Attachment and Psychological Adaptation in High Exposure Survivors of the September 11th Attack on the World Trade Center

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This study examined the relationship between individual differences in adult attachment and psychological adaptation in a sample of high-exposure survivors of the terrorist attacks on the World Trade Center on September 11, 2001. Symptoms of post-traumatic stress disorder (PTSD) and depression were assessed via self-report 7 and 18 months after the attacks. In addition, friends and relatives were asked to provide evaluations of participants' adjustment before and after the attacks. Findings indicate that securely attached individuals exhibited fewer symptoms of PTSD and depression than insecurely attached individuals and were viewed by friends and relatives as showing an increase in adjustment following the attacks. Highly dismissing adults were viewed by their friends and family as showing neither increments nor decrements in adjustment, despite the fact that highly dismissing people self-reported relatively high levels of PTSD and depression.

Keywords: *adult attachment; adaptation; defense; September 11, 2001*

The attack on the World Trade Center (WTC) in New York City on September 11, 2001, was the largest act of terrorism in the history of the United States. More than 2,800 people lost their lives and many others were injured, displaced, or separated from their loved ones. Given the tragic nature of this event, there has been widespread concern among psychologists and social workers for the psychological well-being of New Yorkers (Galea et al., 2002). Although there was ample evidence for post-traumatic stress disorder (PTSD) in the New York metropolitan area shortly after the attack (Galea et al., 2003), the long-term impact of the attack was less pervasive than anticipated for most survivors (Bonanno, Galea, Bucciarelli, & Vhalhov, 2005; Bonanno, Rennicke, & Dekel, 2005). Such findings raise the question of how the majority of New Yorkers were able to exhibit resilience in the face of such traumatic circumstances.

The primary objective of this article is to examine the role that individual differences in adult attachment organization (i.e., attachment style) played in people's adaptation to the events of September 11, 2001. Specifically, we assessed attachment orientation and symptoms of PTSD and depression among a sample of high-exposure survivors who had been in or near the WTC on September 11, 2001. To determine how attachment related to adjustment over time, we assessed PTSD and depression symptoms at approximately 7 and 18 months after the September 11 attack. These data provide us with a unique opportunity to address two important questions. First, are secure people better able to adapt to a traumatic experience, such as the WTC attack, than less se-

Authors' Note: We are grateful to the participants of this study for allowing us to question them so freely regarding their experiences during the September 11, 2001, attacks. The research described in this article was supported by grants from the National Science Foundation to George A. Bonanno (BCS-0202772 and BCS-0337643) and R. Chris Fraley (BCS-0443783). Please address correspondence to R. Chris Fraley, Department of Psychology, University of Illinois at Urbana-Champaign, Champaign, IL 61820, or David A. Fazzari or George A. Bonanno, Department of Counseling and Clinical Psychology, 525 West 120th Street, Teachers College, Box 218, Columbia University, New York, NY 10027; e-mail: rcfraley@uiuc.edu, damf11@yahoo.com, or gab38@columbia.edu.

PSPB, Vol. 32 No. 4, April 2006 538-551
DOI: 10.1177/0146167205282741

cure people? Second, how do people who are defensive in their attachment orientation adapt to such an event? This last question is especially important in light of contemporary debates about the way in which highly avoidant people regulate their emotions in response to stressful events. Some researchers have argued that despite their defensive strategies, highly avoidant people are psychologically vulnerable, and if they were to experience a sufficiently traumatic event, their defenses would break down (e.g., Gjerde, Onishi, & Carlson, 2004; Mikulincer, Dolev, & Shaver, 2004). Other researchers have argued that the defensive strategies of avoidant adults are effective in allowing them to defend themselves against negative thoughts and emotions (e.g., Fraley & Bonanno, 2004; Fraley, Garner, & Shaver, 2000; Fraley & Shaver, 1997). If this is true, then even a potentially highly traumatic experience, such as a terrorist attack, may have less of an aversive impact on the well-being of avoidant people than it would for their less-avoidant counterparts. The present research is designed to address these questions and, in the process, advance our understanding of the role that attachment organization plays in the face of traumatic events.

ATTACHMENT, PSYCHOLOGICAL ADAPTATION, AND PSYCHOLOGICAL DEFENSE

Throughout the past 20 years, attachment theory has become one of the leading theoretical frameworks for the study of emotion regulation, personality development, and interpersonal relationships. Because the theory has been reviewed in depth elsewhere (see Cassidy & Shaver, 1999), we briefly note here the ideas that are most relevant for the present investigation. First, according to attachment theory, people develop cognitive structures, or working models, that represent the extent to which they can rely on important people in their lives. Of importance, these working models are thought to play a critical role in shaping people's experiences. For example, an individual who believes that others are available when needed is more likely to explore the world with confidence, approach novel interpersonal situations in an assured and nondefensive manner, and provide others with appropriate levels of social support.

The second key idea is that there are individual differences in the working models that people hold about themselves and significant others in their lives. Some people are relatively secure. They have a positive and realistic view of themselves and consider other people to be dependable and reliable. In contrast, some people are relatively insecure. They view themselves in a less favorable light and may lack a basic trust in the availability and supportiveness of important people in their lives (for a review, see Mikulincer & Shaver, 2003).

Security and Adaptation to Extreme Adversity

One of the important assumptions of attachment theory is that the working models held by secure people confer them with greater capacity to adapt to aversive events than insecure individuals. This capacity is thought to stem from at least two sources. First, secure people have learned over the course of their lives that other people are available, responsive, and supportive when needed. As such, they have "tangible" social resources that can be used under stressful or challenging circumstances. Indeed, several studies have found that secure adults are more likely to seek social support and benefit from it during stressful situations (e.g., Fraley & Shaver, 1998; Mikulincer & Florian, 1995; Ognibene & Collins, 1998; Simpson, Rholes, & Nelligan, 1992). For example, in a study on dating couples, Collins and Feeney (2000) asked one member of the dyad to disclose a personal problem to his or her partner. The support provided by the partner was videotaped and coded. Collins and Feeney (2000) found that secure people were relatively effective at seeking support from their partners and that their partners were effective at providing that support. Moreover, following the interaction, secure adults felt more cared for than insecure adults and experienced improvements in their moods.

Another major source of resilient adaptation comes from affective or psychodynamic sources, namely, the mental representations that secure people hold are believed to provide a direct source of comfort to them during challenging times (Mikulincer, Shaver, & Horesh, in press). In a fascinating line of research that corroborates this assumption, Mikulincer and Shaver (2004) showed that when secure people are threatened (e.g., when presented with unsolvable puzzles and told that they had failed each one), they tend to bring to mind—apparently without their awareness—representations of episodes in which they felt cared for by a significant other in their lives. Moreover, the activation of this self-with-other model leads to decreases in negative affect.

Taken together, these kinds of findings indicate that highly secure people should be able to adapt to potentially traumatic life experiences because they are willing to seek support when needed, there are other people in their lives who provide them with effective care, and they can draw on representational models of the self as being cared for by attachment figures—a process that provides a symbolic buffer during times of stress.

Avoidance and Psychological Defenses

Although there is little question that attachment security enables an individual to manage stressful circumstances successfully, there is considerable debate about the relation between insecurity and psychological adaptation. The issue is a complicated one for several reasons.

First, theoretically, there are many ways for a person to be insecure. For example, contemporary models of individual differences in attachment organization hold that there are two fundamental dimensions underlying adult attachment patterns: attachment-related anxiety and attachment-related avoidance (see Brennan, Clark, & Shaver, 1998; Fraley & Shaver, 2000; Griffin & Bartholomew, 1994a). Attachment-related anxiety refers to variation in the degree to which people are vigilantly attuned to attachment-related concerns (Fraley & Shaver, 2000). A highly anxious person, for example, may worry that his or her attachment figure is unresponsive, whereas a less anxious person may feel relatively secure about attachment-related matters. Attachment-related avoidance corresponds to variation in people's tendencies to use avoidant versus proximity-seeking strategies to regulate attachment-related behaviors, thoughts, and feelings. People on the high end of this dimension tend to withdraw from close relationships, whereas people on the low end of this dimension are more comfortable opening up to others and relying on others as a secure base (Fraley & Shaver, 2000). By definition, highly secure adults are low on both the anxiety and avoidance dimensions. People may be considered insecure because they are generally worried about the availability and responsiveness of significant others (i.e., they are high in the anxiety dimension) or because they are uncomfortable or unwilling to rely on others as a secure base (i.e., they are high in the avoidance dimension), or both.

A second reason the association between insecurity and adaptation is a complicated one is that researchers do not agree on whether all forms of insecurity are maladaptive. The majority of research on adult attachment organization and psychopathology, for example, has identified highly anxious adults as being the most at-risk for the development of symptoms of anxiety disorders, depression, and eating disorders (see Brennan & Shaver, 1998; Cole-Detke & Kobak, 1996; Eng, Heimberg, Hart, Schneier, & Liebowitz, 2001). It is less clear how variation in attachment-related avoidance maps onto psychological health. Some researchers have argued that people who use avoidant strategies are psychologically vulnerable. For example, Mikulincer et al. (2004) showed that when given a cognitive load, highly avoidant people show a heightened accessibility of their negative self-traits. This suggests that avoidant adults hold a negative view of themselves but that this aspect of the self-concept is less accessible when they are given the opportunity to suppress or inhibit it. Nonetheless, the fact that this negative self-view exists indicates that there is a vulnerability underlying avoidant attachment—one that could undermine their ability to adapt to stressful circumstances successfully.

Other researchers have argued that highly avoidant adults are not as vulnerable as other kinds of insecure adults. Specifically, Fraley, Davis, and Shaver (1998) argued that dismissingly avoidant adults—those who are characterized by compulsive self-reliance—may be relatively resistant to the kinds of attachment-related traumas that affect other people. Indeed, a large body of literature has emerged that appears to support this perspective (for brief reviews, see Edelstein & Shaver, 2004; Fraley et al., 2000). For example, Fraley and Bonanno (2004) found that following the death of a loved one, dismissingly avoidant adults, similar to secure people, exhibited a resilient pattern of adaptation. That is, after the loss, both highly dismissing and secure people had relatively few symptoms of depression, anxiety disorders, or PTSD. Moreover, 14 months later, highly dismissing people did not exhibit an increase in these symptoms—they continued to exhibit symptom levels that were comparable to those of secure individuals.

Fraley and his colleagues put forward a model of dismissing defenses that helps to explain these kinds of findings (e.g., Fraley et al., 1998). A critical component of the Fraley et al. (1998) hypothesis is that psychological defenses work well for highly dismissing adults partly because these defenses prevent them from becoming emotionally invested in significant others to the same degree as less defensive people. Thus, if a significant relationship is threatened in some way, as may happen when a loved one falls ill or passes away, it is relatively easy for dismissing adults to withstand the ordeal. Fraley and his colleagues also argued that dismissing people have developed strategies for regulating their experiences that enable them to deactivate their attachment systems (a process that Bowlby, 1980, referred to as defensive exclusion). Thus, when exposed to potentially stressful experiences, dismissing people divert attention away from the kinds of cues, thoughts, and feelings that tend to contribute to the experience of anxiety and despair.

Previous Research on Attachment and Trauma

Although the majority of research on attachment orientation and adaptation to stressful experiences has focused on mildly stressful events (i.e., those that can be ethically studied in a laboratory context; see Simpson et al., 1992, for an example), there is a growing body of work on the role of attachment orientation in response to real-life stressors, including those that are likely to elicit symptoms of clinical syndromes, such as PTSD and depression (see Mikulincer et al., in press, for a review). This work has found a robust relationship between security and resiliency to trauma in military settings (Dieperink, Leskela, Thuras, & Engdahl, 2001; Zakin, Solomon, & Neria, 2003), in sexual abuse situations (Alexander et al., 1998; Feerick, Haugaard, &

Hien, 2002), during painful medical procedures (Edelstein et al., 2004), and following the transition to parenthood (e.g., Rholes, Simpson, Campbell, & Grich, 2001). One study by Mikulincer, Florian, and Weller (1993) is particularly relevant to the present research. Mikulincer and his colleagues (1993) studied the reaction of Israelis 2 weeks after the Iraqi Scud missile attacks on Israel during the first Gulf War. They found that compared to insecure people, secure adults had lower levels of depression, anxiety, intrusive memories, and hostility. Secure adults also tended to rely more on problem-focused coping strategies—strategies that have been shown to be effective at regulating negative emotions. Mikulincer and his colleagues also found that avoidant adults, compared to secure adults, had higher levels of hostility and somatization. This finding suggests that avoidant individuals may have a difficult time adapting to traumatic experiences. Unfortunately, the Mikulincer et al. (1993) study did not distinguish among different forms of avoidance. As described previously, some individuals who are highly avoidant also may be fairly anxious about attachment-related concerns. This combination of the two attachment dimensions is often referred to as a fearful-avoidance—a pattern that has been linked to a variety of negative psychological and interpersonal outcomes (Bartholomew & Horowitz, 1991; Brennan & Shaver, 1998). Some people who are highly avoidant, however, may be unconcerned about attachment-related matters. These individuals emphasize their independence and tend to dismiss attachment-related needs. As such, Bartholomew and Horowitz (1991) referred to this theoretical pattern as dismissing-avoidance. Because previous research suggests that highly dismissing people are capable of suppressing negative thoughts and feelings (Fraley & Shaver, 1997), can defensively exclude affective information from awareness (Fraley & Brumbaugh, 2005; Fraley et al., 2000), and appear to recover from loss fairly well (Fraley & Bonanno, 2004), it is conceivable that a highly traumatic event, such as the WTC attack, may have only a modest and temporary impact on their well-being.

OVERVIEW OF THE PRESENT STUDY

One of the objectives of the present research was to study the role of individual differences in attachment in adaptation to a traumatic experience—the WTC attack. This study provides us with an opportunity to replicate previous findings on the association between secure attachment and successful adaptation following adverse events. Moreover, the context of the WTC attack offers a unique opportunity to address questions about the role of avoidance as a potential risk factor in the development of psychopathological reactions. From an attachment-theoretical perspective, the WTC attack was unusual in that by any objective standard, it presented survivors with a threat of sufficient magnitude to induce anxiety, fear, and concerns about the safety of one's self and others. However, it is not necessarily the kind of event that the defenses of a highly dismissing person were designed to short-circuit. Although a dismissing person may be well prepared to defend himself or herself against interpersonal rejection, loss, or affection, it is unlikely that a dismissing person has developed a set of defensive strategies to guard against an event as grand in scale as that faced by those who found themselves in or near the WTC towers on September 11, 2001. If this is the case, the experience may prove to affect highly dismissing people in ways that more common attachment-related tragedies (e.g., the loss of a family member) may not.

Given previous research and theory, we hypothesized that secure attachment would be associated with a relatively favorable pattern of adaptation to the WTC attack. Specifically, we hypothesized that individuals low on attachment-related anxiety and avoidance would have fewer symptoms of PTSD and depression across both assessment waves. We also derived two competing hypotheses regarding avoidant attachment. If it is the case that the defenses of dismissing adults are relatively robust, then we would expect dismissing people to exhibit a pattern of symptoms that is comparable to that of secure adults. In contrast, if an event as harrowing as the WTC attack is capable of "cracking their shells," we may find that dismissing people adapted relatively poorly to events of September 11, 2001.

METHOD

Participants

Individuals who were in or within several blocks of the WTC on September 11, 2001, were recruited by contacting companies that had been located in the WTC, by posting flyers in the vicinity of the WTC site, and through public service announcements on local radio stations. The first wave of data collection occurred 7 months after September 11, 2001. Participants were asked to distribute anonymous rating forms to three close friends or relatives of their choosing, complete a questionnaire packet at home, and participate in an interview in which they were asked to discuss their experiences on September 11 and afterward. These procedures were again repeated approximately 11 months later—18 months after September 11. Participants were paid $100 for completing each wave of the study.

Seventy-nine people responded to the recruitment notices. Sixty-five people (83%) returned the questionnaire materials. Data from 2 participants were incomplete and were excluded from the study; 11 participants could not be located or declined participation in the

TABLE 1: Means, Standard Deviations, and Correlations Among Variables

Variable	M	SD	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Attachment anxiety	3.72	1.31	.89								
2. Attachment avoidance	3.90	.75	.34*	.75							
3. PTSD Wave 1	16.71	10.78	.21	.22	.91						
4. PTSD Wave 2	13.74	10.87	.30*	.26*	.78*	.92					
5. Depression Wave 1	13.55	8.07	.27*	.17	.63*	.63*	.79				
6. Depression Wave 2	13.88	7.51	.35*	.27*	.56*	.70*	.70*	.74			
7. Adjustment a	4.86	.93	–.05	–.05	–.10	–.10	–.18	–.23	.81		
8. Adjustment b	.03	.82	.14	–.02	–.10	–.16	–.13	–.13	.04	.78	
9. Adjustment c	.13	.88	–.17	.00	.02	.01	.10	.16	–.40*	.14	.85

NOTE: Adjustment a represents informant ratings of participant's adjustment prior to the attacks, assessed retrospectively at Wave 1. Adjustment b represents informants' perceptions of the extent to which participants increased or decreased in adjustment at Wave 1 since the attacks. Adjustment c represents informants' perceptions of the extent to which participants increased or decreased in adjustment at Wave 2 since the attacks. Cronbach's alphas are given on the diagonal. Correlations among attachment, post-traumatic stress disorder (PTSD), and depression are based on an *N* of 45. Correlations among informant measures and other variables are based on an *N* of 39.
*$p < .10$.

follow-up assessments; and 7 participants did not complete either the attachment, PTSD, or depression measures. The final prospective sample consisted of 45 participants, ranging in age from 23 to 59 ($M = 39$ years, $SD = 10$) and who had an annual income before September 11 that ranged from $4,000 to $275,000 ($M = $74,715, $SD = $52,528). The sample was predominately Caucasian (84.4%) and resided primarily in either Manhattan (46.7%) or Brooklyn (20.0%). At the time the first plane struck the WTC, 24.4% of the current sample ($n = 11$) were in one of the two WTC towers, another 40.0% ($n = 18$) were within four blocks of the WTC, and 35.6% ($n = 16$) were at least four blocks away. Fifty-three percent of the sample ($n = 24$) witnessed people jump from the WTC towers and 84% ($n = 38$) observed dead bodies during the attack. The final prospective sample did not differ on any of the measures included in the present study compared with those participants who completed the first set of measures but dropped out prior to the second interview.

Procedures and Measures

Attachment orientation. Individual differences in adult attachment were assessed once during the study during the first assessment wave. Participants completed the 30-item Relationship Scales Questionnaire (RSQ) (Griffin & Bartholomew, 1994b). Each item was rated on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale. The RSQ contains items designed to tap each of Bartholomew's four prototypes as well as items drawn from the original Hazan and Shaver prototypes. Following procedures similar to those described elsewhere (e.g., Fraley et al., 2000; Fraley & Waller, 1998), we used these items to scale people on two dimensions: attachment-related anxiety and avoidance. These two scales were normally distributed and moderately correlated in the present sample ($r = .34$) and had acceptable internal consistency estimates of reliability (αs = .89 and .75 for anxiety and avoidance, respectively). The average anxiety score was 3.72 ($SD = 1.31$); the average avoidance score was 3.90 ($SD = .75$). These averages are a bit higher than those observed in experimental studies on college students. For example, the average RSQ scores for anxiety and avoidance were 3.61 and 3.71, respectively, in a recent study (Fraley & Brumbaugh, 2005). The two scales were standardized for the analyses reported below.

PTSD symptoms. The PTSD Symptom Scale, Self-Report version (PSS-SR) (Foa, Riggs, Dancu, & Rothbaum, 1993) is a 17-item self-report measure corresponding to PTSD items in the *DSM-III-R* (American Psychiatric Association, 2000). Participants were asked to assess the frequency with which they experienced each item on the PSS-SR in the past month using a scale ranging from 0 (*not at all or only one time*) to 3 (*five or more times per week/almost always*). The PSS-SR was administered at both assessment waves; the descriptive statistics for scores are reported in Table 1. Previous research indicates that a PSS-SR total score of 28 serves as an approximate cutoff for elevated PTSD (Coffey, Dansky, Falsetti, Saladin, & Brady, 1998; Wohlfarth, van den Brink, Winkel, & ter Smitten, 2003). Although we do not utilize cutoffs in the present study, this value serves as a benchmark against which to evaluate the scores reported here.

Depressive symptoms. The nine-item version of the Center for Epidemiologic Studies–Depression Scale (CES-D) was used in the present sample to assess depressive symptoms (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993). This brief scale has reliability and validity statistics that are comparable to the full-scale version in previous research (Kohout et al., 1993). Participants competed the scale at the first and second assessment

waves; the descriptive statistics for the scores are reported in Table 1. The cutoff for probable depression is a score greater or equal to 10 (Andresen, Malmgren, Carter, & Patrick, 1994). Respondents were asked to indicate how true each of the following statements were in the past 2 weeks: "I felt depressed," "I felt that everything I did was an effort," "My sleep was restless," "I felt lonely," "I enjoyed life," "I did not feel like eating," "My appetite was poor," "I felt sad," and "I could not get going."

Friend/relative ratings. At 7 and 18 months post–September 11, participants were provided with three packets containing consent materials and ratings forms and asked to distribute these materials to up to three close friends/relatives who they felt knew them well and with whom they had relatively consistent contact. To ensure confidentiality, friends/relatives returned these ratings directly to the researchers using stamped, preaddressed envelopes. We did not always receive ratings from three informants for each participant, but at least one set of informant ratings were available for 39 participants at 7 months and 18 months. Thus, we entered and analyzed one randomly selected set of informant ratings for each participant. On average, the friends/relatives who provided these ratings had known the participants for 15 years ($SD = 13$). Characteristics of the friends/relatives providing these ratings did not differ across time. In addition, there were no differences between the characteristics of friends/relatives who provided ratings at both waves and those who provided ratings in only the first wave.

The informant reports were used to create three scales. The first was participant's adjustment prior to September 11. Respondents were asked to rate retrospectively the participant's adjustment relative to "most other people" using a 7-point scale (1 = *much worse than most people*, 4 = *about the same as most people*, 7 = *much better than most people*). These ratings were made for five life domains (mental health, physical health, quality of social interactions, ability to accomplish goals, and coping ability), which were averaged to create a composite measure of adjustment prior to the attack ($\alpha = .81$). The second scale was change in participants' levels of adjustment from pre–September 11 to 7 months afterward. Respondents were asked to rate the adjustment of the participant 7 months after September 11 "in comparison to his/her usual level" using a 7-point scale (–3 = *much worse than usual*, 0 = *about the same as usual*, 3 = *much better than usual*) for the same five dimensions described above.[1] We constructed a composite based on these ratings ($\alpha = .78$). The third scale was similar and was designed to assess change in participants' levels of adjustment from pre–September 11 to 18 months afterward. Respondents were asked to rate the adjustment of the participant 18 months after September 11 "in comparison to his/her usual level" using the same scale described previously. The alpha for this composite was .85.

RESULTS

Data Analytic Strategy

Because the sample size in this study is relatively small, we adopted an alpha level of .10 for our significance tests. Given that the present research is not experimental in nature, it strikes us as unlikely that any of the effects are literally equal to zero. If this assumption is warranted (see Waller, 2004), the Type I error rate is undefined and the only error that can be made is a Type II error (i.e., the failure to detect a true nonzero association) or a Type III error (i.e., an error in the direction of a nonzero effect; Harris, 1997). We report exact p values in case other researchers wish to judge the results according to alternative alpha values.

Modeling Patterns of Adjustment

Because we were able to obtain measurements across two time points, we were able to conduct within-person analyses to model symptom patterns for each person as well as between-person analyses to model the way those patterns varied as a function of individual differences in attachment. To model the within-person data across the two waves, we computed the parameters of a simple linear model, $Y = a + bX$, for each person. In this within-person model, the parameter a (i.e., the intercept) represents the initial symptom levels exhibited by that individual, the parameter b (i.e., the slope) represents the rate at which those symptoms changed from one point in time to the next, the variable Y represents the person's symptom levels for the two time points, and the variable X represents the amount of time (in months) since the first assessment (coded 0 for Wave 1 and 11 for Wave 2, which occurred 11 months after the first assessment).

One of the advantages of modeling the data in this manner is that it allows us to study patterns of adjustment in a noncategorical fashion (see Fraley & Bonanno, 2004). A prototypical pattern of resilience, for example, would be modeled mathematically by a relatively small intercept value and a slope of zero. A person with such a trajectory would have low symptom levels overall and would show neither an increase nor decrease in symptoms over time. Another potential pattern is one of recovery, which would be indicated by a relatively high intercept term but a negative slope, indicating high symptom levels initially followed by a decrease in symptoms over time. Other combinations are possible too, such as a delayed reaction (i.e., relatively low intercept coupled with a positive slope) or chronic symptoms (i.e., a high intercept coupled with a slope of zero).

The normative patterns for these participants have been reported elsewhere (see Bonanno, Rennicke, et al., 2005), but we briefly summarize them here to provide a broader context for our individual difference analyses. Overall, people had modest levels of PTSD (M = 16.71, SD = 10.78) and depression (M = 13.55, SD = 8.07) 7 months after the attack. Symptoms of PTSD declined, on average, from the first assessment to the second assessment by approximately a quarter of a point for each month (average slope = –.27, SD = .62), $t(44) = -2.92$, p = .006. On average, depressive symptoms did not change across the two assessment waves (average slope = .03, SD = .58), $t(44) = .35$. Table 1 reports the means, standard deviations, and correlations for the key study variables.

Self-Reports of Symptoms

After estimating the within-person parameters, we conducted between-subjects analyses in which we modeled the intercept and slope parameters as a function of standardized individual differences in attachment. Specifically, we estimated the parameters of two higher-order regression equations. The first equation modeled the variation in intercept terms and the second equation modeled variation in the slopes, each as a function of attachment-related anxiety, avoidance, and the interaction of anxiety and avoidance. This between-subjects analysis allows us to model patterns of change as a function of attachment style. The estimated coefficients for the intercept and slope regressions are presented in Tables 2 and 3. To illustrate the prototypical patterns of change implied by these estimates, we plotted the predicted symptom patterns for the different attachment styles in each analysis (see Figure 1) using the same kinds of techniques that are used to illustrate interaction patterns in multiple regression (see Aiken & West, 1991). Because some of the theoretical issues addressed in this article are related to Bartholomew's (1990) theoretical prototypes (i.e., secure, fearful, dismissing, and preoccupied), we plotted the predicted patterns for each of these four theoretical attachment patterns as derived from the two dimensions. Specifically, the pattern for security was derived by substituting values of –1 for anxiety and avoidance in the estimated regression equation because the prototypical secure individual has low scores on anxiety and avoidance. The pattern for dismissing avoidance was derived by substituting –1 for anxiety and +1 for avoidance because the prototype of dismissing-avoidance involves low scores on anxiety and high scores on avoidance (see Bartholomew & Horowitz, 1991; Fraley et al., 1998). (The prototypes are simple rotations of the two dimensions so the results illustrated in the figures are directly related to the analyses reported in Tables 2 and 3; see Fraley & Waller, 1998.)[2]

TABLE 2: Modeling Variation in Intercepts and Slopes for Symptoms of PTSD as a Function of Individual Differences in Attachment

	Regression Parameters			
Attachment Variables	B	SE B	β	p
Outcome: PTSD intercepts				
Constant	16.71	1.55		<.01
Anxiety	1.33	1.68	.12	.43
Avoidance	1.38	1.69	.13	.42
Anxiety × Avoidance	–2.77	1.31	–.26	.09
Outcome: PTSD slopes				
Constant	–.27	.09		<.01
Anxiety	.10	.10	.16	.35
Avoidance	.02	.10	.04	.83
Anxiety × Avoidance	.10	.10	.16	.33

NOTE: PTSD = post-traumatic stress disorder. The coefficients are regression weights estimated for the full model (i.e., including anxiety, avoidance, and their interaction). Anxiety, avoidance, and their interaction were standardized. The *df* for the *t* tests of each coefficient was 41.

TABLE 3: Modeling Variation in Intercepts and Slopes for Symptoms of Depression as a Function of Individual Differences in Attachment

	Regression Parameters			
Attachment Variables	B	SE	β	p
Outcome: Depression intercepts				
Constant	13.55	1.12		<.01
Anxiety	1.61	1.21	.20	.19
Avoidance	.27	1.22	.03	.83
Anxiety × Avoidance	–2.87	1.16	–.35	.02
Outcome: Depression slopes				
Constant	.03	.09		.74
Anxiety	.03	.10	.05	.75
Avoidance	.06	.10	.10	.54
Anxiety × Avoidance	.06	.10	.10	.54

NOTE: The coefficients are regression weights estimated for the full model (i.e., including anxiety, avoidance, and their interaction). Anxiety, avoidance, and their interaction were standardized. The *df* for the *t* tests of each coefficient was 41.

PTSD. There were no main effects of attachment-related anxiety or avoidance on initial symptom levels or change in symptom levels over time. There was, however, an interaction between the two attachment dimensions in predicting initial symptom levels (see Table 2 for estimates of all model coefficients). The nature of the interaction is depicted in the left-hand panel of Figure 1. Because there were no significant associations between the attachment dimensions and the slope estimates, for simplicity, we plotted the lines in Figure 1 using the average value of the slopes. The first important thing to note about this graph is that prototypically secure adults (i.e., adults with low scores on the dimensions of attachment-

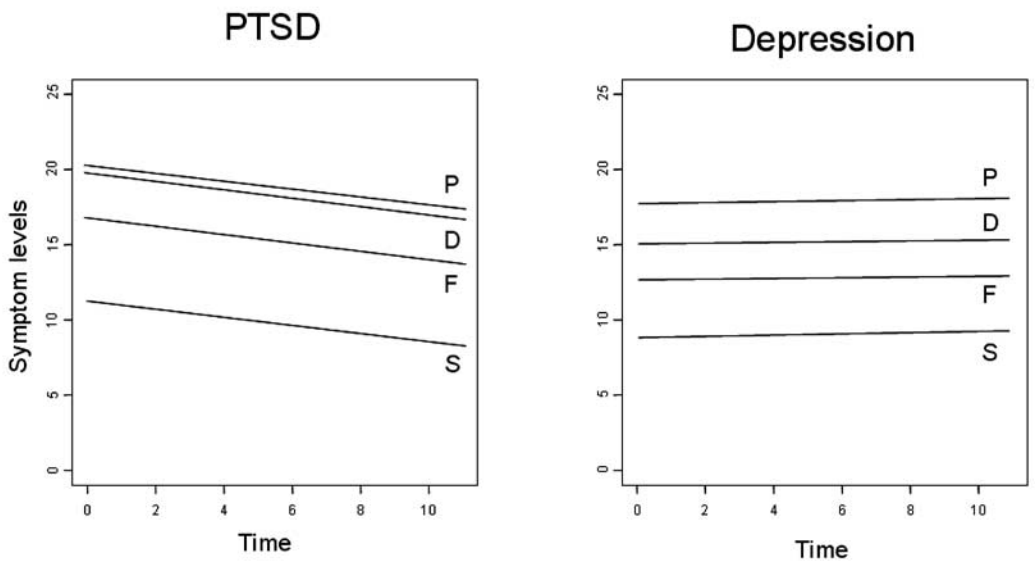

Figure 1 Symptoms of PTSD and depression over time as a function of attachment.
NOTE: PTSD = post-traumatic stress disorder. Time = 0 represents the first assessment wave, which took place 7 months after September 11, 2001. S = secure (–1 Anxiety, –1 Avoidance); F = fearful (+1 Anxiety, +1 Avoidance); P = preoccupied (+1 Anxiety, –1 Avoidance); D = dismissing (–1 Anxiety, +1 Avoidance).

related anxiety and avoidance) exhibited relatively modest initial levels of PTSD symptoms that decreased over time and that across both time points, their PTSD symptom levels were lower than those for prototypically preoccupied, dismissing, and fearful adults. Also of interest is the fact that prototypically dismissing participants had relatively high initial symptom levels. Although their symptom levels also decreased over time, they began at a level that was virtually indistinguishable from that of prototypically preoccupied people. This suggests that the WTC attack may have undermined the psychological well-being of highly dismissing people, despite their defensive nature.

Depression. There were no main effects of attachment-related anxiety or avoidance on initial symptom levels or change in symptom levels over time. As before, however, there was an interaction between the two attachment dimensions in predicting initial symptom levels (see Table 3 for all coefficients). This interaction is illustrated in the right-hand panel of Figure 1. According to the model, prototypically secure adults exhibited a resilient pattern of low symptoms over time. Specifically, their symptom levels were relatively low across both waves compared to those reported by prototypically preoccupied, dismissing, and fearful adults. Indeed, at both time points, secure participants' depression levels were indistinguishable from the normative mean (CES-D = 9) observed for the same scale using community samples (e.g., Myers & Weissman, 1980). It is also of interest that prototypically dismissing participants had relatively high symptom levels across both assessment waves. In other words, the prototypical dismissing person's symptom pattern more closely resembled that of an insecure than a secure person.

Friend and Relative Ratings

In the next set of analyses we focus on the relationship between attachment patterns and adjustment as rated by participants' friends or relatives. As described above, we asked friends to rate participants' adjustment (a) before September 11, 2001, compared to other people; (b) the extent to which participants' adjustment improved or declined across the 7 months following September 11 compared to the person's usual adjustment levels; and (c) the extent to which the participants' adjustment improved or declined throughout the 18 months following September 11, compared to the person's usual adjustment levels. Because these ratings were made on different kinds of scales (i.e., the first rating was made relative to other people, whereas the second two ratings were made relative to the participant's pre–September 11 adjustment), we studied each one separately rather than using those variables to reconstruct patterns of change over time. The three sets of ratings were weakly to moderately correlated with one another. The pre–September 11 ratings correlated .39 with the amount of change in adjustment rated at 7 months after the attack and –.28 with the amount of change in adjustment rated at 18 months after the attack. The amount of change rated at 7

TABLE 4: Modeling Variation in Friend/Relative Ratings of Adjustment as a Function of Individual Differences in Attachment

	Regression Parameters			
Attachment Variables	B	SE	β	p
Outcome: Adjustment prior to Sept. 11				
Constant	4.79	.16		<.01
Anxiety	–.12	.18	–.12	.52
Avoidance	.12	.18	.13	.51
Anxiety × Avoidance	.38	.17	.37	.04
Outcome: Change in adjustment Wave 1				
Constant	–0.09	.13		<.01
Anxiety	–.26	.15	–.30	.10
Avoidance	.17	.15	.21	.27
Anxiety × Avoidance	.32	.15	.36	.04
Outcome: Change in adjustment Wave 2				
Constant	–0.07	.16		<.01
Anxiety	–.16	.17	–.19	.33
Avoidance	.01	.17	.02	.93
Anxiety × Avoidance	–.20	.16	–.23	.21

NOTE: The coefficients are regression weights estimated for the full model (i.e., including anxiety, avoidance, and their interaction). Anxiety, avoidance, and their interaction were standardized. The *df* for the *t* tests for past adjustment, change at Wave 1, and change at Wave 2 was 35, 35, and 30, respectively.

months and 18 months after the attack were only weakly correlated ($r = .08$).

Adjustment prior to September 11. To study the association between attachment patterns and psychological adjustment prior to the WTC attack, we regressed friend ratings of adjustment on anxiety, avoidance, and the interaction between these two dimensions. The regression estimates are reported in Table 4. There was a significant interaction between the two dimensions in predicting adjustment. The interaction is illustrated in the leftmost panel of Figure 2. As before, we plotted the predicted regression lines for each of the four prototypical attachment patterns using combinations of values of –1 and +1 for the two standardized dimensions. The hashed line represents the midpoint of the scale, which represents the pre–September 11 adjustment level of "most people" that was used to anchor the ratings. Notice that prototypically secure people were considered to be better adjusted than most people. Prototypically preoccupied people, in contrast, were considered poorly adjusted prior to September 11. Prototypically dismissing people were rated as being as adjusted as most people. Somewhat surprisingly, prototypically fearful people were deemed better off than most prior to September 11.

Change in adjustment from September 11 to 7 months later. To study the association between attachment patterns and perceived changes in adjustment since September 11, we regressed friend ratings of change on anxiety, avoidance, and the interaction between these two dimensions. The regression estimates are reported in Table 4. In summary, there was an interaction between the two dimensions in predicting changes in adjustment (see the center panel of Figure 2). The hashed line represents the midpoint of the scale, which indicates that the person's adjustment, as evaluated by his or her friend or relative, did not change since September 11. Prototypically secure people were considered to have better levels of adjustment after September 11 than beforehand. Preoccupied people, in contrast, were judged to be much more poorly adjusted following the attacks. According to these analyses, friends and relatives did not observe any noteworthy changes in the adjustment of dismissing or fearful people in the months following September 11. Prototypically dismissing people were rated as being as adjusted following the attacks as they were prior to the attacks.[3]

Change in adjustment from September 11 to 18 months later. To study the association between attachment patterns and psychological perceived changes in adjustment at Wave 2, we regressed friend ratings of changes in adjustment on anxiety, avoidance, and the interaction between these two dimensions. The regression estimates are reported in Table 4. In summary, none of the terms was statistically significant; the regression lines implied by the estimated model are shown in the right-hand panel of Figure 2. In summary, 18 months following the WTC attacks, people were judged by their friends and relatives as having returned to their pre–September 11 adjustment levels; the estimated constant term was –.07. These changes did not vary as a function of attachment style.

DISCUSSION

The attack on the WTC on September 11, 2001, was a devastating one for the residents of New York City. Despite the tragic nature of this event, research has shown that the majority of New Yorkers were able to adapt fairly well to the tragedy (e.g., Bonanno, Galea, et al., 2005; Bonanno, Rennicke, et al., 2005), a finding that underscores the prevalence of resilience following the most tragic of circumstances (Bonanno, 2004). The primary objective of the present research was to examine the role that individual differences in attachment play in adaptation to the WTC attack. To do so, we recruited a sample of New Yorkers who were in or near the WTC on the morning of September 11, 2001, and asked them complete measures of adult attachment style, depression,

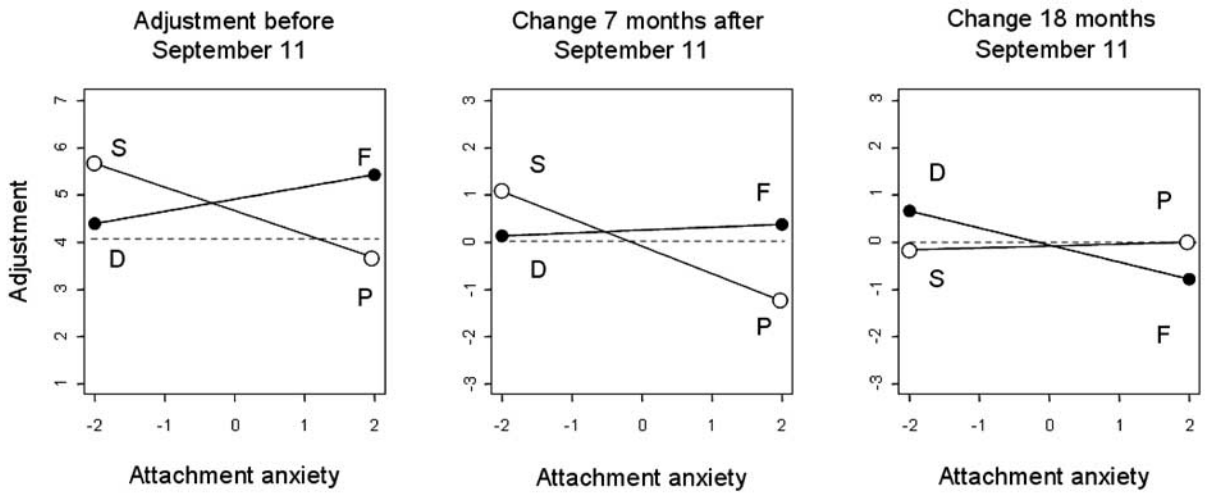

Figure 2 Adjustment as rated by friends and family as a function of attachment style.
NOTE: The left-most panel represents the perceived adjustment of the participant before September 11, 2001. The dashed line represents the anchor—the perceived adjustment of other people. The middle panel represents perceived change in adjustment throughout the 7 months following September 11. The dashed line represents no change. The right-most panel represents perceived change in adjustment in the 18 months following September 11. The dashed line represents no change. S = secure (–1 Anxiety, –1 Avoidance); F = fearful (+1 Anxiety, +1 Avoidance); P = preoccupied (+1 Anxiety, –1 Avoidance); D = dismissing (–1 Anxiety, +1 Avoidance).

and PTSD symptoms 7 and 18 months following the attack. Our findings indicate that highly secure adults tended to be the best adjusted following the tragedy. For example, their self-reported symptom levels indicated that they had only modest PTSD symptoms at 7 months and that their PTSD symptom levels, similar to others, declined throughout the next 11 months. Their levels of depression were comparable to those reported in other studies on community samples that have not experienced a traumatic event. Moreover, secure participants' friends and family members evaluated their adjustment in a favorable manner. Our findings also indicated that highly dismissing people may not have adjusted particularly well to the tragedy. Their self-reported levels of PTSD and depression were comparable to those of other insecure people. Nonetheless, their friends and family considered their adjustment to be neither worse nor better than it was before September 11, 2001. We discuss these findings in more depth below.

Security and Adjustment to Extreme Adversity

One of the key findings from this research was that highly secure people exhibited relatively healthy adjustment in the months following the WTC attack. This was evident in two ways. According to self-report assessments, highly secure people had relatively modest PTSD symptoms and virtually no depression 7 and 18 months after September 11, 2001. In addition, according to the reports of their friends and relatives, highly secure people were not only well-adjusted 7 months following the attacks but they were better adjusted than they are usually. This suggests that highly secure people may have exhibited a form of psychological growth—an ability to rise above the situation. It is possible, of course, that this finding represents nothing more than a scaling artifact. Although we asked friends and relatives of the participants to evaluate the participant's adjustment relative to the participant's pre–September 11 levels, it may be the case that friends and relatives found it difficult to make those comparisons independently of their assumptions about how other people adapted. In other words, it is possible that raters compared the participants against other survivors rather than the participant's own preattack levels of adjustment. One argument against this interpretation is that secure people appear to have returned to baseline levels by 18 months after the attacks, suggesting that peers were not simply rating secure people as being better off than everyone else in an unconditional fashion.

If we take this finding at face value it suggests that highly secure people were not only able to show better adjustment than others in the face of the tragedy but that they were able to use the experience as a means for exhibiting other forms of personal growth or strength. To the best of our knowledge, this is the first time such an observation has been made in the attachment literature. In the trauma literature, however, there is a growing body of ideas on what is referred to as posttraumatic growth (Linley & Joseph, 2004; Tedeschi & Calhoun, 1995). According to this literature, traumatic events can

sometimes have the unexpected consequence of fostering psychological growth and empowerment by leading people to reestablish ties with important people in their lives, to reorganize their priorities in a way that is more compatible with pursuits they find personally meaningful, and to search for and find meaning in their lives. It is possible that the events of September 11, 2001, had an empowering effect among highly secure people. Indeed, in the days following the WTC attack, the media portrayed the event as a tragedy while also showcasing the unusual acts of heroism, strength, and collective charity that were brought about by the event. It might be the case that highly secure individuals are able to draw on their previous interpersonal experiences and their sense of security as a means to exhibit the kinds of nonself-serving acts that would be viewed by others as signs of social strength and adjustment.

We should qualify this discussion by noting that despite their friends' and relatives' perceptions of improvement or growth, secure people nonetheless reported modest PTSD symptoms at 7 months after the attack. Such a pattern is consistent with the idea that posttraumatic growth is most likely to occur following recovery from trauma rather than in association with either resilience or chronic trauma reactions (Bonanno, 2005) and that there may have been both positive and negative consequences of the attacks on the psychological response of secure adults. We also should note that even if they did show signs of growth 7 months after the attack, growth was short-lived: The friends and relatives of secure adults rated them as being just as well-adjusted 18 months after the attack as they were prior to the attack.

We hope future research can explore these issues in more detail. In the meantime, we note that it is necessary for researchers to actively assess acts of altruism and signs of psychological growth to delineate such patterns. There is a tradition in research on the impact of traumatic events to focus almost exclusively on symptomology. However, psychological strength is not simply the relative absence of problematic symptoms. Research that assesses both the positive and negative consequences of traumatic experiences should be able to help illuminate the unique ways in which people adapt to trauma.

Dismissing Avoidance and Response to a Traumatic Event

The data from the present study on the psychological vulnerability of highly dismissing adults is somewhat mixed. On one hand, highly dismissing adults had relatively high levels of PTSD and depression following the WTC attack, at least according to their own self-report. This suggests that highly dismissing people may have had a difficult time adapting to the WTC attack. However, the reports of friends and relatives indicated that highly dismissing adults showed neither an increase nor a decrease in their adjustment following the attack. This would seem to suggest that dismissing people had no obvious reaction to the disaster.

There are at least two ways to interpret these data. One possibility is that the WTC attack had a profound impact on highly dismissing adults, elevating their levels of PTSD and depression above levels that would be observed in other situations. Moreover, because the source of the symptoms would be relatively clear, it would be easy for a highly dismissing person to attribute the cause of these symptoms to an external source (i.e., the terrorist attack) rather than an internal one. Such an attribution would not require that a highly dismissing person view the symptoms as signs of a weak or fragile self and, as such, there would be no reason for him or her to defensively downplay symptom levels in the context of a psychological study of the WTC attack. Nonetheless, highly dismissing people may have downplayed their symptom levels to their friends and relatives as a way of minimizing their potential vulnerability. It also may be that by virtue of their avoidant orientation, dismissing individuals had relatively less intimate relationship with friends and relatives and that, as a consequence, friends and relatively were unable to perceive whatever distress they did experience. If so, this would explain why highly dismissing people seem to be doing okay according to peer reports but doing fairly poorly according to self-reports.

Another possibility is that the WTC attack had only a mild impact on highly dismissing adults and, as such, there was relatively little change in their adjustment levels for their friends and relatives to observe. Nonetheless, they may have self-reported high symptom levels because it is expected that a tragic event should lead to disruptions in everyday functioning. If PTSD and depressive symptoms are viewed as stereotypical responses following a tragedy, highly dismissing people may admit to experiencing them, even if their lives have not been affected deeply by the tragedy.

It is important to note that the standard assumptions that are made about the latent vulnerabilities of dismissing people would predict that highly dismissing people would self-report low symptom levels, but informed observers (e.g., friends and family) would be able to provide a more accurate portrayal of their adjustment (e.g., Gjerde et al., 2004). The present data paint a different picture. Highly dismissing people willingly reported difficulties in adjustment following the WTC attacks, but their peers indicated that they were doing fine. Even if these results do not attest unambiguously to the resilience of highly dismissing adults, they suggest that their

assumed vulnerabilities may be more elusive than would be expected if they were psychologically fragile.

Advantages and Limitations of the Present Research

One of the advantages of the present research is that we were able to recruit a sample of high-exposure participants from the pool of people who were unfortunate enough to be in or near the WTC on the morning of September 11, 2001. This provided us with the opportunity to sample a broad range of responses, ranging from the relative absence of symptoms to elevated PTSD and depression. Such a range would be difficult to obtain if we had focused instead on a sample obtained through clinics or a possibly well-adjusted college sample (e.g., Bonanno, Papa, LaLande, Westphal, & Coifman, 2004). Another advantage of the present work is that we were able to obtain ratings of adjustment both from participants themselves as well as their friends and relatives. This enabled us to study the adjustment of high-exposure New Yorkers from multiple perspectives and minimize the chances that our findings would be exclusively due to self-report biases.

Despite these strengths, there are several limitations of the present research. Most important, we were not able to acquire measures of individual differences in adult attachment prior to the WTC attack. Although research suggests that individual differences in attachment are relatively stable over broad spans of time (e.g., Fraley, 2002; Fraley & Brumbaugh, 2004; Klohnen & Bera, 1998), we cannot be certain that the measurements taken 7 months after the attacks were the same as those that would have been obtained prior to the attacks. Indeed, the fact that the average levels of anxiety and avoidance were slightly higher than those observed in other samples suggests that there probably were mean-level changes in attachment, even if the rank-ordering of individual differences was preserved. Another limitation of the present research is that we did not have symptom measures prior to the attack. As such, it is impossible for us to ascertain the extent to which the variation studied reflects responses to the WTC attack per se versus variation in baseline levels of these symptoms. An additional limitation of the present research is that we only had two waves of data. If we had been able to collect additional longitudinal data it would have been easier to assess symptom trajectories following the attacks. As it stands, there are a number of patterns of adaptation that cannot be discriminated with only two data points. For example, if some people showed a delayed symptom response that eventually decayed, we would be unable to detect it. A final limitation worth noting is that our sample size was rather small. Despite these limitations, we think these data provide a unique opportunity to advance our understanding of how individual differences in attachment may operate following a traumatic event. Further research should enable us to better understand the role of attachment processes in resilience and adaptation to traumatic experiences.

NOTES

1. The actual scale ranged from 1 to 7, but we have centered the values around the midpoint (4) in this report to facilitate interpretation.

2. Although our use of terms such as "fearful," "secure," and "dismissing" may imply that we are referring to categories of attachment, we are conceptualizing and measuring attachment patterns as continuous phenomena (see Fraley & Waller, 1998). According to contemporary two-dimensional models of attachment, these patterns are prototypes or configurations within the two-dimensional space (e.g., Fraley & Spieker, 2003; Griffin & Bartholomew, 1994a). As such, people can vary in the degree to which their pattern of thought, behavior, and feeling resembles these theoretical prototypes.

3. These patterns held when we controlled for adjustment prior to September 11, which was rated relative to other people rather than relative to the person's pre–September 11 levels. Specifically, there was an interaction between avoidance and anxiety such that highly secure people (people low on both variables) were judged as being better adjusted than usual (Y-predicted = 1.25) even when their pre–September 11 adjustment relative to others was taken into consideration. Highly preoccupied people (those with high scores on anxiety and low scores on avoidance) were still judged to be less well-adjusted than usual (Y-predicted = –1.70) when accounting for their pre–September 11 adjustment relative to others.

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Received March 30, 2005
Revision accepted July 19, 2005