Content of Disclosure and Health: Autonomic Response to Talking About a Stressful Event

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The study examined physiological and psychological changes associated with the content of disclosure of a stressful event. A total of 60 students were assigned to either an emotion and facts or a facts-only disclosure condition. Each participant talked about a highly stressful personal event for 5–10 min, while skin conductance was recorded. Measures of negative mood were assessed before and after disclosure. In the emotions and facts condition, skin conductance significantly decreased, whereas the facts-only condition showed no significant change. Sadness and guilt significantly increased from before to after disclosure in both conditions. Including emotional content in verbal disclosure of a highly stressful event may decrease physiological arousal, whereas sadness and guilt may increase whether emotional content is included or not. The findings have implications for applied areas of consultation-liaison services and early crisis intervention. [Brief Treatment and Crisis Intervention 7:176–183 (2007)]

KEY WORDS: verbal disclosure, skin conductance, emotional expression, stressful events.

Verbalizing thoughts, feelings, and images into language has been conceptualized by many to be the core component in recovering from traumatic events (Pennebaker, 1999; Robinson, 2000), and there is evidence to support the psychological and physiological health benefits from the emotional disclosure of highly stressful or traumatic events (Esterling, Antoni, Fletcher, Marguiles, & Schneiderman, 1994; Lutgendorf, Antoni, Kumar, & Schneiderman, 1994; Pennebaker & Beall, 1986; Pennebaker, Hughes, & O’Heeron, 1987; Petrie, Booth, Pennebaker, Davison, & Thomas, 1995). Autonomic responses, for example, have been found to be influenced by disclosure of highly stressful events. Specifically, skin conductance levels have been found to increase when emotional facial expression was inhibited (Gross & Levenson, 1993) and when verbal disclosure of highly stressful events was withheld (Pennebaker et al., 1987). Conversely, skin conductance levels were negatively correlated with health improvements when traumatic events were verbally disclosed (Pennebaker, Barger, & Tiebout, 1989). In particular, decreases in skin conductance occurred in individuals who...
verbally disclosed events that were rated by
decision to be personal and stressful compared
to those in whom trauma disclosure occurred
more superficially (Pennebaker et al., 1987).

Although data support the beneficial effects
of verbal disclosure of stressful or traumatic
events, little is known about the specific under-
lying mechanisms of action (Sloan & Marx,
2004). It is unclear whether discussing only
the facts of a stressful or traumatic event or dis-
cussing the facts combined with the emotions of
a traumatic event is more beneficial. This deter-
mination could enhance how mental health pro-
essionals approach facilitating disclosure in
brief interventions such as consultation-liaison
psychiatry or psychological first aid following a
critical incident. The existing data that address
this area are currently limited to writing parad-
gms. Pennebaker and Beall (1986) reported,
for example, that long-term health benefits oc-
curred after written disclosure of a highly stress-
ful event if the disclosure incorporated both the
emotions and perceived objective features of the
event. In this study, participants who disclosed
only the facts of the event were similar to con-
trols who wrote about trivial topics in that
they did not show long-term health benefits.

The present study expands the findings of
Pennebaker and Beall (1986) to assess autonomic
response to talking about the emotions and facts
versus just talking about the facts of a highly
stressful experience. It was expected that there
would be a relation between content of disclo-
sure and skin conductance, such that partic-
icipants in the combined condition (emotions and
facts) would have a decrease in skin conduc-
tance compared to baseline levels, whereas par-
ticipants in the facts condition would show no
significant change in skin conductance com-
pared to baseline levels. Furthermore, consistent
with the work of Pennebaker and Beall, it was
expected that there would be a relation between
content of disclosure and time of disclosure on
mood, such that participants in the combined
condition (emotions and facts) would report
a significant increase in negative mood after dis-
closure compared to before disclosure, whereas
participants in the facts condition would show
no significant increase in negative mood after
disclosure compared to before disclosure.

Method

Recruitment

Participants were undergraduate students from
a small, private, liberal arts college in Baltimore,
MD, who received course credit for volunteer-
ing. This study was approved by the Loyola Col-
lege in Maryland Institutional Review Board.

Participant Characteristics

Participants were 60 (men, $n = 12$; women, $n =
48) college students between the ages of 18 and
22 who were randomly assigned to either the
emotions and facts condition ($n = 31$) or the
facts-only condition ($n = 29$). Comparable to
other studies utilizing Pennebaker’s writing par-
digm (Epstein, Sloan, & Marx, 2005; Schoutrop,
Lange, Hanewald, Davidovich, & Salomon,
2002), participants in the current study dis-
losed a wide array of stressful experiences rang-
ing from loss of a loved one or friend, substance
abuse or mental illness of a loved one or friend,
cell adjustment difficulties, conflicts with
roommates or friends, and perceived failures.

Measures

Mood Questionnaire Adapted from
Pennebaker and Beall (1986). A mood ques-
tionnaire, adapted from Pennebaker and Beall
(1986), was administered before and after the disclosure session. The questionnaire asked participants to rate eight current emotions (two positive and six negative) on a scale from 1 (not at all) to 5 (a great deal). A negative mood score was calculated by totaling the participants’ ratings of the negative emotions of nervous, sad, guilty, fatigued, constrained, and anxious. No reliability, validity, or normative data for the writing study questionnaire were available.

**Disclosure Questionnaire Adapted from Pennebaker and Beall (1986).** A disclosure questionnaire adapted from Pennebaker and Beall (1986) was administered after the manipulation. The disclosure questionnaire asked participants to rate various aspects of their disclosure on a scale from 1 (not at all) to 5 (a great deal). For example, participants were asked how personal was your disclosure, and how much have you told other people about what you disclosed. Similar to the disclosure questionnaire used by Pennebaker and Beall, no reliability, validity, or normative data for the disclosure questionnaire were available.

**Physiological Reactivity**

Skin conductance levels were monitored continuously throughout the baseline and disclosure periods. Readings were recorded every 30 s by the principal investigator (as was done in a study by Pennebaker et al., 1989) for both a 5-min baseline period before the disclosure session and during the 5- to 10-min disclosure session using a 120 VAC line power, AT64Portable SCR with digital readout displayed in microhoms. Two skin conductance electrodes were attached with a Velcro band to the palmar surface of the participants’ second and third fingers.

**Procedure**

After arriving at the laboratory and completing a consent form and the mood questionnaire, participants were seated in a chair facing the principal investigator and the skin conductance level sensors were attached to participants’ second and third fingers. Baseline measures were recorded every 30 s for 5 min followed immediately by the disclosure session. Based on random assignment, participants were read one of two sets of instructions adapted from previous writing studies (Pennebaker, 1999; Pennebaker et al., 1986; Richards, Beal, Seagal, & Pennebaker, 2000). Briefly, participants in the emotions and facts condition were asked to talk for 5–10 min about one of the most stressful and upsetting experiences that has affected their lives: “The most important thing is that you describe an upsetting personal experience and report any feelings that you have about it.” In contrast, participants in the facts-only condition were asked to talk about one of the most stressful and upsetting experiences that has affected their lives: “The most important thing is that you describe an upsetting personal experience in a narrative fashion, being careful to concentrate the discussion on the event itself, without referring to your feelings about it at all.” During the disclosure period, skin conductance levels were recorded every 30 s (Pennebaker et al., 1989; Shalev, Scott, & Pitman, 1992). In order to maximize the manipulation throughout the disclosure period, the principal investigator promoted talking only through social reinforcement, such as stating “um-hmm” and nodding when appropriate; no empathetic statements were made. If the participant failed to follow the instructions, the principal investigator provided redirection by reminding the participant to follow the specific instructions given (emotions and facts or just facts). After the disclosure period, participants completed the mood and disclosure questionnaires again. After the questionnaires were completed, participants were given information on how to access therapeutic services if desired. Participants were mailed the debriefing statement after data collection was complete.
Results

Preliminary Analysis

As a manipulation check, an independent t test was conducted on the extent to which emotions were disclosed in the emotions and facts group and the facts-only group as assessed by the disclosure questionnaire. As expected, those in the emotions and facts group revealed more emotions (3.5 ± 0.9) than those in the facts-only group (2.4 ± 1.0), \( t(57) = 4.47, p < .001 \) (see Table 1). To explore if participants in the two groups were physiologically different at baseline, an independent t test was conducted to determine whether the average baseline skin conductance values were significantly different for the two groups. No significant difference was found (see Table 1). To compare physiological levels at the end of the disclosure session for each group, an independent t test was also conducted to determine whether the average of the last 10 readings of disclosure were significantly different for the two groups. No significant difference was found. Finally, an independent t test indicated no significant difference between the total disclosure time of the emotions and facts group and the facts-only group (see Table 1).

Physiological Reactivity

To investigate differences in physiological reactivity during baseline and the disclosure session, a repeated-measures analysis of variance (ANOVA) was conducted on the average baseline skin conductance level recording and the average disclosure skin conductance level recording for each group. When pairwise comparisons were conducted, a significant increase in skin conductance levels was found from baseline to disclosure in both the emotions and facts group \( (p < .001) \) and the facts-only group \( (p = .001) \). A significant main effect for time was found, \( F(1, 58) = 27.11, p < .001 \), but there was no significant interaction for time by group. In the two groups, no significant difference was found between the baseline average skin conductance level recording and the disclosure average skin conductance level recording.

Because preliminary analyses revealed no significant difference between the baseline recordings of the two groups, further analyses were conducted on the disclosure skin conductance levels only. Specifically, a repeated-measures ANOVA was conducted on the average of the first three skin conductance level recordings of disclosure, the average of the next three skin conductance level recordings of disclosure, and the average of the last four skin conductance level recordings of disclosure (see Figure 1). Overall, no significant difference was found between the two groups. Furthermore, no significant main effect for time was found. Also, no significant interaction for time by group was found. However, when pairwise comparisons
were conducted, a significant decrease was found in skin conductance levels when comparing the average of the first three recordings of disclosure to the average of the last four recordings of disclosure for the emotions and facts group, $p = .037$, whereas no significant change was found in skin conductance levels for the facts-only group between these two time points, $p = .757$. This finding suggests that talking about the emotions along with the facts of a highly stressful event is associated with a decrease in physiological arousal, whereas talking about just the facts of the event is not.

**Psychological Outcomes of Verbal Disclosure**

To examine the influence of type of disclosure on mood, a repeated-measures ANOVA was conducted on the average negative mood score before disclosure and the average negative mood score after disclosure by group. It was found that in both groups (emotions and facts, $p = .019$, and facts only, $p = .012$) negative mood increased from before disclosure to after disclosure (see Table 2). Overall, the average negative mood score was lower in the facts condition than in the emotions and facts condition, but did not reach significance, $F(1, 58) = 3.58, p = .064$. Furthermore, a significant main effect for time (prebaseline, postdisclosure) was found, $F(1, 58) = 12.60, p = .001$; however, there was no significant interaction for time by group.

To better understand which components of negative mood contributed to the increase of negative mood evidenced in both groups from before disclosure to after disclosure, repeated-measures ANOVAs were conducted by group on each of the six negative emotions to compare the average negative mood score of the specific negative emotion before disclosure and the average negative mood score of the specific negative emotion after disclosure for each of the six negative emotions.

When pairwise comparisons were conducted the “sad” score was found to significantly increase from before disclosure to after disclosure in both the emotions and facts, $p < .001$, and in the facts-only, $p < .001$, groups (see Table 3). Similarly, pairwise comparisons revealed a significant increase in the “guilty” score from before disclosure to after disclosure in the emotions and facts group, $p = .012$, and the facts-only group, $p = .006$ (see Table 3). Overall, there was no significant difference between the guilty scores of the two groups or the sad scores of the two groups from before to after disclosure. For the sad score a significant main effect for time (prebaseline, postdisclosure) was

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Emotions and facts</th>
<th>Facts only</th>
</tr>
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<tbody>
<tr>
<td>Before disclosure negative mood score</td>
<td>2.0 (0.5)</td>
<td>1.8 (0.5)</td>
</tr>
<tr>
<td>After disclosure negative mood score</td>
<td>2.2 (0.6)</td>
<td>2.0 (0.7)</td>
</tr>
</tbody>
</table>

$p = .019^* \quad p = .012^*$

*p < .05, two-tailed.
found, $F(1, 58) = 53.04, p < .001$. Similarly, for the guilty score, a significant main effect for time (prebaseline, postdisclosure) was found, $F(1, 58) = 14.75, p < .001$. No significant interaction for time by group was found for the sad or for the guilty score. Pairwise comparisons conducted on the “nervous,” “anxious,” “constrained,” and “fatigued” scores revealed no significant differences from before baseline to after disclosure in the emotions and facts or the facts-only group (see Table 3).

Consistent with the work of Pennebaker and Beall (1986), follow-up data on negative mood and physical health were collected, and no differences were found in overall negative mood in either group from after disclosure to the 4-month follow-up. There were differences in the number of doctors’ visits made in that semester and the number of visits made to the doctor in the 4-month follow-up period, such that in both the emotions and facts and the facts-only groups, a significant increase in the number of doctors’ visits from baseline to the 4-month follow-up was found. However, given the nominal and transient nature of the manipulation, it seems unlikely that these differences were related directly to the variables.

**Discussion**

The results of the present study are the first to provide evidence that talking about both the emotions and facts of a highly stressful event leads to a decrease in physiological arousal, whereas disclosing only the facts of a stressful event does not. Furthermore, the findings suggest that whether disclosing both the emotions and facts or just the facts of a highly stressful event, negative mood may increase initially. Moreover, although negative mood comprised measures of six different emotions including nervous, anxious, sad, constrained, fatigued, and guilty, secondary analysis revealed that only the emotions of sad and guilty increased significantly from before to after disclosure and did so in both the emotions and facts and the facts-only conditions. It is important to note that these fairly robust findings occurred with a manipulation that involved little more than a supportive presence for no more than 10 min.

These findings have important implications for consultation-liaison services and early crisis interventions, such as psychological first aid. More specifically, it may be prudent for those performing initial interventions on individuals who are discussing stressful or traumatic events,
to encourage or facilitate their disclosure of both facts and emotions. Moreover, it may be important to have interventionists be sensitive to the impact that the negative mood of sadness and guilt may have on those initially disclosing stressful events. Clearly, future studies are needed to replicate and expand the affective and cognitive impact of these findings. For example, it may be worthwhile to formally assess autonomic functioning while providing more active interventions to decrease physiological arousal (e.g., diaphragmatic breathing and meditation). Furthermore, it would be beneficial to include a more explicit and delineated manipulation that assesses, supports, and normalizes sadness and guilt. Consistent with the findings of the present study, trauma-related guilt has been found to be a common problem for survivors of myriad types of traumatic events including combat, physical and sexual abuse, suicide, and sudden illness (Kubany, 1998). As such, implementing aspects of a form of brief therapy aimed at alleviating trauma-related guilt, such as cognitive therapy for trauma-related guilt, may be helpful (Kubany, 1997).

Despite these compelling findings, there are limitations to the current study. Because participants in the present study were asked to talk about a retrospective stressful life event, it is uncertain whether these current findings will generalize to individuals talking about a stressful event that has just occurred. It is noteworthy, however, that despite discussing events that may have occurred years ago, these events still had an apparently powerful physiological and psychological impact on participants. Furthermore, since disclosure took place in one brief 5- to 10-min interval, different results may be found if individuals disclose for a longer period of time. Additionally, unlike writing studies, in which participants can reflect upon what they want to convey more freely and less awkwardly, participants in this study, because they were talking, may have felt awkward if they paused too long to mentally separate the emotions from the facts. Also, the use of college students, the majority of whom were female, limits external validity. Finally, the lack of a control group is a limitation of the study; however, it is important to note that although a trivial-topic writing control is commonly used in writing studies, previous research (Pennebaker et al., 1986) has found no significant difference in health outcomes between trivial-topic writing controls and individuals asked to write about only the facts of a traumatic event. As such, a trivial-topic control was not included in the present study.

In summary, the promising results of this study indicate that verbal disclosure of both the emotions and facts of a highly stressful event leads to a decrease in physiological arousal, whereas disclosing just the facts of the event does not. Furthermore, these findings suggest that the emotions of sadness and guilt may increase immediately after disclosure whether emotions are talked about or not. Replication and expansion of these findings may have relevant practical implications for a myriad of applied areas such as, training and implementation of consultation-liaison psychiatry and early crisis interventions. Recognizing, assessing, and normalizing how individuals respond to verbally disclosing stressful and traumatic events may serve to mitigate the impact of the distress brought on by the event and enhance the confidence of those providing the interventions.

Acknowledgment

Conflict of Interest: None declared.

References

Epstein, E., Sloan, D., & Marx, B. (2005). Getting to the heart of the matter: Written disclosure,
gender, and heart rate. *Psychosomatic Medicine, 67*, 413–419.


