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Predictors of Cancer Progression in Young Adult Men and Women: Avoidance, Intrusive Thoughts, and Psychological Symptoms

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Psychological symptoms, avoidance, and intrusive thoughts were examined prospectively as predictors of cancer progression over a period of 1 year. Sixty-six male and female cancer patients who differed in their diagnoses and initial disease-severity ratings participated. Measures of psychological factors, disease severity, and type of treatment were obtained near time of diagnosis and disease status (no cancer, continued or recurrent cancer, or deceased) 1 year later. Cross-sectional analyses near the time of diagnosis showed that initial psychological variables were intercorrelated with one another but unrelated to initial disease prognosis. Longitudinal findings revealed that, after controlling for initial disease parameters and age, avoidance predicted disease status 1 year later; however, neither psychological symptoms nor intrusive thoughts and emotions accounted for additional variance in disease outcomes.

Key words: cancer, avoidance, intrusive thoughts, disease progression

This year over one million Americans will be diagnosed with cancer. Of this group, approximately 450,000 will be alive in 5 years (American Cancer Society, 1992). Whereas initial disease severity is likely to influence course of cancer and ultimate survival most prominently, it is widely suggested and debated that secondary psychological factors also affect cancer progression. Overcoming cancer through mind over body has been promoted by the media and authors of popular books (e.g., Cousins, 1989; Siegel, 1986). However, health research has lagged behind in this line of inquiry. Available empirical evidence describing the relationship between psychological factors and disease progression in cancer patients is mixed (for a review, see Levenson & Bemis, 1990) and generalizations from this research are complicated by the use of varied designs and the measurement of different variables across studies.

Investigators looking at the relationship between psychological factors and cancer progression can be guided by emerging models of psychological stress, emotions, and disease (for reviews see Andersen, Kiecolt-Glaser, & Glaser, 1994; Herbert & Cohen, 1993; O'Leary, 1990; Weisse, 1992). A premise of these models is that exposure to acute or chronic psychological stress triggers emotional, cognitive, behavioral, and biological processes that lead to increased vulnerability to disease. Disruptions in the body's immune system are hypothesized to be an important pathway through which psychological factors affect health (O'Leary, 1990). Intense affect may alter the immune system's level of functioning, resulting in increased susceptibility to disease (Herbert & Cohen, 1993). Psychological factors such as stress may also affect health by disrupting certain health practices such as adherence and compliance (Andersen et al., 1994; Cohen & Williamson, 1991).

Several studies have found no relationship between psychological factors and cancer progression (e.g., Buddeberg et al., 1991; Cassileth, Lusk, Miller, Brown, & Miller, 1985; Jamison, Burish, & Wallston, 1987; Richardson, Zarnegar, Bisno, & Levine, 1990). For example, Cassileth et al. (1985) prospectively studied psychosocial predictors of survival in cancer patients with advanced disease. Independent variables, measured within 4 weeks of diagnosis, included patients' social ties and marital history, job satisfaction, general life satisfaction, and degree of hopelessness and helplessness. Analyses indicated that these social and psychological factors, individually or in combination, did not predict the length of survival or time until relapse. Jamison et al. (1987) conducted a comparable study by measuring self-esteem, hostility, and symptoms of depression and anxiety in breast cancer patients. Similar to Cassileth et al. (1985), they found nonsignificant results when comparing these psychological variables between short-term and long-term survival groups. Both research groups concluded that in cases of advanced cancer, the inherent biology of the disease alone determines the prognosis, overriding the potentially mitigating influence of these psychological factors.

Other studies, however, have shown a significant relationship between psychological factors and progression of cancer (e.g., Derogatis, Abeloff, & Melisaratos, 1979; Levy, Herberman, Maluish, Schlien, & Lippman, 1985; Levy, Lee, Bagley, & Lippman, 1988; Rogentine et al., 1979; Spiegel, Bloom, Kraemer, & Gottheil, 1989). The majority of evidence suggests that

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efforts to suppress dysphoric feelings (e.g., Derogatis et al., 1979; Levy et al., 1985) and other forms of cognitive and behavioral avoidance of the cancer and of associated negative emotions are associated with shorter disease-free survival. Avoidant coping efforts are defined as active cognitive or behavioral attempts to escape or minimize the significance of the cancer but do not include efforts that center on positive reappraisal. Cancer patients who report that they need to make large adjustments to cope with their cancer—which may reflect low levels of avoidance—have significantly higher survival rates 1 year post diagnosis than those who respond with a low rating of perceived adjustment (Rogentine et al., 1979). One notable exception to these findings has been reported by Greer and colleagues (Greer, 1991; Greer, Morris, & Pettingale, 1979; Greer, Morris, Pettingale, & Haybittle, 1990), who found that breast cancer patients displaying either a fighting spirit or denial/positive avoidance were most likely to survive their diseases. That is, both avoidance and more active, confrontive forms of coping were associated with better disease outcomes. It is noteworthy, however, that avoidance in this sample was characterized as "positive avoidance" and included patients' efforts to put the disease behind them and get on with their lives (Greer, 1991).

Studies of psychological interventions that assist patients in coping with their disease have also shown evidence of an association of psychological variables with cancer progression. Psychological interventions aimed at expression of feelings and active coping with cancer have been associated with immunological changes and longer survival. For example, Spiegel et al. (1989) prospectively studied the effects of support groups on survival time in metastatic breast cancer patients. Results revealed that, although treatment and control groups did not differ significantly in initial severity of cancer or prognosis, treatment group members lived significantly longer than controls (on average, nearly 18 months longer). The authors speculated that supportive group environments might have increased survival time by providing outlets for the identification and expression of feelings. Fawzy and colleagues (Fawzy et al., 1993; Fawzy, Cousins, et al., 1990; Fawzy, Kemeny, et al., 1990) conducted a 6-week structured intervention designed to teach malignant melanoma patients stress management and active coping skills. At the conclusion of the intervention, they found that the treatment group, when compared with a control group, showed significantly lower levels of depressive symptoms, fatigue, confusion, and total mood disturbance and higher levels of vigor. In addition, immunological analyses revealed that the treatment group had significantly more large-granular lymphocytes and natural killer cells, both of which have been hypothesized to have antiviral and antitumor functions (Kiecolt-Glaser & Glaser, 1992). A 6-year follow-up of these patients indicated that survival was significantly enhanced by participation in the intervention (more patients were alive), although changes in immune function did not fully account for survival differences (Fawzy et al., 1993).

In summary, the majority of these studies suggest that minimization and avoidance of thoughts and feelings about one's cancer may be related to poorer disease outcomes, whether avoidance occurs spontaneously or in association with random assignment to control groups in psychological intervention studies. It is noteworthy, however, that none of these studies has directly measured self-reported avoidance. Rather, most have focused on self-reported mood and psychological symptoms as predictors of cancer progression (e.g., Cassileth et al., 1985; Derogatis et al., 1979; Jamison et al., 1987), resulting in mixed findings. Considering the reviewed literature, we believe that it is important to investigate avoidance directly.

In considering avoidance as a possible predictor of cancer progression, an important correlate of avoidance emerges as another potentially significant factor: the presence of intrusive thoughts and emotions. These are defined as unwanted images and strong waves of feelings in response to and associated with a specific stressor (Zilberg, Weiss, & Horowitz, 1982). Intrusive thoughts can be conceptualized as a stimulus for avoidance, which would cause patients to try avoiding unwanted thoughts and emotions. Alternatively, intrusive thoughts may be a result of unsuccessful avoidance efforts; individuals who attempt unsuccessfully to avoid negative thoughts and feelings about their disease are likely to report high levels of intrusive thoughts on an ongoing basis.

Significant relationships between intrusive thoughts and physiological functioning have been demonstrated in generally healthy individuals (Antoni et al., 1990; Davidson & Baum, 1986; Workman & LaVia, 1987) but have not yet been examined with regard to cancer progression. Previous studies have associated intrusive thoughts with markers of stress-related arousal processes such as higher systolic blood pressure (Davidson & Baum, 1986), increased levels of norepinephrine (Davidson & Baum, 1986) and cortisol (Antoni et al., 1990; Davidson & Baum, 1986), and decreased T-lymphocyte polyclonal proliferation (Workman & LaVia, 1987). Because no studies on cancer have yet examined intrusive thoughts as a variable associated with disease progression, the relationship between avoidance, intrusive thoughts, and course of cancer remains unclear. However, these prior studies with noncancer patients (Antoni et al., 1990; Davidson & Baum, 1986; Workman & LaVia, 1987) suggest that high levels of intrusive thoughts may be a marker of emotional arousal and associated dysfunctional physiological processes along with the use of avoidant coping.

In summary, cognitive and behavioral avoidance of one's cancer and its associated negative emotions, coupled with high levels of intrusive or unwanted thoughts and feelings, are strong candidates as predictors of cancer progression. Taken together, high levels of avoidance and intrusive thoughts and emotions are viewed as hallmark characteristics of a generalized stress-response syndrome (Horowitz, Field, & Classen, 1993) and are core symptoms of post-traumatic stress disorder (PTSD; American Psychiatric Association, 1987). The research cited in the previous paragraph (e.g., Antoni et al., 1990; Davidson & Baum, 1986) suggests that avoidance and intrusive thoughts may be more sensitive indices of cognitive/affective and physiological responses to the stress associated with cancer diagnosis and treatment than are measures of generalized psychological distress. Therefore, avoidance and intrusive thoughts may be stronger predictors of adverse

physiological outcomes than are generalized symptoms of distress. From the perspective of cognitive–behavioral models of health and illness (e.g., Cohen & Williamson, 1991), avoidance and intrusive thoughts might affect the course of cancer (a) by leading to increased and prolonged physiological arousal and compromised immune functioning, (b) by causing avoidance of important health maintenance or treatment-related behaviors, or (c) by both of these processes.

We designed the present study to examine whether the psychological variables of avoidance, intrusive thoughts, and psychological symptoms, measured near time of diagnosis, predict disease status 1 year postdiagnosis after controlling for initial prognosis. We examined the following hypotheses, which were based on the reviewed literature: (a) Greater levels of intrusive thoughts near time of diagnosis would significantly predict poorer disease status 1 year postdiagnosis; and (b) greater levels of avoidance near time of diagnosis would significantly predict poorer disease status 1 year post diagnosis. We also hypothesized that the psychological variables of avoidance and intrusive thoughts would be stronger predictors of the progression of cancer than would psychological symptoms. Efforts were taken to control for possible third variables that would account for an association between psychological variables and disease outcome, including patient age, the type of information shared with patients by their physicians, and the nature of the treatment they received.

Method

Participants

Participants were 66 cancer patients (80% female and 20% male; mean age = 41.4 years; *SD* = 8.0) drawn from a larger sample of 126 patients (72% female and 28% male) participating in a longitudinal study of family coping and adjustment with cancer. Inclusion in the present study was based on availability of disease-status data collected 1 year postdiagnosis. Because of the large geographic area from which we drew subjects, a number of participants received follow-up treatment at locations other than those from which they were originally recruited; follow-up medical data were not available from these sites. Comparisons between participants for whom 1-year follow-up data were available (N = 66) and those for whom it was unavailable (n = 60) revealed that participants did not differ from nonparticipants in initial levels of intrusive thoughts, avoidance, or psychological symptoms or with regard to initial disease prognosis, treatments received, or prognosis offered by their physician. Patients in the present study were diagnosed with a variety of different types of cancer, including the most frequent diagnoses of breast cancer (37.9%), gynecologic cancers (19.2%), hematologic malignancies (13.6%), brain tumors (9.1%), and malignant melanoma (4.5%). Because the larger study from which these participants were drawn focused on patients who had children living in their homes, subjects in the present study tended to be younger than the general cancer population, and consequently their diagnoses represent types of cancer that are more common among younger adults.

Procedure

Participants were recruited through three cancer clinics: Medical Oncology (n = 26, 39% of the sample), Radiotherapy (n = 28, 42%), and Gynecologic Oncology (n = 12, 18%) of the Vermont Cancer Center. Patients were approached near their time of diagnosis by a member of the medical staff (nurses, physicians' assistants, or physicians) about participating in the study. For those who were willing, a member of the research team then contacted the person and obtained written consent. The overall sample of 126 represents approximately 75% of patients who were approached regarding participation in the study. Each patient participated in individual structured interviews (in person or over the telephone) and completed written questionnaires assessing psychological variables near the time of diagnosis (mean time from diagnosis to interview = 10.1 weeks, *SD* = 8.1).

Measures

Psychological symptoms. Psychological symptoms were measured by the Brief Symptom Inventory (BSI; Derogatis & Spencer, 1982). The BSI is a 53-item self-report questionnaire covering symptoms of psychological and physical distress experienced during the previous 7 days. Internal consistency and validity are well-established for the BSI. For this study, we used a modified version of the Global Severity Index (GSI) of the BSI, the mean of ratings for all items. For this population, several somatic items are direct side effects of chemotherapy and radiation and therefore could falsely raise GSI scores for those patients receiving aggressive treatment and potentially confound the GSI with indices of disease severity. In order to address this issue, we asked four oncology professionals, two nurses and two physicians, to indicate those items on the BSI that would be expected to be affected by standard cancer treatment such as chemotherapy and radiation. We removed those items from the GSI that at least three out of four oncology specialists had marked. Thirteen items were deleted, leaving 40 items for inclusion in the modified GSI.[1] The alpha coefficient for the modified GSI indicated good internal consistency (α = .96). Additionally, correlational analyses between the original GSI and this modified version revealed a high association, $r(65)$ = .98, p = .0001. However, because the modified GSI represents a measure of psychological symptoms free from the confound of physical symptoms, we retained this modified version for predictive analyses. For purposes of comparison to the original normative sample on the BSI, we calculated normalized T scores for the full set of items. Patients in this sample had a mean GSI T score of 55.11 (*SD* = 7.88), and 12.1% scored above the clinical cutoff of $T > 63$.

Avoidance and intrusive thoughts. We measured avoidance and intrusive thoughts by the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979). The IES is a 15-item measurement that assesses current degree of impact experienced in response to a specific stressful event, in this case, cancer. Participants responded to the IES as part of their interviews. We asked them to indicate how frequently each item had been true with respect to their cancer in the 7 days preceding the interview. Responses were made with 4-point scales, from *not at all true* to *often true* (scores corresponding to 0, 1, 3, and 5). There are two subscales to the IES, Avoidance (eight items, range = 0–40) and Intrusion (seven items, range = 0–35), composed of mutually exclusive items. Sample items in the Avoidance subscale include "I try to remove it from my memory," "I stay away from reminders of it," "I try not to talk about it," and "I try not to think about it." Examples of items in the Intrusion subscale include "I think about it when I don't mean to," "I have waves of strong feelings about

[1] Items deleted from the BSI to create the modified GSI were nervousness or shakiness inside, faintness or dizziness, trouble remembering things, feeling easily annoyed or irritated, poor appetite, feeling blue, nausea or upset stomach, trouble falling asleep, difficulty making decisions, hot or cold spells, numbness or tingling in parts of body, trouble concentrating, and feeling weak in parts of body.

it," "I have dreams about it," and "Pictures about it pop into my mind." Higher scores correspond to greater degree of impact. Internal consistency of the subscales was adequate in the present sample (α = .73 for Intrusion and α = .70 for Avoidance). In original validation studies (Horowitz et al., 1979), the two subscales correlated at $r(64)$ = .42 (p = < .01). In this sample, Avoidance and Intrusion were correlated at $r(64)$ = .51 (p < .01). These correlation coefficients are small enough to infer that the scales represent relatively separate constructs but also indicate a moderate degree of covariation.

Disease variables. We obtained data on disease variables by reviewing medical charts, and we obtained patients' reports of the prognosis they received from their oncologist from the structured interviews. A research assistant and an oncology nurse, both of whom were unaware of patients' psychological data, jointly reviewed each patient's chart. A research assistant unaware of previous findings conducted a separate review and interrater reliability was established at greater than 90%.

Initial prognosis was defined as projected 5-year survival rate. This percentage is derived from statistics that the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program collects (American Cancer Society, 1992) and is used to rate cancer severity at time of diagnosis. Survival rates, which can theoretically range from 1% to 99%, are based on both site and pervasiveness of cancer. Although this study followed patients to 1 year post diagnosis, we used the projected 5-year survival rate, taken directly from the SEER table, because it offers a common prognostic index for this sample of patients with heterogeneous types of cancer. Initial stage ratings I through IV—representative of tumor size and severity—were highly correlated with projected 5-year survival rate, $r(62) = -.80, p < .01$.

We obtained patients' reports of the prognosis that they had been given by their physician by asking the question "Has your physician talked with you about the prognosis of your cancer? [If yes] What have you been told?" Independent raters coded the responses as reflecting a good prognosis, uncertain prognosis, or poor prognosis. Interrater reliability of 89% agreement was achieved by two independent raters. Five (7.6%) patients reported receiving a poor prognosis, 36 (54.5%) reported receiving an uncertain prognosis, and 25 (37.5%) reported receiving a good prognosis.

An index of the number of treatments was derived by adding the total number of the following treatments that each patient received: surgery (87.9% of patients underwent surgery), hormonal therapy (4.5%), chemotherapy (60.6%), and radiation therapy (63.6%). Thus, the number of treatments could range from 0 to 4. Eight (12.1%) patients received only one form of treatment, 39 (59.1%) received two forms of treatment, 19 (28.8%) patients received three forms of treatment, and no patients received all four forms of treatment.

Disease status was measured 1 year postdiagnosis and was dichotomized into (a) no disease or (b) presence of original cancer, recurrence of cancer, or death. This outcome variable was dichotomized because of the categorical nature of disease status and the low sample size in each of the disease subcategories. Of those participants who were not disease free at 1 year, 14 had died from their cancer, 2 had their original cancer, and 2 had experienced a recurrence.

Results

Descriptive Statistics

Means and standard deviations for predictor variables measured near time of diagnosis are displayed in Table 1. The means for the Avoidance (M = 10.4) and Intrusion (M = 12.5) subscales of the IES were moderately high, greater than those of community samples but somewhat lower than a clinical sample of adults experiencing parental bereavement (Horowitz et al., 1979). Although norms are not available and therefore T scores cannot be computed for this modified version of the GSI, the mean (M = 0.33) indicates that, on average, patients responded somewhere between 0, *not at all,* and 1, *a little bit,* on the retained items. However, the value of the standard deviation (SD = 0.4) in relation to the mean indicates that the distribution was positively skewed; this signifies that, as assessed by this measure, the majority of patients were subclinical and only a minority reported a high level of psychological symptoms.

Correlational Analyses

Intercorrelations for both the predictor variables measured near time of diagnosis and disease status measured 1 year post diagnosis are shown in Table 2. The three psychological predictors were moderately correlated in the range of .34 to .52. As previously noted, the correlation between the Avoidance and Intrusion subscales of the IES, $r(64) = .51, p < .001$, is similar to the correlation in original validation study for this measure (r = .42, p < .01; Horowitz et al., 1979). Significant correlations of the Intrusion subscale with the modified GSI, $r(64) = .34, p < .01$, and of the Avoidance subscale with the modified GSI, $r(64) = 0.52, p < .001$, are similar to prior studies of highly stressed adults (e.g., Davidson & Baum, 1986).

Initial prognosis based on SEER data and patients' reports of the prognosis that they had received from their physician were only moderately correlated, $r(64) = .48, p < .001$. As expected, initial prognosis based on SEER data was highly correlated with 1-year disease status, $r(64) = -.72, p < .001$. Similarly, patients' reports of the prognosis that they had received from their physician were also correlated with 1-year disease status, $r(64) = -.48, p < .001$. The number of treatments received was not related to either of the initial prognosis variables or with 1-year disease status. The psychological variables of Avoidance, Intrusion, and the modified GSI items were not significantly associated with initial disease prognosis. However, Avoidance was significantly correlated with disease status 1 year post diagnosis, $r(64) = 0.25, p < .05$. Finally, age was unrelated to any of the disease parameters and was related to only one psychological variable (a negative correlation with avoidance).

Logistic Regression Analyses

Forty-eight patients (72.7%) were disease free 1 year post diagnosis, and 18 patients (27.3%) had their original cancers, had experienced a recurrence, or had died. The percentage of subjects who were disease free after only 1 year postdiagnosis was greater than their corresponding 5-year survival rate (M = 58.3%), although this is expected when considering 1-year data with a 5-year predictor.

Because the criterion variable for this study is dichotomous (disease free vs. ill or deceased), we conducted logistic regressions to address the research questions and hypotheses in this study. Logistic regression provides the same type of analyses as linear multiple regression. That is, multiple independent variables are used to predict variance in a dependent

Table 1
Means and Standard Deviations of Predictor Variables

Predictor variable	*M*	*SD*
Initial SEER prognosis	58.29	30.81
Physician's prognosis	2.30	0.61
Number of treatments	2.17	0.62
Intrusive thoughts	12.53	7.37
Avoidance	10.39	7.30
Modified GSI items	0.33	0.40

Note. SEER = Surveillance, Epidemiology, and End Results program (American Cancer Society, 1992); GSI = Global Severity Index from the Brief Symptom Inventory (Derogatis & Spencer, 1982).

variable. However, linear multiple regression and logistic regression use different methods to create optimal predictive models. Linear regression uses a least-squares criterion to model the predicted outcome. Logistic regression usually uses a maximum likelihood procedure to model the log of the odds ratio, where the latter is expressed as the natural log of the probability of survival divided by the probability of nonsurvival. (For further discussion of logistic regression see Darlington, 1990; Hosmer & Lemeshow, 1989).

In the first logistic regression equation we modeled the probability of survival as a function of a set of control variables composed of patient age, initial SEER prognosis, patients' reports of the prognosis they received from their physician, and the number of treatments patients' received. These variables were treated as covariates and were common to all regressions. Next, to allow direct comparisons with prior studies using a general psychological symptom index, the modified GSI scores were entered along with the control variables. We then added the measure of avoidance to the model, followed in the final analysis by the measure of intrusive thoughts.

In the first regression, age and medically related control variables were used to predict disease status at 1 year. The results of this analysis are shown in Table 3. The overall equation provided a significant fit with the data, $\chi^2(4, N = 66) = 42.67, p < .001$. As expected, the SEER 5-year survival estimate was a strong predictor of 1-year survival status, although neither age, the patients' reports of the prognosis they had received from the physician, or the number of treatments received accounted for any significant variance in the outcome.

Adding the modified GSI—a global measure of psychological distress—to the model did not lead to a significant improvement in fit. The test for this model produced $\chi^2(5, N = 66) = 42.71$. This represents a gain in chi-square of only .04 units, which is itself a chi square on 1 degree of freedom and is not significant. We chose to retain this global measure in future models, however, to maintain comparability with previous studies.

Adding the Avoidance scale of the IES produced a model with a good fit to the data, $\chi^2(6, N = 66) = 49.72, p < .001$, which is a significant improvement over the previous model. The test on the improved fit of the model was $\chi^2(1, N = 66) = 7.01, p < .025$. As can be seen in Table 3, in this model both the initial SEER 5-year prognosis and the Avoidance subscale were significant predictors. The coefficient for the avoidance measure is −0.211, which can be used to calculate an index of the difference in the odds of survival associated with a fixed difference in the avoidance score. If we take a difference in avoidance scores equal to one half of a standard deviation as being a psychologically meaningful difference, this would be associated with a difference of 0.488 in the odds of survival. Thus, holding all other variables constant, including initial prognosis, a patient whose avoidance score is one half of a standard deviation above that of another patient would have only approximately half the odds of being disease free at the end of 1 year.

The complete model added the Intrusion subscale of the IES to the variables in the previous model. This produced a model with $\chi^2(7, N = 66) = 50.54, p < .001$. Although this model does fit the data better than chance, it does not fit significantly better than the simpler previous model; the change was $\chi^2(1, N = 66) = 0.82, p > .10$. In addition, the initial 5-year prognosis and the Avoidance subscale remained significant predictors, but the intrusion measure did not contribute significantly.

The Intrusion and Avoidance subscales of the IES were moderately correlated ($r = .51$) and may have been competing for common variance in predicting 1-year disease status. Therefore, to determine if intrusion was a significant predictor in the absence of avoidance, we included in our final model the control variables, the modified GSI, and the Intrusion subscale of the IES as predictors. The overall model was a good fit, $X2(6, N = 66) = 43.36, p < .001$. However, intrusion was not a

Table 2
Intercorrelations of Predictor Variables Near Diagnosis and Disease Status at 1 Year

Predictor varaible	1	2	3	4	5	6	7	8
1. Intrusive thoughts	—							
2. Avoidance	.51***	—						
3. Modified GSI	.34**	.52***	—					
4. Initial SEER prognosis	.03	−.11	.03	—				
5. Physician's prognosis	−.12	−.19	−.10	.48***	—			
6. Number of treatments	.14	.11	.03	.07	.15	—		
7. 1-Year disease status	.02	.25*	−.02	−.72***	−.48***	−.11	—	
8. Patient age	−.25*	.07	−.09	.11	.08	−.02	−.03	—

Note. GSI = Global Severity Index from the Brief Symptom Inventory (Derogatis & Spencer, 1982); SEER = Surveillance, Epidemiology, and End Results program (American Cancer Society, 1992).
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3
Logistic Regressions Predicting Disease Status at 1 Year From Initial Disease Parameters and Psychological Variables Near Diagnosis

Predictor entered	β	χ^2	Probability
Control variables, $\chi^2(4, N = 66) = 42.67$*			
Intercept	−5.20	2.81	.094
Patient age	−0.01	0.04	.834
SEER prognosis	0.08	11.65	.001
Physician's prognosis	0.90	1.07	.300
Number of treatments	0.59	0.82	.365
Psychological symptoms, $\chi^2(5, N = 66) = 42.71$*			
Intercept	−5.33	2.76	.097
Patient age	−0.01	0.03	.863
SEER prognosis	0.08	11.52	.001
Physician's prognosis	0.91	1.08	.299
Number of treatments	0.56	0.71	.401
Modified GSI	0.34	0.04	.848
Avoidance and psychological symptoms, $\chi^2(6, N = 66) = 49.72$*			
Intercept	−7.27	3.11	.078
Patient age	0.05	0.46	.498
SEER prognosis	0.11	8.52	.004
Physician's prognosis	0.40	0.14	.706
Number of treatments	1.23	1.70	.192
Avoidance subscale	−0.21	5.51	.019
Modified GSI	3.19	1.73	.188
Avoidance, intrusion, and psychological symptoms, $\chi^2(7, N = 66) = 50.54$*			
Intercept	−8.54	3.89	.049
Patient age	0.60	0.84	.360
SEER prognosis	0.11	8.33	.004
Physician's prognosis	0.30	0.08	.774
Number of treatments	1.20	1.49	.222
Intrusion subscale	0.10	0.78	.378
Avoidance subscale	−0.28	4.69	.030
Modified GSI	3.49	1.87	.172
Intrusion and psychological symptoms, $\chi^2(6, N = 66) = 43.36$*			
Intercept	−5.00	2.06	.151
Patient age	−0.01	0.04	.836
SEER prognosis	0.85	11.04	.001
Physician's prognosis	0.85	0.90	.344
Number of treatments	0.73	1.03	.311
Intrusion subscale	−0.06	0.63	.427
Modified GSI	0.84	0.18	.675

Note. SEER = Surveillance, Epidemiology, and End Results program (American Cancer Society, 1992); GSI = Global Severity Index from the Brief Symptom Inventory (Derogatis & Spencer, 1982).
*$p < .001$.

significant predictor; initial SEER 5-year prognosis was the only significant predictor.[2]

Discussion

In the present study we used a prospective design to test psychological symptoms, avoidance, and intrusive thoughts as predictors of cancer progression over a period of 1 year. The findings indicate that avoidance, but not psychological symptoms or intrusive thoughts, predict disease status 1 year later, after controlling for initial prognosis.

In the present sample, psychological symptoms, avoidance, and intrusive thoughts were moderately intercorrelated near time of diagnosis but differentially predictive of subsequent disease status: Avoidance was the sole psychological marker of cancer progression. Prior researchers have not directly measured avoidance of one's disease or reminders of it as a predictor of cancer progression, but have focused on self-reported mood and psychological symptoms as predictors of cancer progression (e.g., Cassileth et al., 1985; Derogatis et al.,

[2] A somewhat simpler analysis of the association between the Avoidance subscale of the IES and disease status at 1 year was conducted by creating groups high and low in avoidance using a median split. Thirty-four individuals were below the median (< 9), and 32 participants were above the median. A 2 × 2 chi-square analysis was used to examine the number of participants who were above and below the median on the Avoidance subscale and who were disease free versus ill or deceased at 1 year. Of the 34 who were low in avoidance, 29 were disease free and 5 were ill or deceased. Of the 32

1979; Jamison et al., 1987), resulting in mixed findings. The current data extend the significance of avoidant responses by implicating their role in predicting cancer progression. These findings are consistent with the more general literature that has shown an association between avoidance and poor physical and psychological outcomes (e.g., Billings & Moos, 1981; Holahan & Moos, 1986, 1987; Suls & Fletcher, 1985). In most of these studies, however, physical symptoms have been assessed by self-reports. The present findings establish an association between self-reported avoidance and objective measures of disease status 1 year later.

Consistent with initial hypotheses, psychological symptoms as reflected in the BSI near time of diagnosis did not predict disease status 1 year postdiagnosis. Similar results were reported by Cassileth et al. (1985) and Jamison et al. (1987), who found psychosocial symptom measures to be unrelated to cancer progression. Our findings suggest that psychological symptoms may not clearly reflect the cognitive and emotional processes that are most closely related to subsequent disease progression in cancer patients, which would account for previous studies' nonsignificant findings. The levels of psychological distress reported by patients in the present sample and in other recent studies of cancer patients (e.g., Stanton & Snider, 1993) reflect low to moderate levels of generalized distress. These symptom patterns, due to their low levels and restricted range, may not play a central role in patients' response to the stress of a cancer diagnosis and early phases of treatment. In contrast, higher levels of psychological distress, reflected by symptoms strong enough that they meet diagnostic criteria for depressive disorders, are related to compromised immune function and disease (Herbert & Cohen, 1993; Weisse, 1992). Furthermore, high levels of avoidance and intrusive thoughts and emotions may reflect a more central way in which cancer patients manifest their distress, that is, through symptoms more characteristic of PTSD.

Contrary to initial hypotheses, intrusive thoughts did not significantly predict disease status in this study. Several explanations could account for this nonsignificant finding. First, intrusive thoughts may reflect short-term levels of high distress in response to a traumatic event such as the diagnosis of cancer. Intrusive thoughts may subside over time as the original trauma is resolved (Horowitz et al., 1993), and therefore they may not be a powerful predictor of longer term physical and psychological outcomes. Second, in light of the positive association between avoidance and intrusive thoughts observed in the present sample, intrusive thoughts may play an important role as a precipitant of continued avoidance. A subgroup of cancer patients who experience high levels of intrusive thoughts and feelings about their illness may be engaging in a cycle of unsuccessful avoidance that may place them at increased risk for poorer disease outcome. The present findings suggest that avoidance of intrusive thoughts and emotions may be a better predictor of disease progression than the presence of intrusive thoughts and emotions alone. This hypothesis is plausible given the significant relationship between avoidance—which can be conceptualized as unsuccessful efforts to avoid particular thoughts and feelings—and subsequent disease progression, as well as the significant positive relationship between intrusive thoughts and avoidance.

It is noteworthy that in the present study all psychological variables were unrelated to initial prognosis. The literature is mixed with regard to the relationships between psychological distress and physical status in cancer patients. Some studies have reported significant relationships (e.g., Cassileth, Lusk, & Tenaglia, 1983; Cella et al., 1987; Taylor et al., 1985), particularly for those with more advanced forms of cancer (e.g., Pettingale, Burgess, & Greer, 1988), whereas others have found that only perceived severity of illness (e.g., Marks, Richardson, Graham, & Levine, 1986) is related to psychological distress. To make sense of these discrepant findings, it is important to consider the ways in which researchers have defined psychological distress. This variable has been operationalized as daily mood (Cella et al., 1987), symptoms of depression and anxiety (Pettingale et al., 1988), body image and satisfaction (Cassileth et al., 1983), and a factor-derived compilation of daily mood with patient- and observer-rated adjustment (Taylor et al., 1985). In the present study, we used self-report measures of generalized psychological symptoms, intrusive thoughts, and avoidance efforts spanning retrospectively 1 week from the time of response. It is possible that the present psychological indices are more stable indicators of psychological functioning and therefore less closely correlated with physical variables than daily mood measures might be.

The present study's prospective findings help in clarifying prior conflicting findings regarding the influence of psychological factors on disease progression. These findings indicate that the literature's discrepant results may have been caused by differences in psychological variables chosen for examination. Findings of previous research examining the influence of generalized psychological symptoms on cancer progression have been mainly nonsignificant (e.g., Cassileth et al., 1985; Jamison et al., 1987), whereas those studies investigating the relationship of more specific symptoms and behavior (in particular, situational adjustment and coping) on disease status have been primarily significant (e.g., Fawzy, Kemeny, et al., 1990; Rogentine et al., 1979). In support of this hypothesis, our study found that avoidance of thoughts and reminders of the cancer, but not more generalized psychological symptoms, was a predictor of cancer progression. Furthermore, it is important to note that the association between initial avoidance and later disease outcomes was not the result of such possible "third variables" or confounds as the patients' age, initial prognosis, the information communicated to patients by their physicians, or the number of treatments that they received.

The mechanisms by which avoidance might affect cancer outcome require further investigation. At least two hypotheses are worth pursuing. First, avoidance might affect immune functioning in cancer patients by contributing to continued high distress and emotional arousal. Second, avoidance might result in decreased compliance with cancer treatments, which in turn could lead to worsened disease status. The relationship of avoidance of intrusive thoughts and emotions with other

who were high in avoidance, 19 were disease free and 13 were ill or deceased. This pattern of observed cases was significantly different from the expected distribution, $\chi^2(1, N = 66) = 5.58$, $p = .018$. Specifically, the expected number of individuals high in avoidance and ill or deceased was 8.7, compared with an observed frequency of 13.

aspects of patients' coping with their illness warrants further attention as well. These questions are unfortunately beyond the scope of this study.

These results offer important guidance to future work in this area. First, the findings warrant replication with a larger sample size and over a longer period of time. The present sample was limited with regard to age, sex, type of cancer, and presence of children in the home and may not be representative of cancer patients in general. Therefore, the generalizability of these results needs to be examined, as the present findings pertain primarily to relatively young married women with cancer. Second, the outcome measure, first-year disease status, is a somewhat coarse indication of physical functioning that does not reflect finer gradations of cancer progression or tumor reduction; future studies using more refined measures of disease outcome are needed. Third, the possible mechanisms that may account for the association between avoidance and disease outcome are a high priority for future research. Understanding of the long-term significance of psychological factors on cancer progression remains an important and realistic goal for research in this area. In addition to warranting continued research on the association between psychological factors and cancer progression, these findings suggest that further research on the applied implications of avoidance and cancer progression is also warranted. Enhancing patients' use of coping skills and use of social support as ways to manage or reduce avoidance of troubling thoughts and emotions may be an important target for interventions to assist cancer patients in coping with their disease.

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