

Effects of Writing About Emotions Versus Goals on Psychological and Physical Health Among Third-Year Medical Students

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ABSTRACT A randomized, controlled trial compared writing about emotional topics (EMO) to writing about goals as the “best possible self” (BPS; after King, 2001) and evaluated emotional approach coping, i.e., efforts to cope through processing and expressing emotion, as a moderator of writing effects on psychological and physical health in 64 third-year medical students. In participants with higher baseline hostility, the EMO condition was associated with less hostility at 3 months compared to the BPS and control conditions. Emotional processing (EP) and emotional expression (EE) moderated the effect of experimental condition on depressive symptoms at 3 months; high EP/EE participants reported fewer depressive symptoms in the EMO condition, whereas low EP/EE individuals reported fewer depressive symptoms in the BPS condition compared to the EMO and control conditions. A moderating effect of EP on physical health was also identified, such that low EP individuals who wrote about goals (BPS) had fewer health care visits at 3 months compared to low EP participants in the EMO and control conditions.

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The health benefits of expressive writing, tested via random assignment of participants to write over several sessions about deepest feelings and thoughts regarding a stressful experience versus a non-emotional topic (Pennebaker & Beall, 1986), have been demonstrated in multiple experiments. A meta-analysis of 13 randomized experiments with nonclinical samples (Smyth, 1998) revealed significant improvements in reported physical health, psychological well-being, physiological health, and general functioning in experimental participants compared to controls.

Recent studies have identified benefits associated not only with written expressive disclosure but also with writing about only positive events (Burton & King, 2004), positive aspects of stressful experiences (King & Miner, 2000; Stanton et al., 2002), or future goals without specific attention to stressful events (King, 2001). For example, King (2001) assigned undergraduates to write about deepest thoughts and feelings (EMO) regarding a traumatic event or about future goals in narrative form as a description of their best possible self (BPS). Control subjects wrote about plans for the day. BPS subjects had a significant increase in positive mood immediately postwriting and higher subjective well-being at 3 weeks than the EMO group. At 5 months, BPS and EMO conditions resulted in fewer illness visits than the control.

The purpose of this experiment was to compare effects of written expressive disclosure to writing about achieving life goals in a sample of medical students in their clinical clerkships. This is a particularly interesting group in which to compare the relative impact of the two conditions; the students are working in a stressful environment in terms of both emotional demands and challenges to their long-held ideals and goals. We also sought to evaluate a specific coping strategy, emotional approach coping, as a potential moderator of writing benefits.

The study participants were in their third year of medical school, representing the first year of clinical clerkships. In most medical schools, this is students' first full-time exposure to patient care during supervised rotations. The clerkship involves immersion in the career setting to which many students aspire and thus likely prompts them to consider long-range goals and self-construals in light of their current experience. Clerkship training is physically demanding because of long hours worked and is psychologically stressful in its direct exposure to suffering patients, a lack of opportunity for

emotional expression with supportive others, and the hierarchical organization of the physician team that places medical students at the bottom (Angoff, 2001). In one survey, 68.5% of students completing their third year reported being verbally abused, and 64.3% of female students reported being sexually harassed (Lubitz & Nguyen, 1996). Erosion of previously held ethical standards also can occur. In a survey of third and fourth year medical students, 58% reported having done something they thought was unethical, 98% heard physicians refer derogatorily to patients, and 62% believed some of their ethical principles had been eroded or lost (Feudtner, Christakis, & Christakis, 1994). In light of the meta-analytic finding (Smyth, 1998) that participants writing about current as opposed to past stressful experiences evidenced greater psychological benefits from EMO, the stressful aspects of the clerkship render it an appropriate venue for testing effects of written expressive disclosure.

Because of the variety of potential clerkship stressors, including verbal abuse and ethical challenges, as well as the evidence that depressive symptoms and hostility increase during medical training (Bellini, Baime, & Shea, 2002; Rosal et al., 1997), we were interested in the effects of writing on depressive symptoms and specific negative moods (i.e., hostility, sadness, fear, guilt). In addition, we examined whether students with elevated negative mood at baseline would be particularly responsive to the EMO task. Owing to the effects of expressive disclosure interventions on physical health indicators (Smyth, 1998), we also were interested in physical symptoms and medical utilization for illness in this sample. A primary hypothesis of this study was that both EMO and BPS would confer physical and psychological health benefits relative to a control condition at a 3-month follow-up.

An emerging question involves specifying how effects of expressive disclosure vary as a function of personal and contextual attributes. Promising moderators include optimism (Cameron & Nicholls, 1998), facets of alexythymia (Lumley, 2004; Paez, Velasco, & Gonzalez, 1999; Solano, Donati, Pecci, Persichetti, & Colaci, 2003), and avoidance-oriented coping (Stanton et al., 2002). Norman and colleagues (2004) found that ambivalence over emotional expression (King & Emmons, 1990), a construct describing a conscious desire to express emotion combined with a reluctance to do so, moderated the effects of expressive writing in a sample of women with chronic pelvic pain, such that women higher in ambivalence

reported less disability at 2-month follow-up when randomized to the EMO condition compared to a control condition. The authors suggested that expressive writing might be particularly beneficial for ambivalent individuals because it provides an anonymous, safe means for exploring negative emotions.

In this study, we examined the moderating effects of another emotion-related construct, emotional approach coping (EAC; Stanton, Danoff-Burg, Cameron, & Ellis, 1994; Stanton, Kirk, Cameron, & Danoff-Burg, 2000b; for a review, see Austenfeld & Stanton, 2004). This construct encompasses emotional processing (i.e., active attempts to acknowledge, explore meanings, and come to an understanding of one's emotions) and emotional expression (i.e., verbal and/or non-verbal attempts to communicate or symbolize one's emotional experience). EAC is associated with improved adjustment to stressors including infertility, chronic pain, and breast cancer (Berghuis & Stanton, 2002; Smith, Lumley, & Longo, 2002; Stanton et al., 2000a).

Although not previously tested via the writing paradigm, evidence suggests that EAC strategies interact with environmental demands in predicting stressor-associated distress. In a study of undergraduates (Stanton et al., 2000b, Study 4), participants who had a parent with chronic illness were randomly assigned to talk to an interviewer about either their emotions or the facts regarding their parent's condition. Participants reporting a high level of emotionally expressive coping had less physiologic arousal and negative affect in the congruent (i.e., emotional expression) experimental condition compared to participants low in emotional expression. In a study of breast cancer patients (Stanton et al., 2000a), women high in emotional expression with regard to coping with breast cancer had fewer medical visits and decreased distress compared to those low in emotional expression, but they also reported improved quality of life if their social context was perceived as receptive to emotional expression regarding cancer. Postulating that congruence between one's naturally elected strategy to manage emotions and contextually imposed demands regarding emotion regulation yields better outcomes (e.g., Engebretson, Matthews, & Scheier, 1989), we predicted that individuals high in EAC would experience greater benefit from the EMO condition than would those low in EAC. Similarly, BPS is likely to be particularly helpful for individuals who cannot or will not approach strong emotions (King, 2001) in that writing about goals might provide self-regulatory benefits without an exploration of neg-

ative emotions. In an effort to strengthen the self-regulatory potential of the BPS condition, we asked participants to describe how they would overcome an obstacle or challenge to attain their goals.

METHOD

Participants

Participants were 64 third-year medical students at a school of medicine in a midwestern state, 35 men (55%) and 29 women (45%), who had completed at least 4 weeks of any of six clinical rotations (i.e., Surgery, Internal Medicine, Obstetrics/Gynecology, Pediatrics, Ambulatory Medicine/Geriatrics, Family Medicine). Participants had a mean age of 26.41 years ($SD = 4.04$, range = 23–43) and were predominantly white (84%), with 2% African American, 2% Latino, 11% Asian, and 2% other ethnicities. Demographic data were not available for those who chose not to participate, but overall the third-year students were 58% male, and 77% white, 6% African American, 5% Latino, 10% Asian, and 1% Native American. The sample thus included a somewhat higher percentage of whites than were represented in the total group.

Eight additional participants were not included in analyses: one student began the study but did not complete the writing phase, two did not return the 3-month follow-up questionnaires, and five returned follow-up questionnaires more than 2 months after their 3-month follow-up date. Although this group was too small for reliable analysis of their characteristics, they were evenly distributed across the three experimental conditions (2 in EMO, 3 in BPS, and 3 in CTL). Of the 72 students initially recruited, 89% were included in the analysis.

Procedure

After approval by the institutional review board, third-year medical students were recruited either via an e-mail announcement sent to all students in clinical clerkships or an in-person announcement at an orientation session during the first week of the third year. Sent to 117 students, the e-mail generated responses from 22 (19%) students, of whom 11 began the study and 9 were included in analyses. Of 106 students who received the personal announcement, 75% ($n = 79$) indicated interest, 61 began the study, and 55 were included in analyses.

Participants met individually with the first author in a classroom at the medical school after finishing their clinical work for the day. In the first session and after providing informed consent, participants completed a

baseline packet of questionnaires, were randomized to one of three writing conditions, and began their first writing session. Following a standard script, the investigator verbally conveyed writing instructions. The three writing tasks to which participants were randomized involved: (1) describing their deepest thoughts and feelings regarding the most “upsetting, traumatic, frustrating, or challenging” experiences they had during their clinical clerkships (EMO); (2) writing about their future as if all their professional and personal goals had been achieved, including a description of how they overcame at least one major obstacle (BPS); (3) describing everything they had done for the past 24 hours, without expressing emotions or opinions (control condition; CTL). Participants wrote about this designated topic during three 25-minute sessions, scheduled at least 1 week apart, with all three writing sessions completed within 8 weeks or less. Each student wrote alone in a separate classroom. Instructions provided on the first day of writing were as follows:

EMO: “What I would like you to write about for these three sessions are your very deepest thoughts and feelings about the most upsetting, traumatic, frustrating or challenging experience or experiences you have had since you began your third-year medical school clerkships. As you know, the transition from the first two years of medical school to the clinical part of your training in clerkships can be a stressful one. Write about each stressful experience in as much detail as you can. Really get into it and freely express any and all emotions or thoughts that you have about the experience. The only rule we have about your writing is that you write continuously for the entire time. If you run out of things to say, just repeat what you have already written. Don’t worry about grammar, spelling or sentence structure. Don’t worry about erasing or crossing things out. Just write. I will be back in 25 minutes.”

BPS: “Think about your life in the future. Imagine that everything has gone as well as it possibly could. You have worked hard, overcome obstacles, and succeeded at accomplishing all of your life goals, both professional and personal. Your medical practice is everything you hoped it would be and your personal life is ideal. Think of this as the realization of all your life dreams. Now, describe in writing this realization of your dreams. Be sure to include a description of how you overcame at least one major obstacle or challenge to achieve these goals. The only other rule we have. . . .” [remainder identical to EMO]

CTL: “I am interested in the experiences of medical students during clerkship training. During this writing session, I would like you describe in detail what you have done for the past 24 hours. It is important that you describe things exactly as they occurred. Do not mention your emotions, feelings, or opinions. Your description should be as objective as possible. You may include details such as what time you got up and what

you have eaten. The most important part of this writing is that you focus on the facts and try to reconstruct what happened in as much objective factual detail as possible. No fact is too big or too small. The only other rule we have. . . ." [remainder identical to EMO]

Three months after their third writing session, a packet of follow-up questionnaires was mailed to each participant. Students were compensated \$25 for their time after each writing session and for completing follow-up questionnaires, for a potential total of \$100.

Measures

Emotional approach coping. The proposed moderator variable was measured at baseline with the Emotional Approach Coping (EAC) scales (Stanton et al., 2000b), consisting of the 4-item Emotional Processing (EP, e.g., "I take time to figure out what I'm really feeling") and Emotion Expression (EE, e.g., "I feel free to express my emotions") subscales. Participants completed the items with respect to what they had done to cope with stressful experiences as medical students. The Emotional Approach Coping scales have established predictive utility (Stanton et al., 2000a, Stanton et al., 2000b). Coefficient alpha in this sample was .68 for EP and .86 for EE. The items were embedded in the COPE (Carver, Scheier, & Weintraub, 1989), a measure of several coping strategies.

Affect. Psychological distress was measured with the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) at both assessment points ($\alpha = .91$ at each point). This measure is a valid measure of depressive symptoms in the general population (Roberts & Vernon, 1983). The PANAS-X (Watson & Clark, 1991) is a measure of several specific affects. Of specific interest were four negative moods: hostility, sadness, fear, and guilt. The PANAS-X has established convergent and discriminant validity. This measure was completed at both assessments with instructions to indicate how the participant had been feeling for the past few weeks. Coefficient alpha for the four subscales ranged from .75 to .91 at baseline and .87 to .93 at the 3-month follow-up.

Physical symptoms. A 9-item version of a measure developed by Pennebaker (1982), the Pennebaker Inventory of Limbic Languidness (PILL), was used to evaluate physical symptoms. Participants indicated on how many of the last 30 days they experienced several physical symptoms (e.g., "coughing/sore throat") that were unrelated to exercise.

Medical care utilization. With a signed release giving the experimenter permission to request the information, the number of medical visits

participants made for illness (not injury) for the 3-month period prior to the study and the 3-month follow-up period was counted by health center or physician's office personnel and reported to the experimenter. The number of visits for both time periods was available for a subset of 50 participants.

Manipulation check and essay ratings. An independent rater read each of the 192 essays in random order and recorded which condition instructions they most reflected. At 3-month follow-up, participants rated on a 7-point scale (1 = not at all, 7 = a great deal) how valuable or meaningful the project was to them, how interesting it was, how much it increased their understanding of their experience, and how much they expected their participation to have lasting positive and negative effects.

RESULTS

Analyses on Baseline Data

To establish that randomization was successful, preliminary analyses of variance for continuous variables and χ^2 analyses for categorical variables were conducted on demographic variables (age, sex, marital status), current clinical rotation (6-week vs. 8-week), emotional approach coping, and baseline values for all dependent variables (depressive symptoms, hostility, sadness, fear, guilt, physical symptoms, medical visits), with experimental condition (EMO $n = 22$; BPS $n = 21$; CTL $n = 21$) as the independent variable. No significant between-groups differences emerged on any variable.¹ Cell sizes were insufficient for analysis of ethnicity but numbers of white versus nonwhite participants were relatively uniform across conditions.

Essay Ratings

An independent rater correctly classified 98% of the 192 essays (98% of 66 EMO essays, 95% of 63 BPS essays, and 100% of 63 CTL

1. In preliminary analyses conducted to examine gender effects, there were no significant 2-way interactions between gender and condition, but significant gender main effects were found on physical symptoms, $F(1, 60) = 4.48$, $p = .038$, partial $\eta^2 = .069$, and health care visits, $F(1, 47) = 4.95$, $p = .031$, partial $\eta^2 = .095$, with women reporting more physical symptoms and health care visits than men. Including gender as a covariate for all other analyses on these two dependent variables did not alter results.

Table 1
Descriptive Statistics on Participation Ratings at 3-Month Follow-Up

Dependent variable	EMO	BPS	CTL
Project valuable/meaningful	4.64 (1.26)	4.81 (1.47)	3.86 (1.90)
Project interesting	5.00 (.87)	5.19 (1.21)	4.48 (1.69)
Project increased understanding	3.95 (1.62)	3.81 (1.57)	3.14 (1.46)
Positive effects	3.32 (1.39)	3.76 (1.48)	3.10 (1.64)
Negative effects	1.32 (.72)	1.00 (.00)	1.10 (.44)

Note. Standard deviations are in parentheses under means.

essays), indicating excellent adherence to writing instructions. Descriptive statistics on participants' ratings of their experience with writing are shown in Table 1. Univariate ANOVAs, with experimental condition as the independent variable, revealed no significant between-groups differences. All means were in the direction of the experimental groups perceiving the writing as more valuable and interesting and more likely to have long-term positive effects and to increase their understanding of their experience compared to controls. Participants expected no long-term negative effects from writing.

Analyses on 3-Month Follow-Up Data

First, analyses were conducted to assess whether baseline values on the dependent variables interacted significantly with experimental condition on the 3-month outcomes (i.e., depressive symptoms, mood variables, physical symptoms, health care visits). A significant interaction emerged between condition and baseline hostility in the prediction of hostility at 3-month follow-up, $F(2, 58) = 3.21$, $p = .048$, partial $\eta^2 = .100$. Analyzed using the method of Aiken and West (1991), the form of the interaction is displayed in Figure 1. In participants with low baseline hostility, experimental condition did not influence hostility at 3 months. For participants with high baseline hostility, however, those randomized to the EMO condition evidenced lower hostility at 3 months compared to the BPS and

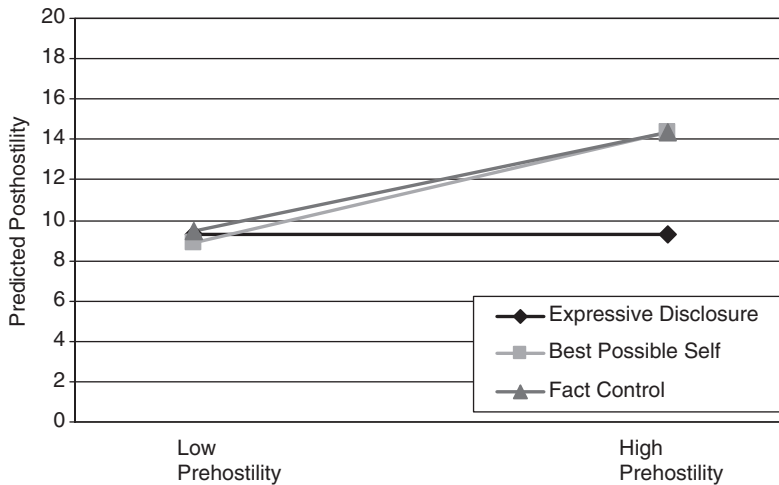


Figure 1

Baseline hostility \times condition interaction on prediction of hostility at 3-month follow-up.

control groups, and their predicted 3-month hostility scores were equivalent to students with low baseline hostility.

Next, analyses of covariance were conducted on dependent variables at three months with baseline values controlled (and the condition \times baseline hostility interaction included in that analysis). Experimental condition and either the continuous emotional processing or emotional expression score, as well as the condition \times coping interaction, were the independent variables.² Due to missing data for some participants, sample size varied slightly in some analyses.

Analyses revealed no significant main effects of condition on any dependent variable. However, significant interactions of condition with emotional processing, $F(2, 55) = 3.48$, $p = .038$, partial $\eta^2 = .112$, and with emotional expression, $F(2, 55) = 4.66$, $p = .014$, partial $\eta^2 = .145$, emerged on 3-month depressive symptoms. Analyzed using the method of Aiken and West (1991), the

2. In order to ensure that the effects of EP and EE were not simply a result of greater coping attempts in general rather than coping specific to emotional approach, we also conducted analyses using proportional coping scores (i.e., EP and EE divided by sum of reported coping, including problem solving, avoidance, positive reappraisal, turning to religion, acceptance, seeking social support, humor, alcohol/drug disengagement). The pattern of findings was the same.

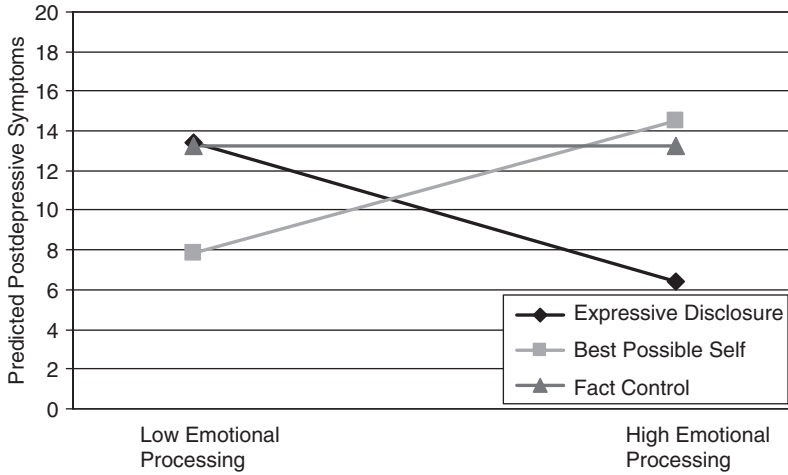


Figure 2

Emotional processing \times condition interaction on prediction of depressive symptoms at 3-month follow-up.

condition \times emotional processing interaction is displayed in Figure 2. For participants high in emotional processing, the EMO condition produced lower levels of depressive symptoms at follow-up, whereas the BPS condition was associated with higher depressive symptoms. By contrast, the BPS condition resulted in lower levels of depressive symptoms compared to the EMO condition for participants low in emotional processing. Predicted depressive symptoms were relatively high for control participants and did not vary as a function of emotional processing. The form of the significant condition \times emotional expression interaction on depressive symptoms was quite similar.

Analyses also revealed a significant emotional processing \times condition interaction in the prediction of health care visits at follow-up, $F(2, 43) = 3.44$, $p = .041$, partial $\eta^2 = .138$. Figure 3 indicates that participants low in emotional processing had fewer health care visits for illness when randomized to the BPS versus the EMO condition. Experimental condition did not appear to affect health care visits for those high in emotional processing.

No significant emotional expression \times condition interaction on health care visits was identified, nor were coping \times condition interactions significant for any other dependent variable. However, for

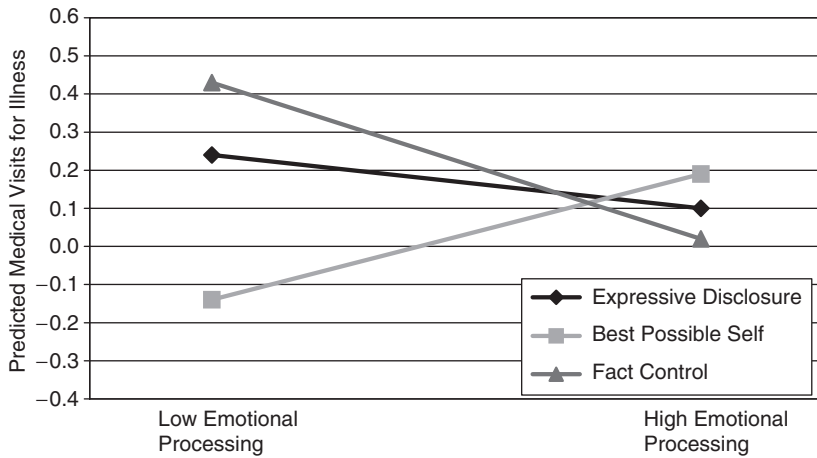


Figure 3
Emotional processing \times condition interaction on prediction of health care visits at 3-month follow-up.

those high in emotional processing and expression, means on these variables were in the direction of enhanced adjustment in the expressive disclosure condition, compared to the BPS and CTL conditions. Table 2 displays 3-month adjusted means from analyses conducted using a median split of 2.75 on EP to indicate high and low emotional processing, for ease of presentation. A similar pattern was obtained for emotional expression.

DISCUSSION

Findings revealed specific effects of emotionally expressive writing on psychological health in a subset of participants. First, EMO produced decreased hostility at 3-month follow-up, compared to both the BPS and control conditions, but only in participants who reported relatively high baseline hostility. The level of hostility reported by the medical students overall in this study at 3-month follow-up was not elevated ($M = 10.8$) compared to normative data in a large sample of college students ($M = 11.2$, $SD = 4.6$; Watson & Clark, 1991). However, in medical students with baseline hostility at least one standard deviation above the mean, hostility in the EMO group decreased at 3 months, whereas hostility increased in the BPS and control groups. This finding is particularly interesting in the context

Table 2
Adjusted Means on Dependent Variables at 3-Month Follow-Up in
High Versus Low Emotional Processors

Dependent Variable	EP	EMO	BPS	CTL
CES-D	High	6.86 (2.58)	14.94 (2.15)	14.14 (2.55)
	Low	13.56 (2.10)	8.04 (2.69)	12.48 (2.42)
PANAS-X Fear	High	9.49 (1.29)	12.56 (1.07)	9.64 (1.31)
	Low	12.42 (1.08)	10.93 (1.37)	12.39 (1.12)
PANAS-X Hostility	High	8.39 (1.23)	11.93 (1.00)	12.52 (1.20)
	Low	9.85 (.99)	11.15 (1.26)	11.46 (1.04)
PANAS-X Guilt	High	8.72 (1.22)	10.83 (1.01)	10.53 (1.21)
	Low	8.83 (1.01)	9.31 (1.28)	10.64 (1.05)
PANAS-X Sadness	High	7.24 (1.25)	10.45 (1.05)	10.86 (1.25)
	Low	9.08 (1.04)	8.40 (1.32)	9.33 (1.08)
Physical Symptoms	High	16.46 (4.81)	19.61 (4.17)	29.98 (4.80)
	Low	22.65 (4.01)	21.58 (5.11)	20.26 (4.16)
Health Care Visits (subset of $n = 50$)	High	.11 (.15)	.15 (.11)	.04 (.15)
	Low	.26 (.13)	.01 (.18)	.39 (.13)

Note. EP = Emotional processing. Means are adjusted for initial values on the dependent variables and for slightly unequal cell sizes. Adjusted means are from analyses conducted using EP at a median split of 2.75 to indicate high and low emotional processing. Standard errors are in parentheses below the means. For high emotional processors, n ranged from 9 to 13 within each experimental condition. For low emotional processors, n ranged from 8 to 13.

of clinical clerkships, in which students must deal with a variety of frustrating situations. Participant essays illustrated these situations, citing sleep deprivation, limited orientation to new environments, lack of communication with superiors in the medical hierarchy, verbal humiliation, and pressure to perform well. This description of a night on call was written by an EMO participant whose level of hostility decreased from 15 at baseline to 10 at 3 months:

When residents and attendings get called they know they are going to a situation that they feel comfortable with (most likely). For a student you know you are going to a situation about which you will know little and be poorly prepared. You don't know what to expect, and nobody else cares. I'm clenching my teeth right now. [The student tries repeatedly to respond to a page from a supervising intern.] So I went back to the . . . floor and lo and behold there was the intern. It was now close to 5:30. All he could say was, "Where have you been! I have been paging you! We have 4 new admissions!" Then he told me to put the new patient's info in the computer. Pause. I don't know what computer, which file, there is no patient information available! So I stumble through the process of finding and putting info on the computer, when I realize that it's 6 AM. I need to be starting to work on my own patients downstairs *now* if I hope to be done by 7 AM for class. Of course the intern came and chewed me out some more and probably gave me a horrible evaluation. Well, I gave him a bad evaluation too. It's just so frustrating to work so hard, have so much stress, do all you can and still get graded down because of instances like this. What am I supposed to do? It's a no-win situation! We have these pins that say "humanism in medicine" that we wear on our white coats. Still, true humanism is sometimes a rare thing in the life of a third-year medical student.

Expressive writing may be one efficient intervention for managing hostility during medical training. This effect of EMO is important in light of a recent report documenting an increase in anger-hostility, as well as increased depressive affect and fatigue, and decreased empathic concern for others during the internship year, which follows clinical clerkships (Bellini et al., 2002). Decreasing hostility is a desirable goal given its potential negative effects on interpersonal relationships and on cardiovascular health (e.g., Brondolo et al., 2003;

Niaura et al., 2002; Smith, Glazer, Ruiz, & Gallo, 2004; Yan et al., 2003). Replication of these findings with more extensive hostility measures and physiological indices used in cardiovascular research is an essential next step in exploring the therapeutic potential of expressive disclosure.

Second, the hypothesis that emotional approach coping would moderate the effects of expressive writing on psychological adjustment was supported for depressive symptoms but not other mood variables. For individuals high in EP or EE, the EMO condition resulted in lower levels of depressive symptoms compared to the BPS and control conditions. These findings have potential clinical relevance because predicted scores on CES-D depressive symptoms in high EP participants randomly assigned to BPS approached 16, a commonly used cutoff suggesting clinical depression (Roberts & Vernon, 1983; Hsu & Marshall, 1987). By contrast, for individuals low in EP or EE, the BPS condition resulted in lower levels of depressive symptoms at 3 months compared to the EMO and control conditions. The following excerpt is from a participant in BPS with a low EE score, whose CES-D level decreased from 23 at baseline to 12 at follow-up. The excerpt illustrates how the BPS condition may serve to enhance self-awareness and clarify goals:

She will be my best friend, and someone I can feel confident in when I share my feelings. I have never been one to open up to others, but I think that's because I haven't found someone that I'm comfortable with yet. . . . The pressures and time constraints of surgery I will handle with incredible ease, waking early and energized with enough vigor to last all day. . . . My patients will have great faith in my skills and consider me someone who has helped their life become more enjoyable—and this will in turn make my own life more enjoyable.

Significant interactions were not observed for other mood variables, but it should be noted that the means for all of these variables were in the direction of enhanced adjustment for high EP and high EE individuals assigned to the EMO condition compared to the BPS and control conditions.

With regard to physical health outcomes, participants low in EP in the BPS condition had fewer medical visits for illness than in the EMO or control conditions. For those high in EP, effects of writing

condition were not evident, but means for self-reported physical symptoms were in the direction of fewer symptoms for high EP individuals assigned to the expressive disclosure condition, compared to all other EP-condition pairings. Main effects of decreased health care visits for both the EMO and BPS conditions observed by King (2001) were not replicated. Medical students may tend to put off obtaining health care because they are too busy, or are concerned about confidentiality, and they may seek informal care from resident physicians (Roberts et al., 2000). These factors could lead to under-reporting of health care needs and utilization. Another possible factor is a “floor effect” on the number of health care visits in this sample, since medical students in general are likely to be physically healthy. Other studies of expressive disclosure, however, have demonstrated decreased health care visits in college students, a population that is also relatively healthy with a low rate of health care utilization (King, 2001; King & Miner, 2000).

What mechanisms might underlie the effectiveness of the EMO and BPS conditions, and why did the experimental conditions have divergent effects as a function of EP/EE? Mechanisms for writing effects have not been definitively established (King, 2002; Lepore, Greenberg, Bruno, & Smyth, 2002; Sloan, 2004), but both emotionally expressive writing and writing about valued goals may promote health by enhancing self-regulation (i.e., “the capacity of a person to effectively pursue goals, to register feedback in that pursuit, and to adjust his or her behavior accordingly,” King, 2002, p. 120). Writing about one’s deepest feelings and thoughts might promote self-regulatory processes through directing attention to central goals and enabling goal clarification and pursuit (e.g., Lepore et al., 2002; Stanton et al., 2000b). Regarding BPS, construction of a competent and successful future self has been associated with greater goal effort and persistence (Ruvulo & Markus, 1992). It also is possible that different writing conditions might have distinct mechanisms. For example, emotional and physiological engagement and habituation might be more relevant to EMO (Low, Stanton, & Danoff-Burg, in press; Sloan, 2004; Sloan & Marx, 2004) than to BPS.

With regard to the divergent condition effects as a function of EP/EE, we return to the importance of person-environment fit. Lazarus and Folkman (1984) argued that coping strategies that are incongruent with one’s values are likely to be used reluctantly and without success. For example, Engebretson et al. (1989)

demonstrated that inducing men to use their preferred (vs. nonpreferred) mode of anger expression led to significant reductions in cardiovascular reactivity. In our study, congruence between naturally elected and experimentally imposed ways of approaching stressors related to medical training appeared to facilitate adjustment to the clinical clerkship. Certainly, mechanisms for the effects of specific forms of expressive writing in individuals with particular attributes require study.

Limitations of this experiment include reliance on self-report for measures of psychological health. Measures used to evaluate these variables, however, have documented reliability and validity. Generalizability of the results is limited by the nature of the study sample. White students were somewhat overrepresented, and medical students tend to be a highly educated, highly motivated group likely to have more uniform goals and educational experience than samples of more diverse groups. Another limitation was insufficient power to detect small to medium-sized effects, although the sample size of approximately 20 participants per condition used in most writing experiments (Smyth, 1998) was met. Because medium to large effect sizes were required for significance in this study, replication with a larger sample might identify a greater number of significant writing condition effects. Larger sample size would also enhance the evaluation of moderator effects.

In summary, this study demonstrated significant and specific benefits of the writing paradigm, including reduction of hostility through expressive writing in those with higher baseline hostility and moderation of the effects of writing instructions on depressive symptoms and physical health by level of emotional approach coping. Certainly, the finding that one's preexisting coping approach and mood might moderate the utility of expressive writing is a potentially important finding as experimental writing protocols are translated into clinical intervention strategies (Smyth & Catley, 2002). Additional studies with larger samples in different stressful contexts are needed to further explore the role of emotional approach coping as a potential moderator of writing benefits.

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