavior Survey (MEBS[a])[27,28] to assess eating attitudes and behaviors. A previous factor analysis[28] of the MEBS yielded four subscales: Body dissatisfaction (i.e., dissatisfaction with the

[a]Minnesota Eating Behavior Survey (MEBS; previously known as the Minnesota Eating Disorder Inventory (M-EDI)) was adapted and reproduced by special permission of Psychological Assessment Resources, Inc., 16204 North Florida Avenue, Lutz, Florida 33549, from the Eating Disorder Inventory (collectively, EDI and EDI-2) by Garner, Olmstead, Polivy, Copyright 1983 by Psychological Assessment Resources, Inc. Further reproduction of the MEBS is prohibited without prior permission from Psychological Assessment Resources, Inc.

size and/or shape of one's body), weight preoccupation (i.e., preoccupation with dieting, weight, and the pursuit of thinness), binge eating (i.e., the tendency to engage in episodes of overeating as well as having attitudes conducive to binge eating), and compensatory behavior (i.e., the tendency to use or contemplate using inappropriate compensatory behaviors such as self-induced vomiting and laxatives to control weight). The MEBS also includes a total score that is the combined score of all 30 items. The score for each subscale is composed of the total score of all items from that subscale. The MEBS scales are scored in the traditional "pathological" direction with high scores indicating greater degrees of the measured construct.

Coefficient alphas of the subscales ranged from 0.62 to –0.91 in this study. The reliability and validity of the MEBS have been supported by previous studies.[27,28] Specifically, internal consistency and 3-year test-retest statistics were adequate among the subscales. Previous studies have also supported the ability of the MEBS to discriminate between participants with eating disorders and controls.[28]

Attachment Style. Adult attachment style was assessed using the Adult Attachment Scale (AAS),[10] an 18-item continuous measure of attachment style. Participants rate how characteristic the statements are of themselves in their current romantic relationships on a Likert scale ranging from 1 (not at all characteristic) to 5 (very characteristic). The AAS yields scores for three adult attachment styles: secure (i.e., comfortable with closeness and independence in relationships), avoidant (i.e., prefer emotional distance from other people), and resistant (i.e., prefer closeness and worry about being abandoned).[10] Participants received a mean score for each subscale. Previous research has shown that the internal consistency of the scales ranges from 0.69 to 0.75.[10] The AAS has also been shown to demonstrate good concurrent validity, because it is correlated with measures assessing beliefs about oneself and others in ways that are consistent with attachment theory.[10] The internal consistency of the AAS scales in the current study were 0.73, 0.78, and 0.89, respectively.

Personality. The NEO Personality Inventory—Revised (NEO-PI-R)[15] was used to assess five dimensions of personality characteristics. These included: neuroticism (i.e., a tendency to be anxious, moody, and hostile), extraversion (i.e., a tendency to be sociable, gregarious, and warm), openness (i.e., a tendency to be imaginative, intellectually curious, and to have a preference for variety), agreeableness (i.e., a tendency to be compliant, altruistic, and sympathetic), and conscientiousness (i.e., a tendency to be determined, competent, and self-disciplined). The NEO contains 60 statements, and participants rate how true the statements are about themselves on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Total scores for each subscale are calculated with higher scores representing more of that personality characteristic. The alpha coefficients ranged from 0.69 to 0.90 for the NEO subscales in this study. Previous research has provided support for the reliability and validity of the NEO-PI-R.[15,29,30]

Statistical Analyses

Pearson product correlations were used to examine initial relationships among AAS, NEO-PI-R, and MEBS scores. Hierarchical linear models (HLM) were subsequently used to examine mediation models, following recommendations by Kenny et al.[31] HLM was chosen for these analyses due to the non-independence of the twin data. We controlled for this non-independence by including a family variable as a Level 2 variable in analyses. Mediation analyses were conducted for each of the MEBS scales separately in order to determine if differential attachment/personality/disordered eating relationships exist for different types of eating pathology.

The mediation models were tested in a number of steps. First, predictive relationships were tested between the predictor (i.e., attachment style) and the criterion (i.e., disordered eating), the predictor (i.e., attachment style) and the mediator (i.e., personality), and between the mediator (i.e., personality) and criterion (i.e., disordered eating). Second, the relationship between the predictor (i.e., attachment style) and the criterion (i.e., disordered eating) was measured, controlling for the relationship between the mediator (i.e., personality) and the criterion (i.e., disordered eating).

Both full and partial mediation models were tested. Evidence for full mediation was present if the relationship between attachment and disordered eating reduced to nonsignificant when controlling for the relationship between the mediator (i.e., personality) and the criterion (i.e., disordered eating). Evidence for partial mediation was present if the relationship between attachment and disordered eating was reduced when controlling for the relationship between the mediator (i.e., personality) and the criterion (i.e., disordered eating).

Separate HLM regressions were conducted for each type of attachment style, personality variable, and disordered eating behavior. The Compensatory Behavior and Binge Eating MEBS scales were log transformed prior to analyses to account for the positive skew of the data.

Results

Although a clinical cut-off score has not yet been established for the MEBS, the range of scores from

TABLE 1. Correlations between MEBS, AAS, and NEO-PI-R scores ($n = 85$)

Variable	TS	BD	CB	BE	WP	SEC	AV	RES	N	E
TS	1.00	–	–	–	–	–	–	–	–	–
BD	.85**	1.00	–	–	–	–	–	–	–	–
CB	.72*	.49**	1.00	–	–	–	–	–	–	–
BE	.75**	.60**	.42**	1.00	–	–	–	–	–	–
WP	.89**	.67**	.65**	.53**	1.00	–	–	–	–	–
SEC	−.16	−.24*	−.02	−.19	−.03	1.00	–	–	–	–
AV	.18	.13	.12	.15	.08	−.61**	1.00	–	–	–
RES	.47**	.39**	.25*	.40**	.35**	−.41**	.61**	1.00	–	–
N	.58**	.52**	.32**	.48**	.44**	−.47**	.39**	.63**	1.00	–
E	−.48**	−.51**	−.34**	−.40**	−.27*	.52**	−.31**	−.39**	−.68**	1.00

Notes: TS = MEBS total score; BD = body dissatisfaction; CB = compensatory behavior; BE = binge eating; WP = weight preoccupation; SEC = secure; AV = avoidant; RES = resistant; N = neuroticism; E = extraversion.

* $p < .05$.

** $p < .01$.

participants in the current study (range = 0–25; $M = 9.22$; SD = 6.64) indicate the presence of a wide range of disordered eating symptoms. Seven participants (8%) received a score of 20 or higher, suggesting that at least some of the participants evidenced significant eating pathology. Overall, these data indicate ample variability in disordered eating for examining associations between eating pathology, attachment, and personality characteristics.

Correlations

Table 1 presents Pearson product correlations examining relationships among the variables. Across correlations, resistant attachment exhibited the most consistent relationships with disordered eating and personality characteristics. Higher scores on the resistant attachment scale were significantly correlated with higher scores on all of the MEBS scales. In addition, resistant attachment showed significant positive relationships with neuroticism and significant negative relationships with extraversion. Avoidant and secure attachment showed fewer significant relationships with disordered eating and personality variables. Therefore, to decrease the number of mediation analyses conducted, only the resistant attachment was examined in the HLM analyses.

Initial HLM Analyses

Table 2 includes results from Step 1 of the HLM analyses that examined predictive relationships among the variables. Findings indicated that resistant attachment positively predicted all of the MEBS scales except for compensatory behavior. In addition, extraversion and neuroticism were found to predict all of the MEBS scales. Extraversion was found to inversely predict disordered eating, while neuroticism was found to positively predict disordered eating.

TABLE 2. Neuroticism as a mediator between resistant attachment and disordered eating ($n = 85$)

Variable	β	p
Criterion: MEBS total score		
Step 1: AAS resistant → MEBS total score	0.49 (0.13)[a]	<.001
Step 2: AAS resistant → NEO-PI-R neuroticism	0.94 (0.16)	<.001
Step 3: AAS resistant and NEO-PI-R neuroticism → MEBS total score		
Resistant attachment	0.16 (0.14)	.26
Neuroticism	0.34 (0.08)	<.001
Criterion: Body dissatisfaction		
Step 1: AAS resistant → MEBS body dissatisfaction	0.14 (0.04)	.002
Step 2: AAS resistant → NEO-PI-R neuroticism	0.94 (0.16)	<.001
Step 3: AAS resistant and NEO-PI-R neuroticism → MEBS body dissatisfaction		
Resistant attachment	0.03 (0.04)	.46
Neuroticism	0.11 (0.03)	.001
Criterion: Weight preoccupation		
Step 1: AAS resistant → MEBS weight preoccupation	0.13 (0.05)	.01
Step 2: AAS resistant → NEO-PI-R neuroticism	0.94 (0.16)	<.001
Step 3: AAS resistant and NEO-PI-R neuroticism → MEBS weight preoccupation		
Resistant attachment	0.03 (0.06)	.60
Neuroticism	0.10 (0.03)	.004
Criterion: Binge eating		
Step 1: AAS resistant → MEBS binge eating	0.02 (0.06)	<.001
Step 2: AAS resistant → NEO-PI-R neuroticism	0.94 (0.16)	<.001
Step 3: AAS resistant and NEO-PI-R neuroticism → MEBS binge eating		
Resistant attachment	0.009 (0.07)	.19
Neuroticism	0.01 (0.04)	.005

Notes: MEBS = Minnesota Eating Behavior Survey; NEO-PI-R = NEO Personality Inventory–Revised; AAS = Adult Attachment Scale; β = regression coefficient; SE = standard error (of measurement).

[a] Values in parentheses indicate SEs.

Mediation Analyses

Mediation analysis results are presented in **Tables 2** and **3**. These analyses were conducted with all of the MEBS scales except for compensatory behavior, which was not related to attachment styles in Step 1 (see earlier).

Using the MEBS Total Score as the outcome variable, the first step was to test the relationship be-

TABLE 3. Extraversion as a mediator between resistant attachment and disordered eating ($n = 85$)

Variable	β	p
Criterion: MEBS total score		
Step 1: AAS resistant → MEBS total score	0.49 (0.13)[a]	<.001
Step 2: AAS resistant → NEO-PI-R extraversion	−0.35 (0.15)	.02
Step 3: AAS resistant and NEO-PI-R extraversion → MEBS total score		
Resistant attachment	0.36 (0.12)	.005
Extraversion	−0.31 (0.09)	.001
Criterion: Body dissatisfaction		
Step 1: AAS resistant → MEBS body dissatisfaction	0.14 (0.04)	.002
Step 2: AAS resistant → NEO-PI-R extraversion	−0.35 (0.15)	.02
Step 3: AAS resistant and NEO-PI-R extraversion → MEBS body dissatisfaction		
Resistant attachment	0.09 (0.04)	.04
Extraversion	−0.12 (0.03)	<.001
Criterion: Weight preoccupation		
Step 1: AAS resistant → MEBS weight preoccupation	0.13 (0.05)	.01
Step 2: AAS resistant → NEO-PI-R extraversion	−0.35 (0.15)	.02
Step 3: AAS resistant and NEO-PI-R extraversion → MEBS weight preoccupation		
Resistant attachment	0.10 (0.05)	.05
Extraversion	−0.07 (0.04)	.09
Criterion: Binge eating		
Step 1: AAS resistant → MEBS binge eating	0.02 (0.06)	<.001
Step 2: AAS resistant → NEO-PI-R extraversion	−0.35 (0.15)	.02
Step 3: AAS resistant and NEO-PI-R extraversion → MEBS binge eating		
Resistant attachment	0.02 (0.06)	.008
Extraversion	−0.01 (0.04)	.009

Notes: MEBS = Minnesota Eating Behavior Survey; NEO-PI-R = NEO Personality Inventory–Revised; AAS = Adult Attachment Scale; β = regression coefficient; SE = standard error (of measurement).

[a]Values in parentheses indicate SEs.

tween resistant attachment and the MEBS total score, and this was found to be significant (see earlier). Next, resistant attachment was found to significantly predict neuroticism scores (Step 2; **Table 2**). Finally, when controlling for the relationship between neuroticism and the MEBS total score, the predictive relationship between resistant attachment and the MEBS total score was reduced and was nonsignificant (Step 3). These findings suggest that neuroticism fully mediated the relationship between resistant attachment and general disordered eating. Neuroticism was also found to fully mediate relationships between resistant attachment and the other MEBS scales in subsequent mediation analyses (**Table 2**).

When extraversion was examined as a mediator in the models, the relationship between resistant attachment and body dissatisfaction was slightly reduced (**Table 3**). This suggests that extraversion is a partial mediator of the relationship between resistant attachment and body dissatisfaction. Extraversion was not found to be a full or partial mediator of the relationships between resistant attachment and any of the other MEBS scales, as these associations remained unchanged when controlling for extraversion.

Conclusion

The current study is the first to explore mediating relationships among attachment styles, personality characteristics, and disordered eating. Findings corroborated previous results showing that only the insecure-resistant attachment style is associated with disordered eating. Results extend these findings by showing that personality characteristics (i.e., neuroticism and extraversion) mediate the relationship between resistant attachment and disordered eating. These findings are significant in suggesting that attachment influences disordered eating indirectly through personality characteristics. Indeed, individuals with resistant attachment are likely to exhibit disordered eating only if they have more neurotic personality characteristics.

There were differences among the personality variables (i.e., neuroticism and extraversion) in the mediation analyses. Neuroticism was found to be a more robust mediator than extraversion; neuroticism fully mediated the relationship between resistant attachment and all forms of disordered eating, while extraversion was only found to partially mediate the relationship between resistant attachment and body dissatisfaction. Differences in findings across personality constructs could be due to the function that disordered eating serves. Previous research has shown that eating disorder symptoms commonly serve to reduce negative affect. [32–35] Thus, it is possible that in resistantly attached individuals, disordered eating serves to reduce negative feelings associated with neurotic personality characteristics. By contrast, lower levels of extraversion may lead to behavior that attempts to increase positive feelings, such as engaging in enjoyable activities. These hypotheses have not been investigated empirically, and thus are only speculative. Future research should attempt to replicate our findings of differential mediating relationships between attachment and disordered eating by personality type.

Overall, however, our findings are consistent with attachment theory that emphasizes the development of resistant attachment in infancy, which then influences the development of neurotic personality characteristics during adolescence and adulthood. Within this framework, our results would indicate that resistant attachment influences the development of disordered eating by shaping neurotic personality characteristics that are associated with eat-

ing pathology. Because cross-sectional data were used in this study, it is not possible to determine whether this temporal relationship exists among the variables; however, our results are consistent with this traditional attachment approach.

However, two alternative models to this traditional approach could be proposed. One could argue that attachment is a mediator of the relationship between personality characteristics and disordered eating. This model would postulate that personality characteristics influence the development of resistant attachment, which then influences disordered eating. Interestingly, a post-hoc analysis revealed that attachment does not mediate relationships between neuroticism and disordered eating (data not shown). Specifically, when controlling for resistant attachment, the relationship between personality characteristics and disordered eating was not reduced.

Alternatively, resistant attachment also could be proposed to influence the development of disordered eating, which then amplifies neurotic personality characteristics. Post-hoc analyses (data not shown) failed to support this model as well, in that the relationship between attachment and personality characteristics was not reduced when controlling for disordered eating. This corroborates longitudinal research which found that personality prospectively predicts the development of eating pathology.[36–38] Taken together, findings from all three models indicate that although personality may have direct effects on disordered eating[16–19] and may be influenced by eating pathology, [39] associations between attachment and disordered eating are mediated by personality characteristics rather than the reverse.

Findings from this study have several implications for treatment. Clinicians should be attuned to the possible presence of resistant attachment in their patients with eating disorders and plan their interventions accordingly. In addition, clinicians should be aware that these resistant attachment styles likely increase neurotic traits, which further exacerbate disordered eating. Consequently, treatment interventions that focus on decreasing resistant attachment styles and neurotic personality characteristics may lead to the most symptom improvement.

Despite the strengths of this study (i.e., examination of a range of disordered eating symptoms, relatively large sample size), there are limitations that should be addressed in future research. First, we focused on current attachment styles in adulthood rather than early infant attachment. Although there is theoretical and empirical support for the continuity of attachment over time,[13] other measures that access early attachment styles (e.g., the Adult Attachment Interview[40]) should be examined in future research. Second, because cross-sectional data were used, we were unable to demonstrate causality among the variables. Thus, determining the extent to which insecure-resistant attachment and personality characteristics cause disordered eating awaits longitudinal research.

Third, this study did not use a clinical sample, and therefore it is unclear whether the relationships observed in this study would extend to individuals with clinical eating disorders. It is possible that the relationships would be stronger in clinical populations, due to the greater severity of disordered eating. Fourth, some research shows that BN symptoms (e.g., binge eating) are more prevalent in non-clinical samples than AN symptoms (e.g., low body weight).[41,42] Thus, findings from this study may relate more to bulimic symptoms than those of restrictor AN.

Finally, this study examined only one mediating factor in the relationship between attachment and disordered eating. There are other variables that may also influence this relationship (e.g., depression, anxiety). Examining the influence of these other factors would further increase understanding of the complex relationship between attachment and eating pathology.

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