

Cognitive-Behavioral Models of Emotional Writing: A Validation Study

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Published online: 10 October 2006
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Abstract Previous research suggests that the Pennebaker writing paradigm may improve physical and psychological health; however, inconsistent findings suggest that it may not be suitable for community dissemination in its current format. This study manipulated writing instructions across groups in order to emphasise putative emotional processes. Three processes were isolated consistent with cognitive-behavioral models of trauma: exposure, devaluation, and benefit-finding. Essay content reports, text analysis, distress, arousal, and physiological data demonstrated that participants assigned to different writing instructions responded during and after the writing session in a manner that was consistent with the putative emotion process. The results highlight the potential for the writing paradigm as a research tool for emotional processing.

Keywords Emotion-processing · Cognitive-Behavioral · Writing · Disclosure · Trauma

Cognitive-Behavioral Processing of Writing

Research has indicated writing one's deepest thoughts and feelings about life's most upsetting past experiences can produce health benefits in the long-term (Pennebaker, Kiecolt-Glaser, & Glaser, 1988). Smyth (1998) reviewed 13 studies using student populations and indicated that emotional disclosure improved physical and psychological health. More recent reviews however, including one that summarised 61 controlled trials (Littrell, 1998; Meads, Lyons, & Carroll, 2003), have tempered these conclusions, and point to an increasing number of inconsistent findings emerging in student, community, and clinical populations (e.g. Brown & Heimberg, 2001; Gidron, Peri, Connolly & Shalev, 1996; Greenberg & Stone, 1992; Greenberg, Wortman & Stone, 1996; Honos-Webb, Harrick, Stiles, & Park, 2000; Kovac & Range, 2000; Kloss & Lissman, 2002;

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Rosenberg et al., 2002; Stroebe, Stroebe, Zech, & Bout, 2002). Furthering concern is that a subgroup of participants may experience negative long-term health effects after completing the paradigm (Gidron et al., 1996; Greenberg et al., 1996; Honos-Webb et al., 2000;). Taken together, these concerns suggest the paradigm may not be suitable for dissemination as an intervention at this point in time.

One limitation of the Pennebaker writing paradigm is the non-directive instructions of the task. Participants write about their deepest thoughts and feelings about their most upsetting life experience (Pennebaker et al., 1988), with no advice on how best to write. Thus, writing styles are confounded by self-selection, leaving an unlimited number of writing methods that may or may not be beneficial. This is illustrated by Pennebaker's process research (Pennebaker, Mayne & Francis, 1997; Suedfeld & Pennebaker, 1997), which suggests that individuals who write with ruminative, static patterns of thinking do not attain benefits.

Despite limitations, the essence of the paradigm provides opportunities for researchers and clinicians. First, the paradigm provides a valuable emotion-processing research tool that is an analogue for a therapeutic process, considered relatively free from therapist variables. Secondly, if refined and better focused, it could provide a cost-effective and easily disseminated intervention to assist the broad community following trauma exposure. An alternative methodology to Pennebaker's instructions is to provide more direction to guide participants' behavior during the writing task. Thus, writing instructions could be varied to increase doses of putative therapeutic mechanisms and therefore alter the size and type of benefits obtained. This methodology has the potential to increase engagement with specific emotion processes and avoid confounds of self-selected writing styles.

The aim of this study was to test whether the writing task could be structured in order to engage individuals with specific emotional processes. The processes we chose for study were selected after a review of current trauma and emotion processing theories, and included *exposure* to the trauma memory (Foa & Kozak, 1986), *devaluation* and re-appraisal of threatening stimuli (Davey, 1997), and positive growth or *benefit-finding* from trauma (Davis, Nolen-Hoeksema & Larson, 1998). These processes are briefly reviewed below.

Exposure

Historically, Cognitive-Behavioral models of trauma (Foa & Kozak, 1986) have argued that imaginal exposure modifies pathological fear reactions through a process of engagement and habituation. Foa and Kozak argued that a substantial increase in physiological arousal and affective distress during the re-living of a trauma memory indicates engagement with the fear-structure. Moreover, they argued modification of the fear structure was evidenced by habituation, which is a gradual decrease in affective and physiological arousal within the exposure session and between each exposure session. This model has received support in the clinical literature and strong evidence exists for the importance of between-session habituation in exposure-processing¹ (e.g., Jaycox, Foa, & Morral, 1998; Van Minen & Hagenaars, 2002). Over the past decade, contemporary models of exposure have become diverse and increasingly incorporate the

¹ These researchers use the term between-session habituation to reflect a decrease in anxiety (SUDS and physiological arousal) from the first exposure session to the last).

language and methods of cognitive psychology (Ehlers & Clark, 2000). However, the idea that engagement with the feared stimulus leads to a reduction in fear responses is the central construct we employed in this study.

Devaluation or reappraisal

A second hypothesised emotion process suggested is devaluation or re-appraisal of the trauma. It involves identification and modification of a negative belief. For instance, numerous dysfunctional cognitions have been suggested to increase trauma pathology symptoms, including stimulus specific appraisals (e.g., high levels of danger, unpredictability, uncontrollability), and dysfunctional schema (e.g., vulnerable self, injustice; Davey, 1997; Ehlers & Clark, 1999; Janoff-Bulman, 1989). After identification, therapy aims to challenge and re-structure negative beliefs.

Attempts to isolate re-appraisal processes differ widely and few research studies have provided clear operational definitions and reliable assessment procedures. Perhaps, the closest experimental and articulate methodologies developed has been that of Davey's (1997) Evaluative-Conditioning Model (ECM). According to ECM, cognitive neutralising strategies are statements individuals say to themselves when thinking about a stressor to control its meaning. These strategies include 'Positive Reappraisals', 'Cognitive Disengagement', 'Optimism', 'Faith In Social Support', and 'Life Perspectives'. They are of similar face validity to the type of strategies cognitive therapists employ. Of importance for cognitive theory, however, is that the use of these intentional strategies when coping with stress and trauma has been associated with improved coping and psychological health in clinical and non-clinical populations (Davey, 1993; Davey et al., 1999; Davey, Burgess, & Rashes, 1995).

Benefit-finding

A final hypothesised emotion process suggested by recent trauma models is that of post-traumatic growth or benefit-finding (Davis et al., 1998; Tedeschi, Park, & Calhoun, 1998); that is, individuals may be able to find some positive meaning in negative experiences for their lives and their future (Burt & Katz, 1987; Taylor, Lichtman, & Wood, 1984). While evidence is inconsistent and based on associative relationships (Calhoun & Tedeschi, 1998), benefit-finding processes have been implicated in health benefits and improved coping (Affleck, Tennen, & Rowe, 1991; Taylor et al., 1984). Research designed to explain the operating mechanisms behind these benefits, however, is in its infancy (O'Leary, Alday, & Ickovics, 1998; Tennen & Affleck, 1998). It is unclear whether benefit-finding represents a stable personality characteristic, is simply a coping response, if it is determined by event characteristics, or whether it represents a real and permanent transformational growth in how people view themselves, the world and others. There is little understanding about whether these changes need to occur spontaneously, at a particular coping phase, or can be induced by directing individuals to identify benefits.

Each of the above three mechanisms, exposure, devaluation, and benefit-finding, was set as the goal for different groups within the writing paradigm. The aim of the study was to assess whether this procedure would produce real differences in participant engagement with different change processes. The ability of participants to focus on specific processes was tested through three types of measures: (1) manipulation checks of instruction adherence by participants and independent raters; (2) linguistic analysis;

and (3) changes in self-reported affect, arousal, distress, and heart-rate while writing and after writing.

We predicted differences between groups in the following manner. First, self-ratings and independent judge ratings of essay content were expected to reflect the relevant emotion process. That is, exposure participants would be rated as engaging in exposure processes, devaluation participants as engaging in devaluation processes, and benefit-finding participants as engaging in benefit-finding processes. Second, we expected these between group differences would also be reflected in linguistic analyses. Dimensions suggested to differentiate between writing conditions (Pennebaker, Francis, & Booth, 2001) were never developed to isolate Cognitive-Behavioral mechanisms. We selected dimensions that we broadly believed should be elevated if participants followed instructions in the following ways: exposure writing participants were requested to provide an elaborate, sensory rich description of the event at the time of the experience. Therefore, they were expected to use more sensory, motion, and physical body descriptions, as well as more negative emotion and past tense words than any other group. Devaluation writing participants were requested to search for reasons why they were upset, develop a causal understanding for their negative emotions and develop insight into new ways to think about their experience. Thus, they were expected to use more causal, tentative words, and insight words, as well as more present and future tense words. Given their focus on upsetting emotions, they were expected to use a similarly high degree of negative emotion words compared to exposure participants. Benefit-finding participants were instructed to focus how their life had changed for the better now and into the future. They were expected to use far more positive emotion words. Similar to devaluation participants however, these participants were also expected to use a high degree of insight words, and use present and future tense words.

Finally, we predicted there would be real differences in how each individual responded to the tasks. We predicted that exposure participants would report the most negative affect, distress, somatic and physiological arousal while writing and post-writing in comparison to all other groups, particularly in the first writing session. Devaluation and standard writing participants should experience less negative affect, distress, and arousal than exposure writing participants, but more than benefit-finding and control. Devaluation participants should also report a larger decrease in distress over time as they become better able to use cognitive neutralising strategies. Benefit-finding participants should report minimal increases in distress, negative affect, and arousal, and increases in positive affect post-writing.

Method

Participants and design

A 5 (condition) \times 3 (time) mixed repeated measures MANOVA design was employed. Participants were first-year psychology students recruited from Griffith University, Brisbane, Australia, who received course credit for participation. Of the 213 participants, 12 participants evenly distributed across writing conditions failed to complete the writing sessions. Two more were removed from analysis due to a requirement for referral to counselling services after writing sessions. Participants were randomly allocated to their writing condition, with 41 control, 40 standard, 38 exposure, 41 devaluation, and 39 benefit-finding group participants. Of the 199 participants included in

analysis, 137 participants (68.8%) were female and 62 (31.2%) were male. Participants were aged between 16 and 56, with an average age of 24 years and 1 month ($SD = 7.75$).

Experimental instructions and measures

All instructions,² except the standard writing instructions, were the same length, number of pages, and of similar format. The first page of all instructions was an overview of the experiment and stated that this study focused on ‘how different people remember past events and how these different types of memories can effect us’. To encourage continued participation, participants were told that research had shown that writing in the manner instructed was found to be useful.

The *Standard Writing Group Instructions* were similar to that of Pennebaker et al. (1988). Participants were instructed to write their deepest thoughts and feelings about their upsetting experience and encouraged to disclose deeply (‘really get into it’). No further instruction was given.

The following four sets of instructions differed from the standard writing instructions to provide more guidance on writing style. Participants were not only given instructions on how to write, but also a hypothetical overview of an essay written by a past participant who followed those instructions. Participants also received a brief summary of the instructions to reinforce the main points, and four steps to help them complete the writing task was placed in front of the individual for the duration of the writing session to guide writing. These steps were specific to instruction.

The *Control Writing Group Instructions* requested participants to ‘visualise’ and write in as much perceptual complexity as possible what they could see, hear, smell, and taste. They wrote about one of three environments, with the environment changing for each session: (1) the university campus; (2) the home they lived in; and (3) a place they go to on weekends. They were instructed not to interpret, place opinions or feelings on the description, but to write as objectively as possible so that they could improve the quality of their mental image.

The *Exposure Writing Group Instructions* requested participants to describe an identified upsetting event in great detail, from beginning to end as it happened. They were asked to describe what they saw, heard, felt, smelt, and tasted so they could sense it all again and to describe their reactions, including their thoughts, feelings, bodily sensations, and their actions at the time so they could feel it all again. Finally, they were instructed focus on what makes them feel most distressed as they think about it and then to habituate (‘persist to let the fear wear off’).

The *Devaluation Writing Group Instructions* requested participants to explore what upsets them now about the event; what it really meant to them. They were asked to identify reasons why they were upset and then explore fresh ways to alter their thinking to help them cope; to persist and explore as many different strategies as possible. They were also given a variety of hypothetical strategies suggested by Davey’s (1997) ECM to prompt the development of cognitive neutralising strategies (i.e., ‘Am I blaming myself too much?; Are there more important things in life?’).

The *Benefit-Finding Writing Group Instructions* requested individuals write about the benefits they gained from the experience in relation to themselves, their relationships with others, and their world-view. They were also requested to state clearly how their life had changed or could change in the future as a result of these gains.

² Instructions are available from the first author upon request.

Upsetting life experience measures

Participants were asked to select an upsetting life event that they considered their most upsetting ever, preferably one that had not been disclosed. No instruction was given as to whether the event should be past or current. After selecting an upsetting experience that would be the subject of their writing, participants responded to five items about the experience: the type of experience, age at experience, whether it was the most severe they had experienced (1 = Yes, 2 = No), a severity rating out of 10 (0 = not at all severe, 10 = the most severely upsetting event ever experienced), and whether the experience had been disclosed previously (1 = Yes, 2 = No).

Essay content checks

The *Essay Evaluation Questionnaire* (EEQ; Pennebaker et al., 1988), is a self-reported measure given to participants immediately following the completion of their written essay. Participants rate on a 7-point scale, from 'not at all' to 'a great deal', the degree the essay was traumatic and personal, how much they had revealed thoughts and emotions, and how much they wanted to talk about what they had written about. Two extra items were added to the scale; the degree to which people were able to 'make sense of their experience' and 'obtain meaning' from the essay.

The *Self-Report Process Identification Questionnaire* (PIQ) is a 6-item self-report questionnaire developed for this study and given to participants immediately after writing. The 6-item scale had 3 independent sub-scales: exposure (e.g., 'I wrote a detailed and elaborate description of the event and the surroundings at the time of the experience from beginning to end'), devaluation (e.g., 'I identified and explored my current thoughts of why I am upset now'), and benefit-finding (e.g., 'I identified the positive things I have gained from my experience for my life in general'), with 2 items representing each construct. Ratings were made on a 7-point scale from 'not at all' to 'a great deal.' Each construct was found to have good internal reliability (Exposure 0.94; Devaluation 0.82; Benefit-finding 0.95). Discriminant validity was indicated with self-report and judge scales positively correlated at $p < .001$ (Exposure $r = .77$; Devaluation $r = .72$; Benefit-finding $r = .69$), while sub-scales of differing processing categories were not.

Two 2nd year PhD students in clinical psychology were recruited as independent judges, blind to condition. One judge read all essays. The second independent judge rated 90 essays for inter-rater reliability. Judges filled in the *Judge Version of the Process Identification Questionnaire* (JPIQ). Two extra items were added to each construct of the PIQ, creating a total of 12 items. Extra items were added so that judges also rated the degree they believed the individual had appropriately engaged in each process from what was written. Correlations between the two judges were strong for exposure ($r = .91$, $p < .001$), devaluation ($r = .75$, $p < .001$) and benefit-finding ($r = .62$, $p < .001$), as were the correlations with self-ratings for exposure ($r = .78$, $p < .001$), devaluation ($r = .71$, $p < .001$), and benefit-finding ($r = .69$, $p < .001$).

The *Linguistic Inquiry Word Count 2001* (LIWC; Pennebaker, Francis, & Booth, 2001) provided linguistic text analysis of the written essays. Of the categories available, 11 were considered relevant to the assessment of the experimental conditions. These included positive emotion words (i.e., happy, pretty), negative emotion words (i.e., hate, nervous), insight words (i.e., think, know, consider), tentative words (i.e., maybe, perhaps, guess), causal related words (i.e., because, effect, hence), sensory words (i.e., see,

touch, listen), motion words (i.e., walk, move, go), physical body states (i.e., ache, heart, swallow) and different time indicators of past tense, present tense, and future tense.

Affect, arousal, and distress measures

The *PANAS-Immediate Version* (PANAS-I; Watson, Clark, & Tellegen, 1988) was used to assess the degree that participants felt positive and negative affect immediately before and after writing sessions. Participants rated one of 20 positive (PA; i.e., strong, interested) and negative emotions (NA; i.e., guilty, ashamed) on a scale of one to five according to how much they experienced the emotion 'right now'. Possible scores on each of the two scales range from 10 to 50.

The *Subjective Units of Distress Self-Report Indicator* (SUDS; Jaycox, Foa, & Morral, 1998) was a rating of how distressed the participant felt, from 0 (not at all) to 100 (most ever felt) immediately after writing. Participants responded to three items, 'the average level of distress experienced during their writing session', 'the maximum level of distress experienced whilst writing', and 'the level of distress experienced in the final minute of writing'. Due to practical reasons, the method was different from past studies as it was reliant on retrospective assessment of SUDS after writing rather than providing the rating during the actual exposure session.

Participants also completed the *Body Sensations Questionnaire* (BSQ; Chambless, Caputo, Bright, & Gallagher, 1984) to determine the experience of anxiety-related body sensations (i.e., heart palpitations, sweaty hands, shortness of breath). The scale was originally developed to assess an individual's fear sensations for a panic disorder population. The questionnaire was modified to measure the extent to which individuals experienced these sensations while writing. Participants rated the experience of each of 17 physical sensations on a 5-point likert scale from 1 'not at all' to 5 'a great deal'.

Finally, continuous *heart-beats per minute (BPM)* while writing were measured on a BIOPAC MP100 system, using Acknowledge as the operating system to record the data. Pulse Plethysmograph Transducers were used to collect the heart beat signal at a rate of 200 beats per second. Transducers were attached to the non-writing hand on the third finger. A computer programmer designed a heart-beat analysis program in MATT Lab that detected peaks per second and averaged the number of peaks for each 30-s interval. These intervals were then averaged overall for each writing session.

Procedure

Testing was conducted over 6-months, in five separate phases. The first phase began in April 2002 and ended in October 2002, while the last phase began in July 2002 and ended in January 2003. Individuals were told that they would be given various writing tasks and some of these tasks could involve a personal and upsetting experience. As this was a non-clinical study, all participants were briefly screened for the presence of current significant intrusive symptoms. Those identified were assessed for PTSD and excluded if diagnostic criteria was met.

Participants completed the pre-assessment booklet with negative life event characteristic information during the first session. For sessions two, three and four, all participants wrote once a week for 3 weeks. Sessions were scheduled at the same time every week. The experimenter stated that it was important not to discuss what they were being asked to do with other people involved in the study. Participants were tested in pairs, however, each was seated at their own isolated booth. The experimenter attached the

pulse-plethysmograph to the third finger, along with skin conductance transducers on index and middle fingers (due to instability of these transducers, this measure was not analysed).

A 7-min orientation phase was used to calibrate the equipment. After completion, participants were then asked to copy two emotionally neutral pages from the APA Manual (2001) for 10 min. This phase was used to obtain a baseline measure for heart rate. Participants were then given the PANAS-I and experimental instructions. Instructions were read out loud by the experimenter and summarised verbally by all participants. When it was clear the participants understood the instructions, they were left on their own to write for 30 min and physiological recording began. Post-writing participants filled out manipulation check self-reports. This process was repeated each week at the same time for 3 weeks. The only differences between session one and the following two sessions was that there was no orientation phase at the beginning of the session. Once data were collected, participants were debriefed. Essays were typed so they could be entered into LIWC analysis and assessed by independent judges.

Results

To check for adequate randomization to groups, one-way ANOVAs were conducted on demographic variables (age, gender) and upsetting event characteristics (age at upsetting event, $M = 17.83$, $SD = 7.31$; most traumatic ever, $M = 1.23$, $SD = .43$; severity, $M = 8.23$, $SD = 1.48$; and past disclosure $M = 1.44$, $SD = .50$). Adequate randomization between each of the five groups was indicated for all measures except for age, $F(4, 194) = 2.58$, $p = .04$, and age at time of upsetting event, $F(4, 192) = 3.08$, $p = .02$. On average, benefit-finding participants were older at the time of the experiment ($M = 27.33$, $SD = 9.33$) and at the time of the upsetting event ($M = 21.00$, $SD = 8.32$) than control ($M = 23.37$, $SD = 9.32$; $M = 16.48$, $SD = 6.38$), exposure ($M = 22.47$, $SD = 4.90$; $M = 17.21$, $SD = 4.92$), and devaluation participants ($M = 22.88$, $SD = 6.24$; $M = 15.98$, $SD = 6.80$). Age was not related to variables of interest in this study.

Upsetting events

It is difficult to convey the intensity and the severity of the upsetting experiences that were reported. Various experiences were disclosed and those categorised included: the death of close friend or family (18.0%), physical or emotional abuse (14%), rape or sexual abuse (10.5%), witnessing violent assault or death (8%), break-up of relationship or marriage (8%), and witnessing or attempting suicide (4.5%). Most participants selected a past event (92%), as opposed to a current event (8%).

Emotion process measures

Before examining whether instructions influenced participants reactions, we first needed to determine that they wrote in the expected manner. Manipulation checks of essay content self-report ratings were first analysed. A 5 (writing condition) \times 7 (EEQ scales) repeated measures MANOVA was conducted indicating a main effect for group, $F(28, 736) = 10.50$, $p < .001$, session, $F(14, 174) = 5.25$, $p < .001$, and the interaction of group and session, $F(56, 708) = 1.83$, $p < .001$. Table 1 presents the means, standard deviations and between subject F -tests. A Tukey HSD test indicated that control

Table 1 EEQ mean scores and standard deviations according to group membership

		Personal	Traumatic	Revealed emotions	Revealed thoughts	Wanted to talk	Found meaning	Made sense
Control	<i>M</i>	2.94 _a	1.11 _a	1.80 _a	3.57 _a	1.96 _a	1.94 _a	2.02 _a
	<i>SD</i>	1.05	0.19	0.77	1.44	1.05	0.98	1.18
Standard	<i>M</i>	5.68 _b	3.63 _b	5.18 _b	5.68 _b	3.24 _b	3.91 _b	3.43 _b
	<i>SD</i>	1.09	1.28	1.02	0.88	1.41	1.13	1.35
Exposure	<i>M</i>	5.69 _b	4.47 _c	5.39 _b	5.69 _b	2.85 _{ab}	3.51 _b	3.11 _b
	<i>SD</i>	1.15	1.13	0.81	0.84	1.47	1.14	1.61
Devaluation	<i>M</i>	5.78 _b	3.50 _b	5.20 _b	5.58 _b	3.50 _b	4.60 _{bc}	4.33 _c
	<i>SD</i>	0.87	1.21	0.77	0.69	1.76	1.01	1.19
Benefit-finding	<i>M</i>	5.61 _b	2.45 _d	5.00 _b	5.73 _b	3.51 _b	5.52 _c	3.96 _{bc}
	<i>SD</i>	1.07	1.00	1.23	1.06	1.36	1.25	1.51
<i>F</i> -value		55.69,	61.84,	106.67,	33.83,	8.32,	10.01,	17.01,
		$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$

Note: Means in the same column that do not share the same subscript differ from each other at the $p < .05$ level

participants wrote less personal, traumatic, emotional, and thoughtful essays than all other groups. They also wanted to talk less about what they had written about, found less meaning, and made less sense of the topic they were writing about from their essays. Differences between upsetting event-writing conditions were revealed in expected directions. Exposure participants wrote more traumatic essays and wanted to talk less about what they had written about than other emotional writing groups. In contrast, benefit-finding participants found more meaning than exposure and standard writing conditions and wrote less traumatic essays than all other emotional writing groups. Finally, the devaluation participants reported making more sense about their experience from their essay than exposure and standard writing conditions.

The observed session by group interaction was due to a number of factors. First, control participants reported writing more personal essays during their second session, while other group reports scored similarly across the three sessions. For control participants, the second session focused on writing about their home in great detail. Second, while all other writing groups remained relatively constant on their rating of how traumatic their essay was and how much sense they made of their experience from their essay, standard writing participants reported a reduction across sessions.

The second self-report questionnaire, the PIQ, was specific to the emotion process use by individuals to write about their upsetting experience. Thus, the control group did not complete the PIQ questionnaire or have their essays analysed. A 4 (group) \times 3 (PIQ: Exposure, Devaluation, and Benefit-finding scales) repeated measures MANOVA indicated a main effect for group, $F(9, 438) = 49.34$, $p < .001$, session, $F(6, 141) = 9.56$, $p < .001$, and the session by group interaction, $F(18, 429) = 3.58$, $p < .001$. Table 2 presents overall means and standard deviation for the self-report ratings across sessions. Tukey HSD tests show that exposure participants reported the highest score on the exposure scale, devaluation participants reported the highest score on the devaluation scale, and benefit-finding reported the highest score on the benefit-finding scale, in comparison to all other upsetting event writing groups. The interaction indicated that exposure, devaluation, and benefit-finding writing groups reported engaging in less of the processes not consistent with their instructions over time. For example, exposure participants reported using less devaluation and

Table 2 Means and standard deviations of the self-reported and judge rated degree writing groups followed experimental instructions

	Exposure ratings		Devaluation ratings		Benefit-finding ratings	
	SR	Judge	SR	Judge	SR	Judge
Standard	3.59 _a	2.61 _a	4.06 _a	2.19 _a	3.40 _a	1.21 _a
Exposure	1.26	1.43	1.12	0.84	1.24	0.46
	4.97 _b	5.26 _b	2.99 _b	1.21 _b	1.79 _b	1.01 _a
Devaluation	0.88	0.84	1.04	0.42	1.06	0.05
	1.80 _c	1.01 _c	5.30 _c	4.30 _c	3.72 _a	1.25 _a
Benefit-finding	0.82	0.02	0.83	0.86	1.29	0.34
	1.64 _c	1.01 _c	2.17 _d	1.16 _b	5.71 _c	4.45 _b
	0.68	0.03	0.92	0.56	1.00	1.07
	105.28,	215.86,	71.58,	166.64,	69.32,	280.60,
	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$

Note: Means in the same column that do not share the same subscript differ from each other at the $p < .05$ level

benefit-finding strategies as sessions progressed. Standard writing participants reported gradually engaging in less exposure and more devaluation strategies and benefit-finding as sessions progressed.

Independent judge ratings were also assessed in a 4 (writing condition) \times 3 (Judged Exposure, Devaluation, and Benefit-finding scales) repeated measures MANOVA. A main effect for group, $F(9, 441) = 77.66$, $p < .001$, session, $F(6, 142) = 13.71$, $p < .001$, and the interaction $F(18, 432) = 4.89$, $p < .001$ was indicated. Tukey HSD tests indicated an identical pattern of results as self-reports.

The Linguistic Inquiry Word Count was run on all typed essays. Linguistic categories were analysed in a 4 (Experimental Group) \times 9 (Word Categories) MANOVA and a main effect for group, $F(33, 423) = 11.84$, $p < .001$, session, $F(22, 128) = 4.37$, $p < .001$ and the interaction, $F(66, 390) = 2.06$, $p < .001$. Table 3 presents mean percentages and standard deviations for each word category across the three writing sessions. Tukey HSD tests of group effects indicated that benefit-finding participants wrote with more positive emotion and insight words than all other groups. Exposure and devaluation writing participants wrote with more negative emotion words than benefit finding participants. Exposure participants also used more sensory, motion, and body state descriptors. Devaluation participants, in contrast, employed more causal language and tentative words than other groups. Finally, exposure and standard writing participants used more past tense descriptors, while devaluation and benefit-finding participants used more present and future tense descriptors.

The interaction of session and group was accounted for by standard writing participants. Their essays shifted from using past descriptors to using more present and future descriptors. Standard writing essays were also characterised as using more positive emotion, more causation and insight related words as session progressed.

Affect, arousal, and distress ratings

All participants were measured on affect, distress, and arousal. These ratings provide valuable information about the degree of stress each writing task placed on participants over each writing session and the degree of habituation for those in the exposure condition. A repeated measures ANOVA was conducted on the PANAS pre-writing

Table 3 Percentages of words used in essays within emotional writing groups

		Positive emotion	Negative emotion	Sensory process	Motion words	Body states	Past tense	Present tense	Future tense	Causation words	Tentative words	Insight words
Standard	<i>M</i>	2.01 _a	2.86 _a	2.68 _a	1.26 _a	1.28 _a	8.37 _a	8.48 _a	0.80 _a	1.23 _a	2.44 _a	3.10 _a
	<i>SD</i>	0.77	0.99	0.78	0.57	0.70	1.82	2.41	0.43	0.45	0.96	0.81
Exposure	<i>M</i>	1.58 _b	3.17 _{ab}	3.77 _b	1.53 _b	2.26 _b	10.48 _b	5.61 _b	0.54 _a	0.84 _b	1.83 _b	2.69 _b
	<i>SD</i>	0.55	1.39	1.02	0.65	1.48	2.31	2.11	0.28	0.36	0.59	0.65
Devaluation	<i>M</i>	2.20 _a	3.40 _b	2.96 _a	0.72 _c	0.53 _c	4.61 _c	11.91 _c	1.43 _b	1.80 _c	2.87 _c	3.20 _a
	<i>SD</i>	0.72	0.99	1.08	0.55	0.36	1.82	2.53	1.33	0.86	0.91	0.86
Benefit-finding	<i>M</i>	3.48 _c	1.64 _c	2.11 _c	0.76 _c	0.69 _c	4.11 _c	12.00 _c	1.17 _b	1.43 _a	2.25 _{ab}	3.67 _c
	<i>SD</i>	1.11	0.59	0.70	0.32	0.48	1.79	2.40	0.46	0.58	0.60	0.94
<i>F</i> -value		37.27, $p < .001$	21.66, $p < .001$	21.40, $p < .001$	20.43, $p < .001$	30.80, $p < .001$	92.19, $p < .001$	62.76, $p < .001$	10.13, $p < .001$	17.11, $p < .001$	11.33, $p < .001$	8.82, $p < .001$

Note: Means in the same column that do not share the same subscript differ from each other at the $p < .05$ level

scores over the three sessions to ensure there were no differences between groups. Examination of the positive affect scale pre-session did not reveal a main effect for group, $F(4, 194) = 1.65$, $p > .05$. A main effect for session number was found, $F(2, 193) = 33.34$, $p < .001$. Overall, participants decreased their ratings of positive affect before writing from the first writing session to the last (Session 1 $M = 23.33$, $SD = 7.05$; Session 2 $M = 20.92$, $SD = 7.17$; Session 3 $M = 19.49$, $SD = 6.85$). There was no interaction effect between group and session, $F(8, 388) = 0.40$, $p > .05$. Examination of the negative affect scale did not reveal a main effect for group, $F(4, 194) = 1.10$, $p > .05$, session, $F(2, 193) = 0.63$, $p > .05$, or an interaction between group and session, $F(8, 388) = 1.16$, $p > .05$ (Session 1 $M = 12.54$, $SD = 3.10$; Session 2 $M = 12.41$, $SD = 4.13$; Session 3 $M = 12.16$, $SD = 3.36$).

As there were no group effects on pre-session scores, post-writing PANAS scores could be analysed without controlling for pre-session scores. A 5 (Group) \times 3 (Session) \times 4 (PA, NA, BSQ, Average SUDS) repeated measures MANOVA indicated a main effect for group, $F(16, 776) = 7.81$, $p < .001$, session, $F(8, 187) = 13.05$, $p < .001$, and the interaction, $F(40, 752) = 1.73$, $p = .002$.

Univariate analysis of positive affect indicated a significant effect for group, $F(4, 194) = 7.36$, $p < .001$, session, $F(2, 193) = 6.43$, $p = .002$, but there was no interaction between group and session, $F(8, 388) = 0.66$, $p > .05$. These results, shown in Fig. 1, indicate that benefit-finding participants reported the greatest increase in positive affect post-writing in comparison to all other groups. All groups experienced a reduction in positive affect post-session from session one to two.

Analysis also indicated a significant main effect for negative affect post-writing for writing condition, $F(4, 194) = 10.82$, $p < .001$, session, $F(2, 193) = 19.22$, $p < .001$, and the interaction, $F(8, 388) = 4.78$, $p < .001$. As indicated in Fig. 1, benefit-finding participants reported similar levels of negative affect as control participants, which remained relatively stable across the three sessions. In contrast, other upsetting event writing groups reported more negative affect post-writing. These higher levels gradually decreased across the three writing sessions.

The next two measures assessed arousal and distress while writing. Concurrent validity between the BSQ and average SUDS scores measures was demonstrated with significant correlations between them in session one ($r = .54$, $p < .01$), session two ($r = .52$, $p < .01$) and session three ($r = .44$, $p < .01$). Examination of BSQ scale indicated an overall main effect for group, $F(4, 194) = 9.13$, $p < .001$, session, $F(2, 193) = 45.71$, $p < .001$, and the interaction of session and group, $F(8, 388) = 2.08$, $p = .04$. As can be seen in Fig. 1, exposure participants reported significantly more body sensations while writing than all other writing groups. Devaluation and standard writing participants also reported more body sensations than control. While a reduction in body sensations across the three writing session was evident, a far greater reduction was found for devaluation, benefit-finding and standard writing participants than for participants assigned to the exposure writing condition.

Analysis of the average level of SUDS experienced over each writing session indicated a main effect for group, $F(4, 194) = 35.53$, $p < .001$, session, $F(2, 193) = 15.14$, $p < .001$, but not for the interaction, $F(8, 388) = 1.08$, $p > .05$. As shown in Fig. 1, exposure, devaluation, and standard writing participants reported significantly more SUDS than benefit-finding participants and control. Benefit-finding participants also reported more SUDS than control. All groups reported a reduction in SUDS across sessions.

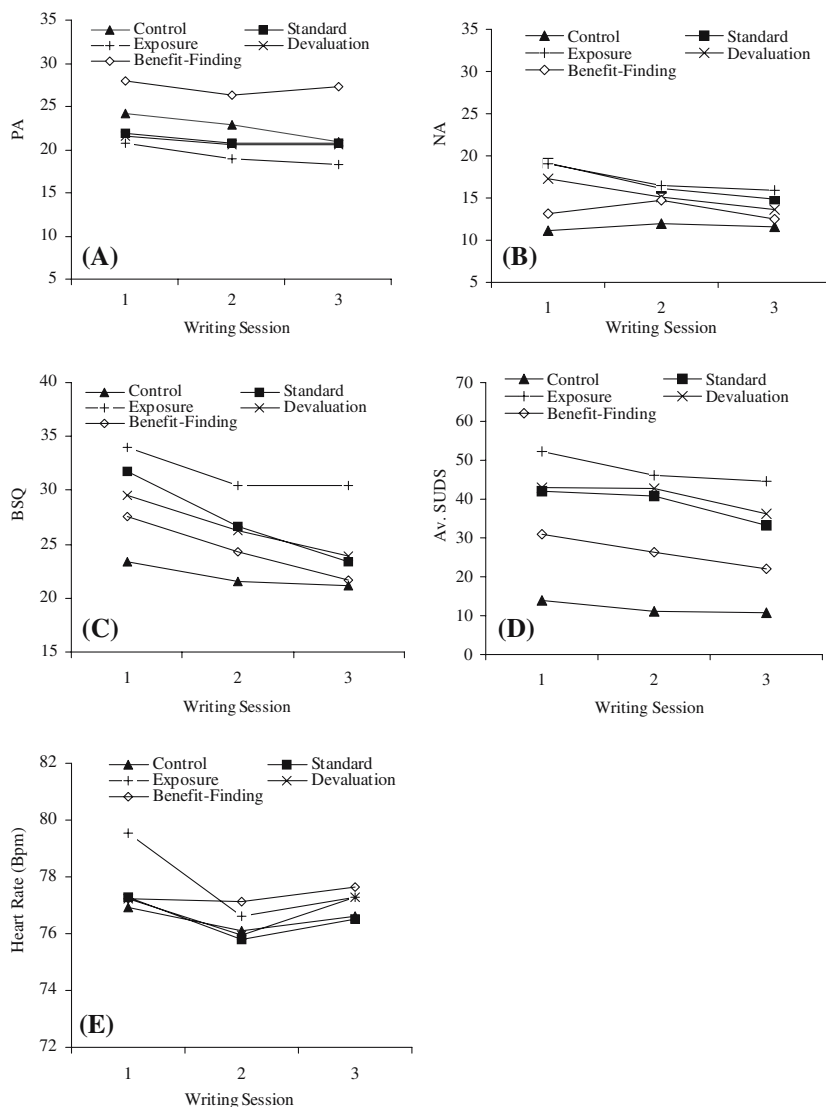


Fig. 1 Writing group scores for each session on distress, affect, and arousal measures

Heart-rate responses while writing

Heart-rate responses were recorded continuously for all participants, however, due to equipment malfunction and noise in the recordings, there were some missing data across the 6 data points (3 baseline and 3 writing tasks sessions). These missing data points were on average only about a few per condition for each session. However, when aggregated over a repeated measures ANOVA, the overall effect was a significant loss of data (about a third of all participants). Consequently, all analysis was conducted as a one-way ANOVA controlling for pre-writing levels.

Analysis of the average BPM for session 1 indicated borderline statistical significance, $F(4, 166) = 2.33$, $p = .05$. Post-hoc analysis indicated that the exposure participants experienced higher BPM in comparison to all other conditions. This is clearly illustrated in Fig. 1. Analysis for session two, $F(4, 159) = 0.86$, $p > .05$, and session three, $F(4, 163) = 0.70$, $p > .05$, failed to reveal any main effects for group.

Discussion

First, our results replicate past research that has employed the standard Pennebaker writing paradigm in comparison to control (Pennebaker et al., 1988). Writing about a personal and upsetting experience leads to predictable outcomes. Individuals feel they have disclosed something that is more traumatic, personal, thoughtful, and emotional. These topics, regardless of the underlying process, leave individuals feeling like they have made more sense of their experience, given it more meaning, and left them feeling like they want to discuss the event with others. Repetition of each writing session decreases distress experienced while writing and leaves individuals feeling less emotional after each writing session, both in positive and negative affect. These findings contrast with Kloss and Lisman (2002) who argued that negative affect does not decrease over the course of each writing session. Differences between this study and that of Kloss and Lisman include the use of a measure of distress while writing, as opposed to after writing, and the request that participants focus on one upsetting event in this study.

Our study also builds on previous work (Pennebaker, Mayne, & Francis, 1997; Suedfeld & Pennebaker, 1997), which suggests that some standard writing participant essays change over time. Group-based changes indicated essays gradually became more insightful, positive, and more focused on the present and future. They became less traumatic, focused less on the event, and what happened in the past. They also engaged in more devaluation and benefit-finding strategies as sessions progressed, while also engaging in less exposure. These findings suggest the standard writing paradigm does assist many individuals to confront upsetting past memories by making them easier to recall, less painful over time, and may encourage more elaborative, integrative processing of the memory (Brewin, Dalgleish, & Joseph, 1996; Ehlers & Clark, 2000; Paez, Valesco, & Gonzalez, 1999).

The aim of the study was to demonstrate whether the standard writing procedure could be modified and structured in a way to produce real differences in participant engagement with specific emotional processes. This study provides strong evidence that participants can reliably engage in different emotional processes during structured writing tasks. This finding provides validation for this writing procedure as an emotion processing research tool, with further applications of this procedure in research warranted.

Emotion process checks of essay content, including independent ratings, self-reports, and computer text analysis, converged to demonstrate that individuals complied with the instructed task throughout the three sessions. Reported reactions from participants during and after they wrote were in the expected directions. Results for each experimental writing group are now discussed.

There was strong evidence to suggest participants assigned to the exposure condition engaged with the stressful event memory. Both self-reports and independent judge ratings of the essay suggested that exposure participants described the upsetting

experience in great detail and focused on the most upsetting aspects of the event as it happened. LIWC analysis indicated these participants wrote essays that described the event in great perceptual and personal detail. They used far more negative emotion words, motion descriptors, physical body descriptors, perceptual descriptor words, and past tense words.

According to Foa and Kozak (1986), the best predictor of engagement with the trauma memory is somatic activation. Our results indicated significant differences between the exposure writing group and all other writing groups for body sensations experienced and heart-beat elevations while writing. Of particular interest, increased engagement did not result in overall distress above and beyond that reported by the standard or devaluation writing conditions for each writing session. Further, negative affect was not significantly different from these groups post-writing. This suggests that the exposure-writing task is no less palatable for participants than any other writing task that requests individuals to focus on negative emotion.

Our results also supported the idea that the fear structure was modified between sessions. Exposure participants reported a reduction in average SUDS, body sensations and adjusted BPM from the first to the last session. This effect was greatest between session one to session two. To achieve maximum habituation in student populations, and in line with exposure therapy recommendations, exposure writing sessions may be even more effective if they were longer (i.e., 60 min), or of an increased number.

Both self-reports and judge assessments indicated that participants assigned to the devaluation writing condition explored what made them upset now, attempted to identify core beliefs about why they were upset, explored ways they could think to make them feel less upset, and attempted to identify new ways to make themselves feel better. They used a similar amount of negative emotion words to exposure writing participants, but more present and future tense words, and more causal language. Of greatest importance, participants in this condition did report a decrease in SUDS, body sensations, and negative affect across sessions. This decrease was most evident by the third session. Consistent with ECM (Davey, 1997), repeated attempts to devalue through the use of cognitive neutralising strategies results in participant's becoming better able to neutralise their distress and therefore lower distress levels during subsequent recall.

Participants assigned to the benefit-finding condition wrote about the positive changes that occurred as a result of their experience for themselves, their relationships with others, and their world-view. Benefits focused on the present and future. These participants also used more positive emotion words and insight-related words than all other groups. They felt their essays were less traumatic and that they were able to develop more meaning than any other writing group. In the short-term, and as expected, participants experienced large increases in positive affect post-writing, replicating past research (King & Miner, 2000). It appeared that benefit-finding participants reported lower SUDS and body sensations while writing in comparison to all other upsetting event writing groups. However, some minimal elevation in SUDS was observed in comparison to control. It suggests that even writing about the positive benefits gained from a negative experience may be uncomfortable for participants.

This study hypothesised that devaluation and benefit-finding processes were independent and discernable cognitive re-structuring processes. While differences in essay content were obvious, participant reactions provided the strongest support for our claim. While devaluation participants were better able to neutralise their distress, they did not experience elevations in positive affect post-writing that was observed in the benefit-finding writing group. In contrast, the distress ratings for benefit-finding

participants neither increased or decreased over the course of sessions, suggesting these participants neither engaged or devalued any upsetting aspect of the memory. The differences between these two processes have been highlighted by theorists (Davis et al., 1998), but are often ignored in other aspects of the clinical literature. The implications suggest the addition of a separate benefit-finding treatment approach to standardised Cognitive-Behavioral interventions may increase both intervention effectiveness and, almost certainly, client satisfaction.

The results of this study suggest the possibility of research into stepped-based procedures. Participants assigned to the Pennebaker writing group engaged in a variety of writing styles and there was a group-based shift in the type of processing across each session. It may be of significant value to examine the effects of combining exposure, devaluation, and benefit-finding strategies in a controlled and directed manner to force this shift in all individuals.

This study aimed to modify the writing paradigm by directly instructing participants to write in a manner consistent with specific emotional processes. The benefit of this type of paradigm is that processes may be isolated so the impact of writing may be increased and processes are controlled in a manner that avoids a self-selection approach. There were, however, a number of limitations to our approach. The direct instruction for each participant to engage in a process may influence reports of engagement through demand characteristics. We believe the number of separate convergent data suggests that participants did follow instructions. It is impossible to state, for instance, that participants who wrote about benefits gained actually believed what they wrote and felt as positive as they reported. A second limitation is associated with the re-appraisal construct. Assessment is necessarily post-hoc and how one might operationally define a re-appraisal in this analogue study is an area for continuing research. Third, we slightly modified the Pennebaker instructions to request participants focus on one upsetting event. We do not believe this to be a major issue, however. Our LIWC analysis and outcome data are identical to that produced by Pennebaker's studies, Smyth (1998) did not report this variable to influence changes in health, and numerous Pennebaker studies are conducted using only one writing session (e.g., Paez et al., 1999).

There are also a number of limitations to the conclusions that may be drawn from our data. Importantly, there was no attempt to demonstrate long-term health changes in accordance with these emotion processes or psychopathology. This is an area for future research (Guastella & Dadds, 2005). Secondly, this study employed a student, non-clinical population. Drawing conclusions for clinical populations based on this study could be erroneous. Thirdly, we attempted to induce Cognitive-Behavioral processes, however, there was no direct comparison with therapy room procedures. Further outcome and mediational research is required to compare effects in this procedure with the demonstrated therapy room processes. Finally, our study did not examine within group differences in responding to the writing task. An examination of various trait and mediator variables may highlight important response difference between participants.

Overall, this study provides strong support for increased engagement with different emotional processes and offers a novel, self-administered approach to the study of Cognitive-Behavioral processing. It demonstrates that different pathways can be assessed on a micro-level and support claims (Esterling et al., 1999) that the writing paradigm provides a useful emotion-processing research tool. Future applications of this research may inform current emotion-processing models and provide a valuable intervention tool for the community that is safe and easy to administer.

Acknowledgments The authors would like to thank Penelope Davis, John O’Gorman, Michelle Moulds, Stefanie Sharman, James Pennebaker, and Graham Davey for advice and testing materials. This Research partially supported by the Australian Research Council Discovery Grants.

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