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Two studies tested the hypothesis that coping through emotional approach, which involves actively processing and expressing emotions surrounding cancer, is influential in enhancing psychological adjustment and health status for breast cancer patients. The longitudinal, naturalistic study (Study 1) included 92 Stage I or II breast cancer patients who completed instruments within 20 weeks following primary treatment and three months later. Findings reveal that participants who, at study entry, coped through expressing emotions surrounding cancer had fewer medical appointments for cancer-related morbidities during the subsequent three months, reported better physical health and more vigor, and reported lower distress than those lower in emotional expression, with age and initial level of psychological adjustment controlled statistically. In Study 2, an independent sample of 53 breast cancer patients, recruited within 20 weeks following primary treatment, were assigned randomly to one of three conditions, each of which involved a writing task conducted over four sessions: emotional expression (EMO), positive focus (POS), and fact control (CTL). At three-month follow-up, the conditions did not differ significantly on psychological adjustment. However, the EMO and POS participants experienced fewer negative physical symptoms and had fewer medical appointments for cancer-related morbidities than did CTL participants.

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Annette A. Santos 3/5/99

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Table of Contents

Item	Page
Front Cover	1
SF 298 Documentation Page	2
Foreword	3
Table of Contents	4
Introduction	5 - 6
Body	7 - 19
Conclusions	20
References	21-23
Bibliography	24

Introduction

When confronting a cancer diagnosis, one is likely to initiate a number of strategies designed to manage the associated demands (1). These may be broadly classified as coping efforts directed toward approaching versus avoiding the stressor (2,3). A substantial body of research suggests that strategies aimed at actively approaching the stressor are useful in facilitating psychological adjustment, whereas those directed toward avoidance are detrimental to functioning, particularly when the stressor is severe (2,4,5). The two funded studies focus on the utility of an approach coping strategy that appears particularly promising: coping through actively processing and expressing emotion, deemed emotional approach coping.

Three lines of evidence suggest that emotional approach coping may be useful in enhancing adjustment to a breast cancer diagnosis. First, randomized, controlled studies, in which one intervention component is the facilitation of emotional expression, provide evidence that these interventions can enhance psychological adjustment (6-8), improve immune function (9), and promote longer survival (10,11) in groups with cancers such as metastatic breast cancer and malignant melanoma. Second, including the investigator's work (4,12), longitudinal studies of adjustment to breast cancer, in which initial levels of distress are controlled statistically, indicate that coping through cognitive and behavioral avoidance is detrimental to adjustment (4,13), and perhaps to health status (14). Given these findings, one would expect that the opposing strategy of actively approaching the stressor through processing and expressing emotion would be beneficial. However, studies with breast cancer patients have not used adequate measures of emotional approach coping. Third, experimental investigations provide the most convincing evidence to date that emotional processing and expression are causally related to positive outcomes. A series of studies by Pennebaker and colleagues (15-20), as well as investigations conducted in other labs (21,22), have revealed that writing or talking about intensely personal experiences can enhance physical and psychological health, as well as important behavioral outcomes.

Furthering the investigator's long-range goal to facilitate adjustment and health-related quality of life for those who confront a cancer diagnosis, the primary aim of the two studies is to provide both a longitudinal and an experimental test of the general hypothesis that coping through emotional approach is useful in enhancing the psychological and physical well-being of women with breast cancer. Primary hypotheses of the two studies include:

Hypothesis 1. In a longitudinal study (Study 1), greater use of self-reported emotional approach coping by breast cancer patients will predict enhanced psychological adjustment and health status, when initial levels of adjustment and health are controlled statistically.

Hypothesis 2. In an experimental study (Study 2), compared with breast cancer patients randomly assigned to conditions in which they are instructed to write about their positive thoughts and feelings regarding breast cancer (Positive Focus) or the facts regarding their cancer and its treatment (Fact Control), patients instructed to write about their "deepest thoughts and feelings" regarding their experience with cancer (Emotional Approach) will evidence more positive adjustment. Based upon findings from the extant literature, positive effects are expected to include:

a. lower mean autonomic arousal (i.e., electrodermal activity) and decreasing arousal

across the four-day writing period.

b. more negative affect across the writing period, but more positive emotion at one-week, one-month, and three-month follow-ups.

c. report of greater quality of life at one month and three months.

d. enhanced health status at one month and three months, as evidenced by fewer self-reported negative somatic symptoms and by fewer doctor visits for ill health, as confirmed by medical records.

BODY

Study 1

Method

Participants

A sample of 92 women diagnosed with Stage I or II breast cancer participated in Study 1, with a mean age of 52 years (range 28-76 years) and educational level of 15 years (range 9-22 years). Eight-seven percent of the participants were white (7% African American; 3% Latina; 1% Asian American; 1% Native American), 69% were employed outside the home, and 78% were married. Average number of weeks since diagnosis was 28 (range 8-53 weeks). Mastectomy was received by 39%, breast conservation by 48%, and both surgical procedures by 13%. Sixty percent of the sample had received chemotherapy, 58% had received radiotherapy, 16% had undergone reconstructive surgery, and 45% were taking tamoxifen at the time of the study. Twenty-nine percent had attended a support group and 28% had consulted a mental health professional regarding breast cancer at least once at the point of study entry.

In addition to the final sample of 92 women, 16 others were introduced to the study but declined participation, 5 consented but did not complete the initial questionnaire packet, and 9 completed the first but not the second assessment. Analyses were conducted only on the data of participants who completed both assessments ($n = 92$), representing an 82% participation rate.

Procedure

Women treated at several participating medical sites who were within 20 weeks after completion of primary treatment were introduced to the study by research staff or medical personnel. The University of Kansas Medical Center, which serves the metropolitan Kansas City area as well as rural Kansas and Missouri, was the primary site. After providing informed consent, patients completed measures of coping strategies and psychological adjustment at study entry and again three months later, which they returned by mail. Participants were compensated $40 for their time.

Measures

Coping processes. Coping processes were assessed with the COPE (23), a 60-item inventory tapping 15 coping strategies. Participants completed the COPE with reference to their experience with breast cancer. Participants rated items on a response scale of 1 ("I don't do this at all") to 4 ("I do this a lot"). The COPE has demonstrated adequate psychometric properties (23) and predictive validity in our own (12) and others' (5) studies of breast cancer patients. In this study, five scales evidencing adequate internal consistency (coefficient alpha $\geq .77$) and demonstrated to predict adjustment to breast cancer in previous research (5, 12) were used: Acceptance (e.g., "I accept the reality of the fact that it happened"), Spiritual Coping (e.g., "I put my trust in God or my spiritual beliefs."), Problem-focused Coping (composite of Active Coping and Planning subscales; e.g., "I make a plan of action."), Seeking Social Support (composite of Seeking Social Support for Instrumental Reasons and Seeking Social Support for Emotional Reasons subscales; e.g., "I get emotional support from others"), Positive Reappraisal (e.g., "I learn something from the experience."), and Avoidance (composite of Mental Disengagement, Behavioral Disengagement, and Denial subscales; e.g., "I say to myself 'this isn't real'.").

Because we have found that the COPE's Focus on and Vent Emotions subscale is contaminated with distress-laden content (24), we substituted our Emotional Approach Coping scales (25). These two scales, Emotional Processing ("I try to understand my feelings.") and Emotional Expression (e.g., "I feel free to express my emotions."), demonstrate sound internal consistency and predictive validity (25). In this study, the coefficient alpha estimate of internal consistency reliability was .80 for Emotional Processing and .93 for Emotional Expression.

Quality of life. The Functional Assessment of Cancer Treatment (FACT; 26) was included as a measure of health-related quality of life. This measure, which assesses perceived life quality in physical, social, relationship with doctors, emotional, and functional domains, possesses adequate psychometric properties. The items are rated on a five-point scale (0 = not at all; 4 = very much). A mean score on the 28 items were used to indicate health-related quality of life. This measure was administered at study entry and one- and three-month follow-up assessments.

Positive and negative affect. The Profile of Mood States (POMS; 27) is a measure of negative and positive affect frequently used in studies of cancer patients. Participants were instructed to complete the measure with regard to their feelings in the past week. As we have in other studies (4, 28), we constructed a distress index by summing items on the Anger, Depression, Tension, Fatigue, and Confusion subscales. The Vigor subscale was used to indicate positive emotions.

Self-reported health status. Participants completed a one-item index of perceived health (1 = excellent; 5 = poor), which has been demonstrated to be associated with all-cause morbidity and mortality (29, 30).

Medical care utilization. Patients prospectively recorded medical visits during the period from study entry through the subsequent three months. They also recorded the medical provider and reason for each visit (e.g., check-up with medical oncologist). A subset of these reports was confirmed through medical records, with patients' consent. Rate of agreement of patients' reports and medical records was 88%, lending confidence to the accuracy of patients' reports. Medical appointments were coded into cancer-related scheduled medical check-ups, medical appointments for cancer-related problems (e.g., edema, breast symptoms, possible recurrence), other scheduled medical check-ups, and medical appointments for other problems (e.g., flu symptoms). Scheduled appointments for breast reconstruction follow-up were coded separately and not included in analyses. We were interested in medical appointments for cancer-related problems (excluding scheduled check-ups) as an indicator of morbidity associated with breast cancer and its treatment.

Results

Preliminary analyses were conducted to select demographic (i.e., age, education, ethnicity, employment status, marital status) and cancer-related (i.e., diagnosis duration, types of treatment, attendance at psychological support services) covariates for use in primary analyses. Of these variables, only age was associated significantly with POMS psychological distress, $r = -.22$, $p < .05$, with younger women reporting more distress. Age was controlled in all subsequent analyses. Sample size varied somewhat in each analysis, owing to missing data on particular scales for some participants.

Multiple regression analyses, with age and initial values on the dependent variables as

the covariates (with the exception of medical visits, for which no initial value was relevant). Table 1 displays results of the regression analyses. Participants' greater use of coping through emotional expression was associated with better self-perceived health status and vigor, lower psychological distress, and fewer medical appointments for cancer-related problems (e.g., edema, assessment of recurrence) over the subsequent three months.[1] Only FACT quality of life, which was very stable across the three-month period, was not predicted significantly by emotional expression. These relations held even when initial values on the dependent variables, age, and other coping strategies were controlled statistically. To illustrate, when we compared the highest and lowest quartiles of scorers on emotional expression, expressive copers had an average of .36 medical visits in the three-month window, whereas women low on emotionally expressive coping had 1.64 medical visits for cancer-related problems.

Contrary to hypothesis, women who coped through emotional processing at study entry became more distressed over time, and emotional processing was associated significantly with no other dependent variable. Other coping strategies that demonstrated unique associations with the dependent variables were avoidance-oriented coping, spiritual coping, and acceptance. Avoidant copers became more distressed and evidenced less positive emotion across time. Participants high on acceptance reported enhanced quality of life over time. Those who used spiritual coping became less distressed over time. However, they also had a greater number of medical visits for cancer-related problems, as did those who coped through acceptance.

Table 1
Multiple Regression Analyses Predicting Three-Month Psychological and Physical Health Outcomes from Coping Processes at Study Entry

Predictors	Perceived Poor Health	Cancer-Related Medical Appts.	POMS Distress	POMS Vigor	FACT Quality of Life
DV at Study Entry	.62***	----	.50***	.53***	.78***
Age	-.07	-.29*	.05	.09	.11
Emotional Processing	.14	-.04	.31*	-.13	-.22
Emotional Expression	-.24*	-.25*	-.27*	.26*	.16
Seeking Social Support	-.03	.00	.01	-.09	.09
Avoidance	.15	.18	.25*	-.32*	-.14
Spiritual Coping	.15	.29*	-.30*	.17	.15
Acceptance	-.07	.27*	.04	-.16	.26*
Prb.-Focused Coping	.00	.19	-.09	.19	.02
Positive Reappraisal	-.11	-.14	.12	.07	.00
F	8.79***	2.77**	8.78***	9.16***	28.22***
R^2	.59	.25	.57	.56	.78

Note. POMS = Profile of Mood States. FACT = Functional Assessment of Cancer Therapy. DV = dependent variable. The r displayed is the partial r, representing the relation of the predictor and the dependent variable, controlling for all other predictors in the set.
*$p < .05$. **$p < .01$. ***$p < .0001$.

Study 2

Method

Participants

An independent sample of 53 women diagnosed with Stage I or II breast cancer participated in Study 2, with a mean age of 49 years (range 21-76 years) and educational level of 15 years (range 12-21 years). Eight-seven percent of the participants were white (11% African American; 2% Asian American), 69% were employed outside the home, and 77% were married. Average number of weeks since diagnosis was 27 (range 12-45 weeks). Mastectomy was received by 33%, breast conservation by 63%, and both surgical procedures by 4%. Seventy-four percent of the sample had received chemotherapy, 64% had received radiotherapy, 17% had undergone reconstructive surgery, and 50% were taking tamoxifen at the time of the study. Forty-four percent had attended a support group and 13% had consulted a mental health professional regarding breast cancer at least once at the point of study entry.

In addition to the 53 participants that composed the sample for analyses, 12 women began the study but did not complete it: two declined the study upon recruitment; four consented to the study, but did not complete the baseline questionnaire; five completed the baseline questionnaire only; and one declined further participation after completing one CTL writing session. Thus, the final sample represents an 82% participation rate.

Procedure

Women treated at several participating sites who were within 20 weeks after completion of primary treatment were introduced to the study by research staff or medical personnel. The University of Kansas Medical Center was the primary site. After providing informed consent, patients were given a baseline questionnaire packet, which they returned by mail or at the time of their first writing session. Each patient was randomized to one of three conditions, all of which involved a writing task, with instructions to write about her: (1) "deepest thoughts and feelings" regarding her experience with breast cancer (EMO). Standard instructions from Pennebaker were used (e.g., 15; Pennebaker performed consultation as specified in Statement of Work); (2) positive thoughts and feelings regarding her experience with breast cancer (POS); (3) facts regarding her cancer and its treatment (fact control condition; CTL). Researchers conducted individual sessions in patients' homes or the investigator's lab. Patients engaged in the 20-minute writing task over four sessions during which physiological arousal (heart rate, skin conductance) was monitored. The four writing sessions occurred within a three-week period for each participant. Before and after each writing session, patients completed measures of somatic symptoms and positive and negative affect. One week, one month, and three months after completion of the experiment, participants also completed measures of quality of life, positive affect, negative affect, and somatic symptoms. At their final writing session, participants also were given a form on which to record any medical visits over the subsequent three months, which they returned at the three-month assessment. Participants returned all follow-up questionnaire packets by mail. Each participant was compensated $100 for her time.

Measures

Quality of life. The Functional Assessment of Cancer Treatment (FACT; 26) was included as a measure of health-related quality of life. This measure, which assesses

perceived life quality in physical, social, relationship with doctors, emotional, and functional domains, possesses adequate psychometric properties (26). The items are rated on a five-point scale (0 = not at all; 4 = very much). A mean score on the 28 items were used to indicate health-related quality of life. This measure was administered at study entry and one- and three-month follow-up assessments.

Positive and negative affect. The Profile of Mood States (27) is a measure of negative and positive affect frequently used in studies of cancer patients. Patients completed this measure at baseline, prior to and after each writing session, and at one-week, one-month, and three-month follow-up assessments. They were instructed to complete the measure with regard to their feelings in the past week at every assessment except the writing sessions, at which they referred to their emotions at the present moment.

Somatic symptoms. On measures developed by Pennebaker (31), self-reported negative somatic symptoms were assessed. At baseline and one-month and three-month follow-ups, patients reported the number of days in the past month on which they had experienced each of nine symptoms (e.g., "coughing/sore throat"), and an average score was calculated. Prior to and after each writing session, as well as at one week, patients reported the extent to which (1 not at all; 7 = a great deal) they were experiencing each of eight physical symptoms indicating physiological arousal (e.g., "racing heart," "sweaty hands") at the present moment (or during the past week, in the case of the one-week assessment). An average score was computed on this scale.

Medical care utilization. Patients prospectively recorded medical visits during the period from the last writing session through the subsequent three months. They also recorded the medical provider and reason for each visit (e.g., check-up with medical oncologist). A subset of these reports was confirmed through medical records, with patients' consent. Rate of agreement of patients' reports and medical records was 92%, lending confidence to the accuracy of patients' reports. Medical appointments were coded into cancer-related scheduled medical check-ups, medical appointments for cancer-related problems (e.g., edema, breast symptoms, possible recurrence), other scheduled medical check-ups, and medical appointments for other problems (e.g., flu symptoms). Scheduled appointments for breast reconstruction follow-up were coded separately and not included in analyses. We were interested in medical appointments for cancer-related problems (excluding scheduled check-ups) as an indicator of morbidity associated with breast cancer and its treatment.

Manipulation check and essay ratings. After each writing session, participants rated how personal their essays were, how much they revealed emotions in their essays, and how much writing increased understanding of their experience on 7-point scales (1 = not at all; 7 = a great deal/extremely). At the one- and three-month follow-ups, participants rated how valuable the experiment was to them and how much they expected their participation to have long-lasting positive and negative effects, also on 7-point response scales. Preliminary analyses indicated that neither scores over the four sessions nor scores from follow-up questionnaires differed significantly across time. Accordingly, means across sessions and across follow-ups were calculated for each variable. In addition, an independent judge, unaware of condition membership, judged whether the set of essays for each participant conformed to condition instructions.

Results

Preliminary analyses conducted on all variables at baseline revealed no significant differences among the experimental conditions on any demographic, cancer-related, or dependent variable, indicating that randomization was successful. Results are reported in three sections: analyses on manipulation check and essay ratings; analyses on dependent variables across the writing sessions and at one-week follow-up; analyses on dependent variables at one-month and three-month follow-up. In all analyses, experimental condition (EMO = deepest thoughts and feelings, $n = 20$; POS = positive focus, $n = 18$; CTL = breast cancer facts control, $n = 15$) was the independent variable. A recently conducted meta-analysis (32) suggests that this sample size is sufficient, given the effect size typically obtained in research using the Pennebaker methodology. Sample size varied somewhat in each analysis, owing to missing data on particular scales for some participants.

Manipulation Check and Essay Ratings

We expected the EMO and POS conditions to engender more positive ratings of the writing task than the CTL condition. A multivariate analysis of variance (MANOVA) conducted on the three essay ratings (i.e., personal, revealing, increase understanding), each averaged across sessions, was significant, Wilks' Lambda $F(6,96) = 3.67$, $p < .005$. As displayed in Table 2, follow-up univariate analyses revealed no significant between-group differences in participants' ratings of how personal their essays were, a finding that is not surprising in light of the fact that all participants were writing about details of their experience with cancer. As expected, both EMO and POS condition participants rated their essays as significantly more revealing of their emotions, compared with CTL participants. POS participants also rated their essays as increasing understanding of their experience significantly more than CTL participants. EMO participants differed significantly from neither group on this question.

A MANOVA conducted on the two ratings of perceptions of value and long-lasting positive effects of the writing task averaged across one- and three-month follow-ups was significant, $F(4, 98) = 4.78$, $p < .05$. Table 2 demonstrates that POS participants rated the experiment as more valuable and as having more long-lasting positive effects than did CTL participants, with EMO participants' ratings falling between the two groups. Shown in Table 2, an analysis of variance conducted on the rating of long-lasting negative effects was not significant and indicated that the groups did not expect enduring negative effects from their participation ($M < 2.5$ on a 7-point scale).

The independent judge's determination of the condition assignment of each participant, based on a reading of the participant's essay set, was correct in every case, providing another indication that participants completed the task as directed.

Analyses on Affect and Somatic Symptoms during the Writing Task and at One Week

Analyses of covariance, controlling for pre-essay initial values on the dependent variables, were performed on the post-essay physical symptom scale and on the POMS distress and vigor scales for each writing session. EMO participants reported decreased physical symptoms after writing, compared with CTL participants. These differences were significant for Writing Session 1, $F(2,49) = 3.76$, $p < .05$, (adjusted EMO $M = 1.12$; POS $M = 1.17$; CTL $M = 1.34$), and Session 4, $F(2,49) = 3.75$, $p < .05$, (adjusted EMO $M = 1.07$; POS $M = 1.10$; CTL $M = 1.20$). Post-essay physical symptoms scores of the POS condition fell

between the other two groups, and differed significantly from neither. At one-week follow-up, the groups differed significantly on physical symptoms, controlling for baseline physical symptoms, $F(2, 44) = 5.58$, $p < .01$. In contrast to findings during the writing sessions, the EMO group (adjusted $M = 1.66$) reported significantly increased physical symptoms as compared with the POS ($M = 1.20$) and CTL ($M = 1.32$) groups, which did not differ from each other.

As hypothesized, POMS distress scores revealed significant post-essay between-groups differences, but only for Writing Session 3, $F(2, 49) = 4.41$, $p < .05$. EMO (adjusted $M = 14.75$) and CTL ($M = 13.85$) participants reported significantly increased distress after writing, compared with POS ($M = 9.46$) participants. The groups did not differ significantly on POMS distress at the one-week follow-up, controlling for baseline distress. POMS vigor scores did not yield significant between-groups differences at any writing session or at one week. Examination of the means on POMS vigor revealed that all groups reported high levels of vigor.

Analyses of One-Month and Three-Month Follow-Up Data

Analyses of covariance were conducted on POMS distress and vigor and FACT Quality of Life scores at one- and three-month assessments, controlling for baseline values on the dependent variables. As displayed in Table 3, quality of life and affect ratings were depressed for the EMO group at one month, as compared to the POS group (and the CTL group for quality of life). That is, EMO participants reported decreased quality of life, decreased vigor, and increased distress compared with women who wrote about positive consequences of their experience. However, at the three-month assessment, the groups did not differ significantly on affect and quality of life.

With regard to health-related outcomes, the groups did not differ on self-reported physical symptoms at one month (see Table 3). However, physical symptoms yielded a significant effect of experimental condition at three months. The CTL group reported significantly increased physical symptoms, compared with the EMO and POS groups. A significant effect for experimental condition also emerged on the prospectively recorded medical appointments for cancer-related morbidities.[1] EMO and POS participants had significantly fewer medical appointments for cancer-related problems than did the CTL participants during the three months following study completion.

Table 2
Analyses of Variance on Essay Ratings across the Four Writing Sessions and at One-Month and Three-Month Follow-Up

Dependent Variable	F	EMO	POS	CTL
Essay Was Personal	0.66	5.74_a	5.65_a	5.18_a
Revealed Emotions in Essay	4.18*	5.40_a	5.44_a	4.08_b
Essay Increased Understanding	5.12**	3.35_{ab}	4.24_a	2.50_b
Project Valuable/Meaningful	4.53*	4.38_{ab}	5.01_a	3.36_b
Project Had Positive Long-Lasting Effects	3.35*	3.13_{ab}	3.63_a	2.32_b
Project Had Negative Effects	0.26	2.44_a	2.31_a	2.21_a

Note. df = 2,50. EMO = Emotion Expression condition. POS = Positive Focus condition. CTL = Fact Control condition.
*$p < .05$. **$p < .01$.

Table 3
Analyses of Psychological and Health-Related Outcomes at the One-Month and Three-Month Follow-Up Assessments

Dependent Variable	F	EMO	POS	CTL
One-Month FACT Quality of Life	3.82*	3.11_a	3.38_b	3.45_b
One-Month POMS Distress	3.48*	32.63_a	14.03_b	22.30_{ab}
One-Month POMS Vigor	2.35	15.93_a	20.28_b	17.79_{ab}
One-Month Physical Symptoms	2.63	3.44_a	2.20_a	2.19_a
Three-Month FACT Quality of Life	0.53	3.29_a	3.36_a	3.41_a
Three-Month POMS Distress	1.27	27.13_a	16.10_a	20.35_a
Three-Month POMS Vigor	1.79	17.43_a	20.39_a	19.23_a
Three-Month Physical Symptoms	3.49*	2.06_a	2.09_a	3.43_b
Three-Month Medical Appointments for Cancer-Related Morbidities	6.60**	0.27_a	1.06_a	2.67_b

Note. df = 2,46 at one month and 2,44 at three months, except for medical appointments, for which df = 2,47. EMO = Emotion Expression condition. POS = Positive Focus condition. CTL = Fact Control condition. Means are adjusted for the covariate and slightly unequal cell sizes, except for medical appointments, for which there was no covariate.
*$p < .05$. **$p < .005$.

Discussion

Consistent with hypotheses, findings for Study 1 reveal that women's use of coping through emotional expression following primary treatment for breast cancer is associated with less distress, greater vigor, better self-perceived health status, and fewer medical appointments for morbidities related to cancer and its treatment over the course of three months, controlling for age and initial status on the dependent variables. As hypothesized, coping through emotional expression was a unique predictor of the dependent variables, over and above the contribution of other coping strategies. By contrast, women who coped through emotional processing became more distressed over time, and processing was related to no other dependent variable. To interpret this result, recall that women entered the study following completion of medical treatment. Perhaps active engagement in the attempt to understand one's emotions that continues from the time of diagnosis through treatment termination reflects a cognitive rumination process, which has been demonstrated to exacerbate distress (33). Thus, there may be a point at which prolonged coping through emotional processing becomes counterproductive. This hypothesis requires longitudinal test from the point of cancer diagnosis, during which emotional processing may be more useful. On the other hand, feeling free to express one's emotions appears adaptive following termination of primary medical treatment for breast cancer. These promising data suggest that coping through emotional expression in recently diagnosed women facilitates psychological adjustment and reduces medical care utilization for cancer-related morbidity over time. Findings from Study 1 warranted an experimental test of emotional approach coping, which was the goal of Study 2.

Findings from Study 2 support the hypothesis that promoting expression of the full range of thoughts and feelings in breast cancer patients promotes enhanced adjustment, at least with regard to experienced physical symptoms and cancer- and treatment-related morbidities. The EMO condition actually produced temporary disruption of mood and life quality at one month after study completion, compared to the POS condition. However, this disruption had remitted by three months. Such temporary mood disruption also has been demonstrated in other studies of expressive writing (32). Counterbalancing this temporary effect is more enduring benefit with regard to physical health outcomes. At three months, women who expressed their emotions through writing reported fewer negative physical symptoms and had fewer medical appointments for cancer-related problems than did control participants. Women who wrote about the positive consequences of their experience fell between the other two groups on these variables, and their scores also differed significantly from CTL participants.

We did not expect the POS condition to yield benefits equivalent to the EMO manipulation, owing to the likelihood that POS participants might experience some untoward consequences of emotional suppression (34). However, the POS condition yielded equivalent perceived value, better short-term mood enhancement, and equivalent longer-term psychological and physical health outcomes, when compared with the EMO condition. These findings are consistent with recent studies of Pennebaker (35) revealing that participants' use of positive emotion words in essays is associated with health benefits in studies in which participants are induced to write about their deepest thoughts and feelings. To the researcher's knowledge, the present study is the first to include a positive focus condition in

the Pennebaker methodology. Written comments from participants suggest that POS participants were not experiencing suppression of negative emotion. Indeed, several noted that they were initially surprised and then pleased at being requested to write about positive consequences, given that they had been more likely to express negative emotions up until study entry. The POS experimental manipulation may not have shut down the expression of negative feelings, but rather encouraged a more balanced emotional evaluation of both the positive and negative aspects of women's experience with breast cancer. Certainly, the obtained benefits of the POS condition might be dependent on the timing of the study in the trajectory of the breast cancer experience. An instruction to focus on the positive very shortly after diagnosis or in the midst of treatment might have been much more difficult for women to perform effectively and might have induced more pronounced emotional suppression, yielding more negative outcomes. The most appropriate point at which to encourage women to consider positive consequences of what typically is viewed as a stressful or traumatic experience requires study.

Integrating the findings of both studies, one might note the discrepancy in psychological outcomes of emotional approach coping between the two investigations, with Study 1 evidencing more positive effects than Study 2. Perhaps this discrepancy reflects differential effects of naturally elected versus induced emotional approach coping. Women who are expressive copers may be effective in their election of outlets and times for emotional expression, yielding greater resolution of feelings and use of emotions to guide goal pursuits (36). They also may have more supportive environments for emotional expression than do women low on emotional expression. Induced emotional approach coping may be performed less effectively or may yield a less stable sense of resolution, at least for those who are not expressive copers in their natural environments. It should be noted that EMO participants did not evidence significant long-term mood decrement, but rather that they did not evidence the relative *benefits* of emotional approach on psychological outcomes that one might expect in light of findings from Study 1.

Findings from the two investigations are consistent in suggesting the benefits of emotional approach coping on physical health. Emotional expression predicted enhanced self-perceived health (Study 1) and decreased physical symptoms (Study 2) over time, even when initial values on the dependent variables were controlled. Even more striking were the findings regarding medical care utilization. Coping through emotional expression, whether naturally elected or induced, produced fewer medical appointments for cancer-related problems. The mechanisms by which emotional expression produces health benefit require empirical test.

Several limitations of the research and difficulties in accomplishing the tasks should be noted. First, assessments of coping in Study 1 and adjustment indices in both studies primarily relied on participants' self-report. The self-report measures administered do represent psychometrically sound and empirically validated instruments, and a subset of self-reported medical appointments were checked against medical records to ensure their accuracy. Further, an independent judge confirmed the experimental condition membership of participants in Study 2, and participant ratings of writing session content also were consistent with expectation. Nonetheless, future research is needed that evaluates behavioral and other indices of emotionally expressive coping. Two problems in accomplishing the tasks

of the present Study 2 as originally proposed are relevant in this regard. First, heart rate and skin conductance data were collected via computer during each of the four writing sessions to assess emotional arousal and emotional processing (e.g., habituation over the four sessions). As mentioned in my letter explaining the delay in the final report, for which an extension was granted through March 31, 1999, my computer hard drive crashed in late September, 1998. I lost over 50% of the data from Study 2. I have since re-entered the self-report and medical visit data, which were central to the hypotheses for the two studies. However, although we have been able to retrieve the physiological data, we have been unable to retrieve the necessary accompanying participant identifying information from the drive. Another computer expert currently is working on this problem, and we hope ultimately to retrieve complete physiological data. A second problem resulted from losing over 50% of the typed transcripts from the writing sessions in that hard drive crash. These were not recoverable, and I am re-entering the transcripts. This will enable analysis of the transcripts through a linguistic analysis computer program developed by Pennebaker. Although not central to the hypotheses, the physiological data and text analysis will strengthen the findings of Study 2, and I certainly will be happy to report any resultant findings to the USAMRMC.

A second limitation regards generalizability of the findings. Because these are the first investigations to use this measure of emotional approach coping and the methodology of Pennebaker to induce emotional approach coping experimentally with a sample of cancer patients, we must limit generalizability to women with early stage breast cancers and to the period after termination of primary medical treatments. Applicability of the findings to men, people with other cancers, women with metastatic disease, and cancer patients at other points in the treatment trajectory will require further study, as will extension of the findings to longer-term psychological adjustment and cancer morbidity and mortality.

A final limitation regards understanding the mechanisms for and the moderators of the obtained effects. The two studies support the promise of coping through emotional expression in enhancing psychological and physical health for breast cancer patients. Precisely *how* and *for whom* emotional approach coping confers maximal benefit warrants examination. I attained the sample size necessary for testing the hypotheses in both studies. (Note that I revised the sample size necessary for Study 2 after a meta-analysis of the Pennebaker methodology was published (32) suggesting that a somewhat smaller sample was adequate to attain desired statistical power.) However, the obtained sample size for Study 2 does not allow for testing mediational and moderated relationships. I am in the process of increasing the sample size by approximately 10 participants (using internal funding) in order to allow for a preliminary test of naturally elected emotional approach coping as a mediator or moderator of the relations between the experimental manipulation and the dependent variables. Such investigation will provide more specific guidance regarding to whom and how to direct psychosocial interventions designed to enhance successful emotional approach coping.

Footnote

[1]As expected, emotional expression did not predict scheduled check-ups for cancer treatment or medical appointments not related to cancer.

Conclusions

Taken together, findings from this longitudinal, naturalistic study (Study 1) and this randomized, controlled experimental design (Study 2) support the hypothesis that coping through emotional expression enhances psychological adjustment and health status for women who recently have completed primary medical treatments for breast cancer. Specifically, in Study 1, which involved 92 Stage I and II breast cancer patients followed over a three-month period, women who coped through expressing emotions at study entry had fewer medical appointments for cancer-related morbidities, reported better physical health and more vigor, and reported lower distress over the subsequent three months than did participants low in the use of emotional expression, controlling for age and initial status on dependent variables. In Study 2, women were assigned randomly to write over four sessions about their deepest thoughts and feelings about their experience with breast cancer (EMO), positive consequences of their experience (POS), or the facts of their cancer experience (CTL). At the three-month assessment, experimental conditions did not differ on psychological adjustment. However, EMO and POS condition participants reported fewer negative physical symptoms and had fewer medical appointments for cancer-related morbidities than did CTL participants.

Limitations of the findings include their primary reliance on participant self-report, generalizability limited to early-stage breast cancer patients who recently have completed medical treatment, and the need for specification of mechanisms and moderators of the obtained effects. Notwithstanding these limitations, the findings suggest that an effective ingredient of positive adjustment and health maintenance following a breast cancer diagnosis is the ability to express emotions surrounding one's experience in a supportive context, as well as to consider the benefits accrued from the experience. The benefits of coping through emotional expression regarding one's experience with cancer are apparent even several months following diagnosis. These findings imply that coping skills training designed to facilitate emotional expression and benefit-finding is likely to bolster adjustment and health status for women confronting breast cancer. Not only may benefits accrue for the breast cancer patient herself, but also such psychosocial interventions may promote more efficient medical care utilization by breast cancer patients.

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