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Searching for and Finding Meaning in Collective Trauma:  
Results from a National Longitudinal Study of the 9/11 Terrorist Attacks

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## Abstract

The ability to make sense of events in one's life has held a central role in theories of adaptation to adversity. Yet, there are few rigorous studies on the role of meaning in adjustment and those that have been conducted have focused predominantly on direct personal trauma. We examined the predictors and long-term consequences of Americans' searching for and finding meaning in a widespread cultural upheaval – the terrorist attacks of September 11, 2001 – among a national probability sample of US adults ( $N = 931$ ). Searching for meaning at 2-months post-9/11 was predicted by demographics and high acute stress response. In contrast, finding meaning was predicted primarily by demographics and specific early strategies used to cope with the attacks. Importantly, both searching for and finding meaning 2-months post-9/11 were associated with lower post-traumatic stress symptoms across the following 2-years, after controlling for pre-9/11 mental health, exposure to 9/11, and acute stress response. Mediation analyses suggest that finding meaning supported adjustment by reducing fears of future terrorism. Results highlight the role of meaning in adjustment following collective traumas that shatter people's fundamental assumptions about security and invulnerability.

Keywords: meaning, adjustment, terrorism, coping behavior, mental health

## Searching for and Finding Meaning in Collective Trauma:

## Results from a National Longitudinal Study of the 9/11 Terrorist Attacks

On September 11, 2001, Americans witnessed the most destructive act of terrorism and one of the most devastating losses of life to have taken place on American soil. Tens of thousands of individuals saw firsthand the attacks on the World Trade Center (WTC) and the Pentagon. Even more individuals were shaken by vivid and pervasive television images - either viewed live, or within minutes after the attacks. Although the psychological impact was greatest among New York City residents (Galea et al., 2002, 2003; Schlenger et al., 2002), the psychological effects of 9/11 spread far wider than the epicenters. In the days following the attacks, nearly half of Americans reported symptoms of posttraumatic stress (PTS; Schuster et al., 2001), and many of these symptoms remained elevated in the following weeks and months (Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002). Even more common were fears of additional terrorist attacks, as more than half of Americans had ongoing concerns for the safety of themselves and their family (Silver et al., 2002). The psychosocial impact of these events went beyond simply distress and heightened vulnerability, as other recent investigations have described reactions of anger and political intolerance (Skitka, Bauman, & Mullen, 2004), gratitude and spirituality (Peterson & Seligman, 2003), and even changes in patterns of normal language use, social behavior, and cognitive processing nationally (Cohn, Mehl, & Pennebaker, 2004; Mehl & Pennebaker, 2003). Clearly, the attacks constituted both a collective cultural upheaval for the American people at large, and a directly-experienced, individual trauma for a small proportion of Americans.

Despite the obvious psychosocial impact of the attacks, even New York City residents varied widely in their long-term responses (Bonanno, Galea, Bucciarelli, & Vlahov, 2006). Thus,

a key question in understanding people's reactions to collective upheavals such as 9/11 is how to account for this variability. In this paper, we investigate how early coping processes – in particular, Americans' degree of searching for and ability to find meaning in the events surrounding 9/11 – may account for differences in long-term adjustment to the attacks and their aftermath. Using data from a longitudinal, nationally representative sample, we examine the prevalence, predictors, and long-term implications for adjustment of the ability to make sense of and find meaning in the events of 9/11.

### *Meaning in the Context of Personal Trauma*

The role of finding meaning in promoting adjustment to negative life experiences was first theorized by Victor Frankl (1963), who drew from his own personal experiences as a prisoner in a Nazi concentration camp. Frankl (1963) observed that the prisoners who were able to retain a sense of meaning in their experiences were the most likely to survive the horrifying conditions, and he argued that the search for meaning is a primary human motivation that enables individuals to retain hope in the face of adversity. To date, nearly all of the empirical research examining the role of meaning in coping with adversity has been conducted in the context of direct, personal traumas such as spinal cord injury (Bulman & Wortman, 1977), bereavement (Carnelly, Wortman, Bolger, & Burke, 2006; Davis, Nolen-Hoeksema, & Larsen, 1998), illness (Taylor, 1983; Thompson, 1991), violence (Currier, Holland, & Neimeyer, 2006), and incest (Silver, Boon, & Stones, 1983). Within this literature, theorists have argued that what makes traumatic events so distressing is that they violate many of the basic assumptions people have about themselves and the world (Janoff-Bulman, 1992; Parkes, 1988; Silver & Wortman, 1980; Taylor, 1983). Several theorists have proposed that people hold deeply-ingrained beliefs that the world is benevolent, predictable, and meaningful, and that the self is worthy (Janoff-Bulman,

1992; Taylor, 1983). These beliefs offer individuals a sense of security and invulnerability (Janoff-Bulman, 1992) and instill coherence into their lives (Antonovsky, 1979). Trauma and other adverse events profoundly challenge these beliefs. For example, exposure to violence challenges beliefs of living in a benevolent, predictable world (Dutton, Burghardt, Perrin, Chrestman, & Halle, 1994; Janoff-Bulman, 1995) and intensifies feelings of vulnerability (Norris & Kaniasty, 1991). Rape, incest, assault, and abuse can also create feelings of vulnerability and erode self-worth (Janoff-Bulman, 1979; Norris & Kaniasty, 1991; O'Neill & Kerig, 2000). Accordingly, one of the major tasks that traumatized individuals face is reconciling the harsh reality of adversity with previously-held, more benign assumptions about oneself and the world (Janoff-Bulman, 1992; Marris, 1975; Silver et al., 1983).

In the context of direct, personal trauma, it has been argued that these challenges to people's "assumptive worlds" (Janoff-Bulman, 1992) trigger a *search for meaning* (Janoff-Bulman, 1992; Silver et al., 1983; Taylor, 1983). Searching for meaning often involves seeking answers to questions such as "Why did this event happen to me?" (Bulman & Wortman, 1977; Frazier & Schauben, 1994; Taylor, 1983). Bereavement studies, for example, have shown that anywhere from one-quarter (Bonanno, Wortman, & Nesse, 2004) to more than two-thirds (Davis, Wortman, Lehman, & Silver, 2000; Lehman, Wortman, & Williams, 1987) of individuals report actively searching for meaning in their losses. In adult survivors of childhood incest experiences, nearly 90% still reported searching for meaning up to two decades after the abuse stopped (Silver et al., 1983). Frequently, these attempts to find meaning are accompanied by substantial emotional distress. Among incest survivors and bereaved, those who most actively searched for meaning reported the most elevated levels of distress (Davis et al., 2000; Silver et al., 1983).

In some cases, individuals are able to reconcile a traumatic event with their worldviews

by *finding* some kind of meaning in the event (Marris, 1975; Neimeyer, 2001; Park & Folkman, 1997; Silver & Wortman, 1980; Taylor, 1983). However, not everyone is able to do so, as the proportion of people who are able to find meaning range from 8% among spouses who lost a loved one in a motor vehicle accident (Lehman et al., 1987), to roughly half among bereaved elderly (Bonanno et al., 2004), incest survivors (Silver et al., 1983), and parents of children who died of Sudden Infant Death Syndrome (Davis et al., 2000), to 68% among older adults suffering the loss of a hospice-residing loved one (Davis et al., 1998). Meaning may be found in a number of ways, for example by assigning responsibility for the event (Bulman & Wortman, 1977), interpreting the experience through one's philosophical or religious beliefs (McIntosh, Silver, & Wortman, 1993), or believing that the event has had some positive consequences (Updegraff & Taylor, 2000).

#### *Expanding the Concept of Meaning Beyond Personal Traumas*

Despite the fact that most research on meaning has been conducted in the context of trauma and loss, there is reason to believe that issues of meaning are not limited solely to such events. Early attribution theorists argued that people seek to find causes and explanations for many everyday events because they offer people the sense that they can predict and control their environments (Heider, 1958; Kelley, 1967). Others have expanded on this premise, arguing that people are most apt to seek explanations for infrequent, unanticipated events (Olson, Roese, & Zanna, 1996). In particular, negative and unexpected events are the most likely to trigger spontaneous attributional searches (Bohner, Bless, Schwarz, & Strack, 1988; Weiner, 1985; Wong & Weiner, 1981), although not among everyone (cf. Downey, Silver, & Wortman, 1990). Furthermore, the explanations people seek for such events are thought to serve two purposes. First, they help people feel that the event was more predictable than it was beforehand (Roese &

Olson, 1996). Second, even in the context of relatively mundane events (Clore & Colcombe, 2003; Wilson, Centerbar, Kermer, & Gilbert, 2005), being able to make sense of them can rob them of their emotional impact. For example, Wilson and colleagues (2005) exposed participants to an unexpected positive event (receiving a \$1 gift) and manipulated whether participants were offered an explanation for it. Participants who were given an explanation felt less excited about the gift than those who were given none. Thus, in the case of positive events, the process of making sense may come at some emotional cost. However, in the context of negative events, having an explanation should lessen the emotional impact and facilitate long-term adaptation (cf. Wilson, Gilbert, & Centerbar, 2003).

To date, a number of empirical studies suggest that meaning may play a role in adaptation to a variety of personal traumas. In fact, some have proposed that people are most likely to search for meaning – and least likely to find it – in particularly severe, direct traumas (e.g., Davis et al., 2000; Park & Folkman, 1997; Thompson & Janigan, 1988). However, personal traumas are not the only events that are likely to challenge people's fundamental assumptions about security and invulnerability. For example, symbolic threats, such as those encountered in a collective social upheaval like 9/11, may trigger the same psychological processes. Few studies have examined coping with collective adversities (see Conejero & Etxebarria, 2007; Gortner & Pennebaker, 2003; Pennebaker & Banasik, 1997; Pennebaker & Harber, 1993; Wayment, 2004, for some exceptions), and to our knowledge no study has examined the process of meaning-making following such events. As research following 9/11 has demonstrated, direct exposure was not required for posttraumatic stress (PTS) symptoms to emerge (Schlenger et al., 2002; Silver et al., 2002). Furthermore, others argue that the subjective experience of distress, rather than the objective circumstances of an event, should be the key determinant of whether meaning

is sought and found (Currier et al., 2006; Neimeyer, 1998). Given that many Americans reported strongly identifying with the victims of 9/11 (Wayment, 2004), feared for the safety of themselves and their loved ones (Silver et al., 2002), and used language indicating an acute need to comprehend the attacks in the days following 9/11 (Cohn et al., 2004), the events of 9/11 represented a considerable threat across the country. Thus, an important goal of the present investigation was to document the degree to which a collective upheaval might elicit a search for meaning similar to that observed in personally experienced traumas.

#### *Factors That Facilitate Finding Meaning in Adversity*

Another goal of the present investigation was to identify longitudinal predictors of meaning in the context of a collective upheaval. To date, very little is known about the predictors of a person's ability to find meaning in adversity. Is meaning typically found soon after a negative life event, or is it influenced by the passing of time? While some have suggested that time can facilitate finding meaning (Murphy, Johnson, & Lohan, 2003), most studies have relied on cross-sectional designs that cannot assess longitudinal patterns (e.g., Silver et al., 1983). However, in a longitudinal study of parents coping with the sudden death of an infant (Davis et al., 2000), meaning was found early, if it was found at all.

Early coping responses may also influence the ability to find meaning (Jim, Richardson, Golden-Kreutz, & Andersen, 2006). For example, active coping strategies such as positive reinterpretation (Updegraff & Taylor, 2000) and social support seeking (Jim et al., 2006; Murphy et al., 2003; Tait & Silver, 1989) may facilitate the ability to finding meaning. In contrast, the use of avoidant coping strategies such as denial or substance abuse are likely to indicate disengagement from an event, and should interfere with the ability to find meaning (Jim et al., 2006).



*Is Searching for and Finding Meaning in Adversity an Adaptive Process?*

The most critical question remaining to be answered deals with the long-term implications of searching for and finding meaning, and the mechanisms through which such a process might be adaptive. Regardless of the particular form of meaning found, it is thought that making *any* kind of sense out of a trauma or loss attenuates its toll and facilitates long-term adaptation (Janoff-Bulman, 1992; Silver et al., 1983; Silver & Wortman, 1980; Taylor, 1983). In most cases, people find meaning by assimilating the event into a pre-existing belief system. When this leaves a person's beliefs relatively intact, finding meaning is theorized to facilitate adjustment by restoring a sense of invulnerability and lessening fears of recurrence (Janoff-Bulman, 1992; Park & Folkman, 1997). In essence, finding meaning is proposed as a central concern in coping with personally experienced trauma, one that restores a victim's belief in a predictable, comprehensible, and controllable world (Janoff-Bulman, 1992; Taylor, 1983).

As noted earlier, most studies of meaning in trauma have used cross-sectional designs. Although this body of research has suggested a link between finding meaning and adjustment (e.g., Silver et al., 1983; Thompson, 1991; see Davis et al., 2000, for exceptions), these associations may be due to an number of confounds including the severity of an event and victims' preexisting mental health status. In other words, psychologically healthier individuals and/or those coping with less severe events may be better able to find meaning than those who face more severe or distressing events. To fully examine the degree to which issues of meaning are uniquely predictive of adjustment, it is necessary to conduct prospective, longitudinal research that can control for these factors.

To date, only one longitudinal study has evaluated the role of pre-event mental health on meaning-making and long-term adjustment. Davis et al. (1998) studied 205 adults coping with

the death of a hospice-residing family member, and reported that those who found meaning at 6 months post-loss were less distressed at subsequent assessments, after controlling for pre-loss levels of distress. Further, they showed that participants' ability to find meaning at an earlier (6-months) rather than later (13-months) assessment was most predictive of long-term adjustment. However, given that the participants were recruited from a hospice, many were already coping with anticipated loss at the pre-loss assessment, so their pre-loss mental health may have been influenced by ongoing coping efforts or other contextual aspects of impending loss. Thus, while these findings are strongly indicative of unique link between meaning and long-term adjustment, an ideal study should have the ability to control for pre-existing mental health status in the context of an event for which people have no forewarning. Furthermore, disproportionate attention has been given to the issue of meaning in the context of bereavement (cf. Currier et al., 2006; Downey et al., 1990; Lehman et al., 1987; Marris, 1975; McIntosh et al., 1993; Neimeyer, 1998, 2001) and chronic illness (cf. Jim et al., 2006; Taylor, 1983; Thompson, 1991), at the expense of other types of adversity. In fact, nearly all *longitudinal* studies of meaning have dealt with bereavement (Bonanno et al., 2004; Davis et al., 1998; Davis et al., 2000; Murphy et al., 2003), leaving to question the potential role of meaning in adjustment to unexpected, collective events – particularly those that challenge people's fundamental assumptions about security and invulnerability.

Finally, nearly all research has been silent about the mechanisms through which meaning-making might be adaptive. As noted earlier, it has been suggested that meaning-making facilitates adjustment by restoring people's sense of invulnerability (Janoff-Bulman, 1992; Park & Folkman, 1997), or by shutting down continued ruminations of the traumatic event (cf. Silver et al., 1983). Nonetheless, limited attention has been paid to this question in

the context of personally experienced traumas, and no research on collective threats has considered this issue at all.

### *The Current Study*

The attacks of 9/11 provided an unusual opportunity to examine the predictors and long-term consequences of meaning-making among individuals coping with a collective social upheaval. Although a vast majority of Americans were not *directly* exposed to the attacks, the largely symbolic threats that the attacks represented (unpredictability, possibility of war and future terrorist attacks, loss of security, threats to the “American way of life,” cf. Wayment, 2004), all challenged fundamental assumptions most Americans held about both national and personal invulnerability. Furthermore, the wide range of Americans’ responses (cf. Bonanno et al., 2006; Silver et al., 2002; Schlenger et al., 2002) underscores the importance of understanding the early predictors of long-term adjustment. In the present investigation, longitudinal data were collected from a representative sample of Americans, and included a baseline assessment prior to the attacks, as well as follow-up assessments over the subsequent 2 years. This prospective, population-based study addresses a number of limitations that characterize most research on the study of unanticipated adversity, such as (a) not having measures of pre-event adjustment, (b) not having assessments in the early aftermath of the event, and (c) not having a representative, population-based probability sample of individuals who represent a range of exposure to an event (see Schlenger & Silver, 2006).

We examined two major questions concerning the role of searching for and finding meaning following the terrorist attacks. First, what factors predict the degree of a person’s search for and ability to find meaning in the attacks? We examined the roles of time, sociodemographic factors, degree of objective exposure, 9/11-related acute stress response, and the use of various

early coping strategies as predictors of searching for and finding meaning.

Second, are these issues of meaning predictive of long-term adjustment? Consistent with the central role that finding meaning is thought to play in adjustment to both everyday life events and direct trauma (Antonovsky, 1979; Janoff-Bulman, 1992; Silver & Wortman, 1980; Wilson et al., 2003), we hypothesized that Americans who were less able to find meaning in the events of 9/11 would report more long-term fears of subsequent attacks and greater PTS symptoms compared to those who were better able to find meaning. Finally, consistent with the proposition that meaning-making facilitates adjustment by restoring a sense of invulnerability (Janoff-Bulman, 1992; Park & Folkman, 1997), we hypothesized that associations between early meaning and long-term PTS symptoms would be mediated by reductions in people's fears of additional terrorist attacks.

## Methods

### *Data Collection*

In collaboration with Knowledge Networks, Inc. (KN), a survey research organization that maintains a nationally representative Web-enabled research panel of respondents, we administered a series of Web-based surveys to a national random adult sample of U.S. residents across the 2 years following 9/11 (see Silver et al., 2006). The KN panel is developed using traditional probability methods and is recruited using stratified random-digit-dial (RDD) telephone sampling. RDD provides a known probability of selection for every U.S. household having a telephone, and the distribution of the KN panel closely tracks the sociodemographic characteristics of U.S. census counts. To ensure representation of population segments that would not otherwise have Internet access, KN provides panel households with an Internet connection and equipment. Panel members participate in brief surveys in exchange for free

Internet access or other compensation if the household is already web-enabled. All procedures were approved by the Institutional Review Board at the University of California, Irvine.

The eligible sample for the present report were the 931 panel members who completed two self-administered surveys confidentially via the web in the first few months post 9/11 (between September 20 and October 4, 2001 and again between November 10 and December 3, 2001; see Silver et al., 2002) in which acute responses to the attacks and questions regarding searching for and finding meaning were assessed. Subjects' reports of physician diagnoses of anxiety and depression (assessed *prior to* 9/11 and between June 17, 2000, and September 4, 2001) were available for all but one respondent. All individuals were followed over time, and completed additional surveys around the one year (September 20 and October 24, 2002) and two year (September 12 and October 31, 2003) anniversaries of the attacks. One-year and 2-year follow-up data were available for 79.9% (N = 741) and 61.4% (N = 569) of the eligible sample, respectively.

### *Measures*

*Demographics.* Several demographic variables were assessed for all KN panel members, including gender, age, marital status, race, ethnicity, education, and household income.

*Pre-9/11 mental health.* Via a KN health survey, respondents reported whether they had ever been diagnosed by a physician as suffering from an anxiety disorder or depression. The total number of diagnosed conditions (none, anxiety or depression, or both) was computed and used as an index of pre-9/11 psychological diagnoses.

*Objective exposure to 9/11.* Three dummy-coded indices assessed respondents' degree of objective exposure to the terrorist attacks. One index was whether the person lived within 100

miles of the WTC at the time of the attacks (Y/N), and was calculated based on the azimuth distance of the respondent's US Postal Service residential zip code. This cutoff was based on previous research showing elevated rates of distress in those Americans residing within 100 miles of the attacks (Schuster et al., 2001) or within the NYC metropolitan area (Schlenger et al., 2002). Two other items were assessed two months post-9/11, and indicated whether the person had direct exposure to the attacks (e.g., in the WTC or Pentagon, witnessed attacks firsthand, within a few blocks of the attacks; Y/N), or had indirectly witnessed the attacks through *live* TV exposure (Y/N).

*Acute stress symptoms.* At the initial survey, an abbreviated version of the Stanford Acute Stress Reaction Questionnaire (SASRQ; Cardena, Koopman, Classen, Waelde, & Spiegel, 2000) assessed acute stress symptoms. The SASRQ was specifically developed to evaluate symptoms in the early aftermath of traumatic events based on DSM-IV criteria for Acute Stress Disorder (ASD). Items on the SASRQ were modified to read at a 6.5-grade Kincaid reading level, and respondents reported whether they “experienced” or “did not experience” each of 25 acute stress symptoms specific to the 9/11 attacks. Items assessed the ASD symptom clusters of dissociation (9 items), reexperiencing/intrusion (5 items), avoidance (3 items), arousal/anxiety (6 items), and social/work functioning (2 items). Because we did not assess all DSM-IV criteria (e.g., feelings of fear, horror, or helplessness; duration of symptoms), respondents were not assumed to have ASD. Responses were summed across items to form a reliable index of total number of acute stress symptoms ( $\alpha = .88$ ). The SASRQ has been shown to be a valid, reliable predictor of subsequent PTS symptoms (Classen, Koopman, Hales, & Spiegel, 1998; Waelde, Koopman, Rierdan, & Spiegel, 2001).

*Immediate coping.* The Brief COPE (Carver, 1997) was administered at the initial survey

to measure the use of 14 common strategies in coping with the 9/11 attacks (denial, instrumental support seeking, religious coping, self-distraction, etc.) with two items each.

*Searching for and finding meaning.* As in a number of previous studies (Currier et al., 2006; Davis et al., 2000; Lehman et al., 1987; McIntosh et al., 1993; Silver et al., 1983), respondents' extent of searching for and finding meaning was assessed at 2-months post-attacks and again at 1-year post 9/11 with two items. Searching for meaning was assessed with the question "Over the past week, have you ever found yourself trying to make sense of the September 11 attacks and their aftermath?" Finding meaning was assessed with "Over the past week, have you been able to make sense of the September 11 attacks and their aftermath?" Participants responded to both questions on a 5-point scale ranging from 1 = *No, never* to 5 = *Yes, all the time*. Searching for and finding meaning were uncorrelated ( $r = -.04, p = .22$ ).

*Fears of future terrorism.* Two months, 1-year, and 2-years post-9/11, fears about future terrorist attacks were assessed with two items modified from the Vaughan perceived risk scale (E. Vaughan and C. Wong, unpublished data, 2002). Respondents reported how often in the past week they had fears about the possibility of another terrorist attack or whether they worried that an act of terrorism would personally affect them or a family member. These items were summed together to form an index ( $\alpha = .83$ ).

*PTS symptoms.* Given our focus on the role of meaning in adjustment to the terrorist attacks, we assessed adjustment at the 1-year and 2-year follow-ups using a measure that was tied specifically to the events surrounding 9/11, the PTSD Checklist-Civilian Version (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL is a well-validated 17-item self-report measure of intrusion, avoidance, and arousal symptoms with excellent reliability ( $\alpha$ 's = .93 and .94). Respondents indicated how distressed and

bothered they were by symptoms related to the 9/11 attacks over the prior 7 days using a scale ranging from 1 = *not at all* to 5 = *extremely*. A PTS severity score was calculated by summing responses for the 17 items (see Weathers et al., 1993). Because we did not assess all DSM-IV criteria for PTSD (e.g., duration of symptoms) and most respondents did not meet the criteria for *direct* exposure to trauma, we do not assume respondents had a PTSD diagnosis.

### *Analytic Strategy*

Statistical analyses were conducted with STATA version 10 survey linear regression and generalized estimating equations (GEE) programs, which were designed to handle weighted analyses of complex longitudinal survey data and provide necessary adjustments of standard errors. All data and analyses were weighted to adjust for differences in the probabilities of selection and non-response within and between households. Post-stratification weights were calculated by deriving weighted sample distributions along combinations of demographics and regional status. Similar distributions were calculated using the most recent U.S. Census Bureau's Current Population Survey data and the KN panel data. Cell-by-cell adjustments over the various univariate and bivariate distributions were calculated and repeated iteratively to make the weighted KN panel sample cells match those of the 2001 U.S. Census and Current Population Survey.

## Results

### *Sample Demographics*

Weighted sociodemographic characteristics of the sample at each wave are presented in Table 1.

### *Attrition Analyses*



Individuals who did not complete a follow-up survey were not significantly different from those who completed the surveys on pre-9/11 psychological diagnoses, gender, exposure to the attacks, or acute stress symptoms. However, nonrespondents to the 1-year and 2-year follow-up surveys were significantly younger ( $M_{diff} = 5.71$  and  $9.39$  years,  $p$ 's  $< .01$ ) than respondents. Also, nonrespondents to the 2-year survey were more likely to be single ( $p < .01$ ), African-American ( $p = .05$ ), and Hispanic ( $p = .08$ ) than respondents.

#### *Exposure to the Attacks, Acute Stress, and PTS Symptoms*

Our sample reported a range of exposure to the terrorist attacks of 9/11. Over half (60.5%) viewed the attacks on live TV. Sixty-nine respondents (8.2%) resided within 100 miles of the attacks and a smaller number of respondents ( $N = 20$ ; 2.7%) reported having direct exposure to the terrorist attacks. Scores on the abbreviated SASRQ measure ranged from the minimum of 0 symptoms (20.0%) to the maximum of 25 symptoms ( $N = 5$ ), with a mean of 5.03 symptoms at the initial survey (95% CI 4.63 – 5.43). For comparison, Cardena and colleagues (1997) assessed acute stress in emergency rescue workers with a full 30-item SASRQ, and reported an average of 26.4 symptoms for those directly exposed to trauma and 4.9 symptoms for those not exposed to trauma. Thus, on average our respondents reported acute stress symptoms at slightly higher levels than those reported in an unexposed sample.

At one year post-9/11, PCL scale scores ranged from the minimum of 17 (corresponding to 0 symptoms; 37.1% of respondents) to a maximum of 81, with a mean of 22.51 (95% CI 21.74 – 23.27). At two years post-9/11, scores ranged from 17 (35.3%) to 74, with a mean of 21.54 (95% CI 20.83 – 22.24).

#### *Prevalence of Meaning Issues in the Aftermath of the Attacks*

A majority of respondents (68.4%) reported some attempt to search for meaning in the

attacks two months post-9/11. Of these individuals, most (62.4%) reported searching for meaning “sometimes” or more often, and 16.6% reported they were searching frequently (i.e., “often” or “all the time”). However, most Americans (59.7%) reported being unable to find any kind of meaning at all at 2-months post-9/11. A smaller proportion (29.4%) found “just a little” or “some” meaning, and few respondents (10.9%) reported finding meaning “quite a bit” or more. Thus, most respondents were searching for meaning in the terrorist attacks, but remained unable to find any adequate way to understand the events.

We also examined whether the ability to find meaning was related to the passing of time or the intensity of one’s search for meaning. One year post-9/11, most respondents (58.7%) remained unable to find meaning, a similar proportion as was found at 2-months post-9/11 ( $p > .50$ ). Similarly, there were no changes in the degree of finding meaning among those who reported finding some, with 31.2% finding “just a little” to “some” meaning and 10.1% reporting finding “quite a bit” or more. In addition, finding meaning at 1-year post-9/11 was not at all related to how much a person searched for meaning at 2-months ( $p > .30$ ). Thus, neither the passage of time nor the intensity of a person’s early search for meaning increased the likelihood of finding meaning over the year following the attacks.

#### *Who Searches and Finds Meaning in the Early Aftermath of the Attacks?*

We conducted a hierarchical regression predicting respondents’ degree of searching for and finding meaning two months post-9/11 from four blocks of variables: demographics (age, gender, ethnicity, marital status, income, education) and pre-9/11 psychological diagnoses; objective exposure to the attacks; acute stress symptoms; and early coping strategies.

The models predicted a significant portion of variance in both searching for and finding

meaning (Tables 3 & 4). Although neither searching for nor finding meaning were significantly predicted by exposure, they were significantly predicted by key sociodemographic, acute stress response, and coping measures. Older respondents, females, and singles were more likely to search for meaning, as were those who experienced greater acute stress at the initial survey. Instrumental social support seeking was the only significant individual coping strategy that predicted searching for meaning.

Males and those with some college education were more likely to find meaning two months post-9/11. Prior to the addition of the coping block, acute stress response was also a significant positive predictor of finding meaning. However, in the full model, the influence of acute stress on finding meaning was partially accounted for by early coping responses, which as a group accounted for the greatest proportion of variance in finding meaning. Individuals who coped by seeking instrumental support and positive reframing were more likely to find meaning, whereas those who used emotional support seeking and denial to cope with the 9/11 attacks were less likely to do so.

#### *Is Finding Meaning Related to PTS Reactions Over Time?*

Our final aim was to identify the long-term consequences of meaning-making in the early aftermath of the terrorist attacks. We first examined the correlations of searching for and finding meaning (at 2 months post 9/11) with the outcomes of fears of future terrorism (at 1 year) and PTS symptoms (assessed at 1 and 2 years). Results indicated that searching for meaning was positively correlated with the outcomes ( $r$ 's = .28, .25, and .26, respectively, all  $p$ 's < .01) and finding meaning was negatively correlated with the outcomes ( $r$ 's = -.21, -.13, and -.13, respectively, all  $p$ 's < .01).

Next, to examine a hypothesized mechanism by which meaning might facilitate long-

term adjustment, we conducted a series of regression analyses that examined whether searching for and finding meaning at two months post-9/11 *uniquely* predicted changes in respondents' fears of future terrorist attacks (at 1-year) and PTS symptoms (at 1 and 2-years).<sup>1</sup> For each outcome, we controlled for respondents' scores on the same (or nearly identical) construct at an earlier assessment, as well as their pre-9/11 psychological diagnoses, degree of objective exposure to the attacks, and acute stress symptoms. We also tested interactions of each of the centered meaning variables with all dummy-coded exposure measures (proximity, live TV, and direct exposure) and the centered acute stress measure to assess whether meaning was more strongly tied to adjustment among those who had greater objective exposure and/or distress in the immediate aftermath of the attacks.

*Fears of future terrorist attacks.* As Table 5 shows, respondents who found more meaning at 2-months reported fewer fears of future terrorism at the 1-year follow-up compared to those who found less meaning in the early aftermath of the attacks, after controlling for fears of future terrorism at 2-months. In contrast, the search for meaning was not significantly associated with respondents' fears of terrorism at 1-year. Furthermore, a significant interaction between finding meaning and proximity emerged, such that there was a stronger link between finding meaning and subsequent fears among respondents who resided within 100 miles of the WTC ( $B = -.25, p < .001$ ) compared to all other respondents ( $B = -.07, p < .05$ ). In other words, for those who lived in the closest proximity to the attacks, finding meaning more strongly predicted a decline in fears of future terrorism 1-year post-9/11. All other interactions between meaning and exposure or acute stress were not significant.

*PTS symptoms.* To examine the unique association between early meaning and PTS symptoms at the 1- and 2-year follow-ups, we used generalized estimating equations (GEE;

Liang & Zeger, 1986). GEE is an extension of the generalized linear model for regressions involving correlated observations that arise from repeated measurement. GEE was chosen over other longitudinal approaches such as hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002) because it makes fewer statistical assumptions and provides more efficient estimates of fixed effects (Ballinger, 2004; Raudenbush & Bryk, 2002). In other words, GEE is best suited for identifying how much a population's average response changes with each one-unit increase in a covariate (Ballinger, 2004).

Because PTS symptom scores were substantially positively skewed, GEE analyses were specified to use a negative binomial distribution with a log link. The negative binomial distribution, generally used to model overdispersed count data, appropriately described the PTS distribution as it had similar properties (i.e., only integers, no negative values, large number of zeros, variance greatly exceeding the mean; cf. McCullagh & Nelder, 1989). The log link was used to facilitate interpretation as the coefficients can be exponentiated to report incidence rate ratios. Because the negative binomial link assumes the dependent measure has a minimum value of 0, PCL scores were rescaled to have a possible range of 0 to 68.

The right panel of Table 5 shows the results of the GEE analyses regressing PCL scores at the 1- and 2-year follow-ups onto the 2-month meaning measures, while simultaneously controlling for pre-9/11 psychological diagnoses, exposure, and acute stress symptoms. As described earlier, the measure of acute stress symptoms used in the initial survey (SASRQ) assessed a similar constellation of symptoms as the PCL (intrusion, arousal, avoidance), so analyses model residual change in posttraumatic distress across time. As Table 5 shows, respondents who were searching for meaning at 2-months reported greater PTS symptoms over time than those who were not searching for meaning. Incidence rate ratios ( $exp(B)$ ) indicate

that each 1-point increase in one's reported degree of searching for meaning increased long-term PTS symptoms by a factor of 1.15. In contrast, finding meaning served as a more protective factor such that each 1-point increase in one's reported degree of finding meaning was associated with a residual decrease in PTS symptoms by a factor of .88. Furthermore, these associations were not moderated by one's degree of proximity, direct exposure, or by the intensity of acute distress, as all interaction terms were not significant.

Given that a number of early coping strategies were associated with finding meaning at 2 months, it is possible that the association between finding meaning and long-term PTS symptoms may have been attributable to the use of particular coping strategies. To examine this possibility, we ran a second GEE model that added the four significant coping predictors of meaning (denial, emotional and instrumental support, positive reframing). None of the coping strategies were significant, and both searching for and finding meaning remained significant predictors of PTS symptoms ( $B = .12$  and  $-.11$ , respectively,  $p's < .05$ ). Thus, the unique association between finding meaning and long-term adjustment was not attributable to the use of particular early coping strategies.

*Mediation of PTS symptoms by fears of terrorist attacks.* As the above analyses attest, finding meaning at 2-months post-9/11 was associated with lower fears of future terrorism at 1-year as well as lower PTS symptoms across the 1-2 years post-9/11. Thus, the findings are consistent with the proposition that finding meaning facilitates adjustment by reducing feelings of vulnerability. To examine this issue of mediation more closely, we followed Baron and Kenny's (1986) four steps for assessing whether the influence of an initial variable (i.e., finding meaning at 2-months) on an outcome (i.e., PTS at 1- and 2-years) is accounted for by a mediating variable (i.e., fears of terrorism at 1-year).

Baron and Kenny's (1986) first two steps require demonstrating 1) a significant association between the initial variable and the outcome, and 2) a significant association between the initial variable and the mediator. As discussed, Table 5 demonstrates these links. Baron and Kenny's (1986) third and fourth steps require showing 3) that the proposed mediator significantly predicts the outcome while controlling for the initial variable, and 4) that the association between the initial variable and the outcome is attenuated after controlling for the proposed mediator. Indeed, when fears of future terrorism at 1-year is added to the GEE model presented in the right panel of Table 5, fears of future terrorism significantly predicts PTS symptoms across 1- and 2-years ( $B = .50, z = 6.72, p < .01$ ), but finding meaning at 2-months is no longer significant ( $B = -.05, z = -.95, p = .34$ ). Because fears of future terrorism at 1-year post-9/11 was measured contemporaneously with one of the PTS assessments, we also conducted separate analyses of mediation for the 1-year and 2-year PTS assessments. As Figure 1 shows, the direct effect of finding meaning on PTS symptoms at each of these assessments became nonsignificant after adding fears of future terrorism to the model. Furthermore, both of the indirect effects of finding meaning on PTS symptoms at 1- and 2-years via fears of terrorism were significant (Sobel  $z$ 's = 3.47 and 2.93, respectively; both  $p$ 's < .01).

Although Baron & Kenny's (1986) procedures are common for testing mediation, they may run the risk of finding significant mediation whenever a proposed mediator and outcome are conceptually related and reasonably correlated cross-sectionally (cf. Spencer, Zanna, & Fong, 2005). To ensure that our mediation paths were not significant simply because of conceptual overlap between fears of terrorism and PTS symptoms, we tested an alternative mediation model in which fears of terrorism across both the 1- and 2-year assessments was the outcome and PTS symptoms at 1-year was the mediator. We added fears of terrorism from the 2-year assessment so

this alternative model would be identical to that shown in the right panel of Table 5, with the exception of what variable was treated as the mediator and what variable was treated as the outcome; all other controls variables were the same.<sup>2</sup> We found no support for this alternative model. Prior to adding PTS symptoms at 1-year to the model, finding meaning at 2 months significantly predicted fears of future terrorism across the 2 years following 9/11 ( $B = -.11, z = -4.40, p < .001$ ). Similarly, after adding PTS symptoms at 1-year to the model ( $B = 32.20, z = 8.89, p < .001$ ), finding meaning continued to be a significant predictor of fears of future terrorism ( $B = -.10, z = -3.92, p < .001$ ). Furthermore, the Sobel test of mediation was non-significant ( $z = 1.71, p = .09$ ), indicating that there was no meaningful attenuation in the association between finding meaning and fears after controlling for PTS symptoms. Thus, we found mediation only to be significant in the hypothesized direction, supporting the prediction that finding meaning facilitates long-term adaptation by reducing fears of recurrence.

### Discussion

The need to make sense of and understand events in one's life is considered a fundamental part of both everyday social functioning as well as adjustment to traumatic events (Antonovsky, 1979; Heider, 1958; Janoff-Bulman, 1992; Kelley, 1967; Taylor, 1983). In each case, the ability to find meaning in negative life events has been theorized to maintain individuals' beliefs in security, predictability and control, as well as to facilitate emotional adaptation. Despite these claims, there have been few longitudinal tests of these ideas, and no prospective, longitudinal tests outside of the context of bereavement. The events of 9/11 provided an opportunity to examine Americans' ability to make sense of a major sudden and unexpected collective upheaval that was widely viewed as a threat to Americans' identity, security, and worldviews. Two months after the attacks, two-thirds of Americans were



actively trying to make sense of the attacks and their aftermath, a search that in most cases persisted over the following year. Furthermore, the search for meaning was in many cases unsuccessful, as most of our sample reported an inability to find any kind of meaning in the events at all.

Our findings are remarkable in part because the vast majority of the sample was not directly exposed to the attacks and instead learned of them predominantly through watching TV. In fact, the degree of objective exposure to the attacks did not predict either the extent to which participants searched for or found meaning in the attacks. Rates of searching for and finding meaning in our sample were similar to that observed in a number of studies of individuals who have personally experienced negative life events such as incest (Silver et al., 1983), and sudden or anticipated bereavement (Bonanno et al., 2004; Davis et al., 1998; Davis et al., 2000; Lehman et al., 1987). This resemblance is likely to stem from the fact that adversity – whether personal or collective – challenges fundamental beliefs held by many people. Terrorism, by its very intent, shatters people’s beliefs in a benevolent and predictable world, and witnessing a terrorist attack on one’s own soil may similarly erode one’s sense of invulnerability. Given that assumptions of benevolence, meaningfulness, and invulnerability form the core of many cognitive theories of adjustment to trauma (Antonovsky, 1979; Janoff-Bulman, 1992; Taylor, 1983), studying people’s responses to collective upheavals such as terrorism is a meaningful area of inquiry, as findings can help inform theoretical models of adjustment to adversity in general.

Consistent with the proposition of many trauma theorists, we found that both searching for and finding meaning were significantly related to adjustment over time. Americans who were engaged in a search for meaning in the early aftermath of the attacks were more likely to report PTS symptoms over the following two years than those who were not searching for meaning.

This finding, taken together with the observation that searching did not appear to facilitate finding meaning, suggests that the search for meaning, in itself, is not always likely to resolve one's preoccupation with a negative life event. In fact, when the search for meaning persists, it may actually be counterproductive (cf. Davis et al., 1998; Silver et al., 1983). In contrast, Americans who were able to find some way of explaining the event in the early aftermath were less likely to report subsequent fears of terrorist attacks and reported fewer subsequent PTS symptoms over time than those who could not make sense of it. We emphasize that these longitudinal analyses controlled for a number of potential confounds that previous studies of unanticipated trauma have been unable to consider, such as pre-event mental health status, degree of objective exposure, and acute stress response. While these controls attenuated the zero-order associations between meaning and PTS symptoms, they offered an unprecedented opportunity to examine the unique prospective link between meaning and long-term adjustment to a collective psychosocial stressor. Furthermore, the unique associations between meaning and subsequent adjustment was observed across the entire sample of Americans, not simply those who were directly exposed or those who experienced the most distress in the early aftermath of the attacks. However, among those respondents residing in the closest proximity to the World Trade Center, we found that the ability to find meaning was more strongly associated with subsequent reductions in fears of future terrorism across the 1-year following the attacks.

Accordingly, our study provides the most conclusive evidence, to date, supporting the proposition that finding meaning plays a role in adjustment to unexpected and negative life events such as a collective upheaval (Janoff-Bulman, 1992; Parkes, 1988; Taylor, 1983). Further, our study provides the first confirmation of a theorized mechanism for this link: finding meaning facilitates adjustment by reducing people's feelings of vulnerability. As such, making sense of a

collective adversity such as terrorist attack is likely to foster adjustment by restoring people's fundamental assumptions in a world that is benevolent, predictable, and meaningful (Antonovsky, 1979; Janoff-Bulman, 1992; Taylor, 1983). Our results mesh with other studies examining meaning in adjustment to loss (Currier et al., 2006; Davis et al., 1998; Davis et al., 2000) and are also consistent with recent empirical work showing that having an explanation for an emotional event increases the speed at which a person adapts to it (Wilson et al., 2005). Our study extends this literature into contexts other than directly-experienced trauma and allows for a real-world examination of how our ability to explain events in our social world can hasten a return to emotional baseline (cf. Wilson et al., 2003).

The design of our study also enabled us to offer a more complete answer to the question of "Who is able to find meaning in collective adversity?" While objective exposure to the terrorist attacks was unrelated to either the degree of searching for meaning or the ability to find it, these responses were both tied to respondents' degree of acute stress in the first two weeks after the attacks. Indeed, acute stress was the strongest of all event-specific predictors of respondents' search for meaning. Social-cognitive models of trauma would suggest that the immediate distress experienced by some in the aftermath of an adversity reflect threats to people's fundamental assumptions about themselves and the world, and these threats prompt a search to make sense of the event and its implications (Janoff-Bulman, 1992; Parkes, 1988; Taylor, 1983). Our data extend prior work by suggesting that the search itself does not necessarily lead a person to find meaning and is, by itself, associated with poorer long-term adjustment. Thus, in the aftermath of collective adversity, our results suggest that those who report high levels of acute stress and are in the midst of an intense search for meaning may be most likely to have long-term difficulties in adjustment.

Although the ability to find meaning was also tied to acute stress, this relationship was accounted for by early coping strategies. People who tried to look for positive consequences and who sought instrumental support from others (i.e., sought other people's help and advice) were more likely to find meaning. Indeed, finding positive consequences of negative life events is a common way in which people report finding meaning in trauma (Davis et al., 1998; Janoff-Bulman & Frantz, 1997; Taylor, 1983). Another positive consequence frequently reported by people dealing with adversity is an increased appreciation of supportive social ties (Updegraff & Taylor, 2000). Thus, people who are looking for some positive consequences and who seek practical assistance from others may be best able to find meaning.

We also found that engaging in denial and seeking emotional support (i.e., getting comfort and understanding from another) in the early aftermath of 9/11 was negatively associated with finding meaning. Denial is an avoidant coping strategy that is negatively related to adjustment to ongoing stressors (Carver & Scheier, 1999), and our findings suggest it impairs the ability to find meaning as well. The findings regarding emotional support were unexpected, although it is possible that people who sought emotional support did so because they experienced greater immediate distress than others. As our findings are among the first to identify the early coping behaviors associated with finding meaning, future research is needed to examine this relationship more closely. Similarly, some of the other predictors of meaning (e.g., age, gender, marital status) may have been significant due to unique aspects of 9/11, and future studies should investigate these predictors in other contexts.

Our findings regarding the intensity of respondents' concerns with meaning in the aftermath of 9/11 were consistent with many findings reported in the context of direct, personal trauma. However, we emphasize that the way the search for meaning unfolds and the factors that

influence it may vary depending on the collective vs. personal nature of a traumatic event. In collective upheavals, the meanings people find may be far more likely to be constructed in a social context. For example, in a study of San Francisco residents' responses to the 1989 Loma Prieta earthquake, Pennebaker and Harber (1993) found extremely high rates of talking in the first two weeks, but these rates sharply declined over the next month. During this latter *inhibition phase* (Pennebaker & Harber, 1993), residents' continued to think about the events but actively inhibited their discussions out of fear that others no longer wanted to hear their stories (see also Hobfoll & London, 1986). In our sample, the strongest predictor of finding meaning was the degree to which a person sought instrumental support (i.e., getting help and advice from others) in the early weeks following the attacks. Thus, it is possible that this finding may be due to the collective nature of the terrorist attacks. Further, given the fact that most discussion of collective upheavals appears to take place in the first few weeks (cf. Pennebaker & Harber, 1993), this period may be the time when meaning is most likely to be found in such events. If meaning is not found in this early window, it may be unlikely to be found at all. Whether this social dynamic is also present in the context of personal traumas awaits further investigation.

Although our study addresses several shortcomings of prior research, it has its own limitations. First, we acknowledge that because many constructs were being assessed in this study, we used single-item measures of searching and finding meaning. We note that although single-item measures of meaning have proven very useful in previous research on personal trauma (Bonanno et al., 2004; Carnelley et al., 2006; Currier et al., 2006; Davis et al., 2000; Lehman et al., 1987; McIntosh et al., 1993; Silver et al., 1983), they are limited in their ability to assess *how* people find meaning and how people's particular explanations might differ across various types of trauma or exposure. We do note that previous studies that have examined how

people find meaning in personal trauma have not found any particular explanation to be more conducive for adjustment, with one exception – blaming others appears to be associated with poorer adjustment (Bulman & Wortman, 1977; Tennen & Affleck, 1990). In our study, it is possible that issues of blame and accountability may have pervaded our respondents' explanations of the attacks to a greater degree than observed in other personal traumas. If this were the case, it may have attenuated the relationship between finding meaning and long-term adjustment in our sample.

Second, although we successfully maintained a panel of respondents that closely resembled a nationally representative sample in the years following 9/11, our attrition was not completely random, as younger respondents, singles, African-Americans and Hispanics were more likely to drop out of our study over time. Third, because our study recruited a representative sample of Americans, only a small handful of our respondents were directly exposed to the terrorist attacks. Thus, we had limited power to detect significant effect of direct exposure on meaning. However, we note that even in our sample of Americans coping with a collective trauma, the rates of searching and finding were similar to those reported in many studies of direct trauma, questioning the role that direct exposure play in the search for meaning. Lastly, our prospective measure of mental health status, although truly a pre-event measure, was limited by its categorical assessment of two disorders. Nonetheless, KN's health survey was patterned after the National Health Interview Survey (NHIS, US DHHS, 1994); using this measure, KN has found rates of health problems comparable to the NHIS (Baker, Bundorf, Singer & Wagner, 2003). Furthermore, Schlenger and Silver (2006) review evidence that anonymous and confidential web-based assessments such as the KN survey are as or more reliable than other interview methodologies for the assessment of mental health symptoms. Of

course, our analyses were not able to fully account for participants' levels of preexisting distress or mental health history. However, prior diagnoses of depression and anxiety are known risk factors for the development of PTS symptoms (American Psychiatric Association, 2000), so we note that our analyses were able to account for some important meaningful individual differences in mental health history.

Despite these limitations, this study is the first to use prospective, longitudinal data from a representative sample of Americans to examine the predictors, mechanisms, and long-term consequences of searching for and finding meaning in a widespread cultural upheaval. Our findings highlight the fact that the search for meaning is not simply an issue that victims of personal traumas face, but rather an issue that may pervade any experience that shatters people's fundamental assumptions about security and invulnerability. Furthermore, in documenting the pervasiveness of issues of meaning in our sample, our findings also challenge a prevailing assumption that direct exposure to a traumatic event is necessary to elicit some of the psychological responses typically described as "posttraumatic" (see also Kroll, 2003; Schuster et al., 2001; Silver et al., 2002). Rather, seeking and finding meaning appear to be important coping processes for individuals facing more social or collective upheavals as well. Even in these contexts, the degree to which people can ultimately come to an understanding of such events in the early aftermath may help restore a sense of security and hasten the process of adaptation.

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## Footnotes

<sup>1</sup> Some previous studies of meaning and adjustment have noted that individuals who search for meaning but are unable to find meaning appear to be particularly distressed (e.g., Davis et al., 2000; Silver et al., 1983). To examine if this was the case in our sample, we examined whether there was a significant interaction between searching for meaning and finding meaning in predicting adjustment outcomes after accounting for the independent associations of searching and finding meaning with adjustment. These interactions were not significant ( $p$ 's > .25), and were not examined further.

<sup>2</sup> Fears of future terrorism at 1- and 2-years were normally distributed, so a normal distribution and identity link were specified in the GEE analyses for the alternative model. To address the issue of skewness, PTS scores were subjected to an inverse transformation and reflection prior to being added as the proposed mediator.

Table 1.

*Demographic Composition of Sample*

	<u>Full sample</u>		<u>In 1-year survey</u>		<u>In 2-year survey</u>	
	<i>N</i>	Weighted % <sup>a</sup>	<i>N</i>	Weighted % <sup>a</sup>	<i>N</i>	Weighted % <sup>a</sup>
<b>Sex</b>						
Male	463	49.2	370	49.7	279	49.4
Female	468	50.8	371	50.3	290	50.6
<b>Age range</b>						
18-24	70	10.0	48	9.3	26	6.6
25-34	153	21.4	106	18.4	65	14.6
35-44	190	20.7	152	21.3	110	21.1
45-54	191	18.1	151	17.6	115	17.3
55-64	158	14.4	138	16.5	124	20.0
>65	169	15.4	146	16.9	129	20.4
<b>Marital Status</b>						
Married	558	59.7	453	60.9	355	62.8
Single	180	22.3	136	20.6	91	17.3
Sep/div/wid	175	18.0	146	18.5	122	19.9
<b>Race</b>						
White	677	69.7	556	70.2	449	75.2
Black	76	11.3	60	11.6	36	8.8
Hispanic	95	12.5	72	11.9	49	10.3
Other	65	6.7	48	6.3	37	5.7
<b>Education</b>						
HS or less	403	51.4	334	52.7	261	53.8
College or more	519	48.6	410	47.3	315	46.2
<b>Household Income</b>						
<10,000	65	8.3	50	8.4	34	7.7
10,000-24,999	171	20.1	137	20.3	111	21.5
25,000-49,999	324	37.2	270	38.4	209	37.5
50,000-74,999	201	19.9	157	19.3	122	19.8
>75,000	164	14.5	127	13.6	93	13.5

<sup>a</sup> Weights adjust estimates for sampling design and poststratification to Current Population Survey, US Bureau of the Census, September 2001.

Table 2.

*Descriptives of Major Study Variables for All Respondents Providing Data at Each Wave*

Measure	2 weeks	2 months	1 year	2 years
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Acute stress response (SASRQ)	5.00 (4.98)			
COPE - Self-distraction	2.14 (0.83)			
COPE – Active coping	2.08 (0.84)			
COPE - Denial	1.73 (0.77)			
COPE - Substance use	1.09 (0.35)			
COPE – Emotional support	2.00 (0.88)			
COPE – Instrumental support	1.54 (0.68)			
COPE - Behavioral disengagement	1.29 (0.52)			
COPE - Venting	2.25 (0.84)			
COPE - Positive reframing	1.70 (0.79)			
COPE - Planning	2.00 (0.82)			
COPE - Humor	1.07 (0.26)			
COPE - Acceptance	3.34 (0.74)			
COPE – Religious coping	2.59 (1.15)			
COPE - Self-blame	1.08 (0.28)			
Searching for Meaning		2.25 (1.07)	1.90 (0.99)	
Finding Meaning		1.82 (1.18)	1.84 (1.19)	
Fears of Future Terrorism		2.77 (0.97)	2.32 (0.94)	2.06 (0.87)
PTS Symptoms			22.59 (8.68)	21.54 (7.68)

Table 3.

*Summary of Hierarchical Regression Analysis for Variables Predicting Respondents' Search for Meaning in 9/11*

Predictor	Step 1	Step 2	Step 3			Step 4	95% CI	
	$\beta$	$\beta$	$\beta$	$\beta$	$B$	$t$		
Age	.23**	.22**	.24**	.24**	.02	5.46	.01	.02
Gender - Female	.15**	.15**	.09*	.08*	.17	2.01	.02	.34
Ethnicity - Black	-.08*	-.08*	-.06	-.05	-.16	-1.28	-.42	.09
Ethnicity - Hispanic	-.06	-.06	-.06	-.05	-.17	-1.41	-.40	.07
Ethnicity - Other race	.04	.03	.04	.05	.20	1.23	-.11	.54
Marital Status - Single	.09*	.09*	.09*	.10*	.27	2.41	.05	.49
Marital Status - Divorced/Separated	.02	.02	.02	.01	.04	.35	-.18	.31
Marital Status - Widowed	.02	.02	.04	.05	.25	1.35	-.11	.61
Household Income	.01	.02	.02	.03	.01	.68	-.01	.03
College education	-.03	-.03	-.04	-.07	-.15	-1.74	-.31	.02
Pre-9/11 psychological diagnoses	.09	.09	.03	.04	.09	.96	-.09	.27
Proximity – Lived within 100 miles		.04	.02	.01	.06	.43	-.21	.31
Exposure – Saw live on TV		.07	.05	.03	.06	.76	-.09	.21
Exposure – Direct exposure		.04	.02	.01	.08	.25	-.47	.87
Acute stress response (SASRQ)			.29**	.19**	.04	3.96	.02	.06
COPE - Self-distraction				.00	-.01	-.13	-.11	.09

COPE – Active coping	-.03	-.04	-.69	-.15	.07
COPE - Denial	.05	.06	1.15	-.05	.17
COPE - Substance use	.04	.12	1.11	-.10	.34
COPE – Emotional support	.03	.04	.58	-.08	.17
COPE – Instrumental support	.10*	.16	2.12	.02	.31
COPE - Behavioral disengagement	-.02	-.04	-.53	-.21	.11
COPE - Venting	.07	.09	1.51	-.03	.22
COPE - Positive reframing	.00	.00	.05	-.10	.10
COPE - Planning	.08	.11	1.93	.00	.22
COPE - Humor	-.01	-.05	-.37	-.32	.26
COPE - Acceptance	.02	.03	.55	-.08	.14
COPE – Religious coping	.03	.03	.62	-.06	.11
COPE - Self-blame	.02	.09	.59	-.22	.38

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*Note.*  $R^2 = .10$  for Step 1,  $p < .01$ ;  $\Delta R^2 = .00$  for Step 2, ns.;  $\Delta R^2 = .08$  for Step 3,  $p < .01$ ;  $\Delta R^2 = .04$  for Step 4,  $p < .01$ . Total  $R^2 = .22$  for full model.

\* $p < .05$ , two-tailed \*\*  $p < .01$ , two-tailed

Table 4.

*Summary of Hierarchical Regression Analysis for Variables Predicting Respondents' Ability to Find Meaning in 9/11*

Predictor	Step 1	Step 2	Step 3			Step 4	95% CI	
	$\beta$	$\beta$	$\beta$	$\beta$	<i>B</i>	<i>t</i>		
Age	.06	.06	.05	.08	.01	1.58	.00	.01
Gender - Female	-.13**	-.13**	-.11**	-.09*	-.22	-2.39	-.39	-.04
Ethnicity - Black	-.02	-.02	-.03	-.03	-.10	-.61	-.42	.22
Ethnicity - Hispanic	-.02	-.02	-.02	-.03	-.12	-.88	-.37	.17
Ethnicity - Other race	.02	.02	.02	.01	.06	.34	-.26	.39
Marital Status - Single	.03	.03	.03	.04	.10	.76	-.18	.36
Marital Status - Divorced/Separated	.05	.05	.05	.04	.16	1.07	-.12	.46
Marital Status - Widowed	.02	.02	.01	.01	.05	.22	-.35	.47
Household Income	-.01	-.01	-.01	.00	.00	-.02	-.03	.03
College education	.14**	.14**	.15**	.11*	.25	2.55	.06	.45
Pre-9/11 psychological diagnoses	-.07	-.07	-.05	-.04	-.09	-1.33	-.23	.05
Proximity – Lived within 100 miles		.00	.00	.00	.02	.10	-.31	.39
Exposure – Saw live on TV		.00	.00	.01	.03	.31	-.17	.22
Exposure – Direct exposure		.01	.01	.00	.02	.07	-.46	.52
Acute stress response (SASRQ)			-.11**	-.04	-.21	-.01	-.03	.01
COPE - Self-distraction				-.07	-.09	-1.50	-.21	.03

COPE – Active coping	.03	.04	.63	-.09	.15
COPE - Denial	-.09*	-.14	-2.45	-.26	-.03
COPE - Substance use	-.06	-.19	-1.76	-.41	.03
COPE – Emotional support	-.12*	-.17	-2.45	-.30	-.04
COPE – Instrumental support	.17**	.29	3.53	.14	.46
COPE - Behavioral disengagement	.00	.00	-.02	-.18	.20
COPE - Venting	-.01	-.01	-.23	-.12	.10
COPE - Positive reframing	.10*	.15	2.43	.04	.29
COPE - Planning	-.01	-.02	-.30	-.15	.10
COPE - Humor	.08	.38	1.95	.01	.77
COPE - Acceptance	.06	.10	1.48	-.03	.22
COPE – Religious coping	-.05	-.05	-1.15	-.15	.04
COPE - Self-blame	-.01	-.04	-.24	-.36	.26

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*Note.*  $R^2 = .04$  for Step 1,  $p < .01$ ;  $\Delta R^2 = .00$  for Step 2, ns.;  $\Delta R^2 = .01$  for Step 3,  $p < .01$ ;  $\Delta R^2 = .06$  for Step 4,  $p < .01$ . Total  $R^2 = .11$  for full model.

\* $p < .05$ , two-tailed \*\*  $p < .01$ , two-tailed



Table 5.

*Summary of Regressions Predicting Fears of Future Terrorism and Posttraumatic Stress Symptoms*

	<u>Fears of Future Terrorism (1 yr)<sup>a</sup></u>					<u>Posttraumatic Stress Symptoms (1-2 yrs)<sup>b</sup></u>				
	<i>B</i>	$\beta$	<i>t</i>	95% <i>CI</i>		<i>B</i>	<i>z</i>	95% <i>CI</i>		Exp( <i>B</i> )
Constant	1.08**		5.72	.71	1.45	.55*	2.14	.05	1.06	1.74
Pre 9/11 psychological diagnoses	.01	.01	.11	-.15	.17	.07	.77	-.11	.25	1.07
Exposure – Lived within 100 mi	.19	.06	1.86	-.01	.39	.09	.48	-.28	.46	1.10
Exposure – Saw live on TV	-.05	-.03	-.72	-.19	.09	.22	1.51	-.06	.50	1.24
Exposure - Direct	.10	.02	.42	-.36	.55	.30	1.07	-.25	.84	1.34
Acute stress response (SASRQ)	.03**	.17	4.11	.02	.05	.12**	11.00	.10	.14	1.13
Fears of terrorism (2 mo)	.43**	.44	8.95	.34	.52					
Searching for meaning (2 mo)	.01	.01	.25	-.06	.08	.14*	2.23	.02	.27	1.15
Finding meaning (2 mo)	-.07*	-.09	-2.36	-.13	-.01	-.13*	-2.30	-.24	-.02	.88
Searching x Proximity < 100mi <sup>c</sup>	.07	.02	.82	-.10	.23			<i>ns</i>		
Finding x Proximity < 100mi <sup>c</sup>	-.18*	-.06	-2.43	-.32	-.03			<i>ns</i>		

<sup>a</sup> Based on survey linear regression analysis, with  $N = 740$ ,  $F(10, 730) = 22.88$ ,  $R^2 = .32$ ,  $p < .001$ .

<sup>b</sup> Based on generalized estimating equations population-averaged model, with  $N = 743$  and 1310 observations. Model Wald  $\chi^2(7) = 212.50$ ,  $p < .001$ .

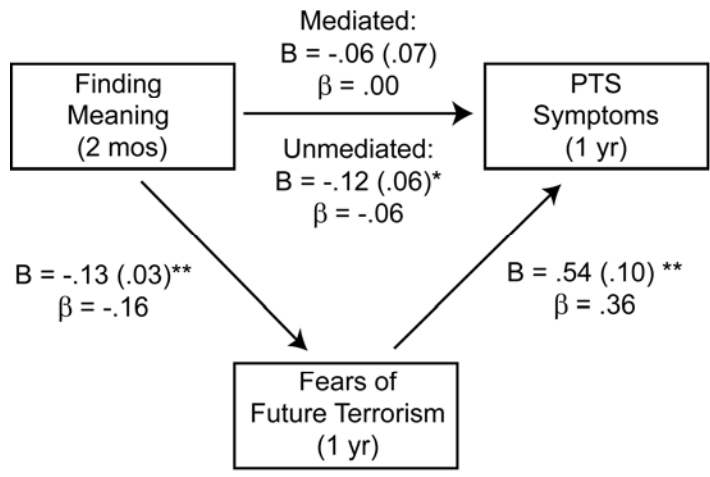
<sup>c</sup> All other two-way interactions between the meaning measures and pre 9/11 psychological diagnoses, exposure, and acute stress response were tested and found nonsignificant.

\* $p < .05$ , two-tailed \*\*  $p < .01$ , two-tailed

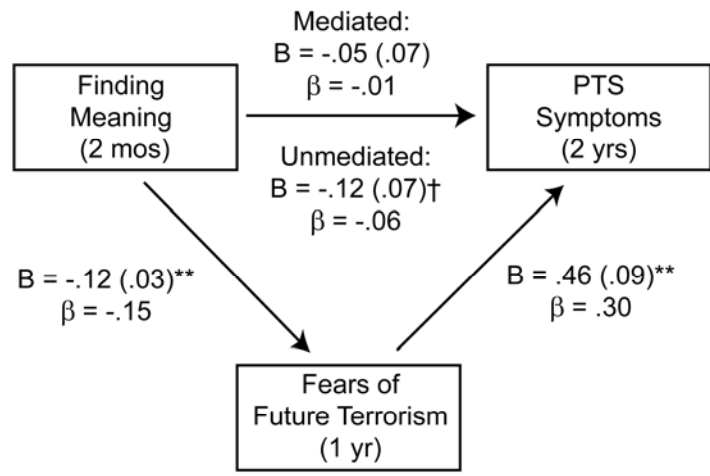
## Figure Caption

*Figure 1.* Mediation of PTS symptoms at 1- and 2-years post-9/11 by fears of terrorist attacks at 1-year. Note: Covariates (not shown) include pre-9/11 psychological diagnoses, proximity, exposure, acute stress response, and degree of searching at 2-months post-9/11. *B*'s values are unstandardized regression coefficients, with standard errors are in parentheses. Statistics and significance tests for paths predicting fears are from regressions that assume a normal outcome distribution; statistics and tests for paths predicting PTS symptoms are from regressions that assume a negative binomial outcome distribution. Standardized coefficients ( $\beta$ 's) are also provided; however, these  $\beta$ 's are derived from separate analyses that used an inverse and reflected transformation of PTS symptom scores and assumed a normal outcome distribution, and therefore are approximations for comparison purposes only.

\* $p < .05$ , two-tailed \*\*  $p < .01$ , two-tailed †  $p = .08$ , two tailed



**PTS Symptoms at 1-year (N = 740)**



**PTS Symptoms at 2-years (N = 566)**