ADULT ATTACHMENT, PERSONALITY TRAITS, AND BORDERLINE PERSONALITY DISORDER FEATURES IN YOUNG ADULTS

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Abstract

Previous studies have demonstrated that insecure attachment patterns and a trait disposition toward negative affect and impulsivity are both associated with borderline personality disorder (BPD) features. According to attachment theory, insecure attachment patterns impart greater risk for the maladaptive personality traits underlying BPD. Hence, insecure attachment might be indirectly related to BPD through its association with these traits. The current cross-sectional study used structural equation modeling to compare two competing models of the relationship between adult attachment patterns, trait negative affect and impulsivity, and BPD features in a large nonclinical sample of young adults: (M1) attachment anxiety and avoidance are positively related to trait negative affect and impulsivity, which in turn, are directly associated with BPD features; and (M2) trait negative affect and impulsivity are positively related to attachment anxiety and avoidance, which in turn, are directly associated with BPD features. Consistent with attachment theory, M1 provided a better fit to the data than M2. However, only attachment anxiety, and not attachment avoidance, was significantly associated with negative affect and impulsivity. The results favored a model in which the relationship between adult attachment anxiety and BPD features is fully mediated by trait negative affect and impulsivity.

Borderline personality disorder (BPD) is estimated to occur in 1% to 2% of the general population (Torgerson, Kringlen, & Cramer, 2001). The current Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (*DSM-IV-TR*); American Psychiatric Association, 2000) characterizes BPD as a pervasive, longstanding, and inflexible pattern of instability in affect, self-image, and interpersonal relationships. Patients with BPD often experience profound impairment in general functioning, marked impulsivity, and high levels of anger and hostility (Skodol et al., 2002). Further, individuals with BPD are at increased risk for self-injurious and suicidal behaviors, with an estimated suicide completion rate of up to 10% (Oldham et al., 2001). Thus, BPD is a chronic, debilitating, and life-threatening disorder that represents a serious clinical and public health concern.

In order to develop efficacious treatments for BPD, it is necessary to first understand the specific psychological mechanisms that characterize the disorder. However, the etiological and maintaining processes underlying BPD features are poorly understood. Moreover, although some nonspecific risk factors for BPD have been identified, it is not clear how such factors are structurally related to one another or to BPD. It is important to understand how these risk factors might relate to one another and to BPD features, as they might influence

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one another during treatment. Investigations of structural relationships between putative risk factors for BPD may help to generate testable hypotheses for longitudinal and intervention studies regarding the etiology, maintenance, and treatment of BPD.

BPD is increasingly conceptualized in the literature as a disorder characterized by high trait levels of negative affect and impulsivity (Cloninger, Svrakic, & Przybeck, 1993; Depue & Lenzenweger, 2001; Gurvits, Koenigsberg, & Siever, 2000; Linehan, 1993; Siever & Davis, 1991; Silk, 2000; Trull, 2001; Widiger & Costa, 2002). However, high levels of negative affect and impulsivity have also been found in groups of non-BPD patients with other types of disorders, such as subtypes of psychopathy (Hicks, Markon, Patrick, Krueger, & Newman, 2004), certain eating disorders (Westen & Harnden-Fischer, 2001), and substance use disorders (Sher & Trull, 1994). Negative affect and impulsivity can also be elevated in individuals who do not meet criteria for any psychiatric disorder (Posner et al., 2003). In addition, these personality traits might be insufficient for explaining the considerable identity and relational problems that often emerge as a homogenous component in factor analyses of BPD criteria (Clarkin, Hull, & Hurt, 1993; Jackson & Trull, 2001; Sanislow et al., 2002). Several studies show that individuals with BPD tend to view others as malevolent (Arntz & Veen, 2001; Meyer, Pilkonis, & Beevers, 2004; Nigg, Lohr, Westen, Gold, & Silk, 1992) and to describe themselves as unlovable, inherently evil or bad, dependent, and helpless (Arntz, Dietzel, & Dreessen, 1999; Butler, Brown, Beck, & Grisham, 2002; Jovev & Jackson, 2004; Nordahl, Holthe, & Haugum, 2005). These difficulties are thought to arise from impaired and maladaptive mental representations of self and others, or cognitive-affective schemata (Bender & Skodol, 2007; Fonagy, 1991; Levy, 2005), which contain expectations about social situations that structure how one thinks and feels about oneself and others (Bowlby, 1988).

Attachment theory provides a conceptual framework and research methodology from which to understand and assess the maladaptive mental representations of self and others that are hypothesized by many researchers to be integral to the development and maintenance of BPD. According to attachment theory (Bowlby, 1988), the quality of childhood relationships with caregivers results in mental representations or "internal working models" of self and others. These representations are social cognitive schemata that include beliefs about the self, as well as expectations about interpersonal relationships, and their quality determines an individual's attachment style (i.e., *secure* versus *insecure* attachment patterns). Because these representations act as prototypes or heuristic guides in later social interactions and conceptualizations of self, they are self-perpetuating and tend to persist into adulthood as general representations with respect to close relationships (Fraley, 2002; Shaver & Mikulincer, 2005). However, as predicted by Bowlby (1988), research suggests that attachment patterns can be modified as a result of major life events or significant changes in relationships (e.g., Waters, Merrick, Treboux, Crowell, & Albersheim, 2000) and that therapeutic progress is accompanied by significant shifts in attachment-related mental representations (Blatt, Auerbach, & Levy, 1997). Thus, attachment styles have their earliest roots in relationships with caregivers, but they are amenable to revision well into adulthood based upon environmental input.

Self-report measures of adult attachment have been developed that assess attachment-related behavior in close romantic relationships based on the theoretical premise that behavior within these relationships reflects general representations with respect to attachment (Hazan & Shaver, 1987). The evidence to date suggests that individual differences in scores on self-report attachment measures are significantly related to observable interpersonal behavior, cannot be explained by constructs that are not related to the attachment system, and are substantially predicted by relevant childhood experiences such as loss or trauma (Shaver & Mikulincer, 2004). Moreover, studies have shown that adult romantic attachment styles are

based on self-reported histories of relationships with significant others (Levy, Blatt, & Shaver, 1998). Research has also demonstrated that self-report measures of attachment are better predictors of relationship quality than are measures of personality traits (Noftle & Shaver, 2006) and that stability in attachment security across the lifespan cannot be explained by trait neuroticism (Fraley, 2007). These findings are consistent with evidence that attachment and temperament are distinct constructs, although temperament may influence the *expression* of attachment in behavior (for a review, see Levy, 2005). Hence, disturbed attachment patterns may explain unique variance in BPD features with regard to relational and identity disturbance that cannot otherwise be explained by trait negative affect and impulsivity.

Adult attachment patterns can be conceptualized along two orthogonal dimensions: attachment anxiety, which refers to fears of separation and abandonment and is associated with negative representations of self (Mikulincer, 1998a); and attachment avoidance, which refers to discomfort with intimacy and dependency, and is associated with negative representations of others (Brennan, Clark, & Shaver, 1998). Low attachment anxiety and avoidance correspond with secure attachment; whereas, high attachment anxiety and avoidance correspond with fearful attachment. Meanwhile, high attachment anxiety and low avoidance correspond with preoccupied or anxious-ambivalent attachment, and low attachment anxiety and high avoidance correspond with dismissing attachment.

Numerous studies have demonstrated a significant relationship between BPD features and self-reported attachment anxiety or preoccupied attachment styles in both nonclinical (Brennan & Shaver, 1998; Meyer et al., 2004; Nickell, Waudby, & Trull, 2002; Stern, 1998) and clinical samples (Alexander, 1993; Aaronson, Bender, Skodol, & Gunderson, 2006; Dutton, Saunders, Starzomski, & Bartholomew, 1994; Eurelings-Bontekoe, Verschuur, & Schreuder, 2003; Levy, Meehan, Weber, Reynoso, & Clarkin, 2005). An association between preoccupied attachment and BPD has also been demonstrated using nonself-report methods of assessing adult attachment (Fonagy et al., 1996; Meyer, Pilkonis, Proietti, Heape, & Egan, 2001; Patrick, Hobson, Castle, Howard, & Maugham, 1994; Rosenstein & Horowitz, 1996; Stalker & Davies, 1995). The association between BPD and attachment avoidance, however, has been less consistent. Although some studies have found no significant association between attachment avoidance and BPD features (Meyer et al., 2001, 2004; Nickell et al., 2002), others have found that BPD features are associated with both attachment anxiety and avoidance (Alexander, 1993; Brennan & Shaver, 1998; Dutton et al., 1994; Eurelings-Bontekoe et al., 2003; Levy et al., 2005), suggesting a link between BPD and fearful attachment. Thus, BPD features seem to be highly associated with attachment anxiety, and may only be associated with attachment avoidance when it co-occurs with high attachment anxiety. However, insecure attachment patterns, like personality traits, appear to be broadband risk factors that do not necessarily directly or in isolation explain BPD features. In addition, there does not appear to be a unitary insecure attachment pattern that describes all individuals with BPD.

As proposed by Fossati et al. (2005), the inconsistent association between BPD and any one specific adult attachment pattern may be attributable to an indirect relationship between adult attachment and BPD. In other words, the relationship between attachment patterns and BPD might be mediated by other putative mechanisms underlying the disorder, such as trait negative affect and impulsivity. Attachment theory would predict that the attachment system serves important self-regulatory functions, and that insecure attachment patterns may give rise to chronic negative affect (Fonagy, 1991; Levy, 2005). Silk (2000) notes that mood lability in BPD is triggered by subtle events in the environment, the interpretation of which would rely upon social cognitive processes. The social cognitive processes in patients with BPD are characterized by negative appraisals of the emotions, motivations, or intentions of

others (e.g., Arntz & Veen, 2001; Donegan et al., 2003; Wagner & Linehan, 1999). These types of social cognitive biases are associated with insecure adult attachment patterns (e.g., Horppu & Ikonen-Varila, 2001; Meyer et al., 2004; Mikulincer & Shaver, 2001; Niedenthal, Brauer, Robin, & Innes-Ker, 2002) and may directly relate to the occurrence of chronic negative affect and impulsivity. Accordingly, several studies have shown that insecure attachment patterns are related to high trait levels of negative affect or neuroticism (e.g., Adam, Gunnar, & Tanaka, 2004; Hagekull & Bohlin, 2003; Shaver & Brennan, 1992; Stams, Juffer, & van IJzendoorn, 2002) as well as aggressive behavior (Lyons-Ruth, 1996), anger (Mikulincer, 1998b), heightened emotional distress and anxiety when accessing negative memories (Mikulincer & Orbach, 1995), and heightened cortisol reactivity in response to psychosocial stress (e.g., Gunnar, Brodersen, Nachmias, Buss, & Rigatuso, 1996; Hertsgaard, Gunnar, Erickson, & Nachmias, 1995). Moreover, longitudinal data suggest that early attachment patterns may influence the development of personality traits later in life (e.g., Hagekull & Bohlin, 2003; Stams et al., 2002). The heritability estimates for the individual personality traits related to negative affect and impulsivity range from 40% to 50% (Jang, Livesley, & Vernon, 1996; Jang, McCrae, Riemann, & Livesley, 1998), and it is possible that a significant portion of the remaining variance in personality traits could be explained by attachment patterns or the interaction between attachment and temperament.

No longitudinal studies have specifically examined the mediating role of both negative affect and impulsivity in the association between attachment and BPD. However, in a cross-sectional study with a nonclinical sample, Trull (2001) found that trait negative affect and impulsivity mediated the relationship between BPD features and self-reported environmental risk factors, including parental psychopathology and childhood abuse. In a cross-sectional study with a clinical sample, Fossati et al. (2005) concluded that impulsive and aggressive traits mediated the relationship between adult attachment patterns and BPD features. In addition, Eggert, Levendosky, and Klump (2007) recently reported that trait neuroticism and extraversion mediated the relationship between insecure-resistant adult attachment (analogous to preoccupied attachment) and disordered eating. Even though causality and primacy cannot be inferred from cross-sectional data, these results lend support to a model in which the relationship between attachment and BPD might be mediated by personality traits.

Nonetheless, an equally plausible model is one in which trait negative affect and impulsivity relate to disturbed attachment patterns, which in turn, are directly related to BPD. Personality traits are moderately heritable (Jang et al., 1996, 1998), whereas, empirical evidence suggests that attachment patterns are largely environmentally determined with negligible heritability (for a review, see Levy, 2005). The partial heritability of these traits makes it conceivable that they are more distally related to BPD than are attachment patterns. Furthermore, there are several potential pathways through which personality traits or temperament might help to shape an individual's interpersonal environment and quality of attachment relationships (e.g., Caspi & Bem, 1990; Caspi & Roberts, 1999). For instance, emotional lability, irritability, and impulsive behaviors may tend to evoke reactions from parents and other important persons that can disrupt interpersonal functioning and the formation of social cognitive schemata (e.g., Caspi, 1998, 2000; Shiner & Caspi, 2003). Research also supports the interactive relationship (or "goodness of fit") between dispositional features and parental characteristics in the prediction of attachment patterns (e.g., Mangelsdorf, Gunnar, Kestenbaum, Lang, & Andreas, 1990; Susman-Stillman, Kalkoske, & Egeland, 1996). Children who are temperamentally prone to crying, tantrums, fearfulness, and impulsive behaviors may tend to exasperate some parents, resulting in less-than-optimal responsiveness to the child's emotional needs that may interfere with attachment relationships. Dispositional negative affect and impulsivity can also impede social exploration and interaction, having adverse consequences for social functioning that

may contribute to maladaptive relational schemata (e.g., Eisenberg et al., 1997; Eisenburg, Fabes, Guthrie, & Reiser, 2000). Moreover, it is possible that dispositional affective instability may interfere with the ability to interpret the behaviors of others as sensitive or supportive, thereby inhibiting the development of stable and adaptive representations of self and others (Gurvits et al., 2000).

These observations imply that trait negative affect and impulsivity might promote or intensify disturbed attachment patterns. Additionally, given that relational disturbance is a core feature of BPD, insecure attachment might relate more directly to BPD features than the underlying personality traits themselves. Hence, trait negative affect and impulsivity may be directly related to insecure attachment patterns, which may in turn be directly related to BPD features (i.e., attachment patterns may mediate the relationship between traits and BPD). Despite the plausibility of such a model, no studies to date that have directly compared this model to other plausible explanations.

AIMS AND HYPOTHESES OF THE PRESENT STUDY

The primary aim of this cross-sectional study is to compare competing multivariate models of adult attachment patterns and trait negative affect and impulsivity as they relate to BPD features in a large nonclinical sample. Because it has been well-demonstrated that individual differences in psychopathology, personality, and attachment patterns are best described dimensionally rather than categorically (e.g., Bartholomew & Shaver, 1998; Livesley, Schroeder, Jackson, & Jang, 1994; Widiger & Sanderson, 1995), all variables of interest were measured dimensionally in the current study. In addition, given the advantages for the use of nonclinical samples in studies of psychopathology, including large sample sizes, greater variability and range in scores, and less comorbidity compared to clinical samples (Trull, 1995; Trull, Useda, Conforti, & Doan, 1997), combined with the evidence that BPD features are distributed throughout the population and are relatively prevalent in nonclinical samples (Trull, 1995), a nonclinical sample is a reasonable demographic in which to examine the interrelationships between risk factors for BPD using multivariate modeling.

Two competing structural models with divergent implications about the relationship between adult attachment patterns, traits, and BPD features are compared: Model 1 (M1): both attachment anxiety and avoidance positively relate to trait negative affect and impulsivity, which in turn, positively and directly relate to BPD features; and Model 2 (M2): both trait negative affect and impulsivity positively relate to attachment anxiety and avoidance, which in turn, positively and directly relate to BPD features. Both models are theoretically plausible and are supported by some empirical evidence. However, consistent with attachment theory (Fonagy, 1991) and evidence from both longitudinal studies (Hagekull & Bohlin, 2003; Stams et al., 2002) and recent cross-sectional research (Fossati et al., 2005), M1 is predicted to provide a better fit to the data compared to M2. Specifically, both attachment anxiety and avoidance are expected to be indirectly related to BPD through their relationship with trait negative affect and impulsivity, which in turn, are expected to be directly related to BPD features. Although the cross-sectional nature of the data do not allow for causal interpretations of the findings or inferences regarding temporal relationships and etiology, the comparison of these competing structural models may suggest potential hypotheses to be tested in longitudinal studies regarding the relationship between adult attachment styles, personality traits, and BPD.

METHODS

PARTICIPANTS

The data for the present study were obtained through online screening of 1,401 undergraduate introductory psychology students at a major university in 2006 as part of an initial screening process designed to select participants for other studies. Participants received credit towards their introductory psychology class research participation requirement. Complete data were obtained for all 1,401 participants (67% women; 86% White American/Caucasian). Although exact data regarding age are not available from the screening data, all participants were 18 years of age or older. In prior studies in this population with similar sample sizes, the mean age of participants was 19.5 years old ($SD =$ 2.3). In order to allow for cross-validation of findings, the full sample was split randomly in half ($N = 701$ in Sample 1, $N = 700$ in Sample 2). All models were tested in Sample 1 and then cross-validated in Sample 2. There were no significant differences between the two samples in numbers of men and women, race or ethnicity, or mean levels of each observed variable (all $ps > .05$).

MEASURES

Trait Negative Affect and Impulsivity—Forty-eight items from the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992) were administered to assess global trait negative affect and impulsivity. The NEO-PI-R is a reliable and valid measure of the five personality traits that comprise the five factor model (FFM) of personality, each of which is further broken down into six trait facets, with eight inventory items corresponding to each facet. Items were rated on a five-point scale ranging from "strongly disagree" (0) to "strongly agree" (4). The Depression, Angry Hostility, and Anxiety facet scales were included as indicators of negative affect. The Impulsiveness, Self-Discipline, and Deliberation facet scales were included as indicators of impulsivity. The items corresponding to each facet scale were summed to yield six continuous facet scores. Two items were deleted from scoring of each of the Self-Discipline and Deliberation scales because they deflated internal consistency (coefficient alpha) values to unacceptable levels. The scale scores for Self-Discipline and Deliberation were reversed to reflect an absence of these trait facets as positive indicators of latent trait impulsivity.

Adult Attachment Patterns—The Revised Experiences in Close Relationships questionnaire (ECR-R; Fraley, Waller, & Brennan, 2000) was administered to assess adult attachment patterns. The ECR-R is a 36-item self-report measure of two dimensions of adult attachment: anxiety (18 items) and avoidance (18 items). Participants rated the extent to which each item was descriptive of their feelings in close relationships on a seven-point scale ranging from "disagree strongly" (1) to "agree strongly" (7). A number of studies have demonstrated the internal consistency and test-retest reliability, as well as the construct, predictive, and discriminative validity, of the attachment anxiety and avoidance scales produced by the ECR-R (Crowell, Fraley, & Shaver, 1999; Fraley, Waller, et al., 2000; Sibley, Fischer, & Liu, 2005; Sibley & Liu, 2004), and Sibley and Liu (2004) confirmed the two-factor structure of the ECR-R. In order to parcel the ECR-R items into multiple indicators of anxiety and avoidance as two separate latent variables, in accordance with the procedures used by Russell, Kahn, Spoth, and Altmaier (1998) and Wei, Mallinckrodt, Russell, and Abraham (2004), two separate exploratory factor analyses, one for items from each of the two attachment dimensions, were conducted using maximum-likelihood extraction. Items for each attachment dimension were then rank-ordered based on factor loading magnitude, and successively assigned to one of three parcels, resulting in three indicators of attachment anxiety and three indicators of attachment avoidance calculated based on the sum of the six items comprising each indicator.

BPD Features—BPD features were measured using items adapted from the McLean Screening Instrument for BPD (MSI-BPD; Zanarini et al., 2003) and the International Personality Disorders Examination Screening Questionnaire (IPDE-SQ; Loranger, 1999). All items were rated on a four-point scale ranging from "False, not at all true" (0) to "Very true" (3). The MSI-BPD and IPDE-SQ summed scores were used as indicators of BPD features. The original MSI-BPD (Zanarini et al., 2003) is a 10-item self-report screener for BPD features with demonstrated test-retest reliability, internal consistency, validity, and diagnostic efficiency for identifying the presence of *DSM-IV* BPD in respondents between the ages of 18 and 59. Items were rewritten in the first-person for self-administration, and some items from the original MSI-BPD were broken up into separate items for more precise assessment. For example, the original MSI-BPD item, "Have you often felt that you had no idea of who you are or that you have no identity?" was presented as two items: "I have often felt that I had no idea who I am" and "I have often felt that I have no identity." The IPDE-SQ (Loranger, 1999) is a self-report measure of personality disorder features that contains nine items specific to BPD. Only the nine BPD-relevant items from the IPDE-SQ were administered. One of the nine items, "I've never threatened suicide or injured myself on purpose," was reverse-scored. Two additional reverse-scored items were added to assess suicidality and parasuicidality separately: "I've never injured myself on purpose (e.g., cut myself, burned myself)" and "I've never attempted suicide."

STATISTICAL PROCEDURES

Preliminary data analyses were conducted using SPSS 14.0 (SPSS Inc., Chicago, IL) and PRELIS 8.80 for Windows (Jöreskog & Sörbom, 2006). All statistical tests were two-tailed with the *p*-value for significance set at .05. Models were tested using LISREL 8.80 for Windows (Jöreskog & Sörbom, 2006) by first identifying a well-fitting measurement model using confirmatory factor analysis (CFA), and then testing the hypothesized structural models by imposing causal paths between latent variables in the CFA model. Due to moderate nonnormality of the data, robust maximum likelihood solutions (using the covariance and asymptotic covariance matrices, available upon request from the first author) were requested. The Normal Theory chi-square ($NT\chi^2$) and Satorra-Bentler chi-square ($SB\chi^2$) goodness-of-fit indices are reported, but model fit was not evaluated based on the significance levels of χ^2 due to the sensitivity of this index to sample size. Several alternative fit indices reflecting diverse criteria were used to evaluate overall fit of each of the models, including the root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), comparative fit index (CFI), and nonnormed fit index (NNFI). The following were considered indications of adequate model fit: RMSEA ≤ .08, SRMR < .08, and CFI and NNFI values > .95 (Kline, 1998). Nonhierarchical (non-nested) models were compared by examining ECVI, AIC, and CAIC values, which are lower for better-fitting models. Hierarchical (nested) models were compared using the Satorra-Bentler-adjusted (Satorra & Bentler, 2001) chi-square difference ($\chi^2\Delta$) test.

RESULTS

PRELIMINARY ANALYSES

The internal consistency (coefficient alpha) of each of the study's self-report scales was calculated to assess the reliability of observed scale scores. All alphas were in the acceptable range. Alphas, descriptive statistics, and univariate skewness and kurtosis values for each observed variable are presented in Table 1. The relative multivariate kurtosis values for each sample were below 1.25, suggesting that multivariate kurtosis was not extreme. Comparisons of men and women's scores on each observed variable in the combined sample (*N* = 1,401) revealed that women scored significantly higher than men in Anxiety, Angry Hostility, Depression, Impulsivity, and Attachment Anxiety parcel 1, and men scored higher

than women on Attachment Avoidance parcel 2, ps < .05. Associations between self-reported race and ethnicity and all observed variables were examined using Pearson's bivariate correlations in the combined sample after listwise deletion of 11 cases that were missing ethnicity data. Although significant associations were observed between ethnicity and three observed variables (Depression, Attachment Anxiety, and Attachment Avoidance; ps < .05), these correlations were very small in magnitude (rs ≤ .11). Therefore, results are reported for all ethnicities combined.

Measurement Model—In the CFA model, we specified the independence of error terms for the indicators and allowed correlations between factors. Latent variables were scaled by fixing the factor loading of one indicator on each latent variable to a value of one. The proposed CFA model provided an adequate fit to the data (see Table 2). However, the correlation between attachment anxiety and avoidance in the measurement model was substantial (r = .55, p < .001). In order to control for the influence of this correlation, the association between these latent variables was incorporated into the structural models.

Structural Models—The structural hypotheses among the latent factors were tested by imposing causal paths between latent variables in the CFA model. Disturbances of mediator variables were allowed to correlate in the structural models because these factors may be correlated due to causes not explained by the models. Fit indices for each model are presented in Table 2.

M1 adequately fit the data, but when controlling for the association between attachment anxiety and avoidance, only attachment anxiety (and not attachment avoidance) was significantly related to trait negative affect and impulsivity, which in turn, were directly related to BPD features. The indirect effect of attachment anxiety on BPD features was highly significant (standardized β = .52, SE = .06, p < .001). Reduced form R^2 values suggested that M1 explained 26% of the variance in BPD features. M2 did not provide a close fit to the data. Comparison of ECVI, AIC, and CAIC values, all of which were lower for M1 (see Table 2), suggested that M1 was the better-fitting model in comparison to M2. Reduced form R^2 values suggested that M2 explained only 14% of the variance in BPD features.

The solution for M1 suggested that attachment anxiety was indirectly related to BPD features through its relationship with personality traits, and this model fit the data better than one in which traits were indirectly related to BPD features through their relationship with attachment patterns (M2). However, if attachment anxiety, in addition to its indirect relationship with BPD features, also *directly* relates to BPD features, then this would suggest partial mediation rather than full mediation. In order to test for partial mediation, M1 was respecified in Model 3 (M3) by adding a direct path from attachment anxiety to BPD features; this direct path was not statistically significant (standardized β = .04, SE = .06, p > .05). In addition, the nonsignificant $\chi^2\Delta$ value (see Table 2) suggested that this direct path was not necessary to the model. These results suggest that the relationship between attachment anxiety and BPD features is fully mediated by trait negative affect and impulsivity. Next, a fourth model (M4) was tested in which the direct path was added between attachment avoidance and BPD features, but this direct path was also nonsignificant (standardized β = −.02, SE = .05, p > .05), and added no further information to the model. Thus, M1 was retained as the best-fitting model. All unstandardized path estimates for M1 (used in subsequent cross-validation analyses) are presented in Table 3, and standardized estimates are illustrated in Figure 1.

Cross-Validation of M1 in Sample 2—M1 and M2 were cross-validated in Sample 2 with factor loadings, direct paths, and error covariances fixed to the unstandardized

estimates derived from the estimation of M1 and M2 in Sample 1. Cross-validation demonstrated that M1 also fit the data adequately in Sample 2, $SB\chi^2$ (85, $N = 700$) = 462.84; RMSEA = .080; SRMR = .071; CFI = .96; NNFI = .96; ECVI = 0.72; AIC = 502.84; CAIC = 613.86. On the other hand, M2 did not provide a good fit to the data in Sample 2, $SB\chi^2$ (85, $N = 700$) = 652.87; RMSEA = .098; SRMR = .100; CFI = .95; NNFI = .94; ECVI = 0.99; AIC = 692.87; CAIC = 803.89. The comparison of ECVI, AIC, and CAIC values in the cross-validated models once again demonstrated that M1 provided a closer fit to the data than M2. Therefore, the model comparison results were cross-validated and M1 appears to fit the data well in an independent sample of similar demographic makeup.

Cross-Validation of M1 by Gender—The best-fitting model (M1) was cross-validated separately for men and women from Samples 1 and 2 combined by fixing all factor loadings, direct paths, and error covariances to the unstandardized estimates derived from the estimation of M1 in Sample 1. Fit indices for each subsample indicated that these specified model parameters for M1 fit the data well for both men ($SB\chi^2$ (85, $N = 460$) = 287.63; RMSEA = .072; SRMR = .071; CFI = .97; NNFI = .96) and women ($SB\chi^2$ (85, $N = 941$) = 528.76; RMSEA = .075; SRMR = .064; CFI = .97; NNFI = .97).

DISCUSSION

Consistent with attachment theory (Fonagy, 1991; Levy, 2005) and recent longitudinal (Hagekull & Bohlin, 2003; Stams et al., 2002) and cross-sectional evidence (Fossati et al., 2005), it was hypothesized that a model in which trait negative affect and impulsivity mediate the relationship between attachment patterns and BPD features would provide a better fit to the data when compared to a model in which attachment patterns mediate the relationship between traits and BPD features. The results of the model comparison were consistent with this hypothesis. However, attachment avoidance was neither directly nor indirectly related to BPD features when controlling for its relationship with attachment anxiety. Only attachment anxiety was related to traits, which in turn, were directly associated with BPD features. The results were cross-validated in an independent sample, leading to the same conclusions.

The findings of this study further our understanding of the relationship between adult attachment patterns, normal-range personality traits, and BPD features, and they suggest hypotheses to be tested in longitudinal research. Even though the cross-sectional nature of the data in the current study precludes inferences regarding temporal sequence of attachment and personality traits, the results imply that adult attachment patterns may be indirectly related to BPD features through their relationship with personality traits that more directly relate to BPD features. These results might be explained by attachment theory, which predicts that attachment patterns contribute to the capacity to regulate behavior and affect (Fonagy, 1991; Levy, 2005). According to Bowlby (1988), secure attachment behaviors include the use of an attachment figure as a "secure base" to freely explore the world when not in distress and as a "safe haven" from whom to seek support, protection, and comfort in times of distress. These attachment-related behaviors are not only observable in childhood, but also in adult relationships (e.g., Simpson, Rholes, & Nelligan, 1992). In the absence of secure adult attachment, these normative behaviors are disrupted, which may leave the individual vulnerable to the intensification of anger, anxiety, depression, and impulsive behavior due to deficiencies in adaptive coping and support-seeking behaviors (Levy, Clarkin, Yeomans, et al., 2006). In this way, a dysregulated adult attachment system may intensify chronic negative affect and impulsivity, which are central traits in BPD. The current results suggest the value of examining similar models using longitudinal data in order to elucidate whether attachment disturbance has a causal role in the manifestation of the core personality traits underlying BPD.

The finding that attachment anxiety, but not attachment avoidance, is indirectly related to BPD features is congruent with the results from several studies that have shown a strong and consistent relationship between attachment anxiety and BPD (Alexander, 1993; Aaronson et al., 2006; Brennan & Shaver, 1998; Dutton et al., 1994; Eurelings-Bontekoe et al., 2003; Levy et al., 2005; Meyer et al., 2004; Nickell et al., 2002). In addition, our findings are consistent with those by Fossati et al. (2005), who found that the relationship between adult attachment and BPD features was fully mediated by impulsive and aggressive traits. These results suggest that adult attachment patterns appear to be associated with BPD features through their relationship with the core personality traits of BPD. As suggested by Fossati et al. (2005), this indirect relationship between attachment patterns and BPD features may help to explain the inconsistencies in associations between BPD and any one specific adult attachment pattern.

The nonsignificant relationship between attachment avoidance and BPD features when controlling for the correlation between attachment avoidance and attachment anxiety is consistent with findings from several studies (Alexander, 1993; Brennan & Shaver, 1998; Dutton et al., 1994; Eurelings-Bontekoe et al., 2003; Levy et al., 2005; Meyer et al. 2001, 2004; Nickell et al., 2002). Combined with previous findings, the current results suggest that attachment avoidance may only relate to BPD features when it co-occurs with attachment anxiety, as would be expected with fearful attachment. Individuals with a fearful attachment style tend to desire closeness and worry about abandonment, yet may simultaneously avoid closeness because of fears of dependency on others. Evidence suggests that fearful attachment patterns are quite common among individuals with BPD (Dutton et al., 1994; Levy et al., 2005). However, it should be noted that attachment anxiety and avoidance were substantially correlated in the current study. Even though the models controlled for this correlation, it is possible that attachment avoidance would contribute more unique effects on these constructs in samples wherein attachment anxiety and avoidance are truly orthogonal.

Despite the empirical evidence that BPD is diagnosed more frequently in women than in men (American Psychiatric Association, 2000), there were no significant sex differences in the occurrence of BPD features in this study. In addition, even though there were mean sex differences in many of the observed variables, cross-validation of the best-fitting model in subsamples of men and women separately suggests that the structural relationship between these constructs appears similar in both sexes.

This is the first study to directly compare theoretically opposing models of the structural relationships between adult attachment patterns, personality traits, and BPD features. Some noteworthy strengths of this study include the substantial sample size, the dimensional measurement of psychological constructs, and the use of SEM in order to compare competing theoretical models of equal complexity. The use of multiple measures for each latent construct is advantageous because it allows for the inclusion of measurement error in the models. The large sample and cross-validation of the results also speak to the stability of these results.

Nevertheless, these results should be interpreted cautiously considering the restrictions inherent in testing structural models with cross-sectional data (Maxwell & Cole, 2007). The measurement of adult attachment, personality traits, and BPD features at one point in time in adulthood does not allow for inferences regarding the causal role of early attachment patterns or traits in the etiology of BPD. SEM is a technique that allows for the statistical comparison of structural relationships between variables, but inferences of causality cannot be made without clear temporal precedence of exogenous variables over endogenous ones, which can only be obtained in longitudinal designs. In addition, as with all studies examining structural models, the identification of a well-fitting model does not necessarily

suggest that the model is the correct causal explanation of the phenomenon under investigation. There are still other statistically equivalent models, as well as nonequivalent but theoretically plausible models, that cannot be ruled out (Tomarken & Waller, 2003). It is highly likely that there is a complex interactional relationship between personality traits and the attachment system, in which neither construct takes complete precedence over the other. Both theory and empirical evidence suggest that traits and attachment are integrally connected and influence each other; therefore, both models might be true to some extent, regardless of whether one model fits the data better than another model. However, bidirectional relationships between traits and attachment could not be tested in the present study, as the models would have been under-identified (for a detailed discussion of model identification, see Kline, 1998). Moreover, there are additional putative risk factors for BPD features that were not included in these models, such as childhood abuse history and parental psychopathology. Hence, the results of the present study suggest a pattern of correlations between variables that fits the data better than another pattern, but these results should not be interpreted to suggest that the better-fitting model is the correct causal explanation of BPD features, that BPD features develop solely through the impact of the attachment system on affective and self-regulatory mechanisms, nor that attachment patterns entirely precede the development of trait negative affect and impulsivity. Future studies might compare the final model to alternative models and attempt to elucidate temporal relationships between attachment, traits, and BPD in longitudinal designs.

There are a number of other limitations of the present study that are worthy of mention. First, these results might not generalize to severely disturbed clinical populations or to more diverse populations representing a wider range of ethnicities, racial groups, and age cohorts. Second, the variables of interest were measured exclusively via self-report instruments, which are susceptible to bias. The well-documented tendency of individuals who are high in attachment avoidance to minimize or deny their own distress (Edelstein, 2006; Fraley, Garner, & Shaver, 2000; Fraley & Shaver, 1997) may at least partially explain the failure to find a significant relationship between attachment avoidance and negative affect, impulsivity, and BPD features in this study. However, it should be noted that self-report measures are advantageous for collecting large amounts of data for large-sample data analyses such as SEM. Third, despite the evidence suggesting that temperament and attachment are distinct constructs (see Levy, 2005) and that the ECR-R is a better predictor of relationship quality than any of the NEO-PI-R scales (Noftle & Shaver, 2006), it is possible that the similar wording of questions and the common measurement method across measures used in this study may lead to shared method variance between instruments that could be confounded with correlations between constructs. On a related note, whereas BPD features were modeled using only two indicators, at least three indicators for latent variables are often recommended. Finally, it is unclear whether the final model is specific to BPD, or if it might also apply to other psychiatric disorders. The modeling of BPD with increasing specificity is an important task for future investigations.

In the event that these results are later validated using longitudinal designs with clinical populations, they may have significant implications for clinical theories and interventions for BPD. If dysfunctional attachment-related representations influence chronic negative affect and impulsivity, then it may be important in the treatment of BPD to activate the attachment system and facilitate changes in attachment. Notwithstanding that traits were more directly related to BPD features in these data than attachment patterns, and there is evidence that change can occur in the personality traits underlying BPD (e.g., Warner et al., 2004), it is also possible that the modification of mental representations with respect to attachment relationships may be important mechanisms of long-term change for these patients (Fonagy & Bateman, 2006; Levy, Clarkin, Yeomans, et al., 2006). Due to their self-perpetuating nature, maladaptive attachment-related representations may engender further

affective instability and behavioral disinhibition if left unmodified. Secure attachment may serve a protective function, decreasing vulnerability for relapse or the continuation of symptoms. Fortunately, there is evidence that some forms of psychotherapy can lead to increased attachment security among patients with BPD. For example, recent evidence suggests that transference-focused psychotherapy (TFP; Clarkin, Yeomans, & Kernberg, 2006), which focuses on mental representations of self and others as they emerge in the therapeutic relationship, leads to significant increases in attachment security in patients with BPD after only a year of treatment (Levy, Meehan, Kelly, et al., 2006). The long-term effects of these representational changes in terms of functioning and outcome are yet to be determined pending longitudinal follow-up. Nonetheless, the results of the current study suggest that examining the indirect influence of attachment patterns on BPD through their effects on core personality traits is a potentially significant avenue of further study in longitudinal research designs.

REFERENCES

Aaronson CJ, Bender DS, Skodol AE, Gunderson JG. Comparison of attachment styles in borderline personality disorder and obsessive-compulsive personality disorder. Psychiatric Quarterly. 2006; 77:69–80. [PubMed: 16397756]

Adam EK, Gunnar MR, Tanaka A. Adult attachment, parent emotion, and observed parenting behavior: Mediator and moderator models. Child Development. 2004; 75:110–122. [PubMed: 15015678]

Alexander PC. The differential effects of abuse characteristics and attachment in the prediction of long-term effects of sexual abuse. Journal of Interpersonal Violence. 1993; 8:346–362.

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed. Author; Washington, DC: 2000.

Arntz A, Dietzel R, Dreessen L. Assumptions in borderline personality disorder: Specificity, stability and relationship with etiological factors. Behavior Research and Therapy. 1999; 37:545–557.

Arntz A, Veen G. Evaluations of others by borderline patients. Journal of Nervous and Mental Disease. 2001; 189:513–521. [PubMed: 11531203]

Bartholomew, K.; Shaver, PR. Methods of assessing adult attachment: Do they converge?. In: Simpson, JA.; Rholes, WS., editors. Attachment theory and close relationships. Guilford Press; New York: 1998. p. 25-45.

Bender DS, Skodol AE. Borderline personality as a self-other representational disturbance. Journal of Personality Disorders. 2007; 21:500–517. [PubMed: 17953503]

Blatt SJ, Auerbach JS, Levy KN. Mental representations in personality development, psychopathology, and the therapeutic process. Review of General Psychology. 1997; 1:351–374.

Bowlby, J. A secure base: Parent-child attachment and healthy human development. Basic Books; New York: 1988.

Brennan, KA.; Clark, CL.; Shaver, PR. Self-report measurement of adult attachment: An integrative overview. In: Simpson, JA.; Rholes, WS., editors. Attachment theory and close relationships. Guilford Press; New York: 1998. p. 46-76.

Brennan KA, Shaver PR. Attachment styles and personality disorders: Their connections to each other and to parental divorce, parental death, and perceptions of parental caregiving. Journal of Personality. 1998; 66:835–878. [PubMed: 9802235]

Butler AC, Brown GK, Beck AT, Grisham J. Assessment of dysfunctional beliefs in borderline personality disorder. Behaviour Research and Therapy. 2002; 40:1231–1240. [PubMed: 12375731]

Caspi, A. Personality development across the life course. In: Damon, W.; Eisenberg, N., editors. Handbook of child psychology: Vol. 3. Social, emotional, and personality development. Wiley; New York: 1998. p. 311-388.

Caspi A. The child is the father of the man: Personality continuities from childhood to adulthood. Journal of Personality and Social Psychology. 2000; 78:158–172. [PubMed: 10653512]

Caspi, A.; Bem, DJ. Personality continuity and change across the life course. In: Pervin, LA., editor. Handbook of personality theory and research. Guilford; New York: 1990. p. 549-575.

Caspi, A.; Roberts, BW. Personality change and continuity across the life course. In: Pervin, LA.; John, OP., editors. Handbook of personality theory and research. Guilford Press; New York: 1999. p. 300-326.

Clarkin JF, Hull JW, Hurt SW. Factor structure of borderline personality disorder criteria. Journal of Personality Disorders. 1993; 7:137–143.

Clarkin, JF.; Yeomans, F.; Kernberg, OF. Psychotherapy of borderline personality: Focusing on object relations. American Psychiatric Publishing; Arlington, VA: 2006.

Cloninger CR, Svrakic DM, Przybeck TR. A psychobiological model of temperament and character. Archives of General Psychiatry. 1993; 50:975–990. [PubMed: 8250684]

Costa, PT., Jr.; McCrae, RR. Revised NEO Personality Inventory (NEO–PI–R) and NEO Five-Factor Inventory (NEO–FFI) professional manual. Psychological Assessment Resources; Odessa, FL: 1992.

Crowell, JA.; Fraley, RC.; Shaver, PR. Measurement of individual differences in adolescent and adult attachment. In: Cassidy, J.; Shaver, PR., editors. Handbook of attachment: Theory, research, and clinical applications. Guilford Press; New York: 1999. p. 434-465.

Depue, RA.; Lenzenweger, MF. A neurobehavioral dimensional model of personality disorders. In: Livesley, WJ., editor. Handbook of personality disorders. Guilford Press; New York: 2001. p. 136-176.

Donegan NH, Sanislow CA, Blumberg HP, Fulbright RK, Lacadie C, Skudlarski P, et al. Amygdala hyperreactivity in borderline personality disorder: Implications for emotional dysregulation. Biological Psychiatry. 2003; 54:1284–1293. [PubMed: 14643096]

Dutton DG, Saunders K, Starzomski A, Bartholomew K. Intimacy–anger and insecure attachment as precursors of abuse in intimate relationships. Journal of Applied Social Psychology. 1994; 24:1367–1386.

Edelstein RS. Attachment and emotional memory: Investigating the source and extent of avoidant memory impairments. Emotion. 2006; 6:340–345. [PubMed: 16768567]

Eggert J, Levendosky A, Klump K. Relationships among attachment styles, personality characteristics, and disordered eating. International Journal of Eating Disorders. 2007; 40:149–155. [PubMed: 17089415]

Eisenberg N, Fabes RA, Guthrie IK, Reiser M. Dispositional emotionality and regulation: Their role in predicting quality of social functioning. Journal of Personality and Social Psychology. 2000; 78:136–157. [PubMed: 10653511]

Eisenberg N, Fabes RA, Shepard SA, Murphy BC, Guthrie IK, Jones S, et al. Contemporaneous and longitudinal prediction of children's social functioning from regulation and emotionality. Child Development. 1997; 68:642–664. [PubMed: 9306644]

Eurelings–Bontekoe EM, Verschuur MJ, Schreuder B. Personality, temperament, and attachment style among offspring of WWII victims: An integration of descriptive and structural features of personality. Traumatology. 2003; 9:106–122.

Fonagy P. Thinking about thinking: Some clinical and theoretical considerations in the treatment of a borderline patient. International Journal of Psychoanalysis. 1991; 72:639–656. [PubMed: 1797718]

Fonagy P, Bateman AW. Mechanisms of change in mentalization-based treatment of BPD. Journal of Clinical Psychology. 2006; 62:411–430. [PubMed: 16470710]

Fonagy P, Leigh T, Steele M, Steele H, Kennedy R, Mattoon G, et al. The relation of attachment status, psychiatric classification and response to psychotherapy. Journal of Consulting and Clinical Psychology. 1996; 64:22–31. [PubMed: 8907081]

Fossati A, Feeney JA, Carretta I, Grazioli F, Milesi R, Lionardi B, et al. Modeling the relationships between adult attachment patterns and borderline personality disorder: The role of impulsivity and aggressiveness. Journal of Social and Clinical Psychology. 2005; 24:520–537.

Fraley RC. Attachment stability from infancy to adulthood: Meta-analysis and dynamic modeling of developmental mechanisms. Personality and Social Psychology Review. 2002; 6:123–151.

Fraley, RC. Attachment over time: Global versus relationship-specific representations, their stability, and their impact on relationship outcomes. Paper presented at the 19th annual convention of the Association for Psychological Science; Washington, D.C.. May. 2007

Fraley RC, Garner JP, Shaver PR. Adult attachment and the defensive regulation of attention and memory: Examining the role of pre-emptive and postemptive defensive processes. Journal of Personality and Social Psychology. 2000; 79:816–826. [PubMed: 11079243]

Fraley RC, Shaver PR. Adult attachment and the suppression of unwanted thoughts. Journal of Personality and Social Psychology. 1997; 73:1080–1091. [PubMed: 9364762]

Fraley RC, Waller NG, Brennan KA. An item response theory analysis of self-report measures of adult attachment. Journal of Personality and Social Psychology. 2000; 78:350–365. [PubMed: 10707340]

Gunnar MR, Brodersen L, Nachmias M, Buss K, Rigatuso J. Stress reactivity and attachment security. Developmental Psychobiology. 1996; 29:191–204. [PubMed: 8666128]

Gurvits IG, Koenigsberg HW, Siever LJ. Neurotransmitter dysfunction in patients with borderline personality disorder. Psychiatric Clinics of North America. 2000; 23:27–40. [PubMed: 10729929]

Hagekull B, Bohlin G. Early temperament and attachment as predictors of the Five Factor Model of personality. Attachment and Human Development. 2003; 5:2–18. [PubMed: 12745826]

Hazan C, Shaver PR. Romantic love conceptualized as an attachment process. Journal of Personality and Social Psychology. 1987; 52:511–524. [PubMed: 3572722]

Hertsgaard L, Gunnar M, Erickson MF, Nachmias M. Adrenoccorticcal responses to the strange situation in infants with disorganized/disyoriented attachment relationships. Child Development. 1995; 66:1100–1106. [PubMed: 7671652]

Hicks BM, Markon KE, Patrick CJ, Krueger RF, Newman JP. Identifying psychopathy subtypes on the basis of personality structure. Psychological Assessment. 2004; 16:276–288. [PubMed: 15456383]

Horppu R, Ikonen-Varila M. Are attachment styles general interpersonal orientations? Applicants' perceptions and emotions in interaction with evaluators in a college entrance examination. Journal of Social and Personal Relationships. 2001; 18:131–148.

Jackson KM, Trull TJ. The factor structure of the personality assessment inventory-borderline features (PAI-BOR) scale in a nonclinical sample. Journal of Personality Disorders. 2001; 15:536–545. [PubMed: 11778395]

Jang KL, Livesley WJ, Vernon PA. Heritability of the big five personality dimensions and their facets: a twin study. Journal of Personality. 1996; 64:577–591. [PubMed: 8776880]

Jang KL, McCrae RR, Riemann R, Livesley WJ. Heritability of facet-level traits in a cross-cultural twin sample: Support for a hierarchical model of personality. Journal of Personality and Social Psychology. 1998; 74:1556–1565. [PubMed: 9654759]

Jöreskog, K.; Sörbom, D. LISREL 8.80. Scientific Software International; Lincolnwood, IL: 2006.

Jovev M, Jackson H. Early maladaptive schemas in personality disordered individuals. Journal of Personality Disorders. 2004; 18:467–478. [PubMed: 15519957]

Kline, RB. Principles and practice of structural equation modeling. Guilford Press; New York: 1998.

Levy KN. The implications of attachment theory and research for understanding borderline personality disorder. Development and Psychopathology. 2005; 17:959–986. [PubMed: 16613426]

Levy KN, Blatt SJ, Shaver PR. Attachment style and parental representations. Journal of Personality and Social Psychology. 1998; 74:407–419.

Levy KN, Clarkin JF, Yeomans FE, Scott LN, Wasserman RH, Kernberg OF. The mechanisms of change in the treatment of borderline personality disorder with transference focused psychotherapy. Journal of Clinical Psychology. 2006; 62:481–501. [PubMed: 16470612]

Levy KN, Meehan KB, Kelly KM, Reynoso J, Weber M, Clarkin JF, et al. Change in attachment patterns and reflective function in a randomized control trial of transference-focused psychotherapy for borderline personality disorder. Journal of Consulting and Clinical Psychology. 2006; 74:1027–1040. [PubMed: 17154733]

Levy KN, Meehan KB, Weber M, Reynoso J, Clarkin JF. Attachment and borderline personality disorder: Implications for psychotherapy. Psychopathology. 2005; 38:64–74. [PubMed: 15802944]

Linehan, MM. Cognitive-behavioral treatment of borderline personality disorder. Guilford Press; New York: 1993.

Livesley WJ, Schroeder ML, Jackson DN, Jang KL. Categorical distinctions in the study of personality disorder: Implications for classification. Journal of Abnormal Psychology. 1994; 103:6–17. [PubMed: 8040482]

Loranger, AW. International personality disorder examination (IPDE) manual. Psychological Assessment Resources, Inc.; Odessa, FL: 1999.

Lyons-Ruth K. Attachment relationships among children with aggressive behavior problems: The role of disorganized early attachment patterns. Journal of Consulting and Clinical Psychology. 1996; 64:64–73. [PubMed: 8907085]

Mangelsdorf S, Gunnar M, Kestenbaum R, Lang S, Andreas D. Infant proneness-to-distress temperament, maternal personality, and motherinfant attachment: Associations and goodness of fit. Child Development. 1990; 61:820–831. [PubMed: 2364756]

Maxwell SE, Cole DA. Bias in cross-sectional analyses of longitudinal mediation. Psychological Methods. 2007; 12:23–44. [PubMed: 17402810]

Meyer B, Pilkonis PA, Beevers CG. What's in a (neutral) face? Personality disorders, attachment styles, and the appraisal of ambiguous social cues. Journal of Personality Disorders. 2004; 18:320–336. [PubMed: 15342321]

Meyer B, Pilkonis PA, Proietti JM, Heape CL, Egan M. Attachment styles and personality disorders as predictors of symptom course. Journal of Personality Disorders. 2001; 15:371–389. [PubMed: 11723873]

Mikulincer M. Adult attachment style and affect regulation: Strategic variations in self-appraisals. Journal of Personality and Social Psychology. 1998a; 75:420–435. [PubMed: 9731317]

Mikulincer M. Adult attachment style and individual differences in functional versus dysfunctional experiences of anger. Journal of Personality and Social Psychology. 1998b; 74:513–524. [PubMed: 9491590]

Mikulincer M, Orbach I. Attachment styles and repressive defensiveness: The accessibility and architecture of affective memories. Journal of Personality and Social Psychology. 1995; 68:917–925. [PubMed: 7776187]

Mikulincer M, Shaver PR. Attachment theory and intergroup bias: Evidence that priming the secure base schema attenuates negative reactions to out-groups. Journal of Personality and Social Psychology. 2001; 81:97–115. [PubMed: 11474729]

Nickell AD, Waudby CJ, Trull TJ. Attachment, parental bonding and borderline personality disorder features in young adults. Journal of Personality Disorders. 2002; 16:148–159. [PubMed: 12004491]

Niedenthal PM, Brauer M, Robin L, Innes-Ker AH. Adult attachment and the perception of facial expression of emotion. Journal of Personality and Social Psychology. 2002; 82:419–433. [PubMed: 11902625]

Nigg JT, Lohr NE, Westen D, Gold LJ, Silk KR. Malevolent object representations in borderline personality disorder and major depression. Journal of Abnormal Psychology. 1992; 101:61–67. [PubMed: 1537974]

Noftle EE, Shaver PR. Attachment dimensions and the big five personality traits: Associations and comparative ability to predict relationship quality. Journal of Research in Personality. 2006; 40:179–208.

Nordahl HM, Holthe H, Haugum JA. Early maladaptive schemas in patients with or without personality disorders: Does schema modification predict symptomatic relief? Clinical Psychology and Psychotherapy. 2005; 12:142–149.

Oldham JM, Gabbard GO, Goin MK, Gunderson J, Soloff P, Spiegel D, et al. Practice guideline for the treatment of patients with borderline personality disorder. American Journal of Psychiatry. 2001; 158:1–52.

Patrick M, Hobson P, Castle P, Howard R, Maugham B. Personality disorder and mental representation of early social experience. Developmental Psychopathology. 1994; 94:375–388.

Posner MI, Rothbart MK, Vizueta N, Thomas KN, Levy KN, Fossella J, et al. An approach to the psychobiology of personality disorders. Development and Psychopathology. 2003; 15:1093–1106. [PubMed: 14984139]

Rosenstein DS, Horowitz HA. Adolescent attachment and psychopathology. Journal of Consulting and Clinical Psychology. 1996; 64:244–253. [PubMed: 8871408]

Russell DW, Kahn JH, Spoth R, Altmaier EM. Analyzing data from experimental studies: A latent variable structural equation modeling approach. Journal of Counseling Psychology. 1998; 45:18–29.

Sanislow CA, Grilo CM, Morey LC, Bender DS, Skodol AE, Gunderson JG, et al. Confirmatory factor analysis of DSM-IV criteria for borderline personality disorder: Findings from the collaborative longitudinal personality disorders study. American Journal of Psychiatry. 2002; 159:284–290. [PubMed: 11823272]

Satorra A, Bentler PM. A scaled difference chi-square test statistic for moment structure analysis. Psychometrika. 2001; 66:507–514.

Shaver PR, Brennan KA. Attachment styles and the 'Big Five' personality traits: Their connections with each other and with romantic relationship outcomes. Personality and Social Psychology Bulletin. 1992; 18:536–545.

Shaver, PR.; Mikulincer, M. What do self-report attachment measures assess?. In: Rholes, WS.; Simpson, JA., editors. Adult attachment: Theory, research, and clinical implications. Guilford Press; New York: 2004. p. 17-54.

Shaver PR, Mikulincer M. Attachment theory and research: Resurrection of the psychodynamic approach to personality. Journal of Research in Personality. 2005; 39:22–45.

Sher KJ, Trull TJ. Personality and disinhibitory psychopathology: Alcoholism and antisocial personality disorder. Journal of Abnormal Psychology. 1994; 103:92–102. [PubMed: 8040486]

Shiner R, Caspi A. Personality differences in childhood and adolescence: Measurement, development, and consequences. Journal of Child Psychology and Psychiatry. 2003; 44:2–32. [PubMed: 12553411]

Sibley CG, Fischer R, Liu JH. Reliability and validity of the revised experiences in close relationships (ECR-R) self-report measure of adult romantic attachment. Personality and Social Psychology Bulletin. 2005; 31:1524–1536. [PubMed: 16207771]

Sibley CG, Liu JH. Short-term temporal stability and factor structure of the revised experiences in close relationships (ECR-R) measure of adult attachment. Personality and Individual Differences. 2004; 36:969–975.

Siever LJ, Davis KL. A psychobiological perspective on the personality disorders. American Journal of Psychiatry. 1991; 148:1647–1658. [PubMed: 1957926]

Silk, KR. Overview of biological factors. In: Paris, J., editor. The psychiatric clinics of North America: Borderline personality disorder. W. B., Saunders; Philadelphia: 2000. p. 61-75.

Simpson JA, Rholes WS, Nelligan JA. Support seeking and support giving within couples in an anxiety-provoking situation: The role of attachment styles. Journal of Personality and Social Psychology. 1992; 62:434–436.

Skodol AE, Gunderson JG, Pfohl B, Widiger TA, Livesley JW, Siever LJ. The borderline diagnosis I: Psychopathology, comorbidity, and personality structure. Biological Psychiatry. 2002; 51:936–950. [PubMed: 12062877]

Stalker CA, Davies F. Attachment organization and adaptation in sexually-abused women. Canadian Journal of Psychiatry. 1995; 40:234–240.

Stams GTJM, Juffer F, van IJzendoorn MH. Maternal sensitivity, infant attachment, and temperament in early childhood predict adjustment in middle childhood: The case of adopted children and their biologically unrelated parents. Developmental Psychology. 2002; 38:806–821. [PubMed: 12220057]

Stern, BL. The clinical utility of adult attachment models in predicting interpersonal adjustment. Paper presented at the 106th annual conference of The American Psychological Association; San Francisco, CA. August. 1998

Susman-Stillman A, Kalkoske M, Egeland B. Infant temperament and maternal sensitivity as predictors of attachment security. Infant Behavior and Development. 1996; 19:33–47.

Tomarken AJ, Waller NG. Potential problems with "well fitting" models. Journal of Abnormal Psychology. 2003; 112:578–598. [PubMed: 14674870]

Torgersen S, Kringlen E, Cramer V. The prevalence of personality disorders in a community sample. Archives of General Psychiatry. 2001; 58:590–596. [PubMed: 11386989]

Trull TJ. Borderline personality disorder features in nonclinical young adults:1. Identification and validation. Psychological Assessment. 1995; 7:33–41.

Trull TJ. Structural features of borderline personality disorder. Journal of Abnormal Psychology. 2001; 110:471–481. [PubMed: 11502090]

Trull TJ, Useda JD, Conforti K, Doan B. Borderline personality disorder features in nonclinical young adults: 2.Two-year outcome. Journal of Abnormal Psychology. 1997; 106:307–314. [PubMed: 9131850]

Wagner AW, Linehan MM. Facial expression recognition ability among women with borderline personality disorder: Implications for emotion regulation? Journal of Personality Disorders. 1999; 13:329–344. [PubMed: 10633314]

Warner MB, Morey LC, Finch JF, Gunderson JG, Skodol AE, Sanislow CA, et al. The longitudinal relationship of personality traits and disorders. Journal of Abnormal Psychology. 2004; 113:217–227. [PubMed: 15122942]

Waters E, Merrick S, Treboux D, Crowell J, Albersheim L. Attachment security in infancy and early adulthood: A twenty-year longitudinal study. Child Development. 2000; 71:684–689. [PubMed: 10953934]

Wei M, Mallinckrodt B, Russell DW, Abraham WT. Maladaptive perfectionism as a mediator and moderator between adult attachment and depressive mood. Journal of Counseling Psychology. 2004; 51:201–212.

Westen D, Harnden-Fischer J. Personality profiles in eating disorders: Rethinking the distinction between Axis I and Axis II. American Journal of Psychiatry. 2001; 158:547–562. [PubMed: 11282688]

Widiger, TA.; Costa, PT. FFM personality disorder research. In: Costa, PT., Jr.; Widiger, TA., editors. Personality disorders and the Five-Factor Model of personality. 2nd ed. American Psychological Association; Washington, DC: 2002. p. 59-87.

Widiger, TA.; Sanderson, CJ. Towards a dimensional model of personality disorders. In: Livesley, WJ., editor. The DSM-IV personality disorders. Guilford Press; New York: 1995. p. 433-458.

Zanarini MC, Vujanovic AA, Parachini EA, Boulanger JL, Frankenburg FR, Hennen J. A screening measure for BPD: The Mclean screening instrument for borderline personality disorder. Journal of Personality Disorders. 2003; 17:568–573. [PubMed: 14744082]
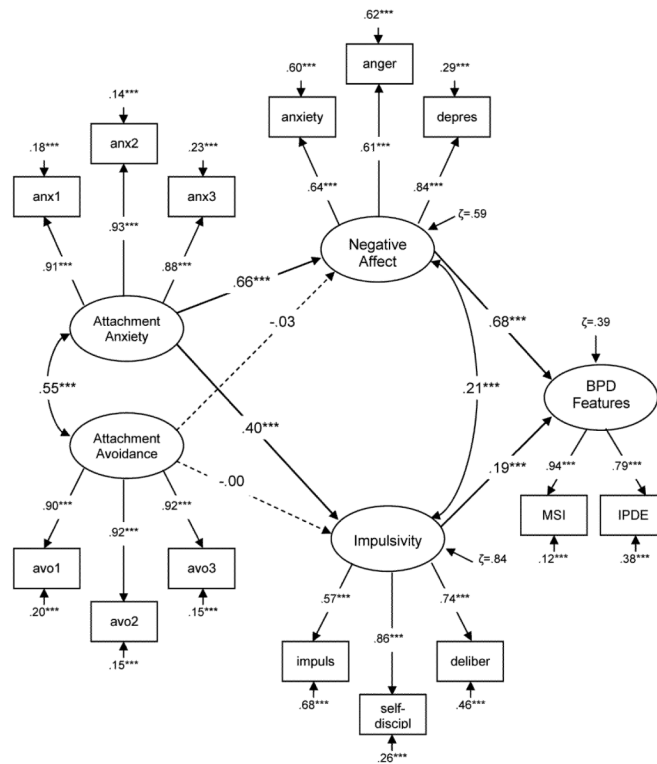
FIGURE 1.
Model 1: Final structural model standardized solution in Sample 1; anx1, 2, and 3 =
attachment anxiety parcels; avo1, 2, and 3 = attachment avoidance parcels; anxiety = NEO-
PI-R Anxiety; anger = NEO-PI-R Angry Hostility; depress = NEO-PI-R Depression;
impuls-NEO-PI-R Impulsiveness; self-discipl = NEO-PI-R Self-Discipline (reversed);
deliber = NEO-PI-R Deliberation (reversed); ***p < .001.

TABLE 1

Descriptive Statistics and Internal Consistency Coefficient Alphas (α) for Each Observed Variable (†reversed scales)

Scale	Sample	M	SD	Skewness	Kurtosis	α
Anxiety	1	16.29	5.40	−0.19	−0.04	.80
	2	16.63	5.58	−0.32	0.05	.81
Angry Hostility	1	13.83	5.21	0.13	−0.09	.78
	2	13.70	5.26	0.08	0.09	.78
Depression	1	13.55	6.09	0.35	−0.15	.84
	2	13.68	6.30	0.14	−0.40	.85
Impulsiveness	1	16.55	4.54	0.03	0.23	.71
	2	16.58	4.70	−0.03	0.51	.73
Self-discipline†	1	11.27	3.63	−0.18	0.22	.69
	2	11.17	3.84	−0.08	0.10	.71
Deliberation†	1	13.57	3.29	0.05	0.02	.64
	2	13.38	3.34	0.22	−0.05	.64
Attachmt Anxiety 1	1	20.32	6.92	0.04	−0.37	.77
	2	20.35	7.32	0.14	−0.58	.79
Attachmt Anxiety 2	1	18.61	6.63	0.13	−0.33	.81
	2	18.46	6.96	0.17	−0.50	.83
Attachmt Anxiety 3	1	19.20	6.73	0.18	−0.20	.82
	2	19.12	7.21	0.32	−0.43	.84
Attachmt Avoidance 1	1	18.14	6.24	0.32	−0.12	.77
	2	17.69	6.48	0.35	−0.40	.78
Attachmt Avoidance 2	1	18.21	6.89	0.30	−0.34	.84
	2	17.79	7.00	0.42	−0.23	.84
Attachmt Avoidance 3	1	19.28	7.04	0.20	−0.14	.84
	2	18.97	7.00	0.23	−0.24	.82
MSI-BPD	1	10.91	8.93	1.22	1.28	.89
	2	10.64	8.76	1.39	2.25	.89
IPDE-BPD	1	6.37	4.75	1.11	1.04	.72
	2	6.13	4.78	1.25	1.55	.73

TABLE 2

Model Fit Indices (Sample 1)

Model	df	$NT\chi^2$	$SB\chi^2$	RMSEA	SRMR	CFI	NNFI	ECVI	AIC	CAIC	$\chi^2\Delta$ (df, p value)
CFA	67	405.76	366.39	.080	.058	.97	.96	.63	442.39	653.38	
1	69	409.09	368.62	.079	.058	.97	.96	.63	440.62	640.51	
2	69	615.69	555.00	.100	.093	.95	.94	.90	627.00	826.89	
3	68	408.31	367.68	.079	.058	.97	.96	.63	441.68	647.12	$\chi^2\Delta_{M1-M3}(1) = 0.74$, *n.s.*
4	68	407.99	367.89	.079	.058	.97	.96	.63	441.89	647.34	$\chi^2\Delta_{M1-M4}(1) = 0.95$, *n.s.*

TABLE 3

Unstandardized Parameter Estimates, Standard Errors (SE) and t-Values for Model 1 (Sample 1)

Path	Estimate	SE	t
Structural Model Direct Paths			
Attachment Anxiety → Negative Affect	0.55	0.04	13.98[**]
Attachment Avoidance → Negative Affect	−0.02	0.04	−0.68
Attachment Anxiety → Impulsivity	0.17	0.03	6.69[**]
Attachment Avoidance → Impulsivity	−0.00	0.02	−0.01
Negative Affect → BPD features	1.10	0.09	12.71[**]
Impulsivity → BPD features	0.61	0.15	4.14[**]
Error Covariances among Latent Variables			
Negative Affect ↔ Impulsivity	5.09	0.83	6.13[**]
Covariances among Latent Variables			
Attachment Anxiety ↔ Attachment Avoidance	18.87	1.81	10.44[**]
Measurement Model Factor Loadings			
Negative Affect			
Anxiety	0.58	0.04	13.71[**]
Angry Hostility	0.69	0.04	16.37[**]
Depression	1.00	—	—
Impulsivity			
Impulsiveness	1.00	—	—
Self-discipline[*]	0.78	0.08	9.33[**]
Deliberation[*]	0.58	0.07	8.69[**]
Attachment Anxiety			
Attachment Anxiety 1	1.00	0.03	36.99[**]
Attachment Anxiety 2	1.00	—	—
Attachment Anxiety 3	0.97	0.03	33.90[**]
Attachment Avoidance			
Attachment Avoidance 1	0.86	0.03	33.29[**]
Attachment Avoidance 2	0.98	0.03	39.59[**]
Attachment Avoidance 3	1.00	—	—
BPD features			
MSI-BPD	1.00	—	—
IPDE-BPD	0.45	0.02	21.00[**]

[*]
Scale scores reversed

[**]
$p < .001$