Emotional Expression and Physical Health: Revising Traumatic Memories or Fostering Self-Regulation?

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Health benefits derived from personal trauma disclosure are well established. This study examined whether disclosing emotions generated by imaginative immersion in a novel traumatic event would similarly enhance health and adjustment. College women, preselected for trauma presence, were randomly assigned to write about real traumas, imaginary traumas, or trivial events. Yoked real-trauma and imaginary-trauma participants wrote about real-trauma participants' experiences. Imaginary-trauma participants were significantly less depressed than real-trauma participants at immediate posttest, but they were similarly angry, fearful, and happy. Compared with control group participants, both trauma groups made significantly fewer illness visits at 1-month follow-up; however, real-trauma participants reported more fatigue and avoidance than did the other groups. Imaginary-trauma group effects could reflect catharsis, emotional regulation, or construction of resilient possible selves.

Individuals may develop adverse physical or psychological reactions to stressful events that persist for prolonged periods (Baum, 1990). There may be delays of months or years between the stressful event and the emergence of overt disturbances in functioning (Solomon, Weisenberg, Schwartzwald, & Mikulincer, 1987). The existence of persistent and delayed posttraumatic reactions suggests the need for theories that can uncover processes underlying the psychosocial effects of trauma and for preventive psychological interventions that can relay trauma-relevant coping skills.

Pennebaker's group has shown repeatedly that healthy participants who disclose emotional reactions to stressful experiences demonstrate improved physical health compared with control group participants (Francis & Pennebaker, 1992; Pennebaker & Beall, 1986; Pennebaker, Colder, & Sharp, 1990; Pennebaker, Kiecolt-Glaser, & Glaser, 1988). In a partial replication, M. A. Greenberg and Stone (1992) found beneficial health effects for the subgroup who disclosed more severe traumas, relative to those disclosing less severe events and to control group participants. In a recent, controlled study Esterling, Antoni, Fletcher, Margulies, and Schneiderman (1994) found beneficial effects of both written and verbal disclosure on measures of antibodies to Epstein-Barr virus, suggesting that disclosure resulted in "better cellular immune control over the latent virus" (p. 130).

The inhibition-confrontation approach (Pennebaker, 1982; Pennebaker & Beall, 1986) explains why beneficial health effects occur following emotional trauma disclosure. Actively inhibiting thoughts, feelings, and impulses associated with traumatic memories requires physiological work, which, over time, places cumulative stress on the body, increasing vulnerability to illness. Following the research of Wegner, Schneider, Carter, and White (1987), previously inhibited thoughts and feelings are presumed to rebound as intrusive ruminations, resulting in chronic stress and renewed inhibition. Thus, actively confronting feelings about past traumas should undo the cumulative physiological stress of inhibition and strengthen resistance to disease.

Recent findings suggest that disclosing feelings about ongoing stressors that are not subject to prolonged inhibition also produces beneficial health effects. College freshmen who disclosed emotions concerning college adjustment had decreased health care utilization during subsequent months, relative to control group participants (Pennebaker et al., 1990). Consequently, cognitive assimilation of the trauma and attainment of insight

were proposed as additional mechanisms underlying the beneficial health effects of disclosure (Pennebaker, 1993; Pennebaker et al., 1990).

According to the inhibition–confrontation approach, recovery and exploration of suppressed emotional reactions result in cognitive reappraisal of traumatic memory schemata. The resultant decreases in trauma-specific rumination and inhibition are presumed to bring about health benefits. As Pennebaker, Barger, and Tiebout (1989) stated, confronting past traumas "should facilitate the assimilation or understanding *of the event* [italics added], which, over time, results in a reduced need to inhibit thoughts and behaviors *related to the experience* [italics added]" (p. 577).

Catharsis theory (Scheff, 1979) offers an alternative view of the process mediating the health benefits of emotional disclosure. According to Scheff, "verbal recall is neither necessary nor sufficient for therapy, and emotional discharge is both necessary and sufficient" (p. 77). Scheff proposed that healing emotional discharge involves "optimum distance" (p. 60) from the distressing emotions expressed. In a state of optimum distance, the participant vividly experiences the emotion while in a context of "present safety" (Scheff, 1979, p. 60); she can terminate the emotional episode before it becomes overwhelming. Thus, healing catharsis is not a simple immersion in emotional distress, but involves concurrent perceptions of control and mastery over the distressing feelings.

Habituation, or a decrease in the intensity of physiological arousal following prolonged exposure to a threatening stimulus, is another potential mediator of the therapeutic effects of expression. Foa and Kozak (1986) stated that "fear is represented in memory structures which serve as blueprints for fear behavior" (p. 21) and that "the process of short-term (within-session) habituation constitutes information that changes a fear structure . . . interoceptive information about the absence of physiological arousal . . . is available for encoding as response propositions that are inconsistent with those of the structure" (p. 27). In other words, physiological habituation results in a cognitive redefinition of what it means to experience fear, such that catastrophic implications are minimized and the time-limited, controllable nature of affective arousal is recognized (Foa & Kozak, 1986, p. 27).

Both habituation and cathartic explanations emphasize perceptions of self-efficacy (Bandura, 1983) in tolerating and regulating emotional arousal as components of therapeutic change. Whereas the inhibition–confrontation approach focuses solely on the reappraisal and emotional expression associated with the traumatic memory stimulus, the habituation and cathartic theories suggest that response- and self-efficacy-based reappraisals may also have therapeutic efficacy. In other words, the benefits of disclosure may extend beyond revision of specific past events to include more general perceptions of control and mastery over one's emotional reactions, regardless of how these are triggered.

There is some empirical evidence that perceptions of control over emotional responses predict psychosocial adjustment to life stressors. After controlling for physical functioning and marital satisfaction, perceived control over emotional reactions and physical symptoms accounted for 46% of the variance in psychosocial adjustment among cancer patients (Thompson,

Sobolew-Shubin, Galbraith, Schwankovsky, & Cruzen, 1993). Furthermore, stronger mood regulation expectancies, or "belief[s] about one's ability to alleviate negative moods" (Kirsch, Mearns, & Catanzaro, 1990, p. 306), have been associated with lower dysphoria and somatic symptoms in college students and caregivers of Alzheimer's patients (Brashares & Catanzaro, 1994; Kirsch et al., 1990).

If the health benefits of emotional expression are due to enhanced self-efficacy for tolerating and regulating emotional distress, reconstruction of past personal memories is not necessary to produce these effects. If therapeutic change is presumed to be response-based rather than stimulus-based, any stimulus that arouses a moderate degree of negative affect should be adequate to bring about catharsis or habituation. In other words, how the emotional reaction is triggered may be a less important component of change than what the emotional reaction is and how much control is perceived and exerted over its progression as the encounter unfolds. Indeed, improvement in posttraumatic stress disorder (PTSD) symptoms has been demonstrated following treatment with anxiety-management interventions (e.g., stress-inoculation training [Meichenbaum, 1974] or electromyograph [EMG] biofeedback training), even in the absence of exposure to the specific traumatic memories that produced these symptoms (Foa, Rothbaum, Riggs, & Murdock, 1991; Hickling, Sison, & Vanderploeg, 1986).

Previous research has demonstrated that psychological improvement can occur in traumatized populations following cognitive–affective coping skills interventions that omit exposure to past traumatic memories. However, the mechanisms producing such change have not been elucidated clearly. Furthermore, it has not been demonstrated that physical health benefits can accrue in the absence of direct exposure to past traumatic memories. The present study sought to extend previous research by exploring whether disclosing emotions about upsetting events that had not been personally experienced and that were encountered for the first time during the experiment would produce similar health benefits, relative to disclosure of actual past traumas. Events encountered for the first time could not, by definition, have been subject to previous inhibition. Thus, any health benefits resulting from this manipulation would suggest that expression of previously suppressed affect is not necessary for health enhancement via disclosure. Indeed, habituation and catharsis provide plausible alternative explanations for the effects found in previous disclosure studies.

In this controlled, experimental study, participants were assigned randomly, within design limitations, to three groups: The *real-trauma group*, like the experimental groups in previous emotional disclosure studies, wrote about their emotional reactions to actual past traumas; the *imaginary-trauma group* wrote about their emotional reactions to imaginary traumatic events that they had not previously experienced; and the *control group* wrote about a trivial, nonemotional event. Pretesting ensured that imaginary-trauma participants had not experienced their assigned events, and a yoking methodology was used to ensure similarity between the two trauma groups in event content and severity.

The following hypotheses were addressed:

Hypothesis 1: Disclosure of emotions associated with actual

past traumas will produce beneficial physical health effects, relative to a control condition, in participants preselected for the presence of such traumas.

Hypothesis 2: Disclosure of emotional reactions to imaginary traumas that are not past personal experiences will produce beneficial physical health effects, relative to a control condition.

Hypothesis 3: Emotional disclosure concerning real or imaginary traumas will decrease intrusive ruminations and cognitive–behavioral avoidance associated with actual past traumas.

To elucidate potential mediators of health effects, between-groups differences in the patterning of health changes across the 4-week follow-up period were examined. Previous findings have suggested a desynchrony between increases in distress and physiological arousal immediately following emotional disclosure and longer term health improvements (M. A. Greenberg & Stone, 1992; Mendolia & Kleck, 1993; Pennebaker & Beall, 1986).

Method

Participants

Potential respondents were selected from an initial cohort of 600 female college students on the basis of an eligibility questionnaire. Eligibility was restricted to female students to avoid confounding of results due to sex differences in emotional expression (Balswick & Avertt, 1977; Blier & Blier-Wilson, 1989; Thoits, 1991). Inclusion criteria were the experience of one of the following traumas or another event subjectively perceived as comparably severe: physical abuse, sexual molestation, rape, death or life-threatening illness of a parent, family violence, a life-threatening injury or accident, violent assault, abandonment by a parent, parental divorce, and witnessing a gruesome event. Eligible respondents ($N = 186$; 31%) were telephoned to request their participation and were informed that participation might involve reporting about past traumas. Participants ($N = 105$; 57%) received course credit, money, or both. Another 63 individuals (34%) refused participation, 12 (7%) could not be contacted, and 6 (3%) missed their scheduled appointments. This participation rate was comparable to the 51% reported by Francis and Pennebaker (1992). Data were not used from 2 real-trauma participants who did not have yoked imaginary-trauma participants. One real-trauma participant, 3 imaginary-trauma participants, and 2 control participants dropped out of the study. Thus, the final N was 97.

Participants were randomly assigned, within design limits, to the real-trauma ($n = 34$), imaginary-trauma ($n = 32$), and control groups ($n = 31$). Power analyses indicated that, with an estimated effect size of .4, the power value was .95 at an alpha level of .05 (Cohen, 1992). Participants had an average age of 18.71 years and were 13.56 years old, on average, when their traumas occurred; thus, on average, participants' traumas occurred 5 years prior to the study.

Procedure

Participant Assignment

We collected data from the participants in small groups of up to 4 people. Because imaginary-trauma participants were yoked to real-trauma participants by event topic, we had to ensure that, when collecting data from an imaginary-trauma group, there were sufficient real-trauma topics available for assignment. To ensure an initial surplus of real-trauma topics, we initially collected data from three groups of real-trauma participants ($n = 9$); thereafter, assignment was random.

Participant Instructions

After the pretest questionnaires described in the *Materials* section were completed, participants were given both verbal and written instructions specific to their assigned group. To facilitate the yoking of trauma participants by event topic, real-trauma participants were asked to write brief, factual outlines of their traumas. Writing factual descriptions of traumatic events was not expected to influence health or mood (Pennebaker & Beall, 1986). Imaginary-trauma participants were presented with written descriptions of their assigned events, consisting of real-trauma participants' factual summaries, which had been rewritten by a professional writer to enhance clarity and eliminate emotional references. Emotion descriptors were excluded to allow imaginary-trauma participants to generate their own emotional reactions.

Real- and imaginary-trauma group participants were told:

> I am now going to give you a test of your imaginative and emotional capacities. People who are imaginative and really in touch with their emotions generally do very well at this task.

If data were being collected from a real-trauma group, participants were subsequently told:

> The aim of this exercise is for you to mentally recreate the most traumatic event that has ever happened to you, especially the emotions associated with this event. Think of the event now. Sit quietly for a few minutes and try to visualize the most traumatic and deeply upsetting experience of your entire life. Recreate this memory as vividly and fully as you can.

If data were being collected from an imaginary-trauma group, participants were told:

> The aim of this exercise is for you to mentally recreate an imaginary traumatic event, especially the emotions associated with this event. The paper that I have just handed out to you contains a description of this traumatic event. Please read it carefully for a few minutes. Read the event now [participants were given 5 min to read the event]. Now, I want you to close your eyes and try to imagine yourself actually experiencing the event you have just read. Let your imagination carry you away from this room and into the traumatic situation. Experience this imaginary situation as vividly and fully as you can.

Both real- and imaginary-trauma group participants were then instructed:

> Visualize all the details of your surroundings, the sights, sounds, and smells. Get into the fantasy as much as possible. Now I want you to look deeply inside yourself and to really experience as intensely as possible the full extent of your feelings associated with this event. Now, for the next 30 minutes, I want you to explore the full extent of your feelings associated with this traumatic experience by writing them down on the piece of paper in front of you. Describe as vividly and fully as possible all of the thoughts and feelings that you have when you imagine this experience. As you write, sink into your feelings more and more. Do not write about your emotions in general, but rather about how you responded emotionally to this particular event.

Instructions were based on Pennebaker et al. (1988) and mood-induction procedures (Salovey & Birnbaum, 1989), with modifications emphasizing the sensory details of the event and immersion in feelings about the event to provide structure and guidance in accessing emotional states. Other departures from standard mood induction were that

feelings were not only imagined but also expressed in writing, and that imaginary events were preassigned rather than generated by participants.

Instructions given to control participants were conceptually similar to Pennebaker et al. (1988):

> I am now going to give you an exercise in mental imagery about events outside of yourself. This is a test of how good you are at perceiving the details of your surroundings. People who are attentive to their environment and who remember things the way they are without distortion generally do very well at this task. The aim of this exercise is for you to recreate in your imagination the physical environment that surrounds you every day, the Stony Brook campus. Try to visualize all of the physical details of the campus, the buildings, people, benches, and trees. Concentrate on these images as much as possible. Visualize the campus now. Now, for the next 30 minutes, I want you to write down as many factual details as you can about the campus. What do the buildings look like and how are they situated in relation to one another? What color are the buildings? It is important that you write down only factual details without describing any opinions or emotions. Describe things exactly the way they are, without elaborating in any way. Your essays should be as clear, detailed, and objective as possible. Remember, we are interested in facts, not feelings.

Participants wrote about their topics for a single 30-min session, whereas Pennebaker et al. (1988) used four 20-min writing sessions. All participants then completed a posttest mood questionnaire, and trauma group participants completed an essay evaluation measure.

Follow-Up Procedure

The following questionnaires were completed weekly for 4 weeks following essay writing: Naval Health Research Center (NHRC) Mood Questionnaire, Physical Symptom Scales, activity restriction measure, subjective illness visit measure, and psychotherapy indicator. The Impact of Event Scale (IES) was completed only at follow-up Weeks 1 and 4, and the Symptom Checklist–90 (SCL-90) was completed only at Week 4.

Debriefing

When follow-up assessment was complete, participants were thanked for their unique and personal contributions and were provided with the telephone numbers of the experimenter and the student counseling center to use if they experienced any adverse reactions associated with the study. They were also informed of the study hypotheses and were given a trauma reference list. Participants were invited to speak privately with the experimenter about their reactions to the study; however, only 16 (15%) accepted. Three real-trauma participants who reported continuing distress and preoccupation with their traumas were referred for counseling. Although participant confidentiality was assured, a few real-trauma participants assumed that the experimenter knew the content of their essays. They seemed to derive comfort from having shared their traumas and spontaneously disclosed additional feelings during debriefing.

Materials

The following types of measures were used: (a) manipulation checks and essay evaluations, (b) physical health measures, and (c) psychological measures.

Manipulation Checks and Essay Evaluations

The Assessment of Past Traumas (APT) Questionnaire. The APT was devised by Melanie A. Greenberg. The participant-eligibility questionnaire had determined the presence of a trauma without specification of the event. Event data were required to assign events to imaginary-trauma participants that were not previous experiences. Event severity ratings were required to assess whether real-trauma participants had actually disclosed their most subjectively severe traumas. Participants indicated which of 45 events they had experienced and rated the extent to which each experienced event was traumatic, using a 7-point Likert scale that ranged from *not at all* (1) to *extremely* (7). Items were constructed on the basis of the more severe traumas reported in previous studies (M. A. Greenberg & Stone, 1992; Pennebaker & Beall, 1986; Pennebaker et al., 1988) and events reported in the criminal victimization and trauma literatures (e.g., Horowitz, Wilner, Kaltreider, & Alvarez, 1980; van der Kolk, 1987; Wirtz & Harrell, 1987).

The Assessment of Prior Disclosure (APD) Questionnaire. This questionnaire was designed by Melanie A. Greenberg to provide a rough index of event-specific inhibition. Participants were asked to describe their most traumatic experience, to state the date of its occurrence, to specify whether it had been disclosed, and, if it had been disclosed, to specify the date of initial disclosure. Participants were assigned a categorical inhibition rating on the basis of the length of time elapsed between the trauma and initial disclosure.

Subjective essay evaluations. These evaluations were participants' ratings, on unipolar 7-point scales that ranged from *not at all* (1) to *a great deal* (7), of the extent to which their essays were personal, traumatic, and revealing of their emotions, and the extent to which their essays reflected each of the following: an actual personal experience, a made-up or imaginary event, an event experienced by somebody they knew, an event that they had read about or seen on television or in a movie, and something that they had previously fantasized about. Participants also indicated whether they had actually experienced the event written about by using a dichotomous yes–no scale.

Objective essay data. Objective data consisted of counts of the number of words contained in each essay and two masked raters' determinations of which essay in each yoked pair had been written by the real-trauma participant. Percentage agreement between the raters was 75%.

Psychotherapy status indicator. Participants were asked to indicate, by circling *yes* or *no,* whether they were currently participating in psychotherapy.

Physical Health Measures

Physical Symptom Scales. Three types of physical symptoms were assessed by self-report: upper respiratory symptoms, musculoskeletal symptoms, and miscellaneous symptoms that reflect both psychological distress and illness (see D. Watson & Pennebaker, 1989). The Upper Respiratory Symptom Scale contains 9 items (e.g., sore throat, dry cough, sneezing), and the Musculoskeletal Symptom Scale contains 3 items (muscle aches, aching joints or bones, and muscle pain or cramps; Vickers & Hervig, 1988). The Miscellaneous Symptom Scale contains 12 of 13 items (e.g., diarrhea, rash, headache) from the Southern Methodist University Health Questionnaire Symptom Scale (D. Watson & Pennebaker, 1989). "Sore throat" was deleted because it overlapped with an upper respiratory symptom item. Participants check *yes* or *no* to indicate whether each symptom was present in the previous week (or month, in the pretest version).

Activity restriction measure (Verbrugge, 1980). The extent to which participants' work and social activities were disrupted by illness during the previous week (month at pretest) was assessed by three items: stay in bed, miss school, and cut down on leisure or social activities. Activity restriction was the total number of items checked as occurring.

Illness visit measure. Participants' signed medical release forms were mailed to their private doctors and to the student health center along with requests for information about medical visits made by participants during the fall semester, 1990. Physicians who did not reply were telephoned to solicit this information. Medical providers were asked to differentiate visits made for illness from those made for injury, routine checkups, or allergies. Only visits for illness were used as data. Because participants were observed over a several-week period, illness visits made at pretest (the month preceding essay writing) and follow-up (the month following essay writing) were calculated separately for each participant on the basis of the actual dates of experimental participation.

Of 103 participants, 28 (27%) visited only the student health center, 69 (67%) visited only private physicians, and 6 (6%) visited both physicians and the health center. Three participants refused permission to contact their doctors, so their illness visit data were coded as missing. Participants who gave permission ($n = 72$) named 89 doctors whom they might visit. Of these 89, 68 (76%) replied in writing, 11 (12%) provided information by telephone, and 10 (11%) either could not be located or did not respond to repeated requests. Nine of these 10 participants did not report visiting any doctors, thus their illness visits were estimated as zero at pretest and follow-up. The remaining participant reported visiting a doctor but did not report the reason for the visit, so her illness visit data were coded as missing.

Psychological Measures

IES (Horowitz, Wilner, & Alvarez, 1979). The IES taps two categories of response to a specific past trauma: *intrusion* (intrusively experienced ideas, images, feelings, or bad dreams) and *avoidance* (consciously recognized avoidance of certain ideas, feelings, or situations). The IES provides a list of 15 responses (e.g., I had waves of strong feelings about it; I tried not to think about it), and participants indicate, by using a 4-point scale that ranges from *not at all* (0) to *often* (5; with responses of 0, 1, 3, and 5) how frequently each response was experienced in the past 7 days. Intrusion and avoidance scores are the sums of the relevant item subsets. Cronbach's alphas ranged from .79 to .92 for intrusion and from .82 to .91 for avoidance (Zilberg, Weiss, & Horowitz, 1982). A manipulation check confirmed that real-trauma participants reported on the IES about their reactions to the same events described in their essays.

NHRC Mood Questionnaire (Vickers & Kusulas, 1989). The NHRC assesses several specific moods varying along dimensions of hedonic quality and activation. Participants describe their mood at the present moment (immediate pretest and posttest versions) or during the previous week (weekly follow-up versions) using 40 mood descriptors and 5-point Likert scales with anchors ranging from *not at all* (1) to *very much* (5). Items are summed to form six mood scales (active, angry, depressed, fatigued, fearful, and happy). This scale has been used to assess the relationship of mood to illness in naval recruits (Vickers & Kusulas, 1989).

The Symptom Checklist-90 (SCL-90; Derogatis, 1977). The SCL-90 contains 90 items describing psychiatric symptoms and allows participants to indicate, on 5-point scales that range from *not at all* (0) to *extremely* (4), how much discomfort each problem had caused them in the past week. Global symptom severity is the sum of the item severity ratings. Cronbach alphas for college students exposed to a trauma ranged from .82 to .93 (Mikulincer, Florian, & Weller, 1993).

Results

Essay Characteristics and Manipulation Checks

Real-trauma participants' essays were classified by two raters using a 10-category scheme (percentage agreement = 92%).

Disagreements were resolved by mutual discussion among the raters. The proportions of essays falling into each category were death of a close other (20%); family violence (17%); unwanted pregnancy or abortion (11%); gruesome, life-threatening, or injurious events (11%); criminal assault (including rape; 11%); parental divorce or abandonment (9%); sexual molestation (9%); mental illness or alcoholism of a family member (6%); psychological abuse (3%); and, serious physical illness of a parent (3%). Examination of the event-specific inhibition index derived from the APD revealed the following proportions of participants in each category: trauma never disclosed (6%), trauma disclosed more than 1 year after the event (23%), trauma disclosed more than 1 month but less than 1 year after the event (13%), trauma disclosed within the first month following the event (58%).

To determine if real-trauma participants had actually written about their most traumatic events, APT trauma severity ratings for events disclosed during the study were compared with ratings for other experienced traumas. Most participants (82%) assigned their highest severity ratings to the events about which they had written. Only 1 of 32 imaginary-trauma participants (3%) reported previous experience of her assigned event on the essay evaluation measure. Reanalysis with the discrepant participant deleted did not substantively alter results obtained with the complete sample. Because both psychotherapy and the trauma manipulations generate emotional expression, substantial rates of participant participation in psychotherapy would make results of this study difficult to interpret. A manipulation check revealed that only 2 of 97 participants, both of whom were in the control group, were in psychotherapy during the study period. Because these control participants had unintentionally received some of the experimental manipulation of emotional expression, their data were deleted (Tabachnick & Fidell, 1989, p. 70).

Group Differences in Essay Perception and Content

We used both subjective and objective criteria and found substantive differences between real- and imaginary-trauma group essays. Means and significance levels for essay ratings and characteristics are shown in Table 1.

Real-trauma participants rated their essays as significantly more personal, traumatic, and revealing of their emotions than did imaginary-trauma participants, whose ratings on these attributes were significantly higher than the ratings of control group participants. Comparing the two trauma groups, real-trauma participants rated their essays as reflecting an actual past experience to a greater degree, than did imaginary-trauma participants, who perceived their essays as reflecting imaginary events, events they had read about or viewed in the media, or occurrences about which they had fantasized prior to the experiment, to a greater degree than did real-trauma participants. The two groups rated their essays as similarly reflective of incidents that had happened to other people whom they knew, a result that perhaps reflects the familial context of childhood traumas and vicarious transmission of information about traumatic experiences. On average, imaginary-trauma participants assigned moderate ratings to each identified content area,

Table 1
Mean Subjective Perceptions of Essay Writing

Evaluation	Real	Imaginary	Control	F	df
Personal	6.09$_a$ (1.16)	3.44$_b$ (1.87)	1.69$_c$ (1.11)	76.61***	2, 92
Emotional	5.38$_a$ (1.58)	4.56$_b$ (1.58)	1.52$_c$ (0.69)	68.09***	2, 92
Traumatic	6.38$_a$ (1.02)	5.19$_b$ (1.80)	2.00$_c$ (2.00)	58.67***	2, 92
Event previously experienced	6.47$_a$ (0.93)	3.00$_b$ (2.09)		77.27***	1, 64
Event made up or imaginary	1.03$_a$ (0.17)	4.38$_b$ (2.01)		93.37***	1, 64
Event happened to somebody else	2.38 (2.27)	3.09 (2.13)		1.72	1, 64
Event depicted in book or movie	1.68$_a$ (1.66)	3.28$_b$ (1.84)		13.87***	1, 64
Event fantasized about	1.15$_a$ (0.70)	3.34$_b$ (1.96)		37.58***	1, 64

Note. Ns were 34, 32, and 29 for the real-trauma, imaginary-trauma, and control groups, respectively. Variables were assessed on 7-point scales ranging from 1 (*not at all*) to 7 (*a great deal/extremely*). Means with different subscripts differed significantly at $p < .05$, using Duncan's test. Standard deviations are indicated in parentheses.
*** $p < .001$.

which suggests that their essays were based on actual, imaginal, and vicarious experiences.

Masked raters, relying on individually determined, self-generated criteria, were able to discriminate yoked real- and imaginary-trauma essays fairly successfully. On average, 26 of 32 essay pairs (81%) were correctly categorized,[1] indicating greater accuracy than would be expected by chance, $\chi^2 (1, N = 32) = 12.5, p < .001$. No significant differences were found between real- and imaginary-trauma groups in number of words per essay, $F(1, 64) = 2.45, p = .12$ (real: $M = 550.09, SD = 181.03$; imaginary: $M = 482.22, SD = 170.31$).

Analysis Strategy

To remove preexisting between-groups variation and guard against Type I error, multivariate analyses of covariance (MANCOVAs), with pretest scores as covariates, were used to assess between-groups differences in variable sets. If overall MANCOVAs were significant, analyses of covariance (ANCOVAs) were used to assess between-groups differences in individual variables. Planned contrasts were used to examine differences among specific groups.

Immediate Effects of Essay Writing

Between-groups differences in mood immediately following essay-writing were examined. MANCOVAs revealed significant between-groups differences in hedonic moods (fearful, angry, depressed, happy), $F(8, 170) = 3.47, p < .001$, and activation (active, fatigued), $F(4, 178) = 2.53, p < .05$. Group means are shown in Table 2. Planned comparisons were used to demonstrate that, as expected, trauma participants reported significantly more intense, fearful, angry, and depressed moods and less intense happy mood, than did control participants. Real-trauma participants differed from imaginary-trauma participants only in their reports of higher depressed mood, $F(1, 91) = 9.52, p < .01$.

Longer Term Health Effects of Essay Writing

Illness visit data[2] and self-reported health data (upper respiratory symptoms, musculoskeletal symptoms, miscellaneous symptoms, and activity restriction) were used to examine whether disclosing emotional reactions to real or imaginary traumas would produce beneficial health effects, relative to the control condition.

Illness Visit Data

A one-way ANCOVA, with pretest scores as a covariate, revealed a significant effect of group,[3] $F(2, 94) = 3.62, p < .05$, on illness visits. Planned contrasts revealed that participants in the two trauma groups had fewer illness visits at follow-up than did control group participants, $F(1, 94) = 7.24, p < .01$. Illness visits did not differ significantly between the real- and imaginary-trauma groups $F(1, 94) = 0.00, ns$. Group means are presented in Figure 1 and Table 3.

Proportions of participants in each group with any illness visits were calculated (real trauma: pretest 12%, follow-up 9%; imaginary trauma: pretest 15%, follow-up 12%; control: pretest 13%, follow-up 26%). These figures suggest that effects on illness visits were not due only to 1 or 2 discrepant participants.

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[1] In cases where essay content explicitly revealed group identity, this was disguised by omission or alteration of particular sentences while keeping overall meaning intact. For example, "I would get very upset" was changed to "I got very upset," and comments about the experimental task (e.g., "If this were to happen to me," or "this event is hard for me to relate to") were deleted.

[2] Because 2 participants had extreme scores that were greater than 4 standard deviations away from their group means on follow-up illness visits and 1 participant had such an extreme score on pretest illness visits, it was desirable to prevent these extreme scores from unduly influencing the statistical analyses (Tabachnick & Fidell, 1989). Therefore, these scores were recoded as equivalent to the next most extreme scores in their distributions. Prior to recoding outliers, group differences in illness visits were marginally significant, $F(2, 94) = 2.31, p < .10$. The overall distribution of illness visits was significantly positively skewed (skewness = 2.54, $z = 10.16; p < .001$) and kurtotic (kurtosis = 5.53, $z = 11.29, p < .001$) and this was not correctable by square root, logarithmic, or inverse transformations.

[3] Because illness visit data were available for some participants who failed to complete follow-up questionnaires, the N was slightly higher in these analyses, compared with analyses of self-report data.

Table 2
Mean Immediate and Longer Term Psychological Effects of Essay Writing

Measure	Real	Imaginary	Control	F	df
Fearful mood					
Pretest	9.53 (3.34)	8.06 (3.09)	7.48 (2.11)		
Adjusted posttest	11.08$_a$ (0.58)	10.46$_a$ (0.58)	8.47$_b$ (0.62)	4.92**	
Adjusted follow-up	11.40 (0.66)	10.60 (0.67)	10.04 (0.71)	0.96	2, 91
Angry mood					
Pretest	9.82 (3.55)	9.38 (2.12)	9.21 (2.99)		
Adjusted posttest	13.53$_a$ (0.72)	11.67$_a$ (0.74)	9.36$_b$ (0.78)	7.62**	
Adjusted follow-up	13.17 (0.58)	12.05 (0.59)	12.24 (0.63)	1.04	2, 91
Depressed mood					
Pretest	10.12 (4.96)	9.25 (4.20)	10.03 (5.74)		
Adjusted posttest	15.63$_a$ (0.86)	11.83$_b$ (0.88)	9.39$_c$ (0.93)	12.62***	
Adjusted follow-up	12.53 (0.73)	11.78 (0.75)	12.14 (0.79)	0.25	2, 91
Happy mood					
Pretest	17.59 (6.82)	20.97 (7.01)	18.41 (5.61)		
Adjusted posttest	12.61$_a$ (0.85)	14.71$_a$ (0.88)	17.33$_b$ (0.91)	7.28**	
Adjusted follow-up	18.66 (0.71)	18.82 (0.74)	19.97 (0.76)	0.92	2, 91
Active mood					
Pretest	12.41 (4.64)	14.25 (6.60)	12.79 (5.22)		
Adjusted posttest	9.90 (0.67)	11.61 (0.69)	12.07 (0.73)	2.77^a	
Adjusted follow-up	15.91 (0.62)	16.43 (0.64)	16.89 (0.67)	0.57	2, 91
Fatigued mood					
Pretest	10.35 (3.95)	11.50 (5.98)	11.72 (5.76)		
Adjusted posttest	11.51 (0.66)	11.22 (0.68)	12.55 (0.71)	1.00	
Adjusted follow-up	13.30$_a$ (0.58)	11.32$_b$ (0.59)	10.90$_b$ (0.62)	4.63**	2, 91
Intrusion					
Pretest	16.62 (10.02)	12.52 (10.41)	12.46 (9.99)		
Adjusted follow-up	9.42 (1.08)	7.12 (1.12)	8.18 (1.18)	1.08	2, 89
Avoidance					
Pretest	18.97 (12.31)	17.42 (10.19)	16.43 (10.38)		
Adjusted follow-up	14.83$_a$ (1.19)	11.06$_b$ (1.24)	10.28$_b$ (1.31)	3.92*	2, 89
Symptom checklist–90					
Pretest	101.21 (52.08)	79.88 (44.84)	93.52 (51.06)		
Adjusted follow-up	77.44 (6.34)	75.20 (6.55)	69.51 (6.82)	0.38	2, 91

Note. Ns were 34, 32, and 29 for the real-trauma, imaginary-trauma, and control groups, respectively. For intrusion and avoidance, Ns were 34 for the real-trauma group, 31 for the imaginary-trauma group, and 28 for the control group. Group means with different subscripts differed significantly at $p < .05$, using means adjusted for covariates. Standard deviations of pretest means and standard errors of adjusted means are in parentheses.
^{a} Marginally significant at $p < .10$.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Chi-squared tests (expected values were equal distribution of participants with illness visits across the groups [13% at pretest; 16% at follow-up]) established that the presence of illness visits was systematically related to group at follow-up, $\chi^2(2, N = 98) = 10.51, p < .01$, but not at pretest, $\chi^2(2, N = 98) = 0.35, ns$.

One possible interpretation of these findings is that results reflect deleterious effects on health of the control manipulation, rather than beneficial effects of emotional disclosure. However, health center records containing rough estimates of the total number of visits made by Stony Brook students during the fall semester, 1990 (2,146 for September, 2,451 for October, 3,141 for November) indicated that Stony Brook students in general had increasing health care utilization across most of that semester. The fact that students who were not experimental participants also had increased health care utilization makes it less plausible that these increases were caused by the control manipulation.

Self-Report Health Measures

Analyses of self-reported health evaluated whether, relative to controls, participants in the two trauma groups had better overall health status at follow-up (group main effects) and whether they exhibited a different patterning of health problems across the 4 follow-up weeks (Group × Time interactions). Participants' four weekly observations were examined separately. The effect of group on self-reported health (upper respiratory symptoms, musculoskeletal symptoms, miscellaneous symptoms, and activity restriction) was marginally significant, $F(32, 146) = 1.38, p < .11$, and the overall Group × Time interaction was highly significant, $F(6, 172) = 3.59, p < .01$. ANCOVAs revealed a significant Group × Time interaction only for upper respiratory symptoms, $F(6, 273) = 2.66, p < .05$, which was due entirely to a significant difference in the linear effects of time between the real-trauma and control groups, $F(1, 60) = 5.11, p < .05$; imaginary versus control: $F(1, 58) = 2.03, ns;$

imaginary versus real: $F(1, 63) = 0.24$, ns. Real-trauma participants exhibited decreasing upper respiratory symptoms, whereas control participants exhibited increasing upper respiratory symptoms across the 4 follow-up weeks. These effects are illustrated in Figure 2. Group means for analyses of longer term health effects are presented in Table 3.

Correlates of Health Changes in the Two Trauma Groups

The similarity of health effects in the two trauma groups raised the issue of whether similar or different processes mediated these effects. To address this question, a series of partial Pearson correlational analyses were conducted to assess the relationship of immediate essay perception and mood variables to longer term health outcomes (with pretest health controlled) within each trauma group. The criterion variables used in these analyses were illness visits, upper respiratory symptoms, musculoskeletal symptoms, and miscellaneous symptoms (average scores across the 4 follow-up weeks). The predictor variables examined were (a) participants' ratings of the extent to which their essays were personal, traumatic, and emotionally revealing; (b) negative mood at immediate posttest (the sum of angry, depressed, and fearful moods); and (c) negative mood at follow-up (the sum of angry, depressed, and fearful moods, averaged across the 4 follow-up weeks).

Subjective essay perceptions were not significantly associated with health outcomes for real-trauma participants. However, marginally significant negative associations were found for three of four analyses involving imaginary-trauma participants. Specifically, perceiving the imaginary traumas as more traumatic tended to be associated with reporting fewer upper respiratory, $r(32) = -.29$, $p < .11$, musculoskeletal, $r(32) = -.26$, p
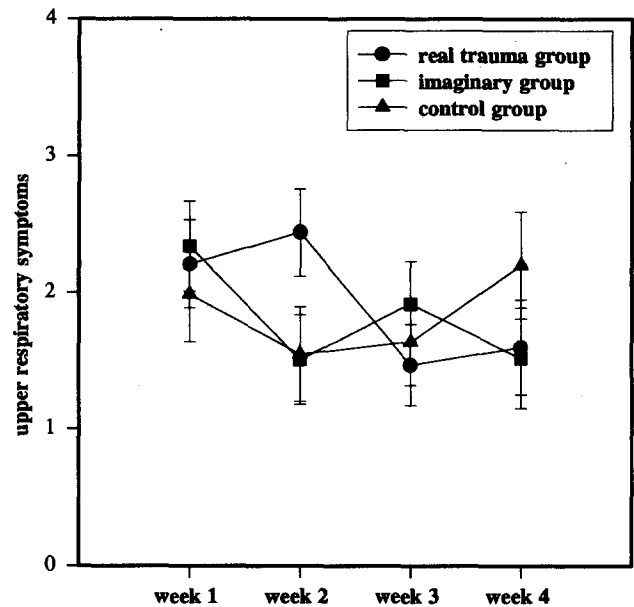

Figure 1. Group means for illness visits at pretest and follow-up.

Figure 2. Group means for upper respiratory symptoms at follow-up Weeks 1–4, adjusted for pretest values.

$< .15$, and miscellaneous, $r(32) = -.33$, $p < .07$, symptoms at follow-up. Negative mood at posttest was not significantly associated with health outcomes for real-trauma participants. For imaginary-trauma participants, the only significant association found was that between greater negative mood at immediate posttest and fewer upper respiratory symptoms at follow-up, $r(32) = -.36$, $p < .05$. Negative mood at follow-up was not significantly associated with health outcomes for real-trauma participants. For imaginary-trauma participants, greater negative mood at follow-up was associated with more miscellaneous symptoms, $r(32) = .50$, $p < .01$, and tended to be associated with more illness visits, $r(32) = .26$, $p < .15$.
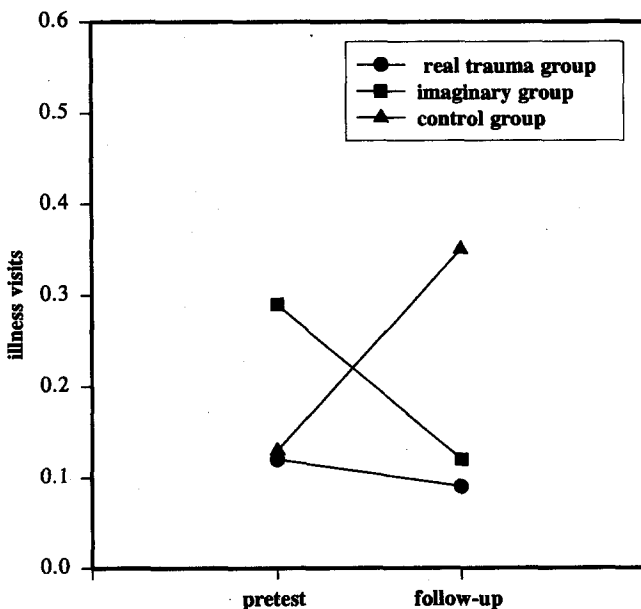
Longer Term Psychological Effects of Essay Writing

Data from the IES, the SCL-90, and the NHRC Mood Questionnaire were used to assess the longer term psychological impact of trauma disclosure. Group effects were significant for activation (active and fatigued), $F(16, 166) = 1.70$, $p < .05$, and trauma-related processing (intrusion and avoidance),[4] $F(8, 170) = 2.07$, $p < .05$, but not for hedonic moods (angry, depressed, fearful, happy), $F(32, 146) = 0.85$, ns. Because no interactions were significant, mean scores across the 4 follow-up weeks were used in further analyses. Group means for these analyses are presented in Table 3. One-way (group) ANCOVAs, with pretest dependent variable scores as covariates, revealed a significant main effect of group on avoidance, $F(2, 89) = 3.92$, $p < .05$, but not on intrusion, $F(2, 89) = 1.08$, ns. Real-trauma

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[4] Intrusion and avoidance scores from 2 participants who had reported these symptoms in relation to different events at pretest and follow-up were deleted from these and later analyses.

Table 3
Mean Longer Term Health Effects of Essay Writing

Measure	Real	Imaginary	Control	F	df
Illness visits				3.62*	2, 94
Pretest	0.12 (0.33)	0.29 (0.80)	0.13 (0.34)		
Follow-up	0.09 (0.29)	0.12 (0.33)	0.35 (0.66)		
Adjusted follow-up	0.10_a (0.08)	0.10_a (0.08)	0.36_b (0.08)		
Upper respiratory symptoms					
Week 1	2.21 (0.32)	2.34 (0.33)	1.99 (0.35)	2.66*	6, 273
Week 2	2.44_a (0.32)	1.51_b (0.33)	$1.55_{a,b}$ (0.35)		
Week 3	1.47 (0.30)	1.92 (0.31)	1.64 (0.32)		
Week 4	1.60 (0.35)	1.52 (0.37)	2.20 (0.39)		
Musculoskeletal symptoms				1.81^a	6, 273
Week 1	1.20 (0.17)	0.79 (0.18)	0.79 (0.19)		
Week 2	0.92 (0.17)	0.59 (0.18)	0.71 (0.19)		
Week 3	0.50 (0.12)	0.58 (0.13)	0.49 (0.13)		
Week 4	0.52 (0.18)	0.71 (0.18)	0.95 (0.19)		
Miscellaneous symptoms				1.40	6, 273
Week 1	1.82 (0.26)	1.82 (0.27)	1.68 (0.29)		
Week 2	1.64 (0.24)	1.26 (0.25)	1.56 (0.26)		
Week 3	1.70 (0.31)	1.88 (0.32)	1.49 (0.33)		
Week 4	1.47_a (0.31)	$1.71_{a,b}$ (0.32)	2.38_b (0.34)		
Activity restriction				1.63	6, 273
Week 1	0.68 (0.15)	0.54 (0.16)	0.54 (0.16)		
Week 2	0.74_a (0.15)	$0.40_{a,b}$ (0.16)	0.21_b (0.16)		
Week 3	0.27 (0.14)	0.49 (0.14)	0.56 (0.15)		
Week 4	0.51 (0.16)	0.42 (0.16)	0.60 (0.17)		

Note. Ns were 34, 32, and 29 for the real-trauma, imaginary-trauma, and control groups, respectively. Ns in the analyses of illness visits were 33, 34, and 31 for the real-trauma, imaginary-trauma, and control groups, respectively. Standard errors are indicated in parentheses. Group means with different subscripts differed significantly at $p < .05$, using means adjusted for covariates. Fs refer to group effects for illness visits and to Group × Time effects for the self-reported health measures.

[a] Marginally significant at $p < .10$.
* $p < .05$.

participants reported significantly more avoidance at follow-up, $F(1, 89) = 7.73, p < .01$, relative to imaginary-trauma participants and control group participants, who did not differ from each other, $F(1, 89) = 0.19, ns$. The effect of group was also significant for fatigued mood, $F(2, 91) = 4.63, p < .05$, but not for active mood, $F(2, 91) = 0.57, ns$. Real-trauma participants reported significantly more fatigue, $F(1, 91) = 9.10, p < .01$, relative to imaginary-trauma participants and control group participants, who did not differ from each other, $F(1, 91) = 0.24, ns$. These effects were in the opposite direction to that expected. No significant between-groups differences were observed on the SCL-90, $F(2, 91) = 0.38, ns$.

Did Dropouts Differ Systematically From Completers?

Because 6 participants did not return follow-up questionnaires, we examined whether systematic differences between dropouts and completers distorted the overall findings. A chi-squared analyses indicated that dropout status was not systematically related to group, $\chi^2 (2, N = 6) = 1.00, ns$. In a series of one-way analyses of variance, dropouts differed from completers only on 1 of 14 outcome variables. Dropouts had significantly more pretest illness visits, relative to completers, $F(1, 96) = 5.28, p < .05$ (dropouts: $M = 0.17, SD = 0.48$; completers: $M = 0.80, SD = 1.79$). Thus, the range of illness visits assessed may have been somewhat restricted.

Discussion

We sought to expand the findings of Pennebaker and colleagues concerning personal trauma disclosure and health by investigating whether disclosing emotions generated by imaginative immersion in a novel traumatic event would similarly enhance health and psychological adjustment. Methodological strengths of this study were the use of participants preselected for trauma presence, inclusion of a nonemotional control group, use of a yoking methodology to ensure equivalent event content and severity, and detailed pretest assessment to rule out previous experience of imaginary traumas.

Manipulation checks indicated that our data were capable of addressing these research questions. Comparisons with trauma questionnaire data indicated that most real-trauma participants (83%) wrote about their most subjectively severe traumas. The bulk (97%) of imaginary-trauma participants denied previous experience of their assigned events. Immediate elevations in negative mood and decrements in positive mood in both trauma groups, relative to the control group, replicated effects found in previous disclosure studies (M. A. Greenberg & Stone, 1992; Murray, Lamnin, & Carver, 1989; Pennebaker & Beall, 1986). Control group participants did not differ from trauma group participants in their immediate posttest reports of active and fatigued moods, suggesting that their task was sufficiently engaging and making demoralization effects less plausible.

Health Effects in the Real-Trauma Group

Parametric and nonparametric analyses indicated that the real-trauma group participants made significantly fewer illness visits to health care providers at follow-up, relative to control group participants. This finding augments a growing literature supporting the beneficial health effects of trauma disclosure (Esterling et al., 1994; Francis & Pennebaker, 1992; M. A. Greenberg & Stone, 1992; Pennebaker & Beall, 1986; Pennebaker, Colder, & Sharp, 1990; Pennebaker et al., 1988; Spera, Buhrfeind, & Pennebaker, 1994). This study demonstrated that experimental emotional disclosure can produce health benefits in women who were preselected for the experience of childhood and adolescent traumas. Furthermore, beneficial health effects were produced following a single 30-min essay-writing session, whereas previous disclosure studies have required three to four sessions (e.g., M. A. Greenberg & Stone, 1992; Pennebaker & Beall, 1986).

The potency of the real-trauma manipulation may be due to several methodological factors. First, the inducement that "people who are imaginative and really in touch with their emotions generally do very well at this task" may have instilled positive expectancies for mastery and implicitly provided social endorsement of expression. Instructions to "look deeply inside yourself and to really experience as intensely as possible the full extent of your feelings associated with this event" may have helped participants to maintain engaged exposure (Foa & Kozak, 1986) to the affective memory. Telling participants to "visualize all the details of your surroundings, the sights, sounds, and smells" may have enhanced the accessibility of affect-laden images, resulting in richer, more elaborated memories. Horowitz and Reidbord (1992) have suggested that "imagistic representation" of a traumatic memory should result in more powerful access to associated feelings than purely "lexical representation" (p. 355). In this study, richly elaborated imagery, such as the following, was present in some essays:

> I really never knew what a dead person looked like. But she looked beautiful. Her hair was nice and soft and her lips were pink—she was so pretty. My Mom said I could touch her. I don't know why, but I trusted her and bent over and kissed her. I was so scared because she felt so cold—like ice. One of my tears dripped onto her face and I felt like she could feel I was there.

An alternative explanation for the potency of a single writing session in this study is that experimental participants were particularly skilled copers who needed only limited guidance in structuring their memories. Casella and Motta (1990) have remarked, in relation to their sample of combat veterans, that "those who did not develop the disorder [PTSD] despite high exposure to combat stress are individuals with exceptional emotional strength and resilience" (p. 595). Similarly, participants in this study were college students who had met educational goals despite the experience of childhood trauma and, in some cases, sociocultural deprivation. Thus, caution should be used in generalizing these findings to clinical populations.

Although overall self-reported health did not differ among the groups, real-trauma participants reported decreases, whereas control participants reported increases in upper respiratory symptoms across the 4 follow-up weeks. Recent studies have reported transient positive and negative changes in lymphocyte activity following brief, expressive interventions (Futterman, Kemeny, Shapiro, Polonsky, & Fahey, 1992; Knapp et al., 1991). We can speculate, on the basis of these findings, that the high levels of depressed mood aroused by the real-trauma manipulation may have been difficult to dispel, resulting in some initial immunosuppressive effects in the first weeks following disclosure. When these subsided, the health-enhancing effects of disclosure were more evident. These findings indicate that weekly assessment of health status in the immediate aftermath of disclosure may highlight theoretically important patterns.

Psychological Effects in the Real-Trauma Group

The only significant psychological effects of essay writing were that real-trauma participants reported more fatigue and greater avoidance at follow-up than did participants in the other two groups. These effects were contrary to those expected. Perhaps real-trauma participants received too strong a dose of exposure to past traumatic memories, necessitating elevated use of mental controls to cope with the emotional aftermath of disclosure. These avoidant controls appeared to be efficacious, as evidenced by the absence of elevations in intrusion, negative mood, or psychological symptomatology at follow-up. Increased fatigue may have been due to the effort required to maintain avoidant strategies or may be a physiological carryover effect of depressed mood evoked by disclosure. Additional research is needed to clarify the genesis of fatigue in healthy individuals.

An alternative interpretation, suggested by a reviewer, is that real-trauma participants actually may not have been using more avoidance at follow-up; they may have merely become more aware of what they did to avoid confronting traumatic memories. In other words, unconscious defensive biases may have precluded accurate reports of avoidance at pretest (Shedler, Mayman, & Manis, 1993; Weinberger, Schwartz, & Davidson, 1979). According to this view, elevated reports of avoidance in the real-trauma group may actually reflect psychological gains in the form of increased self-awareness and conscious control over behavior. Indeed, some real-trauma essays identified conscious decisions made and strategies used to suppress emotion. For example, a participant who had been physically abused wrote:

> I remember the rage that I held in miraculously, how I bit on my lip to hold back the loud wails that come out of there. I banged my hands against the door of my closet then let my whole body fall back onto the bed.

This Intervention Versus Flooding Treatments

The real-trauma intervention shares some elements with behavioral flooding interventions for PTSD, which also require participants to actively confront distressing memories and associated emotions. However, exposure resulted in increased reports of avoidance in this study, whereas clinical interventions

have typically resulted in decreased avoidance (Foa et al., 1991; Keane, Fairbank, Caddell, & Zimering, 1989). Clinical treatment may differ from experimental disclosure manipulations in important ways, including the presence or absence of a therapeutic relationship, duration and frequency of disclosure (one 30-min session vs. six or more 90-min sessions), the psychosocial adjustment of participants, whether participants were actively seeking help to deal with past traumas, and the follow-up period used (1 month vs. 3–6 months). If we interpret increased reports of avoidance as, paradoxically, indicating greater willingness to disclose personally threatening information, then real-trauma participants' increases in reported avoidance are not necessarily discrepant with decreased avoidance on behavioral indexes in clinical studies. However, this explanation does not account for between-studies differences in self-reported avoidance.

Health Effects in the Imaginary-Trauma Group

An intriguing finding is that imaginary-trauma participants, who wrote about events encountered for the first time during the experiment, made fewer illness visits at follow-up, relative to control participants, and did not differ from real-trauma participants in their health care utilization. Physical health effects were produced in this group without any evident parallel changes in mood or psychological symptomatology.

Health effects in the imaginary-trauma group could not possibly have been due to the release of event-specific, emotional reactions that were previously inhibited, because events were encountered for the first time during the experiment. This suggests that event-specific emotional disinhibition is not necessary for the production of health effects following emotional disclosure. Pennebaker et al. (1990) also questioned the role of disinhibition in their study of disclosure associated with college adjustment, when expected within-group associations of previous inhibition and trait self-concealment (Larson & Chastain, 1990) with health outcomes were not found. Thus, although disinhibition could plausibly be involved in some instances of expression (e.g., Pennebaker et al., 1988), it is less able to account for the health effects produced when reactions to immediate or ongoing stressors are disclosed.

Do similar or different mechanisms of action underlie the effects produced in the two trauma groups? It is possible that event-specific, emotional disinhibition occurred in the real-trauma group, despite its implausibility in the imaginary-trauma group. Although a single-process explanation is the most parsimonious, several of our findings suggest that mediating processes in the two trauma groups were dissimilar. First, the two manipulations had different longer term effects on reported fatigue and avoidance. Second, posttest depressed mood was higher in the real-trauma group, and real-trauma participants reported expressing more emotion in their essays. Third, imaginary-trauma participants perceived their essays as less personal and the events written about as less traumatic than did real-trauma participants. Fourth, real-trauma essays differed in content and style from imaginary-trauma essays. Fifth, subjective perceptions of essay writing and immediate posttest negative moods were differentially associated with health outcomes

in the two trauma groups. Finally, negative mood at follow-up was significantly associated with health outcomes in the imaginary group only.

Observed Differences Between Real- and Imaginary-Trauma Essays

Although we did not use a systematic qualitative coding system, the following differences were noted by masked raters and guided their categorizations. Real-trauma essays contained more richly elaborated, sensory images. One sexual abuse survivor wrote "I knew it was my stepfather by the smell of his cigarettes," and another participant wrote "I see my father in my dreams lying in his coffin, holding a liquor bottle, coming back to haunt me." In contrast, imaginary-trauma essays contained more cognitive elements, such as concerns about justice or questions such as "Why me?" "Why did he do this?" or "Why did God let this happen?" Real-trauma essays more often emphasized a family context, whereas imaginary-trauma essays focused on individual perceptions. Furthermore, real-trauma essays were perceived by raters as more truthful and emotionally engaging—one rater remarked, "I can *hear* her speaking as I read this." In contrast, some imaginary-trauma essays appeared contrived, melodramatic, or overly literary. One imaginary-trauma participant titled her essay "A horrid night," and another wrote "life, to me, has been too short to end it like this and alone." More imaginary-trauma than real-trauma essays contained suicidal contemplations and references to "unbearable" or "intolerable" suffering. Fortunately, participants in both trauma groups decided that suicide was not an appropriate solution.

Imaginary-trauma participants expressed strong, morally unambiguous, indictments of perpetrators. Perpetrators were described in some essays as "fat pigs" or "animals," who deserved eternal imprisonment and removal from society. In a few imaginary-trauma essays, protagonists "called the cops" on perpetrators. In contrast, although some real-trauma participants spoke of hating their victimizer, wishing him dead, or wanting to kill him, more guilt and less moral certitude was associated with these desires. These participants' perceptions of abusers often reflected a struggle to reconcile complex and conflicting emotional reactions.

Limitations

The following caveats should be considered in interpreting these findings: First, the parameters of the trauma manipulations (a single essay-writing session and a 1-month follow-up period) may not have been sufficient to capture the full range of the effects of emotional disclosure. Second, unawareness of condition was not possible in this study because assignment of yoked events to imaginary-trauma participants was based on the pretest trauma reports they filled out during the experimental session. Experimenter knowledge of group assignment makes demand characteristics a plausible threat to internal validity. However, demand characteristics should have resulted in trauma participants reporting improved functioning on all measures, and this was not the case. Further, self-report mea-

sures are more susceptible than objective measures to the biasing effects of demand characteristics, yet, in this study, health effects were found only for illness visits.

We acknowledge that, given the low base rate of physician visits, the magnitude of changes produced by disclosure is necessarily small and may have limited clinical significance in a healthy population. Furthermore, physician visit indexes are not pure objective indicators of health status, as they may reflect variance due to personality, mood, and socioeconomic position. Nevertheless, enhancement of health perceptions and reduction of health care utilization may constitute valid therapeutic goals in their own right for certain types of patients, such as those with somatization disorder or chronic pain and fatigue syndromes.

Other Related Findings

Several studies have examined the effects of emotional exposure and expression on fear and avoidance reactions. J. P. Watson and Marks (1972) found that exposure to phobia-relevant stimuli (e.g., scenes involving crowded places) and frightening, but phobia-irrelevant, stimuli (e.g., scenes of being eaten by tigers) produced equivalent reductions in anxiety and avoidance among phobic clients. The authors attributed their findings to emotional catharsis or generalized habituation to the experience of fear. In another experimental study (Pyszczynski, Greenberg, Solomon, Sideris, & Stubing, 1993), healthy participants who expressed their fears of cancer reduced their defensive distancing from hypothetical cancer patients. Similarly, writing first-person narratives describing an AIDS patient's experience "proved to be an effective method of sensitizing students to the personal experience of living with HIV" (Marshall & O'Keefe, 1995, p. 75). However, a recent experimental study comparing verbal and nonverbal expression of "personally troubling or traumatic feelings" (Krantz & Pennebaker, 1995, p. 2) found beneficial health effects only for participants who combined expressive movement with written expression, suggesting that movement alone may be too "overdistanced" (Scheff, 1979, p. 61) to produce physiological change. Differences in findings may be due to the outcomes assessed (health vs. attitudes) or the extensiveness of verbal expression, regardless of whether this was explicitly self-relevant.

Theoretical Implications

We believe that health effects in the imaginary-trauma group are mediated by two mechanisms: enhancing affective regulation and constructing more resilient possible selves. Enhancing affective regulation involves three component processes: (a) acquiring specific skills and strategies associated with affective awareness, tolerance, and modulation (L. S. Greenberg & Safran, 1987; Horowitz, 1986; McCann & Pearlman, 1990); (b) developing perceptions of control and self-efficacy in the context of aversive emotional arousal (Bandura, 1983; Foa & Kozak, 1986; Kirsch et al., 1990; Scheff, 1979; Thompson et al., 1993); and (c) developing self-empathy and acceptance of one's own emotional reactions (L. S. Greenberg & Safran, 1987; McCann & Pearlman, 1990).

Substantial anecdotal and empirical evidence suggests that the ability to regulate affect is crucial to recovery from trauma. Krystal (1978) observed that severe childhood trauma results in "a lifelong dread of the return of the traumatic states and an expectation of it . . . there is a fear of one's emotions and an impairment of affect tolerance" (p. 98). More recent empirical evidence suggests that the abilities to confront, control, and structure thoughts and feelings about past traumas appear to be markers of successful adjustment in victimized populations (Burgess & Holmstrom, 1979; Casella & Motta, 1990; Fairbank, Hansen, & Fitterling, 1991; Green, Lindy, & Grace, 1988; Hendin & Haas, 1984; Silver, Boon, & Stones, 1983).

Correlational and experimental studies of the disclosure-adjustment relationship provide indirect support for the potential mediating role of emotional modulation. Retrospectively reported distress following trauma disclosure was a better predictor of current adjustment than supportiveness of confidant feedback (Kelly, Coenen, & Johnston, 1995). Furthermore, the process of shifting from negative to positive mood during experimental disclosure has been associated with adaptive cognitive, self-esteem, and behavior changes (Donnelly & Murray, 1991; Murray et al., 1989). Additionally, higher levels of "experiencing" (Klein, Mathieu, Gendlin, & Kiesler, 1969), reflecting greater ability to focus on and elaborate inner experience during disclosure, have been associated with immune changes suggestive of enhanced viral control (Lutgendorf, Antoni, Kumar, & Schneiderman, 1994).

Writing about imaginary traumas produced significantly less immediate depression than writing about real traumas. Because depressed mood is associated with defective self-images (Beck & Weishaar, 1989), and pervasive perceptions of helplessness (Peterson & Seligman, 1983), it can be self-perpetuating and resist modulation. Depression has been notoriously difficult to treat in populations with PTSD (Foa et al., 1991; Keane et al., 1989). Between-groups differences in depressed mood suggest that combining distressing material (the traumatic scene) with comforting cues (the imaginary context) may be an effective way of "dosing" (Horowitz, 1986) emotional confrontation.

The imaginary-trauma manipulation may also foster self-empathy by allowing participants to observe their own emotional pain in a context uncontaminated by knowledge of failed coping efforts and associated self-derogation (e.g., Kubany & Manke, 1995). In Ramsey's (1979) behavior therapy for pathological grief, affective awareness and acceptance were facilitated by moving from a participant to an observer perspective. A client was told: "The nurse only allowed you one minute to be with the body before bustling you out of the room. Now, if you heard that had happened to someone else, would it surprise you if that person became angry with the nurse?" (Ramsey, 1979, p. 235). Viewing one's situation from an alternative perspective sets the stage for "allow[ing] into awareness an organization of one's experience previously regarded as unacceptable and accepting it" (L. S. Greenberg & Safran, 1987, p. 193).

The correlates of health outcomes in the imaginary-trauma group that were identified in this study are consistent with an emotion modulation hypothesis. Specifically, better health at follow-up was associated with perceiving the imaginary event as more traumatic, reporting more negative mood at immediate

posttest, and reporting less negative mood at longer term follow-up. Thus, participants who benefited the most from the imaginary-trauma intervention were those who became affectively immersed in the imaginary-trauma scenario, yet were able to modulate and limit these reactions such that relief and diminished negative affective arousal were reported in subsequent weeks.

Writing about a hypothetical trauma could also facilitate development of a more resilient version of self. Markus and Nurius (1986) have suggested that "through the selection and construction of possible selves individuals can be viewed as active producers of their own development" (p. 955). The hypothetical nature of the trauma in this study meant that imagined coping choices and their consequences were potentially controllable, thus providing opportunities for mastery and successful resolution. Imaginal enactment of competent coping efforts should enhance self-efficacy (Bandura, 1983) and promote active coping with real-life stressors. In Dowrick's (1977) study, performance of disabled children was facilitated by having them view a constructed videotape consisting only of exemplars of their competent performance, with mistakes removed. Markus and colleagues (Cross & Markus, 1991; Markus & Nurius, 1986; Ruvolo & Markus, 1992) have reported that conceptions of competent, successful future selves were associated with enhanced effort and persistence, higher self-esteem, and greater perceived life satisfaction.

Clinical Implications

These preliminary findings suggest that disclosure of cognitive and emotional responses to hypothetical challenging situations may be a valuable adjunctive intervention for clients with self-schemas characterized by helplessness and coping inefficacy. Several existing therapeutic interventions for trauma survivors contain some symbolic or imaginal elements. In imaginal exposure and rescripting therapy (Smucker & Niederee, 1995), clients imagine their adult selves entering the scene of a childhood trauma and developing strategies to rescue and comfort the child. In the course of imaginal rescripting and imaginary-trauma disclosure, the survivor's "perception of herself as a powerless, 'frozen' victim is being altered and replaced with a sense of empowerment; she is becoming an active agent, able to bring about change and protect herself from harm" (Smucker & Niederee, 1995, p. 78).

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