

**The Impact of a Military Air Disaster on
The Health of Assistance Workers**

A Prospective Study

PAUL T. BARTONE, PH.D.,¹ ROBERT J. URSANO, M.D.,² KATHLEEN M. WRIGHT, PH.D.,¹
AND LARRY H. INGRAHAM, PH.D.¹

The worst peacetime disaster in United States Army history occurred on December 12, 1985 in Gander, Newfoundland. A charter airline carrying 248 soldiers home from peacekeeping duties in the Sinai Desert crashed after a refueling stop, killing all on board. After the crash, Army family assistance workers were appointed to help the surviving family members of each dead soldier. While substantial attention has been paid to the impact of sudden disasters on survivors and bereaved relatives, little is known about the health risks to those who perform helper roles. This study aimed to: a) identify the major stress areas for disaster family assistance workers; b) examine the relation between degree of exposure to these stressors and health; and c) locate risk factors, or resistance resources that might modulate any ill effects of exposure. A survey instrument assessed duration and intensity of family-helping activities and psychological well-being, psychiatric symptoms, major illness indicators, and social and personality variables at 6 months after the crash and again at the 1-year point for 131 family assistance officers. Results indicate a dose-response effect between exposure measured at time 1 and well-being, symptoms, and illness at time 2. Analysis of covariance findings also show that social supports (work supervisors, family, and friends) modulate the effects of exposure on symptoms and well-being. Social supports and the personality style of hardiness (or dispositional resilience) interact to modulate the effects of exposure on illness. These results demonstrate: a) a delayed negative impact of helper stress on family assistance workers, and b) a protective function of social supports and personality hardiness. Further research in this area should thus consider the potential influence of social/situational variables and personality dispositions in coping with disaster helper stress.

In December 1985, a chartered Army jetliner crashed shortly after taking off from Gander International Airport in Newfoundland, killing all 248 soldiers and eight

crew members on board. This was one of three flights carrying United States soldiers home for Christmas after 6 months of peacekeeping duty in the Sinai. All were from Fort Campbell, Kentucky, where they had previously lived and worked together for 18 months or more. Wives and parents of the dead, crash site workers, morgue personnel, survivors in the military units, and the entire Fort Campbell community were affected by this unexpected disaster.

A substantial literature on human reactions to disasters has accumulated over the years, with researchers usually focusing on immediate or primary disaster victims (*e.g.*, Cobb and Lindemann, 1943; Lifton, 1968; Titchener and Kapp, 1976; Wallace, 1956). These are victims whose suffering is most immediate and noticeable, such as the seriously injured, the homeless

¹ Department of Military Psychiatry, Walter Reed Army Institute of Research (SGRD-UWI-A), Washington, DC 20307. Send reprint requests to Dr. Bartone.

² Department of Psychiatry, Uniformed Services University of the Health Sciences, Bethesda, MD.

Portions of this paper were presented at the 1987 Convention of the American Psychological Association in New York, NY.

The authors gratefully acknowledge the help of Maj. Susan Zivnуска and the Casualty Affairs Office of Ft. Campbell, KY; Melissa Norris Allen for assistance throughout the project; Joseph M. Rothberg, and several anonymous reviewers for helpful comments on the manuscript.

The views of the authors do not necessarily reflect the positions of the Department of the Army or of the Department of Defense (para 4-3, AR 360-5).

and displaced, and the bereaved relatives of the dead. In recent years, more attention is being directed toward understanding the effects of disasters on rescue workers and other disaster helpers (Raphael, 1986). Most such studies have focused on body handlers and morgue workers (*e.g.*, Hershisser and Quarantelli, 1976; Jones, 1985; Taylor, 1984), and on search and rescue personnel (*e.g.*, Durham et al., 1985; McFarlane and Raphael, 1984; Taylor and Frazer, 1982).

Since the introduction of posttraumatic stress disorder (PTSD) as a distinct psychiatric diagnostic category in DSM-III (American Psychiatric Association, 1980), many researchers have characterized disaster reactions in PTSD terms (*e.g.*, Foy et al., 1984; McFarlane, 1988a; Watson, 1987). But as Watson correctly observes, psychiatric disorders and disturbances besides PTSD can follow exposure to traumatic stress. Furthermore, there is much that is not understood regarding the phenomenology and specificity of PTSD (McFarlane, 1988b). Accordingly, PTSD diagnostic criteria are likely to evolve further as our knowledge increases (American Psychiatric Association, 1987). We are now beginning to appreciate the complex biopsychosocial factors involved in short- and long-term reactions to traumatic stress (Holloway and Ursano, 1984). Despite the obvious utility of the construct, it is thus premature to restrict attention solely to PTSD, thereby constraining both clinical and research activities related to traumatic stress reactions (Ursano, 1987).

Whatever the conceptual framework applied, investigators and clinicians have tended to ignore disaster workers whose role is to provide practical assistance and emotional support to bereaved family members. Given the findings of the few studies that have been done, this relative neglect seems little justified. For example, in the aftermath of the Granville (Australia) train disaster, Raphael et al. (1983-84) observed increased role confusion and associated feelings of depression and helplessness in workers whose principal function was providing emotional support to bereaved family members. Berah et al. (1984) found that, after the "Ash Wednesday" brush fires, intense and intimate involvements between helpers and victims led to increased muscle tension, fatigue, and sleep disturbances, especially for those providing emotional support and counseling. And, in a recent study of rescue workers in the Dallas/Ft. Worth Delta Airline crash, Keating et al. (1987) reported that those who worked primarily with families of victims displayed more symptoms than any other group considered.

After the Army's Gander disaster, Survivor Assistance Officers (SAOs) were assigned to care for the families of the dead, one SAO for each family. Usually, the SAO is a young officer living in the same geo-

graphic region as the bereaved. The role of the assistance officer is not always clearly defined; it can include everything from helping arrange the funeral to providing a sympathetic ear, and even a shoulder to cry on. The general guidance provided to SAOs following the Gander disaster was to "assist the family in any way possible." While published policy guidelines focus almost exclusively on administrative task requirements (*e.g.*, Department of the Army, 1980), assistance officers are in fact often exposed to extreme emotional reactions (Bartone, 1987). They are expected to help grieving and often distraught relatives negotiate the Army's often confusing administrative channels to obtain information and insurance benefits, and to assure that the remains, belongings, and personal affairs of the deceased are properly attended to. Ordinarily, the SAO ends his/her involvement with the family once the funeral is over and all appropriate family benefits have been arranged. But in the Gander disaster, the period of contact between officer and family members was unusually long, partly due to the extended body recovery and identification process. In many cases it was over 6 weeks before a positive identification was made, and it was over 2½ months before the last body was identified.

This tragic set of circumstances provided a rare opportunity to learn more about the role of family helpers in disaster scenarios and to explore the possible health consequences of the experience. In civilian air disasters, the study of family support providers is difficult for several reasons. First, victims tend to be strangers from widely scattered geographic regions. This makes follow-up of survivors, bereaved family members, and support providers difficult logistically (Frederick, 1981). Also, supports are usually informal and obtained from a variety of sources, including friends, relatives, and clergy. This often means that support providers are hard to pinpoint. Finally, organizations are sometimes reluctant to sponsor assistance programs for families of victims or to examine effects on support providers out of fear that such attentions might encourage lawsuits and disability claims (Williams et al., 1988). These problems were minimized in the current study. Although SAOs were scattered around the country (to be proximate to next-of-kin), the military organization provided some special mechanisms for contacting them. Also, SAOs were formally assigned as support providers, and thus were clearly identifiable as such. Finally, they carried out their family support activities in a generally nonlitigious context, because amounts of family death benefits were relatively fixed and all medical care for military support providers was free. Also, military members are restricted by law from suing their employer in most circumstances.

This study examines the officers who assisted bereaved family members after the Gander disaster, with three aims: a) to describe the role of family helpers in a mass tragedy and identify the major sources of stress; b) to examine the impact of such stress on the health and psychological well-being of assistance workers; and c) to identify the risk factors, or resistance resources that might modulate this relation.

Methods

Names and addresses for 191 of the approximately 250 Gander survivor assistance officers were provided by the Ft. Campbell Casualty Affairs Office (the remainder were not on file at that location). In order not to interfere with the sensitive activities of SAOs, the research described herein was postponed until 6 months after the crash. At that time a survey instrument was mailed to all assistance officers for whom addresses were available ($N = 191$). A total of 164 responded, or 86%. Modal response time was 2 weeks and the median was 7 weeks (many reported waiting until they completed SAO duties to return the survey). A follow-up survey was mailed to all time 1 respondents 1 year after the crash. There were 131 time 2 respondents, or 80% (69% of original available population). Modal response time was again 2 weeks, with a median of 4.

Exposure

A composite measure of exposure (or stress) at time 1 was constructed, reflecting duration and intensity of contact with surviving family members. This scale included the number of days for which the individual functioned as an assistance officer, number of contacts with surviving family member(s), number of family members actually assisted, proportion of time taken away from normal duties, time taken away from one's own family, whether or not the helper attended the funeral of the deceased, and whether the assistance officer also had responsibility for disposing of the victim's personal effects. Low, medium, and high exposure groups were defined by dividing the distribution at the upper and lower quartile points (low = bottom 25%; medium = middle 50%; and high = upper 25%).

Health

Self-report data on symptoms, recent illnesses, and sick call visits were obtained at both time points. To assess psychiatric symptoms, a 20-item checklist was used (see Appendix). This was composed primarily of 11 items from the psychosomatic complaints scale developed by Stouffer et al. (1950) in their "American Soldier" studies and later adapted by Bradburn (1969). Evidence for the validity and reliability of the Stouffer scale comes from large-scale studies of American sol-

diers during World War II. The test was 89% effective in identifying hospitalized psychoneurotic patients ($N = 563$) and showed 1-week test-retest reliability of .90 in that sample and .93 in a sample of normals ($N = 3,501$; Stouffer et al., 1950). This scale was augmented with nine items drawn from the Hopkins Symptoms Checklist (Derogatis et al., 1974) representing complaints frequently seen in studies of traumatic stress, such as trouble sleeping and depressed mood (Raphael, 1986; Weisaeth and Sund, 1982). Response options ranged from 0 (none) to 3 (very often). Factor analyses (using time 1 SAO data) showed four factors, accounting for 48% of the variance: depression/withdrawal, hyperalertness, generalized anxiety, and somatic complaints. Reliability (Cronbach's alpha) for the full 20-item scale was .90 at time 1, and .93 at time 2. For most of the analyses reported here, responses were summed to create a total symptoms score for SAOs at each time point.

A composite illness index was created, including number of sick call visits over the previous 6 months (excluding regular check-ups), number of work days missed because of illness, and a one-item descriptor of general health.

Also included was a measure of mood state or happiness, the familiar Bradburn (1969) scale of psychological well-being. This 10-item scale yields scores on two distinct conceptual dimensions, positive affect and negative affect. It has demonstrated appropriate convergent and discriminant validity in a variety of studies (*cf.*, Berkman, 1971; Bradburn, 1969). For the present study, the wording of several items was simplified, and a 0 to 5 response option format was used (after Wetzler et al., 1983; see Appendix).

Personality Hardiness

The time 2 survey included a modified version of Kobasa's (1979) measure of personality hardiness. Hardiness is thought to represent the characteristic manner in which a person approaches and interprets experience. It is usually described in terms of three closely-related dispositional tendencies: a) commitment, a sense of meaning and purpose imputed to one's existence encompassing self, others, and work; b) control, a sense of autonomy and ability to influence one's own destiny; and c) challenge, a kind of zest for life and living that leads one to perceive changes as exciting and as opportunities for growth rather than threats to security or survival (Maddi and Kobasa, 1984). There is good evidence that hardiness is an especially salient dimension in influencing how people process and cope with stressful life circumstances (Kobasa et al., 1982).

The hardiness measure used here (Appendix) is a slightly modified version of a scale originally developed

for use with blue-collar workers.³ It corrects a number of problems found in the original hardiness measure, such as long and awkward wordings and the exclusive use of negative item indicators (*cf.* Funk and Houston, 1987). Of 76 available items, 45 were chosen on the basis of high item-scale correlations among bus drivers ($N = 787$) and lower-level managers ($N = 190$; see Maddi et al., 1987 for a description of the manager sample). This 45-item measure correlates $-.93$ with the older and longer form of the test.⁴ Evidence for the construct validity of the old hardiness test is summarized in Kobasa et al., 1985. Principal components factor analyses (varimax rotation) revealed three factors of commitment, challenge, and control in samples of bus drivers ($N = 787$) and Army officers ($N = 111$), confirming the relevance of a three-facet model of hardiness. The three subscales used here show good reliability, as indexed by internal consistency coefficients ranging from $.62$ to $.82$. For the overall measure, Cronbach's $\alpha = .85$.⁵

Social Supports

An index of received social supports was constructed using information provided by the respondent on the reactions of family, friends, and supervisors to his/her assignment as a family assistance officer. Responses to these items were coded on a 1 to 5 scale with 1 = totally nonsupportive, 2 = mostly nonsupportive, 3 = neutral, 4 = mostly supportive, and 5 = extremely supportive. Percent agreement between the two raters was 91%, with disagreements resolved by later discussion. Scores on the three items were then summed to create a total received support measure.

Results

Respondents ranged in age from 22 to 51, with a median of 34. The majority, 73%, were within the ages

of 27 and 39. They were 93% male, 85% white, and 79% married.⁶ Ninety-four percent had at least a college degree. Most (51%) of the SAOs were captains, followed by majors (31%), and lieutenants (10%). Twenty-seven percent provided assistance to one family member, 25% helped two, 25% helped three, and 19% assisted four family members. The most common situation was for a family assistance worker to help both parents of a decedent (48%). Seventeen percent helped widows only (some with children) and 15% helped mothers only. Eleven percent of SAOs assisted two parents and a widow, and 4% helped a mother and a widow.

Content analysis of responses to the open-ended questions revealed four major areas of stress for the family assistance officers. First, many reported being unprepared to deal with the profound grief of widows and bereaved parents. Especially in the early and often awkward first meetings of helpers with family members, there were frequent open expressions of sorrow and anger. Assistance officers described feeling sad, helpless, and disturbed by such encounters. Second, a 1- to 2-week period of extreme confusion and disorder was commonly referred to as extremely trying. Factual information was scant early on, and communication was impeded by the physical separation of the crash site (Gander, Newfoundland), the morgue operations center (Dover Air Force Base, Delaware), and the flight origination point (Egypt). It took over a day simply to confirm the passenger list. Third, the lengthy body identification process was reported by family helpers as an especially trying aspect of the experience. In fact, it was 2½ months before the final body was positively identified. There was little the family assistance officers could do during this period to comfort anxious families waiting for news of their loved ones. Finally, many family assistance officers described having difficulty dissociating themselves from the victim and family. A common experience was imagining oneself in the place of the deceased, often associated with a powerful desire to relieve the pain of family survivors. Many SAOs developed strong emotional ties with the families they assisted, making it difficult to disengage and return to normal activities at an appropriate time.

For the total group, the mean number of symptoms reported at time 1 was 3.11 (out of 20 possible; responses other than "none" counted as indications of symptoms). The most commonly reported symptoms were: headaches (40%), feeling nervous or tense (33%),

³ Reported in: Bartone P. (1984) *Stress and Health in Chicago Transit Authority Bus Drivers*. Unpublished Doctoral Dissertation, Department of Behavioral Sciences, University of Chicago. (A machine-scorable hardiness measure is available through the Hardiness Institute, 5 Revere Drive, Suite 200, Northbrook, IL 60062.)

⁴ Obtained in a large ($N = 787$) sample of city bus drivers. The magnitude of this correlation is due somewhat to overlapping items in old and new forms of the test. The correlation between completely nonredundant items in both forms is $-.71$ ($N = 791$). The old hardiness test is that used most commonly in the Chicago studies conducted by Kobasa et al. (1981, 1982). It consists of items from six scales: a) alienation from work; b) alienation from self (Maddi et al., 1979); c) external locus of control (Rotter et al., 1962); d) powerlessness (Maddi et al., 1979); e) security (Hahn, 1966); and f) cognitive structure (Jackson, 1974).

⁵ It is hoped this discussion of facets of hardiness will not lead investigators to proceed in a simple reductionistic manner regarding this construct. Although it may aid understanding to consider different aspects of this dispositional style, to treat them independently risks obscuring what is apparently a complex, nonreducible phenomenon (Koch, 1965; Maddi et al., 1987).

⁶ Unfortunately, this left too few female SAOs for analysis of possible sex differences. Although the finding cannot be considered reliable, those few female SAOs for whom data were available at both time points ($N = 6$) did report slightly more symptoms than did male SAOs ($p < .06$).

trouble sleeping (31%), general aches and pains (29%), common cold (25%), depressed mood (21%), and tired/lacking energy (20%). Overall, twice as many symptoms were reported at time 2 ($\bar{X} = 6.59$). Most common were headaches (63%), common cold (59%), general aches and pains (56%), feeling nervous or tense (52%), tired/lacking energy (51%), trouble sleeping (49%), difficulty concentrating (49%), upset stomach (45%), and depressed mood (40%). Matched-pair *t*-tests (comparing the same subjects over time) showed significant increases in all symptoms but one (taking medication to relax/sleep). These results are summarized in Table 1.

Analysis of covariance (ANCOVA) procedures were used to examine the effects of exposure on psychological well-being, psychiatric symptoms, and illness, and to identify any modulating effects of social supports or personality hardiness. This technique allows for the simultaneous evaluation of the effects of exposure, social supports, and hardiness on health outcomes, as well as for the control of time 1 health levels. As previously described, respondents who completed both surveys were classified into three exposure groups based upon duration and intensity of family helping activities: high exposure (upper quartile of distribution), medium exposure (middle 50% of distribution), and low exposure (lower quartile of distribution). Also, respondents were grouped as either high or low in hardiness and high or low in social supports (above or below the median).⁷

ANCOVAs were performed on the outcome variables of psychological well-being, psychiatric symptoms, and illness, entering as covariate in each case the corresponding time 1 health measure (most ANCOVAs were done on 100 SAOs with complete data on all variables). For example, the analysis on time 2 psychological well-being entered time 1 well-being into

TABLE 1
Means and Matched-Pair Differences for Symptoms over Time

Symptom	N	Time 1	Time 2	Matched-Pair Difference	T
Common cold	122	.246	.591	.336	5.94***
Dizziness	121	.049	.153	.107	2.79**
Aches and pains	122	.287	.561	.279	5.46***
Hands sweating	121	.107	.220	.107	2.79**
Headaches	122	.402	.629	.238	4.95***
Muscle twitches	122	.139	.295	.139	3.16**
Nervous or tense	122	.328	.523	.189	3.89***
Rapid heart beat	121	.059	.212	.157	4.23***
Shortness of breath	121	.066	.167	.107	3.80***
Skin rashes	121	.091	.182	.074	2.09*
Upset stomach	122	.188	.447	.254	5.72***
Trouble sleeping	121	.314	.485	.174	3.86***
Depressed mood	121	.215	.402	.182	3.87***
Trouble concentrating	121	.182	.485	.289	5.74***
Crying easily	122	.041	.121	.074	2.55*
Loss of appetite	122	.066	.182	.115	2.95**
Medication to relax/sleep	122	.033	.054	.016	1.00
Tired/lack of energy	121	.198	.508	.306	5.85***
General loss of interest	122	.074	.242	.164	4.38***
Life is meaningless	120	.033	.144	.100	3.11**

* $p < .05$; ** $p < .01$; *** $p < .001$.

the model as a covariate. This technique provides a fairly rigorous control for two potential sources of contamination in the stress-illness relation. First is the influence of preexisting and persistent health problems that might lead to spuriously high relations with stress (as people who are sick might exaggerate stress reports in an effort to find culturally acceptable explanations for their illness). Also controlled for are the potential contaminating effects of characteristic neurotic complaining, which leads some people to exaggerate both stress and illness reports (Costa and McCrae, 1985; Maddi et al., 1987; Schroeder and Costa, 1984). Controlling for time 1 levels thus reduces the risk of type I error, although increasing to some degree the type II error risk. In what follows, only statistically significant effects are reported.

First considering psychological well-being, results show a clear dose-response effect, with well-being diminishing as a function of higher exposure (Figure 1). Main (independent) effects were found for exposure ($p < .05$), support ($p < .05$), and hardiness ($p < .001$). Levels of overall well-being are lowest for SAOs who are low in personality hardiness or social supports and high in exposure. High support and high hardiness groups show almost no change in psychological well-being from medium to high exposure conditions. Family helpers high in hardiness are also highest in psychological well-being across all three exposure levels. Those low in hardiness are likewise lowest in well-being.

Although there was no significant interaction effect between supports and hardiness (so combined effects are not displayed in Figure 1), it is still instructive to

⁷ Some readers may wonder why variables scored on a continuous scale were transformed into categorical variables, and why regression procedures were not used instead of analysis of variance. Funk and Houston (1987) have even argued that ANOVA is an inappropriate statistical technique for analyzing hardiness data. In fact personality hardiness, like many social-psychological variables, is probably best treated as an ordinal rather than an interval variable given: a) the lack of measurement precision (no personality test is ever likely to provide fine gradient distinctions comparable to those yielded by instruments such as thermometers); b) inherent properties of the concept itself (does a difference of 2 or 3 points in hardiness scores represent a meaningful difference in how experience gets processed?); and c) the unlikelihood that respondents could accurately report such fine distinctions, regardless of the accuracy of the scale or nature of the concept. Just as people can provide reasonably accurate judgements about water temperature (cold, lukewarm, hot) without being able to specify degrees Celsius, so also they may be able to report accurately on their own tendencies and attitudes, although a 10-point scale is likely to provide more categories than are used, and so represents an artificial level of precision (cf. Bradburn, 1969; Hildebrand et al., 1977).

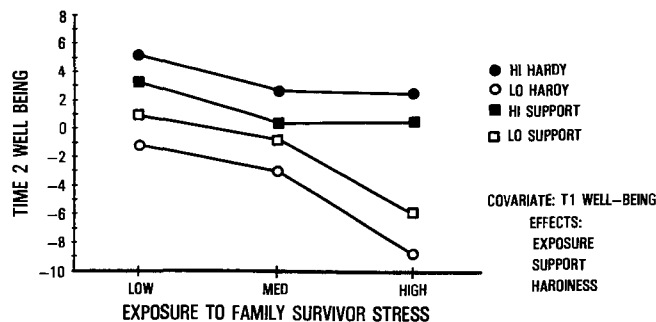


FIG. 1. Time 2 psychological well-being for various exposure groups ($N = 100$ with complete data on all measures; variance accounted for is 39% without covariate, 52% with covariate in model; minimum significant difference = 2.16 at 95% confidence).

examine the combined effects of these variables on psychological well-being. High exposure family helpers who were low in both hardiness and social support were by far the lowest in time 2 psychological well-being ($\bar{X} = -14.2$), while those highest in well-being ($\bar{X} = 6.0$) were high in both these resources and low in exposure. Those high in both resources appeared resilient under high exposure, with moderate positive scores on well-being ($\bar{X} = 2.7$). These results suggest an additive effect for both social supports and hardiness on psychological well-being, at least at low and medium exposure levels. At high exposure levels, these resources appear to lend resiliency to their owners. Those high in either hardiness or social supports maintain relatively high levels of well-being, while those low in either resource are at the lowest levels of well-being.

As mentioned earlier, Bradburn and others maintain that psychological well-being is not a unidimensional construct, but rather is composed of two independent elements. The negative affect component has been shown to correlate strongly with various measures of anxiety, neurotic tendencies, and psychic impairment. In contrast, positive affect is more related to a sense of control over one's environment and oneself, success in the pursuit of goals, and ego strength (Bradburn, 1969). To explore the possible differential effects of exposure on positive and negative well-being, these dimensions were examined separately in analyses similar to that for total well-being.

Looking first at positive affect, main (independent) effects were seen for support ($p < .01$) and hardiness ($p < .001$), but not for exposure (Figure 2). The most significant group contrasts are at the high exposure condition, where those low in either resource are lowest in positive well-being or affect.

For negative affect, a main (independent) effect was seen for hardiness ($p < .001$), and an interaction effect for support \times hardiness ($p < .05$; Figure 3). Those low in hardiness or support were highest in negative

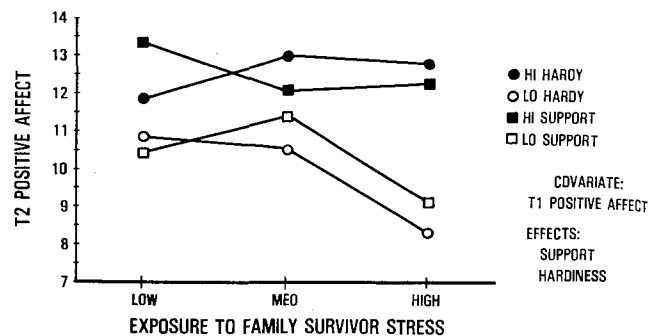


FIG. 2. Time 2 positive affect for various exposure groups ($N = 100$; variance accounted for is 32% without covariate, 43% with covariate in model; minimum significant difference = 1.07 at 95% confidence).

affect. The combined effects of support and hardiness (not displayed in Figure 3) show an unexpected result. While those low in both resources are highest in negative affect ($\bar{X} = 15.0$), the lowest levels of negative affect ($\bar{X} = 8.9$) are reported by SAOs high in hardiness, but low in social support (with high support groups in between).

It is interesting that, while negative affect either increased or stayed the same with higher exposure, increased exposure was actually associated with somewhat higher positive affect for two groups. Those high in hardiness are higher in positive affect at medium exposure levels ($\bar{X} = 13.0$), and comparably high even at high exposure ($\bar{X} = 12.8$). Those low in social supports are also slightly higher in positive affect at medium exposure ($\bar{X} = 11.4$), but are considerably lower at high exposure levels ($\bar{X} = 9.2$). These results suggest that under increasingly stressful conditions, overall psychological well-being may sometimes be maintained by increases in positive well-being that offset increases in negative well-being.

The next analysis examines effects of exposure, social supports, and hardiness on time 2 psychiatric

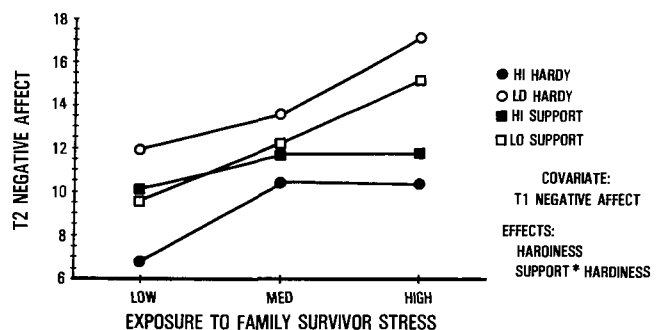


FIG. 3. Time 2 negative affect for various exposure groups ($N = 100$; variance accounted for is 33% without covariate, 45% with covariate in model; minimum significant difference = 1.6 at 95% confidence).

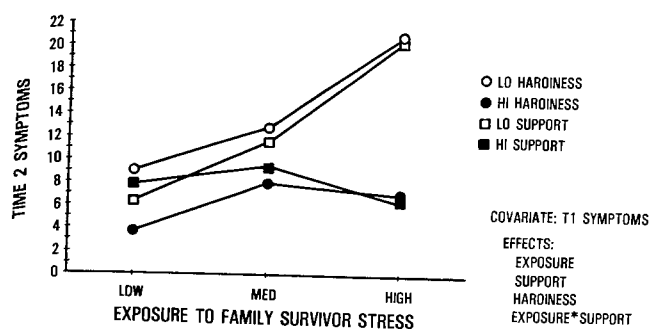


FIG. 4. Time 2 symptoms for various exposure groups ($N = 99$; variance accounted for is 42% without covariate, 58% with covariate in model; minimum significant difference = 2.6 at 95% confidence).

symptoms, controlling for time 1 symptom levels. Significant, independent main effects were seen for exposure ($p < .01$), supports ($p < .01$), and hardiness ($p < .001$), and a significant interaction effect for exposure \times supports ($p < .05$; Figure 4). Again, both hardiness and social supports show additive effects with exposure at low and medium levels, and apparent buffering effects at high exposure. Survivor assistance officers who are low in either personality hardiness or social supports show higher symptom scores than other groups, while those high in either resource report relatively few symptoms despite high exposure.

The final analysis examined reported illness (composite measure), controlling for time 1 general health levels (Figure 5). A significant 3-way interaction effect was observed for exposure \times supports \times hardiness ($p < .05$), a 2-way interaction for supports \times hardiness ($p < .05$), and a main effect for social supports ($p < .05$). Family helpers low in both hardiness and social supports report more illness than those high in these resources, and both groups show linear increases with exposure. Those high in hardiness but low in support show rather comparable illness levels across exposure categories. An unusual pattern is seen for family helpers high in supports but low in hardiness. They report

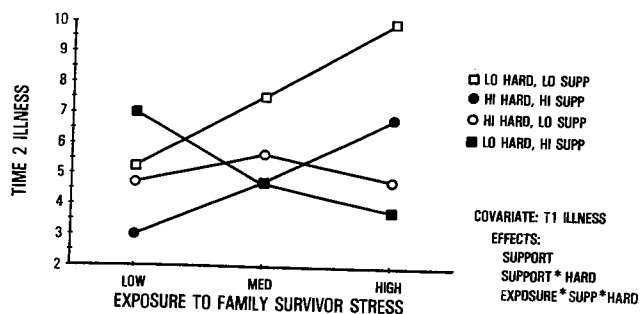


FIG. 5. Time 2 illness for various exposure groups ($N = 99$; variance accounted for is 20% without covariate, 23% with covariate in model; minimum significant difference = 1.35 at 95% confidence).

more illness ($\bar{X} = 7.0$) than other groups at the low exposure condition, but less illness ($\bar{X} = 3.8$) at high exposure.

Discussion

These results indicate that survivor assistance workers who provide support to bereaved families of disaster victims are at risk for increased illness, psychiatric symptoms, and negative psychological well-being for up to a year after beginning their support activities. In the Gander disaster, there was an unusually long period of contact between helpers and families, averaging 5½ months. Providing practical and emotional assistance to grieving families under circumstances such as these is evidently a very demanding activity. Family assistance workers in this study described as especially trying the initial period of disruption and disorder, the long body identification effort, seeing themselves in place of the dead, and a sense of being powerless to help either the dead or their grieving relatives. The time 1 data (6 months postcrash) do suggest some early ill effects associated with this stress; a dose-response curve was seen between degree of exposure to bereaved family members and the outcome variables of psychological well-being, psychiatric symptoms, and illness.

The 1-year follow-up data revealed increased negative health consequences. These data show increased ill effects associated with providing support to families of disaster victims and suggest a delayed expression of these effects. It is possible that "anniversary reactions" (Raphael, 1983; Frederick, 1981) account for some of the increased distress observed at time 2. Since the Gander crash occurred so close to the Christmas holiday, subsequent holidays might provide many seasonal reminders to stir memories of the event. Still, the findings show that degree of distress is related to degree of exposure, despite possible intensification by anniversary reactions. Planned follow-up studies of SAOs may allow better specification of the impact of seasonal reminders.

Whether the observed effects are more due to the unusual demands of the disaster helper role (qualitative factors), or rather to the long period of helping activities (quantitative factors) is not clear. Most likely, it is some combination of both. Not only is the bereaved family helper role peculiarly taxing but, unlike the role of the typical rescue worker, its demands can persist for a long time. Such was certainly the case in the Gander disaster, where the average period of official involvement was 5½ months (and in many cases, unofficial contact between SAO and family members continued long beyond this point). In some respects, this kind of stress may be akin to the chronic stress of living near a nuclear or chemical disaster site, such as

Three Mile Island or Love Canal. Other investigators have documented the harmful psychological effects of long-term exposure to a persistent stressor (Baum et al., 1983; Bromet and Schulberg, 1986; Fowlkes and Miller, 1982).

Providing assistance and emotional support to bereaved family members plainly involves a different set of tensions than those associated with living near a nuclear accident site. But what are they? Raphael (1986) suggests there are three sources of extreme stress for helpers in disasters: a) the close encounter with death, which reminds helpers of their own vulnerability; b) sharing the anguish of victims and families, and the close empathic identification that often results; and c) role ambiguity and conflict. The present study indicates that all three sources of stress were operative for Gander survivor assistance officers. Role issues were especially troublesome. The assistance officer role is not always clearly described by the sponsor organization, leaving many helpers to define it for themselves. Also, providing emotional support to grieving relatives is an unfamiliar activity for most family assistance officers, in contrast to Army chaplains for example, who deal with death on a more regular basis. And finally, the demands of the normal workload usually continue unabated. Family assistance officers were often in conflict as to how to allocate their time, feeling pressured to meet their normal work responsibilities and yet desiring to assist and comfort families still in need. Organizations that sponsor such activities might benefit from a consideration of conflicting role demands placed on disaster helpers, as well as the desirability of adequate training and preparation for the helper role.⁸

Perhaps the most significant findings of this study are those that implicate social supports and personality hardiness or resilience as modulators of the deleterious impact of disaster helper stress. The supports of family, friends, and work supervisors (commanders) with regard to the survivor assistance role was an important resource for many SAOs. Particularly at high exposure or stress levels, having these kinds of supports seemed to protect individuals from related psychological and physical morbidity. Event-specific social supports in extreme circumstances such as this may serve to enhance a sense of commitment to the task, thereby also diminishing the sense of role conflict and confusion.

The personality style of hardiness, or "dispositional resilience" also emerged as an important modulator of disaster helper stress. Possibly, individuals high in

these tendencies adjust more readily to the chaos and confusion of disaster situations, and are more apt to perceive challenges and opportunities for growth where others see only threat and disruption. Disaster helpers with a characteristic hardy world view may be more likely to regard their assistance activities as highly meaningful, and so also be more committed to the role.⁹ Additionally, they are perhaps better equipped to step into and make sense of ambiguously defined roles, drawing upon a personal sense of control to formulate their own definitions and decisions. Here lies a possible explanation for why many individuals affected by disasters of various kinds have apparently benefited from their experiences, rather than suffering any lasting damage (*e.g.*, Fritz, 1961; Quarantelli, 1985). In terms of long-term effects, it may also be that individuals with hardy or resilient dispositions are more prone to make the kind of optimistic retrospective appraisals of traumatic experiences seen in various studies of Vietnam veterans and prisoners of war (Holloway and Ursano, 1984; Sledge et al., 1980; Ursano et al., 1981).

Finally, the findings with respect to the composite illness indicator would caution against any simple understanding of the benefits of either social supports or personality hardiness. Clearly, these dimensions can interact in complex ways with each other and with degree of stress. In this study, SAOs high or low in both resources show steadily higher illness with increased exposure (although SAOs high in both are relatively more healthy across exposure levels). But those high in just one or the other resource show a complex pattern of illness scores. The group reporting highest illness levels at low exposure comprise those low in hardiness but high in social supports.

One possible explanation is that social supports for low-hardy SAOs have the unfortunate effect of encouraging illness behavior (Mechanic, 1980). As Kobasa and Puccetti (1983) found with executives, social supports for nonhardy individuals can be like pampering, encouraging avoidance coping and more real or imagined illness. But if this interpretation were correct, then high support/low hardy SAOs would be expected to report even more illness as exposure increases. In fact, they report less. A more likely explanation is that high support/low hardy SAOs experience greater conflict or cognitive dissonance at low exposure levels, which then impacts on health. While the people around them (bosses, family, friends) are reinforcing the importance of their SAO duties, they

⁸ Additional prevention and treatment implications are beyond the purview of this report. The interested reader is referred to Williams et al. (1988) and Wright (1987).

⁹ The question of commitment to the role of SAO was explored from another direction, by examining the effect of having volunteered, as opposed to being assigned to the duty. Volunteers ($N = 25$) were found to be somewhat less at risk for illness (ANCOVA, $p < .06$) than nonvolunteers. No other effects for volunteer status were observed.

little in that role (by definition, low exposure). Without the additional resilience provided by hardiness, they respond to this conflict with more illness behavior or actual illness. As exposure increases, this conflict diminishes and so does illness. Perhaps future studies can address some of these possibilities more directly.

Conclusions

This study has demonstrated long-term negative health consequences among a large group of Army officers, related to their role as helpers of bereaved families after a major air disaster. Degree of exposure to bereaved family members was directly related to several measures of mental and physical distress.

Perhaps more importantly, we find that the relation between disaster helper stress and morbidity is not a simple one. For many survivor assistance officers, the effects of their activities were tempered by social supports provided by bosses, family and friends, and by a personality style described as hardiness. Generally, those high in social supports and hardiness remained healthy under prolonged stress, while those low in these resources were most at risk for illness.

The extent to which these findings are generalizable to other kinds of helpers in disasters, or to helpers of bereaved people generally (following nondisaster deaths) is an open question. Further research should attempt to clarify the stress conditions under which dispositional resilience or hardiness serves a protective function, and what the mechanisms involved are. The relation of hardiness to other apparently similar constructs, such as Antonovsky's (1979) "sense of coherence," and Scheier and Carver's (1985) "dispositional optimism," should also be examined.

The kinds of social supports that proved helpful to family assistance officers following the Gander disaster were event specific and limited in scope, as opposed to generalized social networks. More work is needed to explore what the most effective kinds of supports are, under what circumstances they are protective, for whom, and at what times. The results of such studies will have important implications for the prevention and treatment of stress-related disorders among those who assist disaster victims.

References

- American Psychiatric Association (1980) *Diagnostic and statistical manual of mental disorders* (3rd ed). Washington, DC: Author.
- American Psychiatric Association (1987) *Diagnostic and statistical manual of mental disorders* (3rd ed revised). Washington, DC: Author.
- Antonovsky A (1979) *Health, stress and coping*. San Francisco: Jossey-Bass.
- Bartone, P (1987) *Boundary crossers: The role of Army family assistance officers in the Gander disaster*. Paper presented at Biennial Conference of Inter-University Seminar on Armed Forces and Society, Chicago, IL.
- Baum A, Gatchel RJ, Schaeffer MA (1983) Emotional, behavioral, and physiological effects of chronic stress at Three Mile Island. *J Consult Clin Psychol* 51:565-572.
- Berach EF, Jones HJ, Valent P (1984) The experience of a mental health team involved in the early phase of a disaster. *Aust NZ J Psychiatry* 18:354-358.
- Berkman PL (1971) Measurement of mental health in a general population survey. *Am J Epidemiol* 94:105-111.
- Bradburn N (1969) *The structure of psychological well-being*. Chicago: Aldine.
- Bromet E, Schulberg HC (1986) The Three Mile Island disaster: A search for high-risk groups. In J Shore (Ed) *Disaster stress studies: New methods and findings*. Washington, DC: American Psychiatric Press.
- Cobb S, Lindemann E (1943) Neuropsychiatric observations during the Coconut Grove fire. *Ann Surg* 117:814-824.
- Costa PT, McCrae RR (1985) Hypochondriasis, neuroticism, and aging: When are somatic complaints unfounded? *Am Psychol* 40:19-28.
- Department of the Army (1980) *Casualty assistance handbook* (DA Pamphlet 608-33; US GPO 310-980/1024). Washington, DC: US Government Printing Office.
- Derogatis LR, Lipman RS, Rickels K, et al (1974) The Hopkins Symptoms Checklist (HSCL): A measure of primary symptom dimensions. In P Pichot (Ed) *Psychological measurements in psychopharmacology: Modern problems in pharmacopsychiatry* (vol 7, pp 79-110). Basel: Karger.
- Durham TW, McCammon SL, Allison EJ (1985) The psychological impact of disaster on rescue personnel. *Ann Emerg Med* 14:664-668.
- Fowlkes MR, Miller P (1982) *Love Canal: The social construction of disaster*. Washington, DC: Federal Emergency Management Agency, Project No. 6441E.
- Foy DW, Sippelle RC, Rueger DB, et al (1984) Etiology of post-traumatic stress disorder in Vietnam veterans: Analysis of pre-military, military, and combat exposure influences. *J Consult Clin Psychol* 52:79-87.
- Frederick CJ (Ed) (1981) *Aircraft accidents: Emergency mental health problems* (DHHS Publication ADM 81-956). Washington, DC: US Government Printing Office.
- Fritz CE (1961) Disaster. In R Merton, RA Nisbet (Eds) *Contemporary social problems*. New York: Harcourt, Brace & World.
- Funk SC, Houston BK (1987) A critical analysis of the hardiness scale's validity and utility. *J Pers Soc Psychol* 53:572-578.
- Hahn ME (1966) *California Life Goals Evaluation Schedule*. Palo Alto, CA: Western Psychological Services.
- Hershisher MR, Quarantelli E (1976) The handling of the dead in a disaster. *Omega* 7:195-208.
- Hildebrand DK, Laing JD, Rosenthal H (1977) *Analysis of Ordinal Data*. Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-008. Beverly Hills and London: Sage.
- Holloway HC, Ursano RJ (1984) The Vietnam veteran: Memory, social context, and metaphor. *Psychiatry* 47:103-108.
- Jackson DN (1974) *Personality research form manual*. Goshen, NY: Research Psychologists Press.
- Jones D (1985) Secondary disaster victims: The emotional effects of recovering and identifying human remains. *Am J Psychiatry* 142:303-307.
- Keating JP, Blumenfeld M, Reilly M, et al (1987, May) Post-disaster stress in emergency responders. Paper presented at the American Psychiatric Association meetings, Chicago.
- Kobasa SC (1979) Stressful life events, personality, and health: An inquiry into hardiness. *J Pers Soc Psychol* 37:1-11.
- Kobasa SC, Maddi SR, Courington S (1981) Personality and constitution as mediators in the stress-illness relationship. *Health Soc Behav* 22:368-378.
- Kobasa SC, Maddi SR, Kahn S (1982) Hardiness and health: A prospective study. *J Pers Soc Psychol* 42:168-177.
- Kobasa SC, Puccetti MC (1983) Personality and social resources in stress-resistance. *J Pers Soc Psychol* 45:839-850.
- Kobasa SC, Maddi SR, Puccetti MC, et al (1985) Effectiveness of

- hardiness, exercise and social support as resources against illness. *J Psychosom Res* 29:525-533.
- Koch S (1965) The allures of a meaning in modern psychology. In RE Farson (Ed) *Science and human affairs*. Palo Alto, CA: Science and Behavior Books.
- Lifton RJ (1968) *Death in life: The survivors of Hiroshima*. London: Weidenfeld and Nicholson.
- Maddi SR, Bartone PT, Puccetti MC (1987) Stressful events are indeed a factor in physical illness: Reply to Schroeder and Costa (1984) *J Pers Soc Psychol* 52:833-843.
- Maddi SR, Kobasa SC (1984) *The hardy executive: Health under stress*. Homewood, IL: Dow Jones-Irwin.
- Maddi SR, Kobasa SC, Hoover M (1979) An alienation test. *J Humanistic Psychol* 19:73-76.
- McFarlane AC (1988a) The phenomenology of posttraumatic stress disorders following a natural disaster. *J Nerv Ment Dis* 176:22-29.
- McFarlane AC (1988b) The longitudinal course of posttraumatic morbidity: The range of outcomes and their predictors. *J Nerv Ment Dis* 176:30-39.
- McFarlane AC, Raphael B (1984) Ash Wednesday: The effects of a fire. *Aust NZ J Psychiatry* 18:341-353.
- Mechanic D (1980) The experience and reporting of common physical complaints. *Health Soc Behav* 21:146-155.
- Quarantelli EL (1985) An assessment of conflicting views on mental health: The consequences of traumatic events. In CR Figley (Ed) *Trauma and its wake*. New York: Brunner/Mazel.
- Raphael B (1983) *The anatomy of bereavement*. New York: Basic.
- Raphael B (1986) *When disaster strikes*. New York: Basic.
- Raphael B, Singh B, Bradbury L, et al (1983-84) Who helps the helpers? The effects of a disaster on the rescue workers. *Omega* 14:9-20.
- Rotter JB, Seeman M, Liverant S (1962) Internal vs external locus of control of reinforcement: A major variable in behavioral theory. In NF Washburne (Ed), *Decisions, values and groups*. London: Pergamon.
- Scheier MF, Carver CS (1985) Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychol* 4:219-247.
- Schroeder DH, Costa PT (1984) Influence of life event stress on physical illness: Substantive effects or methodological flaws? *J Pers Soc Psychol* 46:853-863.
- Sledge WH, Boydston JA, Rahe AJ (1980) Self-concept changes related to war captivity. *Arch Gen Psychiatry* 37:430-443.
- Stouffer SA, Guttman L, Suchman EA, et al (1950) *Studies in social psychology in World War II: Measurement and prediction* (Vol 4). Princeton, NJ: Princeton University Press.
- Taylor AJW (1984) Architecture and society: Disaster structures and human stress. *Ergonomics* 30:446-451.
- Taylor AJW, Frazer AG (1982) The stress of postdisaster body handling and victim identification work. *J Human Stress* 4:12.
- Titchener JL, Kapp FT (1976) Family and character change at Buffalo Creek. *Am J Psychiatry* 133:295-316.
- Ursano RJ (1987) Posttraumatic stress disorder: The stressor criterion. *J Nerv Ment Dis* 175:273-275.
- Ursano RJ, Boydston JA, Wheatley RD (1981) Psychiatric illness in U.S. Air Force Viet Nam prisoners of war: A five-year follow-up. *Am J Psychiatry* 138:310-314.
- Wallace AFC (1956) Human behavior in extreme situations. In *Disaster Study No. 1 (Publication 390)*. Washington, DC: National Research Council Committee on Disaster Studies, National Academy of Sciences.
- Watson PB (1987) Post-traumatic stress disorder in Australia and New Zealand: A clinical review of the consequences of inescapable horror. *Med J Aust* 147:443-447.
- Weisaeth L, Sund A (1982) Psychiatric problems in Unifil and the U.N. Soldiers Stress Syndrome. *Int Review of the Army, Navy, and Air Force Medical Services* 55:109-116.
- Wetzler HP, Ursano RJ, Cruess DF (1983) Psychological well-being in United States Air Force fliers. *J Nerv Ment Dis* 171:342-347.
- Williams CL, Solomon SD, Bartone PT (1988) Primary prevention in aircraft disasters: Integrating research and practice. *Am Psychol* 43:730-739.
- Wright KM (Ed) (1987) *The human response to the Gander Military Air Disaster: A Summary Report* (WRAIR-NP-88-12). Washington, DC: Walter Reed Army Institute of Research.

APPENDIX 1: PSYCHOLOGICAL WELL-BEING SCALE

Instructions

The following questions concern how you've been feeling lately. Please circle your answer, thinking about the last few weeks:

How often have you felt:	Never	Seldom	Sometimes	Often	Very often
1. Particularly excited or interested in something?*	0	1	2	3	4
2. Bored?	0	1	2	3	4
3. Very lonely or remote from other people?	0	1	2	3	4
4. On top of the world?*	0	1	2	3	4
5. Restless or impatient?	0	1	2	3	4
6. Depressed or very unhappy?	0	1	2	3	4
7. Pleased about having accomplished something?*	0	1	2	3	4
8. Like things are going your way?*	0	1	2	3	4
9. Upset because someone criticized you?	0	1	2	3	4
10. Proud because someone complimented you?*	0	1	2	3	4

* Indicates positive affect item; others are negative affect.

APPENDIX 2: SYMPTOMS CHECKLIST

Instructions

Following is a list of various troubles or complaints people sometimes have. Please indicate whether or not you experienced any of these over the past few weeks, by circling the appropriate number:

	None	A little	Often	Very often
1. Common cold or flu...	0	1	2	3
2. Dizziness	0	1	2	3

3. General aches and pains	0	1	2	3	7. Working hard doesn't matter, since only the bosses profit by it (*CM) ...	0	1	2	3
4. Hands sweat and feel damp and clammy	0	1	2	3	8. By working hard you can always achieve your goals (*CM+).....	0	1	2	3
5. Headaches	0	1	2	3	9. Most working people are simply manipulated by their bosses (CM)	0	1	2	3
6. Muscle twitches or trembling.....	0	1	2	3	10. Most of what happens in life is just meant to be (*CO).....	0	1	2	3
7. Nervous or tense	0	1	2	3	11. It's usually impossible for me to change things at work (CO).....	0	1	2	3
8. Rapid heart beat (not exercising)	0	1	2	3	12. New laws should never hurt a person's pay-check (CH)	0	1	2	3
9. Shortness of breath (not exercising)	0	1	2	3	13. When I make plans, I'm certain I can make them work (*CO+).....	0	1	2	3
10. Skin rashes	0	1	2	3	14. It's very hard for me to change a friend's mind about something (CO) .	0	1	2	3
11. Upset stomach.....	0	1	2	3	15. It's exciting to learn something about myself (*CH+).....	0	1	2	3
12. Trouble sleeping.....	0	1	2	3	16. People who never change their minds usually have good judgment (CH).....	0	1	2	3
13. Depressed mood.....	0	1	2	3	17. I really look forward to my work (*CM+)	0	1	2	3
14. Difficulty concentrating	0	1	2	3	18. Politicians run our lives (CM).....	0	1	2	3
15. Crying easily	0	1	2	3	19. If I'm working on a difficult task, I know when to seek help (*CO+)	0	1	2	3
16. Lack of appetite/loss of weight	0	1	2	3	20. I won't answer a question until I'm really sure I understand it (*CH)....	0	1	2	3
17. Taking medication to sleep or calm down ..	0	1	2	3	21. I like a lot of variety in my work (*CH+)	0	1	2	3
18. Overly tired/lack of energy	0	1	2	3	22. Most of the time, people listen carefully to what I say (*CO+).....	0	1	2	3
19. Loss of interest in TV, movies, news, friends	0	1	2	3	23. Daydreams are more exciting than reality for me (CM).....	0	1	2	3
20. Feeling life is pointless, meaningless	0	1	2	3	24. Thinking of yourself as a free person just leads to frustration (*CM).....	0	1	2	3

APPENDIX 3: DISPOSITIONAL RESILIENCE (HARDINESS)

Instructions

Below are statements about life that people often feel differently about. Circle a number to show how you feel about each one. Read the items carefully and indicate how much you think each one is true in general. There are no right or wrong answers; just give your own honest opinions.

Not at all true = 0

A little true = 1

Quite true = 2

Completely true = 3

1. Most of my life gets spent doing things that are worthwhile (*CM+) .	0	1	2	3	31. Lots of times, I don't really know my own mind (*CM).....	0	1	2	3
2. Planning ahead can help avoid most future problems (*CO+).....	0	1	2	3	32. I respect rules because they guide me (*CH).....	0	1	2	3
3. Trying hard doesn't pay, since things still don't turn out right (CO).	0	1	2	3	33. I like it when things are uncertain or unpredictable (*CH+).....	0	1	2	3
4. No matter how hard I try, my efforts usually accomplish nothing (*CO).....	0	1	2	3	34. I can't do much to prevent it if someone wants to harm me (*CO) ...	0	1	2	3
5. I don't like to make changes in my everyday schedule (*CH).....	0	1	2	3	35. People who do their best should get full support from society (CH).....	0	1	2	3
6. The "tried and true" ways are always best (*CH).....	0	1	2	3	36. Changes in routine are interesting to me (*CH+).....	0	1	2	3

- | | |
|--|--|
| <p>37. People who believe in individuality
are only kidding themselves (CM) ... 0 1 2 3</p> <p>38. I have no use for theories that are
not closely tied to facts (CH) 0 1 2 3</p> <p>39. Most days, life is really interesting
and exciting for me (*CM+)..... 0 1 2 3</p> <p>40. I want to be sure someone will take
care of me when I'm old (CH) 0 1 2 3</p> <p>41. It's hard to imagine anyone getting
excited about working (*CM)..... 0 1 2 3</p> <p>42. What happens to me tomorrow de-
pends on what I do today (*CO+)... 0 1 2 3</p> | <p>43. If someone gets angry at me, it's
usually no fault of mine (CO) 0 1 2 3</p> <p>44. It's hard to believe people who say
their work helps society (CM) 0 1 2 3</p> <p>45. Ordinary work is just too boring to
be worth doing (*CM) 0 1 2 3</p> <p>* Items belong to short (30-item) form (Cronbach's alpha
= .82, $N = 178$).</p> <p>+ Items are positively scored; all others are negatively
scored.</p> <p>CM = commitment (Cronbach's alpha = .82, $N = 172$).</p> <p>CO = control (Cronbach's alpha = .66, $N = 172$).</p> <p>CH = challenge (Cronbach's alpha = .62, $N = 172$).</p> |
|--|--|