

The Effects of Different Methods of Emotional Disclosure: Differentiating Post-Traumatic Growth From Stress Symptoms

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Research on emotional disclosure should test the effects of different disclosure methods and whether symptoms are affected differently than post-traumatic growth. We randomized 214 participants with unresolved stressful experiences to four disclosure conditions (written, private spoken, talking to a passive listener, talking to an active facilitator) or two control conditions. All groups had one 30-minute session. After 6 weeks, disclosure groups reported more post-traumatic growth than controls, and disclosure conditions were similar in this effect. All groups decreased in stress symptoms (intrusions, avoidance, psychological and physical symptoms), but disclosure did not differ from control. We conclude that 30 minutes of disclosure leads to post-traumatic growth but not necessarily symptom reduction, and various disclosure methods have similar effects. Research on the effects of disclosure should focus on the benefits of growth as well as symptom reduction. © 2010 Wiley Periodicals, Inc. *J Clin Psychol* 00:1–15, 2010.

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Traumatic or stressful life events can have a sustained impact on emotional and physical well-being; thus, it is vital to develop and test interventions to ameliorate those consequences. The technique of expressive writing about stressful events, also known as written emotional disclosure, was first tested by Pennebaker and Beall (1986). In the standard expressive writing paradigm, participants are randomized to write emotionally about a stressful experience (disclosure condition) or nonemotionally about a neutral topic. Writing is typically conducted in private for three to four sessions of 15–20 minutes each, and there is no interaction or feedback about the content and process of disclosure. Health status is assessed at baseline and then at follow-up, which is typically several weeks to months after the intervention.

Since the mid-1980s, emotional disclosure has been tested in many studies, with overall mixed results. An early meta-analysis revealed moderate effect-size improvement in the disclosure group over the control group in psychological symptoms, immune function, health care visits, and academic performance (Smyth, 1998). More recent meta-analyses include more studies on various populations but provide less support for health benefits (Harris, 2006; Meads & Nouwen, 2005), indicate that the effects are present but quite small (Frattaroli, 2006), and suggest that the effects are weaker for psychological symptoms than physical health indices (Frisina, Borod, & Lepore, 2004). Thus, it is important to test methods to enhance the efficacy of this technique and to examine outcomes other than health symptoms.

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Different Methods of Eliciting Disclosure

Although the vast majority of disclosure studies have tested writing conducted in private, emotional expression and processing can occur in a range of ways, including mental imagery, bodily expression, typing, talking privately out loud, speaking to a passive listener, and speaking to an active facilitator. It is noteworthy that the most of the original studies in the disclosure literature focused on the effects of talking about stressful experiences (Pennebaker, Barger, & Tiebout, 1989; Pennebaker, Hughes, & O'Heeron, 1987; Pennebaker & O'Heeron, 1984), which is a more common form of emotional disclosure than writing for most people. This early interest in talking, however, waned in favor of writing about stressors, apparently to enhance experimental control by eliminating the possible awkwardness of talking to a tape recorder or the potential complications of the presence of a listener (Pennebaker et al., 1987). As a result, only a few experiments have tested the effects of disclosure by privately talking. Some of these studies have shown benefits (Kelley, Lumley, & Leisen, 1997), whereas others have had mixed results (van Middendorp et al., 2009; Wetherell et al., 2005), or null effects (Keefe et al., 2008). Furthermore, direct comparisons of the effects of private writing and talking are quite rare. Murray and Segal (1994) found that spoken and written expression about a traumatic event for several sessions were equally effective in reducing distress and more effective than control writing or talking. Lyubomirsky, Sousa, and Dickerhoof (2006) found similar effects for writing and talking privately. Esterling, Antoni, Fletcher, Margulies, and Schneiderman (1994) reported that talking about stressful events for three sessions led to better immune status than writing about stress, which was better than a control condition. Aside from these few studies, however, comparisons of private written versus spoken disclosure have not been published.

Spoken disclosure to a listener is more natural—and far more common—than speaking into a tape recorder, and research shows that the vast majority of people talk about emotional experiences to other people (Rimé, Herbette, & Corsini, 2004). Of course, verbally sharing with an empathic listener is the cornerstone of many forms of effective psychotherapy. The literature on the effects of disclosure to a listener, however, is quite mixed. For example, the benefits of brief or single episodes of disclosure to another person may be temporary or limited. Zech and Rimé (2005) demonstrated that sharing stressful experiences with others leads to immediate relief, but not to longer lasting changes in emotional functioning. Segal and Murray (1994) found that four sessions of disclosing to a therapist decreased negative affect as much as privately talking into a recorder. In contrast, Pennebaker et al. (1987) found that disclosing to a “silent confessor” behind a screen actually inhibited participants' disclosures, and stigmatized or shame-based experiences are more easily disclosed to an impersonal computer than face-to-face to a person (Newman, Des Jerslais, Turner, & Gribble, 2002). In contrast, there is some evidence that the benefits of written disclosure are enhanced when someone reads the person's writing, rather than keeping the writings completely private (Radcliffe, Lumley, Kendall, Stevenson, & Beltran, 2007). Also, studies have documented that attitude change is stronger under public than private conditions (Baumeister, 1982), and public experiences can affect self-evaluations more strongly than private events (Kelly & Rodriguez, 2006). Thus, it remains unclear whether verbally disclosing about stressors to a listener is helpful.

The consequences of interpersonal disclosure likely depend, in part, on the reactions of the listener. The responses of others can vary from rejecting and punitive, through passive yet empathic, to facilitative or actively eliciting. Most studies of interpersonal disclosure have not controlled the responses of the other person, thereby complicating interpretations of the effects. One study that involved training nurses to use experiential methods to facilitate disclosure found that neither facilitated disclosure nor disclosing privately into a tape recorder was beneficial for patients with rheumatoid arthritis (Keefe et al., 2008). Schilte et al. (2001) also found no benefits for primary care patients who talked with a “disclosure doctor,” who was trained to probe certain life stress domains and to use active techniques such as emotional reflection and summarizing. It is not clear, however, how active versus passive these facilitators were, nor how skilled and comfortable they were at eliciting secrets and other

emotionally aversive experiences of the patients. We think that it is important to more thoroughly control the behavior of the recipient in the disclosure context and to disentangle the presence of a passive listener from one who is actively facilitating disclosure and processing. The latter can be accomplished by techniques such as making specific requests for people to disclose more, meta-communicating about the fears of doing so, and inquiring about avoided experiences and emotions.

Stress Symptom Reduction Versus Post-Traumatic Growth

Almost all studies of emotional disclosure have examined its effects on stress manifestations, such as cognitive intrusions, avoidance, and hyperarousal, as well as physical and emotional symptoms of stress. In contrast, post-traumatic growth refers to broader cognitive benefits occurring after aversive experiences, such as finding meaning, changing priorities, seeing new possibilities, increasing understanding and appreciation of life, improving relationships, and making spiritual changes (Tedeschi & Calhoun, 2004). Research shows that loss, abuse, or natural disasters, for example, can lead to growth and new perspectives (Cobb, Tedeschi, Calhoun, & Cann, 2006; Taku, Calhoun, Cann, & Tedeschi, 2008).

It is unclear, however, how post-traumatic growth relates to symptom reduction, and an early literature review concluded that some studies find a positive, linear relationship between post-traumatic growth and emotional adjustment, but other studies do not support such a link (Park, 1998). For example, a study of urban teens reported that higher post-traumatic growth was associated with less emotional distress 12 and 18 months after a traumatic event (Ickovics et al., 2006). Other studies find more complex relationships between growth and symptoms. A study of women with breast cancer found a nonlinear relationship between post-traumatic growth and psychological symptoms; women who had low or high levels of growth reported fewer symptoms compared to women with intermediate levels of growth (Lechner, Carver, Antoni, Weaver, & Phillips, 2006). A recent meta-analysis, however, concluded that post-traumatic growth is independent of anxiety, global distress, and physical symptoms, and may actually correlate positively with cognitive signs of stress, such as intrusive and avoidant thoughts (Helgeson, Reynolds, & Tomich, 2006). Overall, then, the relationship between growth and symptoms is inconsistent and likely complex. Furthermore, how interventions—as opposed to simply the passage of time and adaptation—affect both symptoms and growth is not known. It is possible that emotional disclosure might improve both post-traumatic growth and symptoms, or affect just one or the other. Only one study of disclosure has examined post-traumatic growth. A small sample of people with post-traumatic stress disorder (PTSD) who wrote about trauma had more post-traumatic growth, but no improvement on symptoms, compared with control patients (Smyth, Hockemeyer, & Tulloch, 2008).

Goals of This Study

This study sought to advance the literature in several ways. It tested the effects of emotional disclosure for people with unresolved stress and directly compared four different methods to elicit disclosure—writing, private talking, talking to a passive listener, and talking to a facilitating therapist. This study assessed not only stress symptoms at 6-week follow-up but also post-traumatic growth to determine whether and how these outcomes are influenced by emotional disclosure. We hypothesized that all of the disclosure conditions would lead to more symptom reduction as well as post-traumatic growth than would the control conditions, and that facilitated disclosure would influence outcomes more than other disclosure methods. This study tested only one session of disclosure, as has been done in a number of other studies (Burton & King, 2008; Greenberg, Wortman, & Stone, 1996; Lepore, 1997; Smyth, True, & Souto, 2001).

Methods

Participants, Recruitment, and Screening

Participants were undergraduate psychology students who reported having an unresolved traumatic or stressful event. Approximately 3,000 students were screened through a department Web-based screening system over the course of 2 academic years, from September 2006 through April 2008. The inventory solicited demographic information (name, age, sex, and contact information) as well as basic information about stressful experiences. Approximately 40% of those screened met the following inclusion criteria: they endorsed that they had experienced “a traumatic or stressful event,” and that the event continued to bother them “moderately” or “very much.” Of those who met these criteria, approximately one-third were excluded because they qualified for competing studies in our laboratory, and nearly half could not be contacted, did not reply, or were not interested in participating, including 15 who came to the laboratory for session 1, but dropped before being randomized.

As shown in Figure 1, a total of 214 students provided baseline data and were randomized to experimental groups (randomized sample). Of these participants, 193 (90.2%) completed the 6-week follow-up evaluation (“completer sample”). The completer sample was 82% female, had a mean age of 22 years ($SD = 5.5$), and comprised 37.3% Caucasian, 33.2% African-American, 13.0% Middle Eastern, 6.2% Asian, 2.6% Hispanic, and 7.8% multiethnic or other ethnicity.

Procedures

Participants came to the laboratory individually. During the first session, the study was described in full, and participants provided institutional review board-approved written informed consent and completed baseline measures. At a second visit (within 1 week of visit 1), participants were stratified by gender and randomized into one of six experimental conditions using randomization software. Talking sessions were audiotaped, and writings were submitted to the research team. Participants returned to the laboratory 6 weeks later and completed the same measures that they had completed at baseline. Participants were given course credit, cash up to \$40, or a combination of the two as compensation.

Experimental Groups and Interventions

There were four emotional disclosure conditions and two control conditions. Participants received written or verbal instructions on their assigned condition at the beginning of session 2. All six groups engaged in a single writing or talking session in a private room for 30 minutes. All six conditions received parallel instructions to equate groups for expectancies and effort, including that they should speak or write freely and honestly and not worry about language or

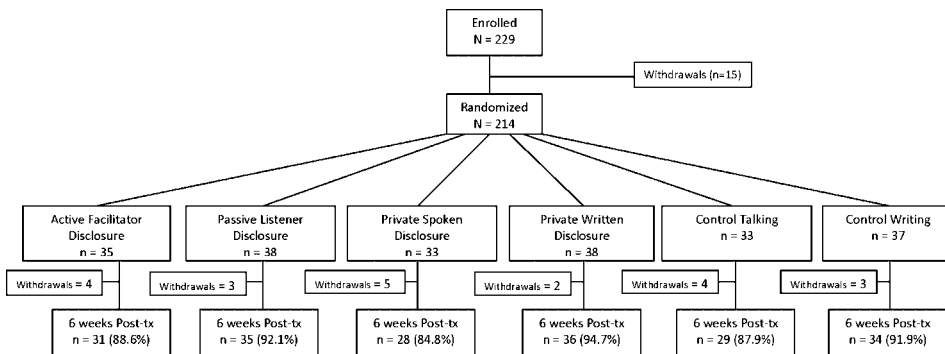


Figure 1. Flow of participants through the study.

grammar or spelling (for the writing conditions). The general instructions for the four disclosure groups were as follows:

- The goal of this project is to see whether (talking to a facilitator, or talking into a tape recorder, or writing) about a stressful event in your life will reduce stress and therefore improve your health and functioning. If you are like most people, you have had some stressful experiences or events during your life. Research has found that when people (talk or write) about stress, they feel less stressed. Please spend a few moments to identify one particularly stressful experience. Some stressors happen only once to a person, whereas other stressors happen repeatedly or continue for a long time, and may even be happening right now. Please try to identify a stressful experience that continues to bother you. This may be a stressful experience that you have not talked about or shared much with other people, or it may be one that you don't like to be reminded of. Now, we would like you to (talk or write) about this stressful experience. As you (talk or write) today, your task is to do the following: (a) try to make your memories of the stressful experience as vivid as possible, including mental images, emotions, and sensations in your body; (b) try to describe both the facts about the experience, and also (talk or write) about your deepest feelings about it; (c) try to (talk or write) as much as you are able, even if there is some part of the experience that you are reluctant to (talk or write) about.

Active facilitator disclosure. Participants spoke to a facilitating therapist about their stressful experience and emotions relating to that experience. The therapist was one of three female graduate students in clinical psychology, who was trained using a set of guidelines to facilitate disclosure. In this condition, the therapist was engaging and active and tried to identify missing content or affect in the participant's story. The therapist encouraged the participant to elaborate further on these topics, including asking if something more stressful had happened but was not being shared. The therapist asked the participant to provide details about facts or emotions and used reflections and labeling to encourage the participant to experience more emotion. Supervision was provided by a doctoral level psychologist from tapes of the sessions.

Passive listener disclosure. In this condition, the graduate student therapist also met with the participant, but the therapist was empathic yet passive. She listened carefully, used body language and neutral phrases like "uh-huh," and "ok" to show engagement in the story and encourage the participant to continue, but did not provide any prompts, questions, or directives to further explore emotions or facts relating to the experience.

Private spoken disclosure. Participants followed the general disclosure instructions but were alone and spoke into a tape recorder.

Private written disclosure. Participants followed the general disclosure instructions but were instructed to write about their experience and emotions in a journal, which was provided.

This study had two control conditions, which engaged in emotionally neutral talking to a listener or writing in a journal, and for the same duration and as the four disclosure conditions. The instructions were parallel to those of the disclosure groups:

- The goal of this project is to see whether (talking or writing) about how you manage your time will reduce stress and therefore improve your health and functioning. If you are like most people, how you spend your time can be a source of stress. Research has found that when people plan their time or organize their activities better, they feel less stressed. The task you are asked to do is to (talk or write) about how you manage your time. You are to (talk to a facilitator or write) in detail for 30 minutes about the following topics: what you plan to do over the next 24 hours, what you plan to do with your time over the next month, and what you plan to do with your time over the next year. As you (talk or write), you should try to stick to your actual behaviors or your planned actions. Try not to (talk or

write) about your feelings about what is going to happen, and try to avoid giving your opinions. (Talk or Write) only about the facts—what will happen, perhaps day by day or hour by hour—or what you plan to do in the next day or week, but not about your feelings or opinions.

Control talking. This condition served as a control for the three disclosure conditions that involved talking and/or the presence of a therapist. Participants spoke to one of the three graduate student therapists about time management. The therapist was attentive but passive, simply following the participant's speaking and encouraging them to continue if indicated.

Control writing. This condition served as a control for the written disclosure condition, and participants followed the same instructions as the Control talking group, except for being instructed to write privately instead of talk.

Measures

The following constructs were assessed at both baseline and 6-week follow-up.

Post-traumatic growth. The 21-item Post-Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) assessed perceived benefits that emerge from coping with traumatic or stressful events. The scale yields a total score as well as scores on five subscales: new possibilities, relating to others, personal strength, appreciation of life, and spiritual change. Participants were instructed to identify the single most stressful event or experience that they have had and that continues to bother them and to complete this questionnaire with respect to that event. They rated how much change has occurred on a scale from 1 (*I did not experience this change as a result of my stressor*) to 6 (*I experienced this to a very great degree as a result of my stressor*) and scale means were calculated. The validity of the scale has been demonstrated in various studies (Tedeschi & Calhoun, 1996; Weinrib, Rothrock, Johnsen, & Lutgendorf, 2006). At baseline in this sample, the overall scale had excellent internal consistency (Cronbach's $\alpha = .92$), as did the individual subscales (alphas ranging from .81 to .89).

Cognitive intrusions and avoidance. The 22-item Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997) measures cognitive intrusions, attempts at avoidance of memories and stimuli related to a trauma, and physiological hyperarousal with respect to a specific stressful event. Participants rated items with respect to the same event that they identified for the PTGI, on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*) and scale means were calculated. The scale has excellent internal consistency reliability ($\alpha = .96$) and was found to correlate highly ($r = .84$) with the PTSD Checklist (Creamer, Bell, & Failla, 2003). In the current sample at baseline, the scale also demonstrated excellent reliability ($\alpha = .92$). This study analyzed only the avoidance and intrusions subscales because they are from the original measure and have been widely studied in the disclosure literature. In addition, to make sure that participants completed the PTGI and the IES-R at follow-up with respect to the same stressor they referenced at baseline, participants wrote their stressor on a card, sealed it in an envelope, and this sealed envelope was given to them at follow-up, with instructions to open it privately and complete these two scales about that stressor.

Psychological symptoms. The 53-item Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) assesses a range of symptom domains (e.g., anxiety, depression, interpersonal sensitivity, hostility). Participants rated each item for the past 2 weeks on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). This measure and its parent measure, the Symptom Checklist-90-Revised (Derogatis, 1983), have been widely used and validated, and we analyzed the Global Severity Index (mean of all items), which had excellent reliability in this sample (Cronbach's $\alpha = .97$).

Physical symptoms. The 36-item Physical Health Symptoms Questionnaire (Greenberg et al., 1996) assesses health complaints pertaining to upper respiratory, muscular, and

gastrointestinal symptoms during the past 2 weeks. The severity of each item is rated on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely severe*) and the measure yields a mean score. Greenberg et al. (1996) found that this measure was sensitive to improvement after single session of disclosure. In the current study, baseline internal consistency was excellent ($\alpha = .91$).

Data Analyses

First, to determine the success of randomization in creating equivalent groups, the demographics and baseline scores of the outcome measures were compared across the six experimental groups using analysis of variance (ANOVA) or chi-squares. Next, participants who completed the follow-up visit ($n = 193$) were compared with those who dropped after randomization ($n = 21$) to determine the effects of attrition. Next, to determine how the outcome measures were related, correlations were calculated among outcome measures at baseline for the randomized sample.

Primary analyses first tested whether disclosure overall affected symptoms and post-traumatic growth compared with the control conditions. For these analyses, the four disclosure groups were combined and compared with the two control groups combined, yielding a 2-group comparison with substantial statistical power. Following this omnibus analysis, subsequent analyses compared the four disclosure groups with each other. Next, individual disclosure groups were compared to their own control group to examine specific group differences. We conducted analysis of covariance (ANCOVA), comparing groups on outcomes, controlling for baseline levels of the outcome. Primary analyses were done on the completer sample ($n = 193$), but ancillary analyses were conducted on the full-randomized sample ($n = 214$) to determine whether attrition affected findings; for these analyses, missing outcome values were replaced with participants' own baseline values. Effect sizes for group comparisons are presented as partial eta squared ($p\eta^2$), which is the proportion of variance in the outcome related to the group factor while holding constant baseline scores. This effect size statistic can be converted to Cohen's d , and values of $p\eta^2$ of .01, .06, and .14 correspond to d values that are small, medium, and large, respectively (Cohen, 1988). Effect sizes for within-group changes are presented as d (follow-up minus baseline divided by the group's baseline standard deviation).

Results

Preliminary Analyses

For the randomized sample, there were no significant differences among the six groups on baseline scores of outcome measures (all $p > .44$), gender ($p = .96$), race ($p = .28$), and age ($p = .72$), suggesting that randomization was successful in generating equivalent groups. Next, the 193 completers were compared with the 21 who dropped after randomization. Dropout was similar among the six conditions, ranging from two to five participants per condition. No differences between completers and drop-outs were found on baseline scores of outcome measures (all $p > .05$), gender ($p = .33$), age ($p = .11$), and ethnicity ($p = .16$).

Table 1 presents correlations among the measures at baseline for the randomized sample. What is most obvious is that, whereas the scales of the PTGI were moderately positively correlated among themselves—and the symptoms measures (intrusions, avoidance, psychological symptoms, physical symptoms) were moderately positively correlated among themselves—there was little or no correlation between post-traumatic growth scales and the symptoms measures. Thus, post-traumatic growth and symptoms were largely independent.

Primary Analyses

Combined disclosure groups versus combined controls. To test the primary hypothesis—that disclosure would lead to more growth and less symptoms at follow-up than would control—the four combined disclosure groups were compared on outcomes to the

Table 1
Correlations Among Outcome Measures at Baseline

| | NP | RO | PS | AL | SC | AVD | INTR | BSI | PS |
|------------------------------|-------|-------|-------|-------|-------|------|-------|-------|-------|
| Post-traumatic growth total | .80** | .84** | .80** | .87** | .61** | .04 | .07 | -.10 | .01 |
| New possibilities (NP) | | .52** | .63** | .72** | .41** | .10 | .08 | -.05 | -.05 |
| Relating to others (RO) | | | .51** | .60** | .42** | -.07 | -.00 | -.16* | .01 |
| Personal strength (PS) | | | | .67** | .42** | .06 | -.01 | -.10 | .01 |
| Appreciation of life (AL) | | | | | .45** | .05 | .11 | -.03 | .05 |
| Spiritual change (SC) | | | | | | .13 | .17* | .04 | .01 |
| Cognitive avoidance (AVD) | | | | | | | .61** | .51** | .18* |
| Cognitive intrusions (INTR) | | | | | | | | .52** | .23** |
| Psychological symptoms (BSI) | | | | | | | | | .52** |
| Physical symptoms (PS) | | | | | | | | | |

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

two combined control groups. Table 2 presents these data, including baseline-adjusted means for each outcome measure. Disclosure led to significantly higher PTGI total score, $F(1, 190) = 8.69, p = .004, \eta^2 = .04$, and four of its subscales: new possibilities, $F(1, 190) = 10.84, p = .001, \eta^2 = .05$; relating to others, $F(1, 190) = 7.70, p = .006, \eta^2 = .04$; personal strength, $F(1, 190) = 5.58, p = .019, \eta^2 = .03$; and appreciation of life, $F(1, 190) = 7.25, p = .008, \eta^2 = .04$. Only spiritual change was unaffected by disclosure, $F(1, 190) = 0.53, p = .47, \eta^2 = .00$. From baseline to follow-up, the combined disclosure groups showed a significant increase in total post-traumatic growth, paired $t(130) = 2.54, p = .01, d = .20$; and the combined controls decreased marginally in post-traumatic growth, paired $t(61) = 1.69, p = .10$. When the control groups were examined separately, the decrease in post-traumatic growth was marginally significant in the control talking group, paired $t(28) = 1.69, p = .10$, but the decrease was not significant in the writing control group, paired $t(33) = 0.67, p = .51$ (Table 3).

In contrast to post-traumatic growth, no symptom measure was influenced by the combined disclosure groups compared with combined controls: avoidance, $F(1, 190) = 0.92, p = .34, \eta^2 = .01$; intrusions, $F(1, 190) = 0.07, p = .79, \eta^2 = .00$; psychological symptoms, $F(1, 190) = 1.34, p = .25, \eta^2 = .01$; or physical symptoms, $F(1, 190) = 1.54, p = .22, \eta^2 = .01$. It is noteworthy that the combined disclosure groups showed significant improvement on all of

Table 2

Comparison of Combined Disclosure Versus Combined Control Group: Means (SD) and Adjusted Means (SE) on Outcome Measures at Baseline and 6-Week Follow-up

| Outcome measures | Time point | Combined disclosure (<i>n</i> = 131) | Combined control (<i>n</i> = 62) |
|------------------------------|-----------------------------|--|--------------------------------------|
| Post-traumatic growth: Total | Baseline | 3.71 (1.13) | 3.78 (1.05) |
| | Follow-up | 3.94 (1.19) | 3.51 (1.41) |
| | Adj. <i>M</i> (<i>SE</i>) | 3.95 (0.09) | 3.48 (0.13) |
| New possibilities | Baseline | 3.51 (1.39) | 3.53 (1.43) |
| | Follow-up | 3.76 (1.40) | 3.14 (1.42) |
| | Adj. <i>M</i> (<i>SE</i>) | 3.76 (0.11) | 3.14 (0.16) |
| Relating to others | Baseline | 3.38 (1.32) | 3.53 (1.24) |
| | Follow-up | 3.79 (1.35) | 3.38 (1.53) |
| | Adj. <i>M</i> (<i>SE</i>) | 3.82 (0.10) | 3.32 (0.15) |
| Personal strength | Baseline | 4.07 (1.30) | 4.23 (1.21) |
| | Follow-up | 4.29 (1.35) | 3.90 (1.68) |
| | Adj. <i>M</i> (<i>SE</i>) | 4.31 (0.11) | 3.84 (0.17) |
| Appreciation of life | Baseline | 4.12 (1.31) | 4.19 (1.37) |
| | Follow-up | 4.19 (1.33) | 3.73 (1.57) |
| | Adj. <i>M</i> (<i>SE</i>) | 4.20 (0.11) | 3.71 (0.15) |
| Spiritual change | Baseline | 3.51 (1.83) | 3.36 (1.78) |
| | Follow-up | 3.48 (1.88) | 3.22 (1.93) |
| | Adj. <i>M</i> (<i>SE</i>) | 3.44 (0.11) | 3.29 (0.17) |
| Cognitive avoidance | Baseline | 1.98 (0.87) | 1.86 (0.92) |
| | Follow-up | 1.53 (1.04) | 1.33 (0.92) |
| | Adj. <i>M</i> (<i>SE</i>) | 1.51 (0.07) | 1.38 (0.11) |
| Cognitive intrusions | Baseline | 2.15 (1.04) | 1.95 (1.06) |
| | Follow-up | 1.39 (1.03) | 1.32 (1.00) |
| | Adj. <i>M</i> (<i>SE</i>) | 1.36 (0.08) | 1.39 (0.11) |
| Psychological symptoms | Baseline | 1.12 (0.75) | 1.02 (0.74) |
| | Follow-up | 0.80 (0.77) | 0.84 (0.67) |
| | Adj. <i>M</i> (<i>SE</i>) | 0.78 (0.05) | 0.88 (0.07) |
| Physical symptoms | Baseline | 23.92 (16.12) | 24.03 (16.65) |
| | Follow-up | 19.83 (16.41) | 22.14 (15.13) |
| | Adj. <i>M</i> (<i>SE</i>) | 19.85 (1.03) | 22.09 (1.50) |

SD = standard deviation; SE = standard error; M = mean.

these measures over time: avoidance, $t(130) = 5.79, p < .001, d = .52$; intrusions, $t(130) = 8.41, p < .001, d = .73$; psychological symptoms, $t(130) = 5.70, p < .001, d = .43$; and physical symptoms, $t(130) = 3.60, p < .001, d = .25$. However, the combined controls also showed significant improvement over time in avoidance, $t(61) = 4.45, p < .001, d = .58$; intrusions, $t(61) = 5.15, p < .001, d = .59$; and psychological symptoms, $t(61) = 2.99, p = .004, d = .24$; although not physical symptoms, $t(61) = 1.18, p = .24, d = .11$. Thus, both groups had improved stress symptoms, but disclosure did not lead to significantly more improvement than control.

Differences among four disclosure groups. Table 3 presents the data for each of the six groups separately. The next analyses tested differences among the four disclosure groups to determine which group(s) contributed to the improvement in post-traumatic growth, and whether any specific disclosure group might have reduced symptoms. First, the four disclosure groups were compared to each other on outcomes, again using ANCOVAs. No differences among the four disclosure groups were observed for any measure: post-traumatic growth, $F(3, 125) = 0.03, p = .99, \eta^2 = .00$, avoidance, $F(3, 125) = 0.42, p = .74, \eta^2 = .01$, intrusions, $F(3, 125) = 0.43, p = .73, \eta^2 = .01$, psychological symptoms, $F(3, 125) = 0.58, p = .63, \eta^2 = .01$, or physical symptoms, $F(3, 125) = 0.27, p = .85, \eta^2 = .01$.

Table 3

Comparison of Group Means (SD) and Adjusted Means (SE) on Outcome Measures at Baseline and 6-Week Follow-Up

| Outcome measure | Time point | Active facilitator disclosure (<i>n</i> = 31) | Passive listener disclosure (<i>n</i> = 35) | Private spoken disclosure (<i>n</i> = 28) | Private written disclosure (<i>n</i> = 36) | Control talking (<i>n</i> = 29) | Control writing (<i>n</i> = 34) |
|------------------------------|------------|---|---|---|--|-------------------------------------|-------------------------------------|
| Post-traumatic growth: total | Baseline | 3.84 (1.23) | 3.71 (0.91) | 3.79 (1.16) | 3.53 (1.23) | 3.80 (1.11) | 3.77 (1.00) |
| | Follow-up | 4.01 (1.25) | 3.98 (0.94) | 3.99 (1.18) | 3.80 (1.39) | 3.33 (1.45) | 3.66 (1.35) |
| | Adjusted | 3.94 (0.19) | 4.00 (0.18) | 3.96 (0.20) | 3.94 (0.18) | 3.28 (0.20) | 3.63 (0.18) |
| New possibilities | Baseline | 3.48 (1.50) | 3.48 (1.23) | 3.71 (1.38) | 3.41 (1.49) | 3.64 (1.56) | 3.42 (1.29) |
| | Follow-up | 3.72 (1.59) | 3.78 (1.14) | 3.89 (1.36) | 3.73 (1.53) | 2.88 (1.47) | 3.32 (1.35) |
| | Adjusted | 3.74 (0.22) | 3.79 (0.21) | 3.80 (0.24) | 3.78 (0.21) | 2.83 (0.23) | 3.37 (0.21) |
| Relating to others | Baseline | 3.78 (1.28) | 3.31 (1.18) | 3.37 (1.40) | 3.10 (1.40) | 3.53 (1.21) | 3.53 (1.27) |
| | Follow-up | 4.03 (1.25) | 3.64 (1.26) | 3.87 (1.32) | 3.69 (1.58) | 3.16 (1.58) | 3.56 (1.46) |
| | Adjusted | 3.81 (0.21) | 3.71 (0.20) | 3.91 (0.22) | 3.89 (0.20) | 3.10 (0.22) | 3.50 (0.20) |
| Personal strength | Baseline | 4.07 (1.35) | 4.12 (1.12) | 4.18 (1.29) | 3.90 (1.44) | 4.27 (1.22) | 4.22 (1.23) |
| | Follow-up | 4.27 (1.39) | 4.43 (1.12) | 4.26 (1.33) | 4.17 (1.58) | 3.74 (1.77) | 4.05 (1.60) |
| | Adjusted | 4.30 (0.23) | 4.43 (0.22) | 4.23 (0.25) | 4.29 (0.22) | 3.66 (0.24) | 4.00 (0.22) |
| Appreciation of life | Baseline | 4.10 (1.39) | 4.17 (1.11) | 4.19 (1.29) | 4.05 (1.47) | 4.22 (1.44) | 4.13 (1.33) |
| | Follow-up | 4.24 (1.32) | 4.41 (1.09) | 4.21 (1.37) | 3.96 (1.50) | 3.61 (1.59) | 3.80 (1.56) |
| | Adjusted | 4.26 (0.22) | 4.39 (0.20) | 4.19 (0.23) | 4.01 (0.20) | 3.57 (0.22) | 3.81 (0.21) |
| Spiritual change | Baseline | 3.58 (1.82) | 3.54 (1.79) | 3.54 (1.90) | 3.39 (1.94) | 3.24 (1.72) | 3.49 (1.83) |
| | Follow-up | 3.65 (1.93) | 3.49 (1.76) | 3.46 (1.89) | 3.32 (2.03) | 3.17 (1.91) | 3.28 (1.95) |
| | Adjusted | 3.56 (0.24) | 3.43 (0.22) | 3.41 (0.25) | 3.38 (0.22) | 3.34 (0.25) | 3.26 (0.23) |
| Cognitive avoidance | Baseline | 1.87 (0.90) | 2.12 (0.86) | 1.96 (0.96) | 1.94 (0.79) | 1.77 (0.94) | 1.97 (0.92) |
| | Follow-up | 1.38 (1.05) | 1.63 (1.14) | 1.41 (0.89) | 1.61 (1.02) | 1.41 (0.98) | 1.32 (0.92) |
| | Adjusted | 1.42 (0.15) | 1.53 (0.14) | 1.40 (0.16) | 1.61 (0.14) | 1.51 (0.16) | 1.31 (0.15) |
| Cognitive intrusions | Baseline | 2.24 (1.01) | 2.23 (0.95) | 2.06 (1.02) | 2.01 (1.18) | 1.89 (1.07) | 2.04 (1.09) |
| | Follow-up | 1.44 (1.09) | 1.46 (1.11) | 1.21 (0.77) | 1.44 (1.09) | 1.26 (0.94) | 1.35 (1.07) |
| | Adjusted | 1.35 (0.16) | 1.39 (0.15) | 1.23 (0.17) | 1.48 (0.15) | 1.36 (0.16) | 1.37 (0.15) |
| Psychological symptoms | Baseline | 1.12 (0.64) | 1.16 (0.69) | 0.92 (0.70) | 1.22 (0.91) | 1.03 (0.77) | 1.03 (0.71) |
| | Follow-up | 0.89 (0.72) | 0.85 (0.77) | 0.56 (0.56) | 0.87 (0.94) | 0.93 (0.74) | 0.77 (0.60) |
| | Adjusted | 0.87 (0.10) | 0.80 (0.09) | 0.67 (0.10) | 0.78 (0.09) | 0.97 (0.10) | 0.81 (0.09) |
| Physical symptoms | Baseline | 22.60 (12.91) | 26.44 (17.29) | 21.69 (15.19) | 23.95 (18.33) | 24.21 (14.65) | 24.28 (18.33) |
| | Follow-up | 20.04 (12.52) | 21.22 (17.91) | 16.75 (16.59) | 20.38 (18.56) | 23.59 (15.94) | 21.14 (14.38) |
| | Adjusted | 20.95 (2.12) | 19.55 (2.00) | 18.27 (2.24) | 20.39 (1.98) | 23.41 (2.20) | 20.92 (2.03) |

Comparisons of each disclosure group with its control group. Next, each of the three talking disclosure groups was compared to the control talking group, and the written disclosure group was compared to the control writing group. The active facilitator disclosure group had significantly higher post-traumatic growth (total score) than did the control talking group, $F(1, 57) = 4.56, p = .037, \text{p}\eta^2 = .07$; however, the two groups did not differ on avoidance, $F(1, 57) = .24, p = .62, \text{p}\eta^2 = .00$; intrusions, $F(1, 57) = .03, p = .87, \text{p}\eta^2 = .00$; psychological symptoms, $F(1, 57) = .66, p = .42, \text{p}\eta^2 = .01$; or physical symptoms, $F(1, 57) = .82, p = .37, \text{p}\eta^2 = .01$.

The passive listener disclosure group had significantly higher post-traumatic growth (total score) than control talking, $F(1, 61) = 6.62, p = .013, \text{p}\eta^2 = .10$. Once again, however, these two conditions did not differ on avoidance, $F(1, 61) = 0.09, p = .76, \text{p}\eta^2 = .00$, intrusions, $F(1, 61) = 0.06, p = .80, \text{p}\eta^2 = .00$, psychological symptoms, $F(1, 61) = 1.39, p = .24, \text{p}\eta^2 = .02$, or physical symptoms, $F(1, 61) = 2.10, p = .15, \text{p}\eta^2 = .03$.

The private spoken disclosure group had significantly higher post-traumatic growth (total score) than control talking, $F(1, 54) = 4.62, p = .036, \text{p}\eta^2 = .08$, but did not differ on avoidance, $F(1, 54) = 0.22, p = .65, \text{p}\eta^2 = .00$, intrusions, $F(1, 54) = 0.34, p = .56, \text{p}\eta^2 = .01$, or physical symptoms, $F(1, 54) = 3.01, p = .09, \text{p}\eta^2 = .05$. In this case, however, private spoken disclosure led to significantly lower psychological symptoms than control talking, $F(1, 54) = 7.09, p = .01, \text{p}\eta^2 = .12$.

Finally, compared with the control writing group, the written disclosure group did not differ on post-traumatic growth, $F(1, 67) = 1.51, p = .22, \text{p}\eta^2 = .02$, avoidance, $F(1, 67) = 2.63, p = .11, \text{p}\eta^2 = .04$, intrusions, $F(1, 67) = 0.26, p = .61, \text{p}\eta^2 = .00$, psychological symptoms, $F(1, 67) = 0.04, p = .84, \text{p}\eta^2 = .00$, or physical symptoms, $F(1, 67) = 0.03, p = .85, \text{p}\eta^2 = .00$.

Intent-to-treat analyses. Analyses were repeated for the full randomized sample. All analyses that were significant above remained so in this larger sample. The above non-significant effects also remained so.

Discussion

This study compared the effects of different methods of emotional disclosure on the post-traumatic growth and stress symptoms of people who had an unresolved traumatic or stressful experience. The main hypothesis—that participants who engaged in disclosure would improve more than control participants—was supported only for post-traumatic growth, but not for stress symptoms. Participants who engaged in emotional disclosure experienced more growth from trauma than participants who engaged in a control exercise. The cognitive, psychological, and physical symptoms of disclosing participants also decreased, but not significantly more than the symptoms of controls. This pattern of outcomes was similar among the four disclosure methods that we tested—talking to a facilitator, talking to a passive listener, speaking alone, and writing.

Our most provocative finding is that one 30-minute session of emotional disclosure led to significant post-traumatic growth, including seeing new possibilities, relating to others, personal strength, and appreciation of life. Disclosure did not result in spiritual change, suggesting that this dimension may not respond to disclosure or is not relevant in this young adult population. One other study also found that written emotional disclosure improved the same dimensions of post-traumatic growth—but not symptoms—in a small sample of adults with PTSD (Smyth et al., 2008). In the current study, all four disclosure methods led to a similar magnitude of change in post-traumatic growth as indicated by within-group change. When compared with specific control groups, however, only the three verbal disclosure groups showed a significant effect.

Our findings are consistent with studies that find that post-traumatic growth and stress symptoms are independent (Helgeson et al., 2006), and suggests that interventions can affect these two outcomes differently. In contrast to post-traumatic growth, disclosure did not lead to greater improvement in psychological or cognitive symptoms, even with the substantial power generated by comparing combined disclosure groups to combined control groups. One

comparison reached significance—private spoken disclosure led to less psychological symptoms than control talking, but given the number of analyses, this finding may be spurious.

The failure of disclosure to reduce symptoms may be surprising, especially because this study had many conditions associated with beneficial disclosure in previous studies (Sloan, Marx, & Epstein, 2005; Sloan, Marx, Epstein, & Lexington, 2007). We studied college students who had unresolved stress (so all participants had something to disclose, and there was room for symptom improvement), they engaged in disclosure under supervised laboratory conditions, and they were assessed with measures that have shown effects of disclosure and at an optimal follow-up time of 6 weeks. There are several possible reasons for the limited effect of disclosure on symptoms. The improvement in symptoms among controls is a central reason for the lack of group differences, because the disclosure groups would have to improve symptoms at a greater rate than the already improving control group. The controls' improved symptoms may stem from nonspecific study processes, such as repeated assessments about stress and the attention given during the intervention. Also, we recruited participants at a time of elevated stress, so there may have been regression to the mean for the whole sample.

It also is possible that having controls focus on plans for the near future may have unexpectedly improved symptoms. Although different forms of time management controls are commonly used (e.g., describing both recent past actions and planned actions), at least one study found that writing about future plans led to greater improvements in eating pathology than did writing about trauma (Frayne & Wade, 2006). Conversely, it is not clear why post-traumatic growth decreased somewhat in both control groups, and more so in the talking control group. It is possible that focusing on future plans might make a person feel better (i.e., reduce symptoms), but simultaneously counter or impede deeper or broader changes in beliefs and perspectives (i.e., growth). The decreased growth among controls could also be an artifact of the study. Participants may have expected to share their stressful experiences, but the assigned requirement to eschew such sharing in favor of discussing future plans may have been too artificial, disappointing, or actually led to active inhibition of stressful memories and feelings. Also, the facilitators of the talking control condition reported that some participants did not enjoy talking about their plans or were worried about being perceived as "boring" by the facilitators. Future studies should explore the circumstances under which post-traumatic growth does not occur or actually deteriorates.

Another possible reason for the lack of disclosure effects on symptoms is that the intervention was simply too brief to generate such changes. Disclosure is most commonly conducted over three or four sessions, and even then has a relatively weak effect on symptoms (Frattaroli, 2006). Although some studies of single-session or brief disclosure have reported benefits (Burton & King, 2008), others have reported both benefits and negative effects (Greenberg et al., 1996; Smyth et al., 2001), or only negative effects (Páez, Velasco, & González, 1999). Given that psychotherapies for people with unresolved stress usually require a larger number of therapist-facilitated sessions to effect change, one might be skeptical that much change can occur on one's own in just minutes in the absence of further feedback, emotional processing, help with cognitive reappraisal, or skills building.

All four disclosure methods had similar effects on both symptoms and post-traumatic growth, suggesting that it does not matter whether emotional disclosure is verbal or written, shared with others or private, or facilitated or not. One might wonder, however, whether the experimental conditions were implemented as intended. Certainly, we can confirm that the formats indeed differed between those participants assigned to write, talk privately into a recorder, or talk to another person. The distinction between facilitated disclosure and passive listening, however, is less easily confirmed. (Nonetheless, we examined the transcripts of the sessions and found that facilitating therapists made an average of 38.8 facilitating comments per session—such as questions, directives, emotion reflections—compared with a mean of only 0.2 facilitating comments for the passive listening therapists. This indicates a substantial difference in these two conditions.) Unanswered questions, however, are whether the four disclosure conditions differed in participants' disclosures and affective reactions, and how personality variables influence these patterns. These questions await further analyses of our data.

It also is possible that the four disclosure conditions did not differ because one 30-minute session is insufficient for the various methods to have differential effects. For example, the facilitators might have been more effective if given more time to understand a story and encourage exploration, and participants might have needed more time or sessions to process feelings. Also, it is likely that individual differences among participants, such as emotional processing style and interpersonal schemas (e.g., attachment security), moderate the effects of different disclosure methods.

There are several limitations of the study. The types of stressors that participants disclosed varied widely and included discrete traumatic events (e.g., a single assault or the death of a loved one), chronic serious stressors (e.g., growing up with abusive parents), private shame-based experiences (e.g., sexual behavior against one's religion), and ongoing hassles (e.g., relationship, school, or job conflicts). It is likely that disclosure is of limited benefit for some of these stressors, such as chronic stressors or daily hassles. More extensive screening about one's stressors, however, runs the risk of confounding the intervention itself, in that the screening or evaluation process can become a disclosure exercise in itself. Also, the participants, although ethnically diverse, were nontreatment-seeking, predominantly female college students with symptoms but not typically full PTSD, and who were obtaining credit for study participation. Therefore, the results may not generalize to clinical populations whose pathology is more chronic and severe, whose motivation for change is presumably greater, and who are not in a research context. We think, however, that our screening method and inclusion criteria are an improvement over the many past studies that have enrolled participants into disclosure studies regardless of the experience of stress or degree of its resolution. Our screening data indicate that approximately 60% of unselected students do not have an unresolved stressor that is at least "moderately" problematic, so it is not clear how appropriate or helpful a disclosure intervention would be to them.

We conclude that a single session of disclosure about stressful or traumatic experiences—regardless of the method—can lead to growth from trauma, although symptom improvement may be limited. It is likely that longer or more intense interventions may be needed to effect symptom change. Researchers and clinicians should distinguish symptom change from post-traumatic growth and clarify the relationship between the two constructs after interventions.

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