Journal of Abnormal Psychology
1986, Vol. 95, No. 3, 274-281

0021-843X/86/$00.75

Confronting a Traumatic Event: Toward an Understanding of Inhibition and Disease

James W. Pennebaker and Sandra Klihr Beall
Southern Methodist University

According to previous work, failure to confide in others about traumatic events is associated with increased incidence of stress-related disease. The present study served as a preliminary investigation to learn if writing about traumatic events would influence long-term measures of health as well as short-term indicators of physiological arousal and reports of negative moods. In addition, we examined the aspects of writing about traumatic events (i.e., cognitive, affective, or both) that are most related to physiological and self-report variables. Forty-six healthy undergraduates wrote about either personally traumatic life events or trivial topics on 4 consecutive days. In addition to health center records, physiological measures and self-reported moods and physical symptoms were collected throughout the experiment. Overall, writing about both the emotions and facts surrounding a traumatic event was associated with relatively higher blood pressure and negative moods following the essays, but fewer health center visits in the 6 months following the experiment. Although the findings and underlying theory should be considered preliminary, they bear directly on issues surrounding catharsis, self-disclosure, and a general theory of psychosomatics based on behavioral inhibition.

Individuals seek to understand major upheavals in their lives. Although a natural way of understanding traumas is by talking with others, many upsetting events cannot easily be discussed. For example, victims of family or sexual abuse, or perpetrators of illegal or illicit acts, are often reticent to divulge these experiences because of guilt or fear of punishment. In order not to betray their true feelings or experiences, they must inhibit their overt behaviors, facial expressions, and language. In addition to the work of inhibiting behavior following a trauma, individuals may actively attempt not to think about aspects of the concealed information because of its aversive and unresolved nature. In short, individuals who are unable to confide in others about extremely upsetting events must work to inhibit their behaviors, thoughts, and feelings.

In recent years, evidence has accumulated indicating that not disclosing extremely personal and traumatic experiences to others over a long period of time may be related to disease processes. For example, across several surveys, college students and adults who reported having experienced one of several types of childhood traumatic events (e.g., sexual or physical abuse, death or divorce of parents) were more likely to report current health problems if they had not disclosed the trauma to others than if they had divulged it (Pennebaker & Hoover, 1986; Susman, 1986). These results were obtained independent of measures of social support (see Pennebaker, 1985, for review). Similarly, a survey of spouses of suicide and accidental-death victims revealed that those individuals most likely to become ill in the year following the death were the ones who had not confided in others about their experiences (Pennebaker & O'Heeron, 1984). Survey results indicate that the less individuals confided, the more they ruminated about the death.

A question that emerges from these studies is What aspects of confiding a traumatic event reduce physiological levels and disease rates? On a strict interpersonal level, discussing a trauma allows for social comparison (e.g., Wortman & Dunkel-Schetter, 1979) and coping information from others (e.g., Lazarus, 1966). From a cognitive perspective, talking about, or in some way confronting a traumatic event, may help the individual to organize (Meichenbaum, 1977), assimilate (Horowitz, 1976), or give meaning (Silver & Wortman, 1980) to the trauma. These approaches assume that a major upheaval undermines the world view of the person. Confronting the event, then, should help the individual categorize the experience into a meaningful framework.

Many investigators have argued that discussing an event may also serve a cathartic function (e.g., Scheff, 1979). In one of the few well-controlled clinical studies examining catharsis, Nichols (1974) found that patients undergoing somatic–emotional discharge therapy (in which subjects actively express emotions) were more likely to achieve their therapeutic goals than were matched control subjects who received traditional insight therapy. Other studies that have employed venting, in which subjects hit a pillow or write about fantasies associated with aggression, have produced mixed results in subsequent reports of anger (see Nichols & Zax, 1977, for review).

Portions of this research were supported by National Institutes of Health Grant HL32547 and were presented at the meeting of the American Psychological Association in Toronto, 1984.

We are indebted to Karen Tanzy and Larry Barber for their help in conducting the research. Thanks are also extended to David Watson, Roxanne Silver, and Abe Tesser for their insightful comments on the manuscript.

Correspondence concerning this article should be addressed to James W. Pennebaker, Department of Psychology, Southern Methodist University, Dallas, Texas 75275.

Catharsis and the cathartic method, as developed by Freud (1904/1954) and Breuer and Freud (1895/1966), stress the fundamental links between cognition and affect surrounding a significant or threatening experience. If the experience is particularly disturbing, the memory or ideation may be suppressed, whereas the emotion or affect associated with the event continues to exist in consciousness in the form of anxiety. The cathartic method, or talking cure, was effective in that the forgotten memories were recalled and linked to the anxiety. Breuer and Freud (1895/1966) noted that hysterical symptoms were most likely to disappear after the patient had described the event in fine detail. Although very few studies have directly tested the original catharsis ideas, some recent work suggests that the linking of the cognitive and affective components of a given phobia helps to reduce the magnitude of the phobia (Tesser, Leone, & Clary, 1978).

Our own views assume that to inhibit one's behavior requires physiological work. To not talk about or otherwise confront major upheavals that have occurred in one's life is viewed as a form of inhibition. Actively inhibiting one's behavior, thoughts, and/or feelings over time places cumulative stress on the body and thus increases the probability of stress-related diseases (cf. Selye, 1976). It would follow that if individuals actively inhibit divulging personal or traumatic events, or both, allowing them to do so in a benign setting could have the positive effect of reducing long-term stress and stress-related disease. The original purpose of the present project was to learn if merely writing about a given traumatic event would reduce stress associated with inhibition in both the short run and over time. Our second purpose was to attempt to evaluate the aspects of dealing with a past trauma that were most effective in reducing stress.

Because we were interested in examining the effects of divulging traumatic events independent of social feedback, subjects in the present experiment were required to write rather than talk about upsetting experiences. On 4 consecutive nights, subjects wrote about either a trivial preassigned topic (control condition) or a traumatic experience in their own life from one of three perspectives. Analogous to the venting view of catharsis, trauma–emotion subjects were instructed to write each night about their feelings concerning their traumatic experiences without discussing the precipitating event. In line with a strict cognitive approach, the trauma–fact subjects were required to write about traumatic events without discussing their feelings. Similar to the cathartic method, the trauma–combination subjects wrote about both the traumatic events and their feelings about them. Heart rate, blood pressure, and self-reports were collected during each session. Finally, health center records and mail-back surveys were collected from 4 to 6 months following the experiment in order to determine long-term health consequences of the study.

Method

Overview

Within the 4 × 4 (Condition × Session) between–within design, 46 undergraduates were randomly assigned to write one of four types of essays for 15 min each night for 4 consecutive evenings. Those in the control condition (n = 12) were assigned different trivial topics each night; those in the trauma–emotion cell (n = 12) wrote about their feelings associated with one or more traumas in their life; trauma–fact subjects (n = 11) wrote about the facts surrounding traumatic events; and trauma–combination subjects (n = 11) wrote about both their feelings and the facts surrounding the traumas. Before and following the writing of each essay, subjects had their blood pressure, heart rate, and self-reported moods and physical symptoms collected. Four months after completion of the study, subjects completed questionnaires about their health and general views of the experiment. In addition, records for both prior to and 6 months following the experiment were collected from the health and counseling centers.

Subjects

Forty-six introductory psychology students (34 women and 12 men) participated as part of a course requirement. The data of all of the subjects were included. For 2 subjects, who were unable to attend one of the four experimental sessions, mean physiological measures and self-reports were substituted for the missing day. Four months after the experiment, all of the subjects were mailed follow-up questionnaires along with self-addressed stamped envelopes. Four subjects (one in each condition) failed to return their questionnaires.

Procedure

On the initial day of the experiment, subjects were individually told that they would be required to write, for four consecutive sessions, either about a preassigned topic or about one or more traumatic experiences that had occurred in their lives. After agreeing to participate, subjects completed a battery of individual difference scales including the Cognitive and Social Anxiety Questionnaire (CSAQ; Schwartz, Davidson, & Goleman, 1978), the Marlowe–Crowne Social Desirability Scale (Crowne & Marlowe, 1964), a general physical symptom inventory (the PILL; Pennebaker, 1982), and a questionnaire that tapped a number of health-relevant behaviors. After completing the questionnaires, subjects were randomly assigned to one of the four conditions and were given the appropriate experimental instructions by the first experimenter.

Those subjects assigned to the control condition were told to write about a different trivial topic each evening (a description of their living room, during the first session, the shoes that they were wearing, for the second session, and a tree and the room in which they were sitting, during the third and fourth sessions, respectively). Prior to writing during each session, the experimenter noted that the person was to describe the assigned item as objectively as possible. The trauma–emotion subjects were asked to write about a personally upsetting experience and to describe the feelings they had about the experience. It was emphasized that they were to write only about their feelings, with no mention of what actually happened. Subjects in the trauma–fact condition were asked to describe an upsetting personal experience in a narrative fashion, being careful to concentrate their writing on the event itself, without referring to their feelings at all. The trauma–combination subjects were instructed both to describe an upsetting event and to report any feelings they had about it.

Subjects in the three trauma groups were told they could write about the same traumatic event each session or choose a different upsetting event each day, as long as they followed the guidelines given by the experimenter. Finally, subjects in all conditions were told that for exploratory purposes, it would be appreciated if they would place each night's essay in a box by the door prior to leaving. Although the essays would be marked by subject number, subjects were assured that their names would not be associated with any aspect of their data. It should be emphasized that all of the subjects were greeted for each session by the first experimenter who reiterated the specific instructions for each condition.

After receiving the general experimental instructions from the first

experimenter, subjects were introduced to the second experimenter, who remained blind to condition throughout the study. The second experimenter escorted the subjects to a private cubicle. Once seated in the cubicle, the subjects were asked to complete a short questionnaire that assessed the degree to which they were experiencing each of nine physical symptoms (e.g., headache, racing heart, tense stomach) and eight moods (e.g., sad, guilty, contented) along unipolar 7-point scales, ranging from *not at all* (1) to *a great deal* (7). On completing the questionnaire, the second experimenter measured systolic and diastolic blood pressure using a Conphar mercury sphygmomanometer. Subjects' pulses were measured manually by the experimenter at the radial artery. After recording pulse and blood pressure, the experimenter handed the subjects a blank note pad and instructed them to begin writing about their topic for the next 15 min, until the experimenter returned. The experimenter exited and shut the doors to assure the subjects' privacy.

The experimenter returned 15 min later. After measuring and recording blood pressure and pulse, the experimenter handed subjects a post-experimental questionnaire that assessed the degree to which they were experiencing each of the same symptoms and moods that were measured prior to writing the essay. In addition, subjects were asked to respond to questions that asked, along 7-point scales, how personal their essay had been and the degree to which they had revealed their emotions in their essay. Subjects also responded, along a 7-point scale, to the question, "Overall, how much have you told other people about what you wrote today?" Following the sessions, subjects were thanked, requested to place their essay in the box, and reminded to return at a prearranged time the following day.

Following the final experimental session, each of the subjects was extensively debriefed for more than 20 min. During the debriefing session, subjects were told about the manipulations and measures that had been used in the experiment. Although explicit predictions about the outcome of the various trauma manipulations were not divulged, subjects were informed that one possible outcome of the experiment was that writing about traumatic experiences could have beneficial health effects in both the short run and the long run. It was repeatedly emphasized, however, that the project was empirical and that "we do not know how it will come out." The extended debriefing was necessary for both ethical reasons and to encourage subjects to sign a consent form giving the experimenters access to their health records for the following 2 years. All of the subjects also agreed to complete future questionnaire surveys that would be mailed to them.

The experiment was conducted November 14–17, 1983. In mid-March 1984, all of the subjects were mailed the same health questionnaire that they had completed on the first day of the experiment, assessing health habits, self-reported health center visits, number of days their activities had been restricted due to illness, and so forth, since participating in the experiment. In addition, subjects were asked to rate the degree to which they had thought about the study since participating in it, the degree to which they had discussed the study with others, and the degree to which they felt the study had had an impact on them. Finally, subjects were encouraged to write their long-term impressions of the study since having participated in it.

At the end of May 1984, Student Health Center and Counseling and Testing Center personnel were given names and subject numbers for each of the participants in the study. Personnel in each office listed the number of visits the student had made for illness, injury, checkups, psychiatric, or other reasons for the time periods August 27–November 13 and November 14–May 15. Personnel in both centers, who were blind to condition, returned the coded data with names and other identifying information removed.

Results

Overall, the study has four general classes of variables. The first class dealt with the essays themselves, including what the subjects wrote about, the way they approached the essays, and their perceptions of the essays. The second type of variable relates to the subjects' responses to the essays. That is, we sought to learn about changes in the subjects' physiological levels, moods, and symptom reports from before to after writing each essay across the 4 days. The third broad issue concerned the long-term effects of the experiment. For example, did the study influence the various health-related variables or have any lasting psychological or behavioral impact, or both? A final group of variables of interest includes several individual difference factors, such as sex of subject, and measures of anxiety, symptom-reporting, and so forth. Specifically, we sought to learn if any of these variables relate to any of our manipulated factors.

Content of Essays

Following each session, subjects rated their own essay as to the degree to which (a) it was personal, (b) it revealed their emotions, and (c) they had shared it with other people. For each item, a 4 × 4 (Condition × Session) between–within repeated measures analysis of variance (ANOVA) was computed. In response to the question "How personal was the essay that you wrote today?" on a 7-point scale ranging from *not at all* (1) to *a great deal* (7), a significant condition main effect obtained, $F(3, 42) = 12.9, p < .001$. No other effects attained significance. As can be seen in Table 1, all three trauma groups reported writing more personal essays than did control subjects. Further, contrasts using the mean-square error term indicated no significant differences between any of the trauma groups. In response to the item "How much did you reveal your emotions in what you wrote today?" the condition main effect attained significance, $F(3, 42) = 26.4, p < .001$. As expected, contrasts indicated that the trauma–emotion and trauma–combination subjects revealed their emotions to a greater degree than did either the trauma–facts or control subjects.

As a general check on the degree to which subjects had previously inhibited divulging their writing topics, subjects were asked to rate the degree to which they had told other people about what they had written following each session. The highly significant condition main effect, $F(3, 42) = 8.70, p < .001$, was attributable to the subjects in the control condition who had rarely discussed the trivial events that had been assigned to them (means for the four conditions: control = 1.58; trauma–emotion = 2.83; trauma–fact = 3.84; trauma–combination = 3.86; pairwise comparisons among the three trauma condition means did not attain significance). To directly evaluate the inhibition interpretation, a comparison was made between ratings of how personal each night's writing topic had been with the degree to which it had previously been disclosed to others. One difficulty with relying on each subject's mean reports averaged across all 4 nights was that many subjects wrote about extremely traumatic topics, that they had not previously disclosed, on only 1 of the 4 nights. Consequently, the ratings of previous disclosure were subtracted from ratings of how personal the essay had been for each session for each subject in all conditions. If the difference between these two 7-point scales was +4 or higher on any of the 4 nights, the subject was classified as an individual who was disclosing a previously inhibited experience.

Table 1
Means of Essay-Related Variables by Condition

Variables	Condition			
	Control	Trauma–emotion	Trauma–fact	Trauma–combination
Essay-related dimensions				
Personal	2.8_a	5.2_b	4.4_b	4.9_b
Reveal emotion	2.5_a	5.3_b	2.5_a	5.4_b
Subjects writing personal essay previously not discussed (%)	16.6_a	75.0_b	63.6_b	54.6_b
Words per essay	252_a	301_{ab}	296_{ab}	340_b
Self-references per essay (%)	2.4_a	11.3_b	7.1_c	8.4_c
Self-report and physiological measures				
Systolic blood pressure change	-3.9_a	-0.8_{ab}	-3.0_a	$+0.4_b$
Negative moods change	-1.0_a	$+1.7_{bc}$	$+0.6_{ab}$	$+3.8_c$
N	12	12	11	11

Note. The personal and reveal emotion means are based on subjects' self-reports of their own essays averaged across all four sessions. Ratings were based on 7-point scales, where 7 = *essay was personal or revealed emotion to a great extent.* Change scores are computed by subtracting the pre-essay score from the post-essay score. A positive number, then, indicates an increase in blood pressure or negative emotion following the essay. For none of the above variables are there significant initial differences. Means with different subscripts are different at $p \leq .05$.

The percentage of subjects who were classified as writing about a personal experience that had not been disclosed to others is included in Table 1. An overall one-way ANOVA on the classification was statistically significant, $F(3, 42) = 3.49$, $p = .02$. Pairwise comparisons indicate that subjects in the three trauma cells wrote more personal essays and more essays on topics not previously discussed than did those in the control condition.

Following each writing session, all of the subjects were asked to place their essay in a box. Of the 184 possible essays among the 46 subjects, all but 10 were returned. Each essay was coded as to number of words written, percentage of self-references (i.e., use of I, me, we, us), number of mark-outs, and—for the trauma groups only—the general theme of the essay (e.g., death of family member, public humiliation, break-up with boyfriend/girlfriend).

As is depicted in Table 1, subjects in the trauma–combination condition tended to write the most and subjects in the control cell the least. Although neither the session nor the Condition × Session effects attained significance, the overall condition main effect was marginally significant, $F(3, 42) = 2.67$, $p < .06$. Subjects in the trauma–emotion condition were far more likely to use first person in their essays than were those in the control or other trauma cells (condition main effect, $F(3, 41) = 50.6$, $p < .001$). Finally, no main effects or interactions emerged in terms of the number of mark-outs per word ratio across condition.

Of the 127 trauma essays, 27% dealt with the death of a close friend, family member, or pet; 20% involved boyfriend/girlfriend problems (usually the breaking of a relationship); and 16% centered on fights among or with parents or friends. Other percentages of topics were, major failure, such as not being elected cheerleader (8%); public humiliation, such as overhearing friends laughing about them (8%); leaving home to go to college (7%); being involved in car accident (5%); an alcohol or drug problem (5%); their own health problems (4%); sexual abuse, such as incest or rape (3%); and other, or unclassifiable (13%). The percentages total more than 100% because some of the topics could be classified in two separate categories. One-way ANOVAS comparing the three trauma conditions indicated no consistent differences in type of topics written about. Note, however, that a significantly higher percentage of trauma–emotion essays could not be categorized ($p = .03$). The only individual difference variable related to essay topic was sex of subject: women were more likely to write about losing a boyfriend/girlfriend; men were more likely to focus on the death of a pet (both $ps < .05$).

It is difficult to convey the powerful and personal nature of the majority of trauma condition essays with statistical analyses. One woman wrote about teaching her brother to sail; on his first solo outing, he drowned. The father of a male subject separated from his mother when the subject was about 9 years old. Prior to leaving home, the father told the subject that the divorce was the subject's fault (because his birth had disrupted the family). When she was 10 years old, one female subject had been asked to clean her room because her grandmother was to be visiting that night. The girl did not do so. That night, the grandmother tripped on one of the girl's toys, broke her hip, and died of complications during surgery a week later. Another subject depicted her seduction by her grandfather when she was about 12 years old. Another, who had written about relatively trivial topics during the first sessions, admitted during the last evening that she was gay. A male subject reported that he had considered suicide because he thought that he had disappointed his parents.

Two additional observations are in order. First, there was no discernable pattern about the depth or emotionality of the subject's topic from one night to another. For some subjects, the first session produced the most profound essay, whereas for others the final session did. Often a particularly emotional essay would be followed by a startlingly superficial one. No individual difference measures were related to the patterning or overall depth of essay topic. Second, a mere reading of the topics by each subject overlooks the person's reaction to it. For example, approximately one third of the essays dealing with the death of a close friend or family member indicated that the subjects were

not particularly upset by the loss of the person. Rather, the death made them aware of their own mortality.

Responses to Essays

Before and after each day's essay writing, the heart rate and blood pressure of each of the subjects were measured by the experimenter. Also before and after writing the essay subjects completed a brief questionnaire that assessed the degree to which they were experiencing each of nine physical symptoms and eight moods.

Physiological measures. Because heart rate and systolic and diastolic blood pressure reflect a general cardiovascular response, all three measures were simultaneously subjected to a 4 × 4 × 2 × 3 (Condition × Session × Pre- versus Post-Essay Reading × Physiological Index [heart rate, systolic and diastolic blood pressure]) between–within repeated measures multivariate analysis of variance (MANOVA). Across all three physiological indexes, a Condition × Session × Pre–Post interaction attained significance, $F(9, 116) = 1.99$, $p = .046$. In addition, the type of physiological index interacted with both session, $F(6, 37) = 11.7$, $p < .001$, and Condition × Pre–Post, $F(6, 80) = 2.26$, $p < .046$. No other main effects or interactions were significant.

Separate repeated measures ANOVAs on each of the physiological measures indicated that all of the above effects were attributable to changes in systolic blood pressure. That is, a 4 × 4 × 2 (Condition × Session × Pre–Post) between–within ANOVA yielded a significant session main effect indicating a general lowering of blood pressures over the course of the experiment for subjects in all conditions, $F(3, 40) = 16.6$, $p < .001$. In addition, a marginally significant Condition × Pre–Post interaction, $F(3, 42) = 2.56$, $p = .068$, and a Condition × Session × Pre–Post interaction, $F(9, 116) = 2.23$, $p = .025$, were obtained. As depicted in Table 1, the Condition × Pre–Post interaction reflects the fact that subjects in the control and trauma–fact cells demonstrated significantly larger decreases in blood pressure following the writing sessions. The triple interaction is primarily attributable to the trauma–combination condition subjects, who initially evidenced a large increase in blood pressure from before to after the essay. After the first session, however, the trauma–combination subjects demonstrated moderate decreases in blood pressure from before to after the writing session. Separate repeated measures (ANOVAs) on heart rate and diastolic blood pressure yielded no significant condition main effects or interactions.

Self-reports. Before and after each assay, subjects responded to a questionnaire asking them to rate the degree to which they were currently experiencing each of nine symptoms and eight moods—ranging from *not at all* (1) to *a great deal* (7). Because previous research has indicated that the symptoms (racing heart, upset stomach, headache, backache, dizziness, shortness of breath, cold hands, sweaty hands, pounding heart) such as these are correlated, the items were summed to yield an overall symptom index (see Pennebaker, 1982, for scalar properties of comparable symptom and mood indexes). Similarly, the summed mood items (nervous, sad, guilty, not happy, not contented, fatigued, anxious) composed a general negative mood index.

A 4 × 4 × 2 (Condition × Session × Pre- versus Post-Essay) repeated measures ANOVA on the self-reported symptom index yielded no main effects or interactions. A comparable analysis on the negative mood index resulted in a significant pre–post main effect, $F(1, 42) = 4.49$, $p = .04$, such that subjects tended to report more negative moods after writing each day's essay. In addition, a significant Pre–Post × Session interaction emerged, $F(3, 40) = 3.07$, $p = .04$, such that over time, subjects' negative moods increased after writing each essay. Finally, the Condition × Pre–Post interaction attained significance, $F(3, 42) = 2.83$, $p = .05$. As seen in Table 1, these effects reflect the fact that subjects in the trauma conditions reported more negative moods after writing the essays, whereas control subjects typically felt more positive.

The means presented in Table 1 depict the general changes in blood pressure and self-reported negative moods from before to after writing each day's essay. It is of interest that across each of these measures the means of the trauma–emotion and trauma–combination conditions are similar, as are the trauma–fact and control cells. Indeed, contrasts using the mean-square error term comparing these two sets of cells indicate that they are all significantly different. Further, in referring back to Table 1, this general pattern holds for the degree to which subjects revealed emotions and the percentage of self-references used in their essays. The implications of these similarities in response to a relatively brief stimulus are discussed later.

Long-Term Effects

At the conclusion of the school year, Student Health Center personnel recorded the number of times that each subject had visited the health center for each of the following reasons: illness, injury, check-up, psychiatric, or other. The number of visits were recorded separately for number of visits prior to the experiment (i.e., from the beginning of the school year in late August to mid-November) and following the experiment (mid-November through mid-May). Counseling center records were recorded for number of visits for psychological versus other reasons (e.g., vocational) for both prior to and following the experiment. Approximately 4 months following the completion of the laboratory study, subjects were mailed a questionnaire that included a number of health and health-related items that had been assessed on the beginning day of the experiment. The items on the follow-up survey asked subjects about health problems that had occurred since the completion of the laboratory study. Finally, two additional questions were included that asked subjects how much they had thought about and had been affected by their participation in the study. Further, subjects were encouraged to write, in their own words, their perceptions of the experiment. All but four of the subjects completed and returned the questionnaire.

Health and counseling center visits. The number of visits to the health center for illness was subjected to a 4 × 2 (Condition × Before versus After the Experiment) repeated measures ANOVA. Although neither main effect approached significance, the predicted Condition × Before–After interaction was obtained, $F(3, 42) = 2.74$, $p = .055$. As can be seen in Table 2, the change in health center visits for illness was due to an overall increase in all conditions except the trauma–combination cell.

Table 2
Summary of Long-Term Effects

Variables	Condition			
	Control	Trauma–emotion	Trauma–fact	Trauma–combination
No. of health center visits				
Prior to study	0.33	0.33	0.27	0.54
Following study	1.33_{ab}	1.58_{a}	1.45_{ab}	0.54_{b}
Change in visits	1.00_{a}	1.25_{a}	1.18_{a}	0.00_{b}
Self-reported health measures				
Change in no. of days restricted activity for illness	4.00_{a}	1.18_{ab}	1.90_{ab}	0.70_{b}
Change in no. of illnesses	0.18_{a}	-0.73_{b}	0.10_{a}	-0.60_{b}
Amount of thought about study	1.82_{a}	2.73_{b}	1.40_{a}	2.70_{b}
Degree of longlasting effects	1.36	2.45	1.70	2.40

Note. The health center visit means are based on all subjects ($N = 46$). All other variables are based on follow-up self-reports ($n = 42$). See text for significance levels of overall one-way analyses of variance. Means with different subscripts are significantly different, $p \leq .05$. No significant initial differences by condition were obtained for any of the above variables.

Separate repeated measures ANOVAs for the number of health center visits due to injury, psychiatric, or other reasons yielded no significant effects. Over the course of the year, only 1 subject visited the counseling center for psychological reasons and 2 for vocational help. Analyses of variance on these data produced no significant effects.

Follow-up questionnaire data. Although only 42 of the original 46 subjects returned the follow-up questionnaires, their health data were similar to the health center findings. Subjects were asked at the beginning of the experiment in November and on the follow-up questionnaire to report the number of days their activities had been restricted due to illness (since the beginning of school, during the November administration, and since the experiment for the follow-up questionnaire). A repeated measures ANOVA yielded a trend for the Condition × Time interaction, $F(3, 38) = 2.19$, $p = .10$, suggesting that those in the control condition reported the most days and those in the trauma–combination the least (see Table 2). On both administrations of the questionnaire, subjects were asked to check if they had experienced each of eight specific health problems (ulcers, high blood pressure, constipation/diarrhea, colds or flu, migraine headaches, acne or skin disorders, heart problems, or other major difficulties). The summed health problem index was then subjected to a repeated measures ANOVA. Overall, subjects in the trauma–combination and trauma–emotion conditions reported reductions in health problems relative to those in the control and trauma–fact cells, $F(3, 38) = 3.05$, $p = .04$. For none of the above measures were there significant condition effects at Time 1. In addition, subjects were asked about several health-related behaviors, such as aspirin consumption, and alcohol, tobacco, and caffeine use for both prior to and following the experiment. No significant differences were obtained on any measure.

All of the subjects were asked to rate the degree to which they had thought about or had been affected by the experiment. In response to the question, "Since the end of the experiment back in November, how much have you thought about what you wrote," on a scale ranging from *not at all* (1) to *a great deal* (7), a marginally significant condition main effect obtained, $F(3, 38) = 2.58$, $p = .06$. As seen in Table 2, those in the trauma–emotion and trauma–combination conditions were more likely to have thought about their essays than those in the trauma–facts or control cells.

Finally, subjects responded to the question, "Looking back on the experiment, do you feel as if it has had any longlasting effects? Please answer this in your own words as well as rating it on a 1 to 7 scale." Although the overall one-way ANOVA was not statistically significant, $F(3, 38) = 1.43$, $p = .25$, the Means × Condition interaction is presented in the table. Overall, 7 of the 31 trauma subjects rated the long-lasting effect as a 4 or higher along the 7-point scale. The responses to the open-ended question were uniformly positive. Because of the potentially sensitive nature of this paradigm, we feel that it is useful to present the responses of each of these subjects:

> *Trauma–emotion subjects.* It helped me think about what I felt during those times. I never realized how it affected me before.
>
> It helped to write things out when I was tense, so now when I'm worried I sit and write it out . . . later I feel better.
>
> I had to think and resolve past experiences . . . One result of the experiment is peace of mind, and a method to relieve emotional experiences. To have to write emotions and feelings helped me understand how I felt and why.
>
> *Trauma–fact subject.* It made me think a little deeper about some of the important parts of my life.
>
> *Trauma–combination subjects.* It made me think a lot—But I'm still in the same situation.
>
> If one writes down things that worry one, there is a tendency to feel better.
>
> Although I have not talked with anyone about what I wrote, I was finally able to deal with it, work through the pain instead of trying to block it out. Now it doesn't hurt to think about it.

Other Relevant Data

All of the subjects completed a number of individual difference measures at the beginning of the experiment, including the Marlowe-Crowne Social Desirability Scale, the Cognitive and Somatic Anxiety Scales, and the PILL, which taps the general frequency of occurrence of 54 common symptoms and sensa-

tions. Collapsing across condition, these measures were not consistently related to any of the primary dependent measures in the experiment. Although women reported writing about events that were more personal than did men, $r(44) = .41$, $p < .01$, no other sex differences were obtained. Finally, intercorrelations among the changes in physiological levels and self-reports during the experiment with changes in health yielded no consistent significant effects.

Discussion

The results of the experiment should be viewed as promising rather than definitive. Writing about earlier traumatic experience was associated with both short-term increases in physiological arousal and long-term decreases in health problems. Although these effects were most pronounced among subjects who wrote about both the trauma and their emotions associated with the trauma, there was substantial overlap in effects with those subjects who wrote only about their emotions associated with traumatic events. Subjects who were instructed to write only about previous traumatic events—without referring to their own emotions—were similar to control condition subjects on most physiological, health, and self-report measures.

Despite the general pattern of results, several weaknesses underscore the importance of future replication. Some of the measures yielded contradictory or only marginally significant effects. The number of subjects was quite small. Subjects were not selected in any way for having a debilitating undisclosed past trauma; therefore, it was impossible to evaluate the degree to which such subjects carried the results. In addition, two possible confounds associated with demand characteristics and changes in coping strategies may have influenced the health center data. These alternative explanations, as well as a number of issues surrounding catharsis, self-disclosure, coping strategies, and behavioral inhibition, are discussed next.

Recall that subjects were debriefed following the final essay-writing session. Although subjects were told about the experimental design, we were honest in admitting that we had no idea which, if any, condition would be most related to health. It is possible that subjects regulated their health center visits and follow-up questionnaire reports to some degree on the basis of our debriefing information.

One unforeseen mechanism that may also have affected the results was that we apparently provided some subjects with a new strategy for coping with both traumatic and significant daily events. It was clear that among those subjects who responded in writing to our follow-up questionnaire, some had begun writing about their experiences on their own after having participated in the experiment. Although we suspect that this behavior occurred with greater frequency in the trauma–emotion and trauma–combination cells, we cannot evaluate its direct impact on health.

Although these alternative explanations must be considered seriously, several of the experimental findings offer important directions for future research. For all but the objective health center data, the trauma–emotion and trauma–combination subjects were strikingly similar. Both groups evidenced higher blood pressure and more negative moods, relative to the other groups, each day after writing the essay; and both groups thought a great deal about the study in the months following the study. The results from both of these conditions cause one to argue against a simple venting or discharge theory of catharsis, which would predict that the expression of emotion should make the person more relaxed or happy, or both. Despite these relatively brief negative effects, both groups showed some long-term benefits. For example, self-reports concerning the change in number of different illnesses reported indicated an improvement in health for both groups. Similar trends emerged for self-reported days of restricted activity due to illness. Unfortunately, we cannot evaluate whether the long-term similarity between the two groups for these self-report measures reflects expectancy effects or true self-perceptions. Clearly, writing about the emotional side of a traumatic event was upsetting and physiologically arousing. However, the arousal per se may not have produced any long-term changes.

Perhaps one of the more unexpected findings was that having subjects write about the objective aspects of the traumatic events alone was neither arousing nor particularly upsetting. Indeed, this is reminiscent of the finding with subjects in studies by Lazarus and his colleagues (e.g., Lazarus, Opton, Nomikos, & Rankin, 1965), in which hearing a nonemotional and/or intellectual description of an upsetting scene greatly reduced physiological responses to that event. Despite the fact that there were no short-term adverse effects from writing the nonemotional description of one's own traumatic experiences, there appear to be few, if any, long-term benefits in any objective or subjective indexes of health. It should be emphasized that these results are not necessarily inconsistent with the views of theorists who argue that the resolution of a trauma is associated with the cognitive work of organizing, assimilating, or finding meaning to the events surrounding the trauma (e.g., Horowitz, 1976; Silver, Boon, & Stones, 1983; Swann & Predmore, 1985). Rather, our findings point to the importance of emphasizing the emotions that coincide with the objective (or, at least, perceived) trauma.

Although the results of the experiment support what has been hypothesized by theorists in psychology and psychosomatics for decades, the exact mechanisms linking confiding and disease have not been sufficiently identified. The early ideas of Freud and Breuer were partially confirmed, in that tying both the cognitions and affect surrounding traumatic events was optimally effective in maintaining long-term health. Unlike their early claims, however, these effects were not immediate. It must be admitted, however, that subjects wrote only briefly each night. Either longer writing times or collecting our self-reports and physiological measures several minutes or hours after each night's essay, or both, may have demonstrated different results.

An interesting variation on this idea, posited by Jourard (1971), argues that self-disclosure allows for one's feelings and thoughts to become more concrete, which ultimately results in greater self-knowledge. Disease results, according to Jourard, when the motive toward self-understanding is blocked. Although we cannot evaluate the role of a possible blocked motive related to understanding, the concept of making thoughts and feelings concrete may be critically important. In this study, subjects did not receive social support or social comparison information. In none of the essays did subjects write about developing some type of coping strategies for the future. No love, posi-

tive feedback, or other mechanism commonly used to explain psychotherapy was at work.

The ideas of Jourard closely parallel many of our ideas about behavioral inhibition. We have argued that the act of inhibiting behavior is physiologically stressful (cf. Pennebaker & Chew, 1985). Previous surveys indicate that not confiding in others about a traumatic event—which we view as a form of behavioral inhibition—is associated with disease. As our study has indicated, one need not orally confide to another. Rather, the mere act of writing about an event and the emotions surrounding it is sufficient to reduce the long-term work of inhibition.

We have raised more questions than we have answered. The general pattern of results—although promising—must be replicated under more stringent conditions. Further, the role of inhibition must be demonstrated more precisely. Although writing about traumas appears to have positive long-term health effects, we must pinpoint the aspect of this exercise that is beneficial. Possibilities include making an event concrete, linking the affective and cognitive aspects, the reduction of forces associated with behavioral inhibition over time, and so forth. The ultimate resolution of these issues should have direct bearing on our understanding of social, cognitive, and psychosomatic processes.

References

Breuer, J., & Freud, S. (1966). *Studies on hysteria.* New York: Avon. (Original work published 1895)

Crowne, D. P., & Marlowe, D. (1964). *The approval motive: Studies in evaluative dependence.* New York: Wiley.

Freud, S. (1954). *The origins of psychoanalysis.* New York: Basic Books. (Original work published 1904)

Horowitz, M. J. (1976). *Stress response syndromes.* New York: Jacob Aronson.

Jourard, S. M. (1971). *Self-disclosure: An experimental analysis of the transparent self.* New York: Wiley.

Lazarus, R. (1966). *Psychological stress and the coping process.* New York: McGraw-Hill.

Lazarus, R., Opton, E., Nomikos, M., & Rankin, N. (1965). The principle of short-circuiting of threat: Further evidence. *Journal of Personality, 33,* 622–635.

Meichenbaum, D. (1977). *Cognitive-behavior modification: An integrative approach.* New York: Plenum Press.

Nichols, M. P. (1974). Outcome of brief cathartic psychotherapy. *Journal of Consulting and Clinical Psychology, 42,* 403–410.

Nichols, M. P., & Zax, M. (1977). *Catharsis in psychotherapy.* New York: Gardner Press.

Pennebaker, J. W. (1982). *The psychology of physical symptoms.* New York: Springer-Verlag.

Pennebaker, J. W. (1985). Traumatic experience and psychosomatic disease: Exploring the roles of behavioural inhibition, obsession, and confiding. *Canadian Psychology, 26,* 82–95.

Pennebaker, J. W., & Chew, C. H. (1985). Deception, electrodermal activity, and inhibition of behavior. *Journal of Personality and Social Psychology, 49,* 1427–1433.

Pennebaker, J. W., & Hoover, C. W. (1986). Inhibition and cognition: Toward an understanding of trauma and disease. In R. J. Davidson, G. E. Schwartz, & D. Shapiro (Eds.), *Consciousness and self-regulation* (Vol. 4, pp. 107–136). New York: Plenum Press.

Pennebaker, J. W., & O'Heeron, R. C. (1984). Confiding in others and illness rates among spouses of suicide and accidental-death victims. *Journal of Abnormal Psychology, 93,* 473–476.

Scheff, T. J. (1979). *Catharsis in healing, ritual, and drama.* Berkeley: University of California Press.

Schwartz, G. E., Davidson, R. J., & Goleman, D. (1978). Patterning of cognitive and somatic processes in the self-generation of anxiety: Effects of meditation versus exercise. *Psychosomatic Medicine, 40,* 321–328.

Selye, H. (1976). *The stress of life.* New York: McGraw-Hill.

Silver, R. L., Boon, C., & Stones, M. H. (1983). Searching for meaning in misfortune: Making sense of incest. *Journal of Social Issues, 39,* 81–102.

Silver, R. L., & Wortman, C. B. (1980). Coping with undesirable life events. In J. Garber & M. E. P. Seligman (Eds.), *Human helplessness: Theory and applications* (pp. 279–375). New York: Academic Press.

Susman, J. R. (1986). *The relationship of expressiveness styles and elements of traumatic experience to self-reported illness.* Unpublished master's thesis, Southern Methodist University.

Swann, W. B., & Predmore, S. C. (1985). Intimates as agents of social support: Sources of consolation or despair? *Journal of Personality and Social Psychology, 49,* 1609–1617.

Tesser, A., Leone, C., & Clary, E. G. (1978). Affect control: Process constraints versus catharsis. *Cognitive Therapy and Research, 2,* 265–274.

Wortman, C. B., & Dunkel-Schetter, C. (1979). Interpersonal relationships and cancer: A theoretical analysis. *Journal of Social Issues, 35,* 120–155.

Received July 8, 1985
Revision received April 7, 1986 ■