Psychological Adjustment in Breast Cancer: Processes of Emotional Distress

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The process of psychological adjustment to breast cancer was examined at diagnosis and at 3- and 6-month follow-ups in a sample of 80 women with Stage I–Stage IV breast cancer. At diagnosis, symptoms of anxiety/depression were predicted by low dispositional optimism, and this path was partially mediated by use of emotion-focused disengagement coping. Younger age also was predictive of anxiety/depression symptoms at time of diagnosis, and this relationship was fully mediated by magnitude of intrusive thoughts. At 3 months, changes in anxiety/depression symptoms were predicted only by intrusive thoughts. At 6 months, low dispositional optimism reemerged as a significant predictor of changes in anxiety/depression and again was partially mediated by the use of emotion-focused disengagement coping. Independent effects for problem-focused engagement and disengagement and emotion-focused engagement coping were also found at 6 months. Implications of these data for psychosocial interventions with breast cancer patients are highlighted.

Key words: breast cancer, psychological adjustment, coping, optimism

Breast cancer is an increasingly common experience among women in the United States, affecting approximately 185,000 women annually (American Cancer Society, 1997). Although the prognosis for this disease is generally favorable (American Cancer Society, 1997), some women experience high levels of anxiety and depression symptoms near the time of diagnosis and throughout treatment and recovery (e.g., Fallowfield, Hall, Maguire, & Baum, 1990; Hilton, 1988; Hughes, 1982; Leinster, Ashcroft, Slade, & Dewey, 1989). Three critical questions to be answered are, Are there background or dispositional factors that predict anxiety and depression in women with newly diagnosed breast cancer? If so, what proximal processes are associated with these relationships? And do these processes change over the course of treatment and recovery?

Research and theory in this area suggest four factors that may be associated with anxiety and depression following

breast cancer diagnosis: (a) demographic variables of age and educational level, and degree of disease severity, (b) two dispositional characteristics of individuals: optimism/pessimism and the tendency to monitor threat-relevant cues in stressful situations, (c) the stress-response symptoms of avoidance and intrusive thoughts, and (d) the use of engagement and disengagement coping strategies. Whereas disease, demographic, and dispositional characteristics can be conceptualized as background variables, stressor-specific cognitive and behavioral responses can be conceptualized as more proximal to emotional distress following breast cancer diagnosis.

One type of proximal response includes involuntary intrusive thoughts about cancer and efforts to suppress or avoid these thoughts (e.g., Cordova et al., 1995; Epping-Jordan, Compas, & Howell, 1994). These symptoms are typically reported at high levels at the time of diagnosis and, for some patients, may persist over periods of months or years subsequent to initial diagnosis and treatment. Intrusive thoughts and avoidance are proximal because they often occur near the time of diagnosis and are focused directly on cancer and its stressful characteristics.

Generalized coping responses represent a second subgroup of potential proximal predictors. Coping responses can be distinguished along two dimensions, the first involving either engagement or disengagement strategies and the second focusing on the problem or alternatively on one's emotions about the stressor (Compas, Connor, Osowiecki, & Welch, 1997; Lazarus & Folkman, 1984; Tobin, Holroyd, Reynolds, & Wigal, 1989). Engagement coping is directed toward the stressor (problem solving, cognitive restructuring) or one's emotions (emotional ventilation, seeking social support). Disengagement coping is directed away from the

problem (problem avoidance, wishful thinking) or one's emotions (self-criticism, social withdrawal).

Key studies to date suggest possible relationships among dispositional characteristics, more proximal cognitive and behavioral responses to the cancer, and symptoms of anxiety and depression. In a study of 59 women with early stage breast cancer, Carver et al. (1993) demonstrated that high levels of optimism near time of diagnosis significantly predicted less psychological distress up to 12 months later. This relationship was mediated by coping responses at each assessment time point, suggesting that women who were generally optimistic experienced less affective distress than more pessimistic women because they coped differently. Specifically, the effects of optimism were mediated by the use of acceptance, humor, denial, and behavioral disengagement in varying ways over the first year after diagnosis. These data suggest that coping responses are key processes through which more distal factors impact the adjustment to breast cancer, and that the role of various coping responses changes over the first year after diagnosis. Further evidence for the role of coping in cancer adjustment is provided by Stanton and Snider (1993). Using a prospective design, they demonstrated that cognitive avoidance coping (including wishful thinking and relinquishing responsibility to others) was predictive of psychological distress in 30 women with newly diagnosed breast cancer. These two studies suggest that both problem-focused (behavioral disengagement) and emotion-focused (wishful thinking) disengagement coping may mediate the relationship between cancer diagnosis and increased distress. Conversely, acceptance and humor, which may reflect more engagement-oriented coping, appear to be related to decreased affective distress. In a separate line of research, dispositional monitoring (the tendency to seek out or monitor threat-relevant cues) has been correlated with psychological distress in women at risk for breast or ovarian cancer (Miller, Shoda, & Hurley, 1996; Schwartz, Lerman, Miller, Daly, & Masny, 1995). Path analyses indicated this association was mediated by the level of intrusive thoughts about having a relative with ovarian cancer; high monitoring was associated with increased intrusive thoughts, which were related to increased affective distress (Schwartz et al., 1995).

The results of previous studies indicate that effects of dispositional optimism and dispositional monitoring may be mediated by cognitive and behavioral variables more specific to the stressful situation. However, several issues need to be addressed in understanding these processes among breast cancer patients. To date, optimism and monitoring have not been studied together, yet a more complete model can include both of these dispositional characteristics. As a result, the relative contribution of each dispositional characteristic to situation-specific variables, and to symptoms of anxiety and depression, is unclear. Second, the role of intrusive thoughts and avoidance as mediators of emotional distress in response to breast cancer has not been examined. Third, prior studies have examined specific types of coping (e.g., humor, wishful thinking) but not the higher order factors of problem- and emotion-focused engagement and disengagement coping.

The present study examined dispositional optimism and pessimism, dispositional monitoring, cancer-related stress-response symptoms of intrusive thoughts and avoidance, and coping as predictors of anxiety and depression symptoms in women with breast cancer. In order to understand the nature of the relationships among these variables and the ways in which these relationships may change over time, participants were assessed near the time of diagnosis and again 3 and 6 months postdiagnosis. We hypothesized that dispositional pessimism and dispositional monitoring would predict anxiety and depression symptoms and that these relationships would be mediated by the proximal variables of avoidance, intrusive thoughts, and engagement and disengagement coping.

Method

Participants

Participants were 80 women with newly diagnosed breast cancer who were part of a larger sample in a longitudinal study of individual coping and adjustment to breast cancer ($N = 110$). Inclusion in the present study was based on availability of complete data on all measures at each time point. Patients had a mean age of 54.8 years ($SD = 10.3$), and a mean of 14.4 years of education ($SD = 3.2$); 69% were either married or living with a partner, 10% were single, 8% were divorced, and 13% were widowed. Representative of the region of northern New York state and northern New England from which the sample was drawn, 89.7% of the sample was Caucasian. The sample was representative of typical diagnosis and treatment diversity among women with breast cancer. Diagnoses included invasive ductal carcinoma (66.3%), invasive lobular carcinoma (10.8%), ductal carcinoma in situ (10.8%), mucinous carcinoma (3.6%), lobular carcinoma in situ (1.2%), and tubular carcinoma (3.0%); 6% had unspecified diagnoses. Of participants, 11% were diagnosed as Stage 0 (in situ patients), 51% were diagnosed with Stage I breast cancer, 28% with Stage II, 8% with Stage III, and 1% with Stage IV cancer. The in situ patients were compared with the other patients in a series of analyses of variance (ANOVAs) at each assessment, and they did not differ on any of the psychological or background variables. Similarly, the one patient with metastatic disease was within 0.5 SD on all measures at all three assessments. The vast majority of the sample ($n = 79$) had some type of surgical procedure: 64% had a partial mastectomy, 35% had a total mastectomy, and 76% underwent lymph node dissection for cancer staging. Most participants completed the study's initial assessment before undergoing any surgical procedure ($n = 60$; 75%); on average, the sample was assessed 14 days prior to surgery. Similarly, no participants were receiving chemotherapy or radiation therapy at the time of the diagnosis interview. During the 6-month study time interval, 60% of the participants received radiation therapy, 41% received hormonal therapy, and 30% received chemotherapy. By 3 months, most radiation and chemotherapy was complete: 5% were receiving radiation therapy and 15% were receiving chemotherapy at this time point. By 6 months, 4% of the participants were receiving radiation therapy and 7% were receiving chemotherapy. Of the sample, 36% continued to receive hormonal therapy at 3 and 6 months.

Comparisons were made between the 80 participants included in the present analyses and the 30 participants for whom partial data were missing. Participants who remained in the study and those who had missing data did not differ on any of the disease variables (stage), demographics (age, education), or psychological character-

istics (optimism, monitoring, intrusive thoughts, avoidance, initial symptoms of anxiety/depression, or coping). Thus, the sample included in the present analyses is representative of the full sample who originally volunteered for the study.

Procedure

Participants were recruited from the Breast Care Center of Fletcher Allen Health Care and the Vermont Cancer Center. Patients were approached about participation near the time of their diagnosis by a member of the medical staff (mean time from diagnosis to interview was 10.8 days, $SD = 8.5$, range = 1 to 43 days) and were referred to a research assistant who obtained written consent from those willing to participate. Approximately 85% of eligible patients volunteered for the study. Participants were either interviewed in person or completed a telephone interview within a few days. Each participant completed a structured interview and written questionnaires assessing psychological variables.

Follow-up assessments were conducted at 3 and 6 months postdiagnosis. These time points were chosen because they corresponded with the timing of standardized follow-up medical office visits for all patients receiving their care at the Breast Care Center. Thus, regardless of the specific type of treatments participants received, all of the participants returned for follow-up medical exams with their oncologist at 3 and 6 months postdiagnosis. In pilot work, women with breast cancer reported that these exams were meaningful time markers of their recovery.

Measures

Structured interview. A structured interview was developed for this study to collect information on patient demographics and other variables on the basis of prior research on the psychological adjustment of cancer patients (Compas et al., 1994; Taylor, Lichtman, & Wood, 1984). Trained interviewers administered the protocol and recorded the participants' responses (de Leeuw & van der Zouwen, 1988).

Medical variables. Information on cancer diagnoses and staging was obtained by reviewing participants' medical charts. The stage of breast cancer was determined by the tumor size, lymph node involvement, and whether it had spread to any other sites (American Joint Committee on Cancer, 1992). The data were also analyzed by categorizing patient stage categorically (early stage vs. late stage) and at three levels (in situ, early stage, and late stage). The analyses did not change when these alternative methods were used to classify cancer stage.

Optimism. Optimism was measured by the Life Orientation Test (LOT; Scheier & Carver, 1985; Scheier, Carver, & Bridges, 1994). The LOT is a 10-item (6 target items and 4 fillers) self-report scale; only items that have been retained in the revised LOT (Scheier et al., 1994) were included in the present analyses. Examples of items are "In uncertain times I usually expect the best," and "Things never work out the way I want them to." In validation studies (Scheier et al., 1994), internal consistency was $\alpha = .78$, and in the present sample $\alpha = .84$. Because optimism is considered a dispositional trait, only the LOT score from the time of diagnosis was used in the present analyses.

Monitoring. The Miller Behavioral Style Scale (MBSS; Miller, 1987) was used to assess individual differences in the tendency to seek out versus avoid information under conditions of threat. For the purposes of this study, only the monitoring scale was used, as the blunting scale has typically failed to achieve adequate reliability in previous research (Miller, Brody, & Summerton, 1988). The total monitoring score was derived by summing the number of

monitoring options endorsed across the four situations (with higher scores indicative of more monitoring or information seeking). Internal consistency in the present sample was $\alpha = .67$. Similar to the LOT, the MBSS is considered to be a measure of a cognitive processing style (Miller et al., 1996), and consequently only the monitoring score from diagnosis was used in the present analyses.

Stress-response symptoms. Participants' intrusive thoughts about their cancer and avoidance of these thoughts were measured by the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979), a 15-item measure that assesses the current degree of impact experienced in response to a specific stressful event, in this case cancer. Participants were asked to indicate how frequently each item had been true with respect to their cancer in the preceding 7 days. Responses were made with 4-point scales, from *not at all true* to *often true* (scores corresponding to 0, 1, 3, 5). There are two subscales to the IES: Avoidance (8 items, range = 0–40; e.g., "I try not to think about it") and Intrusion (7 items, range = 0–35; e.g., "Pictures about it jump into my mind"). Internal consistencies of the Avoidance and Intrusion subscales were adequate in the present sample (ranging from $\alpha = .83$ to .85 at the three assessments for Avoidance, and $\alpha = .71$ to .70 for Intrusion). Avoidance and Intrusion were correlated $r = .41, p < .001; r = .40, p < .001;$ and $r = .38, p < .01$ at diagnosis and 3 and 6 months postdiagnosis, respectively. These correlations are small enough to infer that the scales represent relatively separate constructs but also indicate a moderate degree of covariation. Intrusive thoughts and avoidance are expected to change over the course of adjustment to breast cancer; consequently, measures from all three assessments were used.

Coping. Coping was assessed by the Coping Strategies Inventory (CSI; Tobin et al., 1989). This is a 72-item self-report questionnaire in which respondents indicate the extent to which they have used specific coping strategies in managing a stressor, in this case their cancer. Scores from the four secondary scales, problem- and emotion-focused engagement and disengagement, were used. Problem-focused engagement is composed of problem solving and cognitive restructuring; problem-focused disengagement is composed of problem avoidance and wishful thinking. Emotion-focused engagement is composed of social support and expressed emotion; emotion-focused disengagement is composed of social withdrawal and self-criticism. There is considerable overlap in items on the Problem-Focused Disengagement scale of the CSI and the Avoidance scale of the IES, so potentially confounded items on the CSI were deleted from the present analyses. A team of four raters identified 7 such items (e.g., "I tried to forget the whole thing," "I avoided thinking or doing anything about the situation"). The correlations of the revised CSI Problem-Focused Disengagement scale with the IES Avoidance scale were lower (mean across the three assessments of $r = .35$) than the correlations of the original CSI scale with IES Avoidance (mean correlation of $r = .44$), indicating that there was some confounding of the items on the two scales. However, the lower correlations between the IES Avoidance scale and the CSI scale may have been a consequence of lower reliability of the CSI Problem-Focused Disengagement scale that contained fewer items.

Internal consistencies for the present sample were adequate, ranging from $\alpha = .68$ for Problem-Focused Disengagement at 3 months to $\alpha = .92$ for Emotion-Focused Engagement at 6 months. The mean alphas for the scales averaged across the three assessments were $\alpha = .73$ for Problem-Focused Disengagement, $\alpha = .90$ for Emotion-Focused Disengagement, $\alpha = .85$ for Problem-Focused Engagement, and $\alpha = .90$ for Emotion-Focused Engagement. Correlations among the four scales ranged from $r = -.10$, *ns*, between Emotion-Focused Engagement and Emotion-Focused Disengagement at the initial assessment, to $r = .63, p < .001,$

between Emotion-Focused Engagement and Problem-Focused Engagement at the 6 month follow-up. The mean correlation between the subscales across the three time points was $r = .25$.

Emotional distress. Symptoms of anxiety and depression were measured by the Symptom Checklist–90–Revised (SCL–90R; Derogatis, 1983). The SCL–90R is a 90-item self-report questionnaire covering symptoms of emotional distress with well-established internal consistency, test–retest reliability and discriminant validity. For this study, the Anxiety and Depression scales were combined and used as an index of participants' emotional distress. These two scales were chosen because they reflect overall psychological distress or negative affect (Clark & Watson, 1991; Katon & Roy-Byrne, 1991) and because they are relatively free of symptoms that may occur as a result of factors related to the participants' cancer or their treatment. The two scales can be converted to normalized T scores based on the normative data from a community sample of adult women reported by Derogatis (1983). Although raw scores were used for all analyses, the means of the Anxiety and Depression T scores are presented in Table 1 to provide a normative comparison for the present sample. Internal consistency reliabilities for the combined Anxiety/Depression scales in the present sample were $\alpha = .93$ at diagnosis, $\alpha = .93$ at 3 months, and $\alpha = .95$ at 6 months postdiagnosis. The Anxiety and Depression scales were significantly correlated in the present sample, $r = .81$ at diagnosis, $r = .81$ at 3 months, and $r = .82$ at 6 months postdiagnosis.

Results

In order to optimally describe the processes related to the course of anxiety/depression symptoms, results are presented in several steps. First, descriptive statistics for psychological variables at each time point are reported. Second, ANOVAs that examine potential relationships among cancer treatment-related variables and anxiety/depression are presented. Third, correlations among key demographic variables, dispositional characteristics, stress-response symptoms, coping, and anxiety/depression symptoms are reported. Fourth, a series of multiple regression analyses is reported and summarized in the form of path models. These models display predictive relationships among psychological variables at each time point. Mediated effects were examined on the basis of three criteria outlined by Baron and

Kenny (1986): The initial predictor variable must be correlated with both the mediator and the outcome; the mediator must be correlated with the outcome and, when the mediator is included, the association between the initial predictor and the outcome is either substantially reduced or nonsignificant.

Descriptive Analyses

Means and standard deviations for psychological variables measured near time of diagnosis are displayed in Table 1. The means for dispositional optimism and dispositional monitoring were consistent with values obtained in initial validation studies drawn from community samples, indicating that these variables were not significantly affected by the diagnosis of breast cancer. The means for avoidance and intrusive thoughts were moderately high, greater than those of community samples (Horowitz, Field, & Classen, 1993) and notably higher than those of a sample of women 6 to 60 months post breast cancer diagnosis (Cordova et al., 1995). On average, participants reported using more engagement coping than disengagement coping strategies. The mean for anxiety/depression symptoms is presented as a raw score because norms are not available for this combined subscale score. The item mean indicates that, on average, participants responded somewhere between 0 (*not at all*) and 1 (*a little bit*) on the anxiety and depression items.

Data displayed in Table 1 indicate that a sizable minority of women were experiencing anxiety and depression symptoms in the clinical range (T score = 63) at baseline. A total of 40% reported clinical-range anxiety symptoms, and 34% reported clinical-range depression symptoms; these proportions are 3 to 4 times greater than what one would expect in the general population (Derogatis, 1983). This suggests that the diagnosis of breast cancer was associated with increased symptoms for at least a subgroup of participants.

Repeated measures ANOVAs indicated that there was considerable change in select variables over the course of the three assessments. From diagnosis to 3 months and 6 months postdiagnosis, participants reported fewer intrusive thoughts about their cancer, $F(2, 78) = 16.73$, $p < .001$; fewer anxiety symptoms, $F(2, 78) = 24.96$, $p < .001$; less problem-focused engagement coping, $F(2, 78) = 19.84$, $p < .001$; less emotion-focused engagement coping, $F(2, 78) = 28.31$, $p < .001$; and less problem-focused disengagement coping, $F(2, 78) = 5.12$, $p < .01$. Depressive symptoms, avoidance, emotion-focused disengagement coping, optimism, and monitoring did not change across the three assessments.

ANOVAs for Treatment-Related Variables

ANOVAs were conducted to determine whether cancer treatment-related variables had an impact on anxiety/depression scores at any time point. Results were generally nonsignificant. Participants who were enrolled and interviewed prior to surgery did not differ significantly from those who were interviewed following surgery on baseline levels of anxiety/depression. Moreover, anxiety/depression scores did not differ significantly by whether participants

Table 1
Means and Standard Deviations of Variables at Each Time Point

Variable	Time 1		Time 2		Time 3	
	M	SD	M	SD	M	SD
Dispositional optimism	17.3	5.5	—	—	—	—
Dispositional monitoring	9.9	2.6	—	—	—	—
Avoidance	14.7	7.4	15.1	8.0	14.1	8.3
Intrusive thoughts	15.5	8.0	11.6	8.1	11.0	7.3
Problem-focused engagement	6.5	1.3	6.0	1.2	5.4	1.5
Emotion-focused engagement	6.0	1.6	5.4	1.4	4.7	1.6
Problem-focused disengagement	3.8	1.0	3.9	1.0	3.6	1.0
Emotion-focused disengagement	3.0	0.8	2.8	0.7	2.9	1.1
Anxiety/depression symptoms	0.8	0.6	0.6	0.5	0.6	0.6
	N	%	N	%	N	%
Clinical range anxiety	32	40.0	14	17.5	17	21.3
Clinical range depression	27	33.7	23	28.7	21	26.3

had received a total versus partial mastectomy, radiation therapy, or chemotherapy at any point during the study time window. Finally, anxiety/depression scores at any given time point did not differ significantly according to whether participants were receiving radiation therapy or chemotherapy at that same time point. The only significant finding was that women who were participating simultaneously in a double-blind randomized clinical trial for hormonal therapy versus placebo ($n = 6$) had lower anxiety/depression scores at 3 and 6 months—$F(2, 77) = 2.91, p = .06$, at 3 months; $F(2, 77) = 3.19, p < .05$, at 6 months—relative to those who were receiving known hormonal therapy or those who were not receiving hormonal therapy.

Correlational Analyses

Analyses were conducted to examine the association of key demographic and disease variables with psychological variables measured near time of diagnosis. Significant associations were found for age and intrusive thoughts, $r(79) = -.25, p < .05$, anxiety/depression symptoms, $r(79) = -.28, p < .05$, and emotion-focused engagement, $r(79) = -.32, p < .01$; years of education and dispositional optimism, $r(79) = .25, p < .05$, avoidance, $r(79) = -.35, p < .01$, and emotion-focused disengagement, $r(79) = -.24, p < .05$; and cancer stage and emotion-focused disengagement, $r(79) = .26, p < .05$. All other associations were nonsignificant. Age, years of education, and cancer stage were retained as control variables in all regression analyses.

Correlations between psychological variables and anxiety/depression symptoms at each measurement time point are displayed in Table 2. Optimism measured at diagnosis was negatively correlated with anxiety/depression symptoms at all time points. Conversely, monitoring was not significantly correlated with anxiety/depression symptoms at any of the assessments. Whereas avoidance was only minimally correlated with anxiety/depression symptoms, intrusive thoughts were strongly correlated with greater levels of affective distress at all three measurement points. Problem-focused engagement was uncorrelated with anxiety/depression symptoms at all time points; emotion-focused engagement was moderately related to greater anxiety/depression symptoms

at diagnosis and 3 months postdiagnosis, but was unrelated to anxiety/depression symptoms at 6 months postdiagnosis. In contrast, both problem-focused and emotion-focused disengagement coping were significantly associated with greater anxiety/depression symptoms at all time points.

Correlations of optimism and monitoring at diagnosis with coping scales at all three assessments also were examined. These analyses indicated that optimism at diagnosis was negatively correlated with emotion-focused disengagement coping at diagnosis ($r = -.41, p < .001$), 3 months ($r = -.35, p < .01$), and 6 months ($r = -.40, p < .001$). Optimism also was negatively correlated with problem-focused disengagement coping at 3 months ($r = -.33, p < .01$), but not at diagnosis or 6 months. Optimism was not correlated with problem-focused or emotion-focused engagement at any of the assessments. Monitoring was not correlated with any of the coping scales at any of the assessments. On the basis of the absence of significant correlations between monitoring and any of the mediator or outcome variables at any of the assessments, it was dropped from the multiple regression analyses.

Multiple Regression Analyses

A series of regression equations was constructed at each time point to explore direct and mediated paths to anxiety/depression symptoms. In accordance with guidelines for testing mediated models (Baron & Kenny, 1986), the background variables of age, educational level, disease stage, and dispositional optimism were examined first as predictors of the potential mediator variables avoidance, intrusive thoughts, and engagement and disengagement coping and, second, as predictors of anxiety/depression symptoms. Potential mediator variables were examined next as predictors of anxiety/depression symptoms. Finally, a full model was tested to examine relationships between background variables and anxiety/depression symptoms after potential mediator variables were included. Collectively, these analyses permitted the construction of models displaying direct and mediated paths to anxiety/depression at each time point.[1]

Table 2
Correlations of Psychological Variables With Anxiety/Depression Symptoms at Each Measurement Point

Variable	Diagnosis	3 months postdiagnosis	6 months postdiagnosis
Optimism at diagnosis	−.50***	−.40***	−.55***
Monitoring at diagnosis	.16	.07	.15
Avoidance	.20	.21	.23*
Intrusive thoughts	.70***	.63***	.48***
PF engagement	−.01	.12	.05
EF engagement	.33**	.31**	.16
PF disengagement	.40***	.45***	.48***
EF disengagement	.45***	.34**	.75***

Note. PF = problem-focused; EF = emotion-focused.
*$p < .05$. **$p < .01$. ***$p < .001$.

[1] The ratio of the sample size to the number of predictor variables is important in determining statistical power in multiple regression analyses (Green, 1991). The sample of 80 patients may have resulted in low power in some of the regression equations, especially those testing the full models that included 10 to 11 predictors. To examine these regressions with a larger sample, missing data were substituted for those patients who were missing data on one of the measures at one of the time points. Patients' z scores were calculated on the measures at the two times that they completed them, and the z score corresponding to the mean of these two z scores was substituted for the missing data at the third time point. This substitution method accounted for each participant's relative standing in the sample at those assessments when they completed the measure and the tendency for scores for the sample to change on some measures across the three assessments. Using this procedure, data from 16 additional patients could be added, resulting in a sample of 96. The multiple regression analyses were rerun with this larger sample and were virtually identical to those

Near diagnosis: Background variable prediction of avoidance. This equation was significant, $F(4, 75) = 2.85, p < .05$, accounting for 13% of the variance. More years of education was predictive of less avoidance ($\beta = -.33$). Age, cancer stage, and optimism were not significant predictors for this variable.

Background variable prediction of intrusive thoughts. This equation also was significant, $F(4, 75) = 3.10, p < .05$, accounting for 14% of the variance. Higher levels of intrusive thoughts were predicted by younger age ($\beta = -.26$). Education, cancer stage, and optimism were not significant.

Background variable prediction of problem-focused engagement. The overall equation of age, years of education, disease stage, and optimism did not provide a significant fit with problem-focused engagement, $F(4, 75) = 1.48, ns$.

Background variable prediction of emotion-focused engagement. The model successfully predicted emotion-focused engagement coping, $F(4, 75) = 3.25, p < .05$, accounting for 15% of the variance. Older age was predictive of less use of emotion-focused engagement coping ($\beta = -.33$). Education, stage, and optimism were not significant.

Background variable prediction of problem-focused disengagement. The equation predicting problem-focused disengagement coping from age, stage, education, and optimism was not significant, $F(4, 75) = 2.19, p < .10$.

Background prediction of emotion-focused disengagement. This equation was significant, $F(4, 75) = 6.33$, accounting for 25% of the variance. More advanced cancer stage was predictive of greater use of emotion-focused disengagement ($\beta = .20$). Conversely, higher levels of dispositional optimism were predictive of less use of emotion-focused disengagement ($\beta = -.39$). Age and education were not significant.

Background variable prediction of anxiety/depression symptoms. Anxiety/depression symptoms were significantly predicted by this model, $F(4, 75) = 8.94, p < .001$, accounting for 32% of the variance. Older age ($\beta = -.28$) and greater optimism ($\beta = -.48$) were predictive of lesser anxiety/depression symptoms. Cancer stage and years of education were not significant.

Potential mediator variable prediction of anxiety/depression symptoms. The overall model accounted for 62% of the variance, $F(6, 73) = 19.53, p < .001$. Greater intrusive thoughts ($\beta = .60$) and use of emotion-focused disengagement strategies ($\beta = .34$) were predictive of more anxiety/depression symptoms, whereas greater use of problem-focused engagement coping ($\beta = -.25$) was predictive of fewer anxiety/depression symptoms.

Full model prediction of anxiety/depression symptoms. A final full regression model was constructed to predict anxiety/depression symptoms near time of diagnosis, and it explained 68% of the variance, $F(10, 69) = 14.64, p < .001$. Anxiety/depression symptoms were predicted by optimism ($\beta = -.27$), intrusive thoughts ($\beta = .52$), problem-focused engagement coping ($\beta = -.18$), and emotion-focused disengagement coping ($\beta = .23$). Higher levels of anxiety/depression were related to lower dispositional optimism (i.e., greater dispositional pessimism), more intrusive thoughts, less problem-focused engagement coping, and greater emotion-focused disengagement coping. Age, education, cancer stage, and emotion-focused engagement and problem-focused disengagement coping were nonsignificant.

The final path model predicting anxiety/depression symptoms at diagnosis is displayed in Figure 1. Full model effects, as well as mediated pathways, are presented in this figure. Dispositional optimism was predictive of anxiety/depression symptoms, and this relationship was partially mediated by use of emotion-focused disengagement coping strategies. The significant relationship between age and anxiety/depression symptoms was fully mediated by intrusive thoughts near time of diagnosis. Problem-focused engagement coping also predicted anxiety/depression symptoms, but was not related to any background variables. Dispositional monitoring, years of education, cancer stage, avoidance, problem-focused disengagement, and emotion-focused engagement were not predictive of anxiety/depression symptoms in the full model at this time point.

Three months postdiagnosis. The potential mediator variables of intrusive thoughts, avoidance, and coping were assessed at 3 months for this set of equations. Anxiety/depression symptoms measured at diagnosis also were included in analyses of 3-month anxiety/depression.

Background variable prediction of avoidance. In contrast to avoidance at diagnosis, avoidance at 3 months postdiagnosis was not predicted by baseline background variables, $F(4, 75) = 1.49, ns$.

Background variable prediction of intrusive thoughts. The equation predicting intrusive thoughts was significant, accounting for 15% of the variance, $F(4, 75) = 3.27, p < .05$. Higher levels of intrusive thoughts at 3 months postdiagnosis were again associated with younger age ($\beta = -.26$) and lower optimism ($\beta = -.23$). Education and cancer stage were not significant predictors of intrusive thoughts.

Background variable prediction of problem-focused engagement. As at time of diagnosis, the overall equation of demographic and disease variables did not provide a significant fit with the use of problem-focused engagement coping at 3 months, $F(4, 75) = 0.77, ns$.
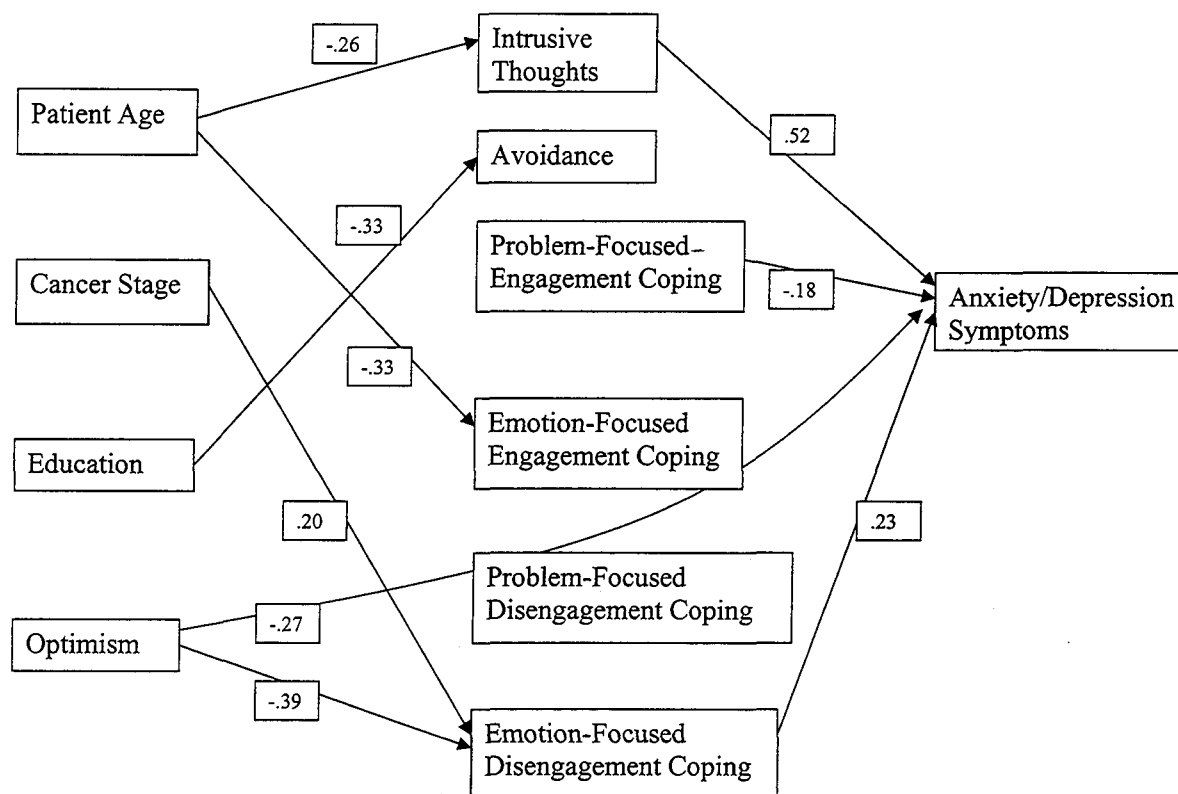
with the sample of 80 patients who had complete data on all measures. Because the sample size issue is primarily one of power, the changes that occurred involved additional paths that are significant with the larger sample; there is no loss of significant effects with the additional participants included. At the first step (mediators predicted by background variables), problem-focused engagement coping was predicted by optimism, and problem-focused disengagement coping was more consistently predicted by optimism and cancer stage. There were no changes at the second step (anxiety/depression predicted by the background variables). At the third step (prediction of anxiety/depression by the mediators), prior anxiety/depression symptoms were predictive at 3 months, and intrusive thoughts were predictive at 6 months. And in the full model, intrusive thoughts were predictive of anxiety/depression at 6 months. Otherwise, all of the paths that were significant in the analyses with 80 patients were also significant in the analyses with 96 patients.

Figure 1. Path model of psychological adjustment at diagnosis. Full model significant standardized beta coefficients are reported.

Background variable prediction of emotion-focused engagement. The equation predicting emotion-focused engagement coping at 3 months from the background variables was significant, $F(4, 75) = 2.60$, $p < .05$, accounting for 12% of the variance. Age ($\beta = -.33$) was the only significant predictor.

Background variable prediction of problem-focused disengagement. The equation was significant, explaining 22% of the variance, $F(4, 75) = 5.16$, $p < .001$. More advanced cancer stage ($\beta = .25$) and lower optimism ($\beta = -.30$) significantly predicted greater use of problem-focused disengagement. Age was not significant.

Background variable prediction of emotion-focused disengagement. This equation was significant, accounting for 15% of the variance, $F(4, 75) = 3.37$, $p < .05$. Similar to time of diagnosis, higher levels of dispositional optimism were predictive of less emotion-focused disengagement coping ($\beta = -.33$). Other background variables were nonsignificant.

Background variable prediction of anxiety/depression symptoms. Controlling for anxiety/depression symptoms near the time of diagnosis, the equation was significant, explaining 33% of the variance, $F(5, 74) = 7.24$, $p < .001$. More advanced cancer stage ($\beta = .20$) and baseline anxiety/depression symptoms ($\beta = .37$) predicted anxiety/depression symptoms at 3 months. Age, education, and optimism did not significantly predict anxiety/depression symptoms at this time point.

Potential mediator variable prediction of anxiety/depression symptoms. The model was significant, accounting for 47% of the variance, $F(7, 72) = 9.41$, $p < .0001$. Greater intrusive thoughts ($\beta = .39$) symptoms and 3-month problem-focused disengagement coping ($\beta = .20$) were predictive of more anxiety/depression. Baseline anxiety/depression symptoms, 3-month avoidance, and the other 3-month coping variables were not significant predictors.

Full model prediction of anxiety/depression symptoms. This full regression model was significant, accounting for 51% of the variance in 3-month anxiety/depression, $F(11, 68) = 6.45$, $p < .0001$. Although anxiety/depression symptoms near time of diagnosis were entered in the equation, 3-month anxiety/depression symptoms were predicted only by intrusive thoughts. Greater intrusive thoughts were predictive of more anxiety/depression symptoms, accounting for 8% unique variance ($\beta = .39$). All other variables were nonsignificant.

The final path model leading to anxiety/depression symptoms at 3 months postdiagnosis is displayed in Figure 2. As depicted by Figures 1 and 2, the relationships among variables changed substantially from diagnosis to 3 months postdiagnosis. Mediated pathways that were present at diagnosis dropped out at this time point. The only significant predictor of greater anxiety/depression symptoms was 3-month intrusive thoughts. Years of education, cancer stage, dispositional optimism, avoidance, and coping were unrelated to anxiety/depression symptoms at this time point.
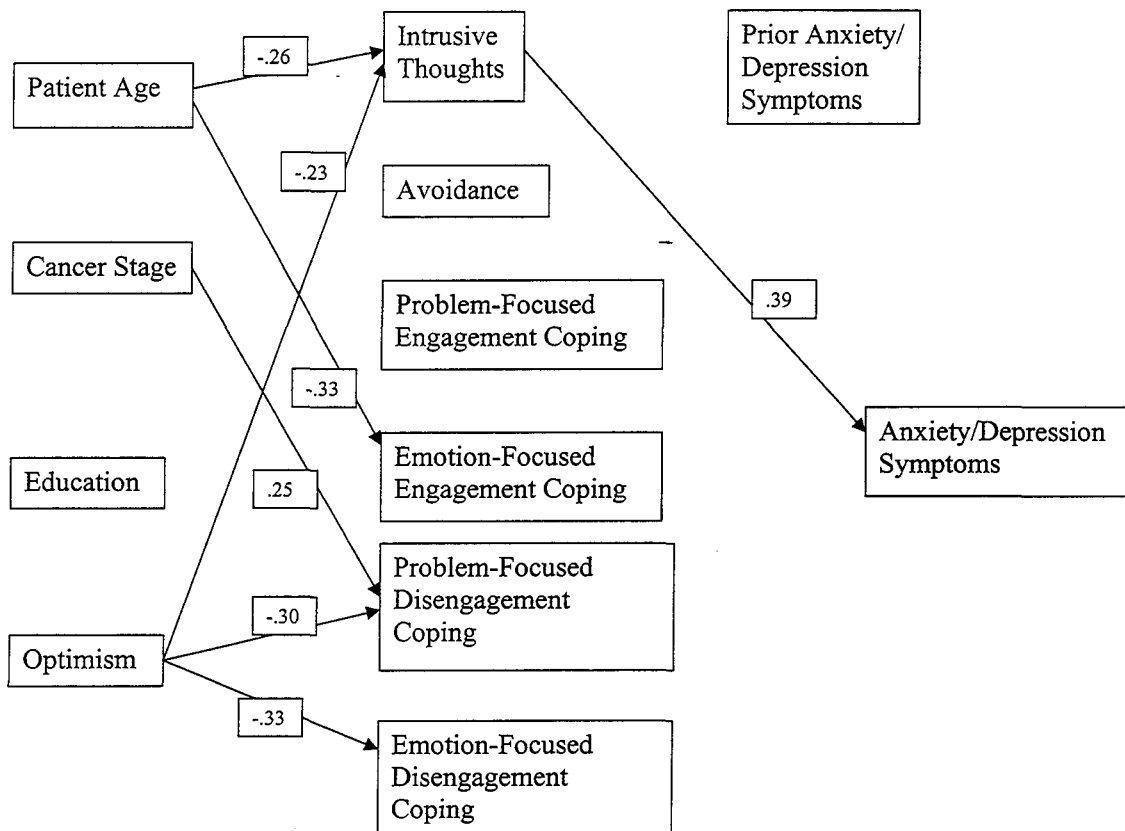
Figure 2. Path model of psychological adjustment at 3 months postdiagnosis. Full model significant standardized beta coefficients are reported.

Although optimism was not directly related to anxiety/depression symptoms, there was an indirect relationship through intrusive thoughts.

Six months postdiagnosis. For this set of analyses, potential mediator variables (intrusive thoughts, avoidance, coping) were assessed at 6 months. Anxiety/depression symptoms at 3 months were entered as control variables for equations in which 6-month anxiety/depression symptoms were being predicted.

Background variable prediction of avoidance. Similar to avoidance at 3 months, avoidance at 6 months was not predicted by baseline demographic or dispositional variables, $F(4, 75) = 0.67$, *ns.*

Background variable prediction of intrusive thoughts. This equation was significant, explaining 23% of the variance, $F(4, 75) = 5.66$, $p < .001$. Higher levels of intrusive thoughts at 6 months were again associated with younger age ($\beta = -.31$). Fewer years of education ($\beta = -.28$) and lower optimism ($\beta = -.20$) emerged as an additional significant predictor of intrusive thoughts at this time point. Cancer stage was not a significant predictor.

Background variable prediction of problem-focused engagement. As at prior time points, background predictor variables did not provide a significant fit with the use of problem-focused engagement coping at 6 months, $F(4, 75) = 1.08$, *ns.*

Background variable prediction of emotion-focused engagement. Similar to 3 months, the use of emotion-focused engagement coping at 6 months was not significantly accounted for by background predictor variables, $F(4, 75) = 1.73$, *ns.*

Background variable prediction of problem-focused disengagement. In contrast to prior time points, this equation was nonsignificant, $F(4, 75) = 1.96$, *ns.*

Background variable prediction of emotion-focused disengagement. The equation was significant, explaining 17% of the variance, $F(4, 75) = 3.92$, $p < .01$. Higher levels of dispositional optimism were again predictive of less use of emotion-focused disengagement coping ($\beta = -.37$). As at 3 months, all other predictor variables were nonsignificant.

Background variable prediction of anxiety/depression symptoms. The equation was significant, $F(5, 74) = 13.72$, $p < .0001$, accounting for 48% of the variance. Greater 3-month anxiety/depression ($\beta = .42$) and lesser 6-month optimism ($\beta = -.35$) were predictive of greater anxiety/depression symptoms at 6 months. Cancer stage, years of education, and age did not significantly predict anxiety/depression symptoms at this time point.

Potential mediator prediction of anxiety/depression symptoms. The model was significant, accounting for 72% of the variance, $F(7, 72) = 27.42$, $p < .0001$. Anxiety/depression symptoms at 6 months were predicted by 3-month

anxiety/depression (β = .26) and 6-month problem-focused engagement (β = $-.19$), problem-focused disengagement (β = .15), emotion-focused engagement (β = .16), and emotion-focused disengagement (β = .58) coping strategies. Six-month avoidance and intrusive thoughts were nonsignificant.

Full model prediction of anxiety/depression symptoms. A final full regression model predicting 6-month anxiety/depression symptoms again explained 76% of the variance, $F(11, 68)$ = 19.90, p < .0001. Anxiety/depression symptoms were predicted by 3-month anxiety/depression (β = .21), baseline optimism (β = $-.19$), 6-month problem-focused engagement (β = $-.16$), 6-month problem-focused disengagement coping (β = .15), 6 month emotion-focused engagement (β = .16), and 6-month emotion-focused disengagement (β = .53) coping. Nonsignificant predictors of anxiety/depression symptoms included demographics, cancer stage, dispositional monitoring, avoidance, and problem-focused disengagement coping.

The final path model leading to anxiety/depression symptoms at 6 months is displayed in Figure 3. At this time point, coping reemerges as a notable predictor of anxiety/depression symptoms. Optimism also resurfaces with direct and partially mediated pathways to emotional distress. Demographic variables, disease stage, dispositional monitoring, avoidance, and intrusive thoughts are unrelated to anxiety/depression symptoms at this time point.

Discussion

The present findings provide a perspective on the nature of and changes in the process of adjustment to breast cancer during the first 6 months after diagnosis. Whereas specific demographic and dispositional factors are background predictors of anxiety and depression symptoms, the more proximal factors of intrusive thoughts and coping responses are important mediators that account for substantial variation in levels of distress. Results further indicate that these relationships change considerably over the course of treatment and recovery.

Although each of the background variables (patient age, education, cancer stage, and dispositional optimism) was related to one or more of the proximal variables at at least one of the assessments, they varied considerably in their importance. Consistent with findings of Carver et al. (1993), optimism played a major role in predicting coping and emotional distress. Optimism had a direct relationship to anxiety and depression symptoms near diagnosis and at 6 months, and fit criteria for being partially mediated (Baron & Kenny, 1986) through emotion-focused disengagement coping at both of these times as well. The direct path indicated that, as expected, more optimistic women experienced lower levels of distress. The partially mediated path further indicated that women who were more pessimistic used more emotion-focused disengagement coping (self-
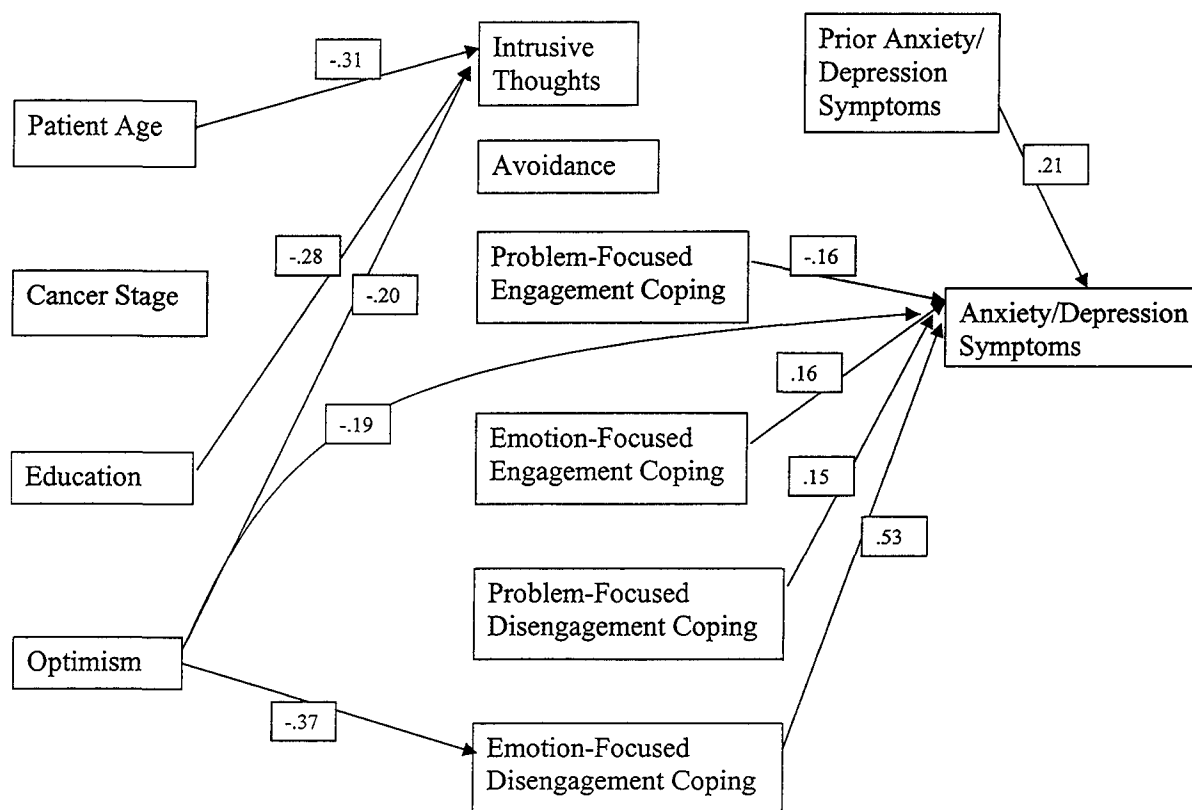

Figure 3. Path model of psychological adjustment at 6 months postdiagnosis. Full model significant standardized beta coefficients are reported.

criticism and social withdrawal), and the use of this type of coping was related to more emotional distress at diagnosis, and increases in distress from 3 to 6 months. This is consistent with the finding from Carver et al. (1993) that pessimism was related to more denial and behavioral disengagement coping. On the other hand, optimism was not related to the use of more problem-focused engagement coping (cognitive restructuring and problem solving); that is, optimism did not predict greater use of the one type of coping that was positively related to lower emotional distress. Carver et al. (1993) found that optimism was related to the use of acceptance and humor as coping strategies but, similar to the present study, they did not find an association between optimism and the use of active coping, planning, or positive reframing. However, when missing data were substituted in the present study and a larger sample of 96 was included, optimism was predictive of problem-focused engagement coping, suggesting that this effect was not detected because of relatively low statistical power.

At diagnosis, younger age was predictive of greater emotional distress, but this relationship was fully mediated (Baron & Kenny, 1986) by intrusive thoughts. By 3 and 6 months postdiagnosis, age no longer was predictive of emotional distress, although younger women continued to experience significantly greater intrusive thoughts. An inverse relationship between age and emotional distress at the time of diagnosis has been documented in other cancer publications (e.g., Northouse & Swain, 1987), and the present study further illuminates the nature of this association. Results suggest that, relative to older women, younger women may experience higher levels of distress near the time of breast cancer diagnosis because they have more intrusive thoughts about their cancer. Younger and older women do not differ in their adjustment over the course of treatment and recovery, however.

The other background variables were less strongly related to the ongoing process of adjustment. Years of education were related only to more avoidance at diagnosis and more intrusion at 6 months, but neither of these variables were associated with emotional distress at these points in time (i.e., there were no direct or mediated paths between education and distress). Stage of cancer was related to more emotion-focused disengagement coping at diagnosis and to problem-focused disengagement at 3 months; however, these types of coping were not related to more emotional distress at these time points. The present sample was composed primarily of women with early stage breast cancer, and this may account for the null association between cancer stage and emotional distress. Alternatively, the limited relationship between disease severity and emotional distress is consistent with results from at least some previous cancer studies (e.g., Compas et al., 1994). Dispositional monitoring also played a minor role in the present study. This is quite different from the central role that monitoring has played in recent studies of women at risk for breast cancer (e.g., Schwartz et al., 1995). The present findings suggest that monitoring may play a more important role in situations of circumscribed threat, but a less central

role in the context of complex stressors such as the diagnosis and treatment of breast cancer.

The proximal variables of intrusive thoughts, avoidance, and coping ranged considerably in their prediction of emotional distress. Intrusive thoughts were important predictors of distress at both diagnosis and 3 months, but played a less central role at 6 months. In contrast, avoidance was not related to emotional distress at any of the assessments. Coping responses accounted for distress in different ways across the three time points. At diagnosis, problem-focused engagement (problem solving and cognitive restructuring) was associated with less distress, and emotion-focused disengagement (self-criticism and social withdrawal) was related to more distress. At 6 months, after controlling of distress at 3 months, problem-focused engagement coping was again related to decreased distress, whereas emotion-focused engagement (emotional ventilation and social support), emotion-focused disengagement coping, and problem-focused coping (avoidance and wishful thinking) were all related to higher distress. In contrast, after controlling for distress at diagnosis, there were no significant effects of coping on distress at 3 months. This is noteworthy in that there were no appreciable differences in the simple correlations of coping with distress at 3 months compared with the other two assessments. However, this pattern is consistent with other process-oriented studies of stress and coping that have found that coping and adjustment change as the demands of the stressful encounter change (e.g., Folkman & Lazarus, 1985).

Closer consideration of these data provides a picture of the process of adjustment to breast cancer over this 6-month period. Diagnosis is a time of heightened distress, as reflected by the high levels of anxiety and depression symptoms at this time. Women who hold more optimistic attitudes about their future are somewhat protected from distress, whereas those who are more pessimistic may increase their distress by using emotion-focused disengagement coping responses that involve self-criticism and withdrawal from others. Younger women also are at risk for emotional distress during this time, and this risk is accounted for by heightened intrusive thoughts in response to cancer diagnosis. However, at least some patients are able to mobilize coping responses that are effective in reducing their emotional distress, as reflected in the inverse association of problem-focused engagement coping with affective distress.

The picture changes rather dramatically 3 months after diagnosis. Optimism and age no longer directly predict emotional distress, and there are no effects of coping on emotional distress at this point. This suggests that coping responses mobilized by patients 3 months postdiagnosis may play a minor role in the regulation of their emotional response. Even more striking is the finding that anxiety and depression symptoms at diagnosis have no predictive effect on levels of these symptoms 3 months later. The only independent predictor of distress is concurrent levels of intrusive thoughts, which is analogous to the relationship between these two variables at diagnosis. Collectively, these findings are similar to those reported by Carver et al. (1993), in which emotional distress at 3 months postdiagnosis was

more difficult to predict than distress at either diagnosis or 6 months. It is possible that this assessment reflects a particularly disrupted time for breast cancer patients, as most have undergone surgery since the prior assessment, and many also have received adjuvant chemotherapy or radiation therapy, or both, during this time interval. The residual impact of these treatments may overwhelm the influence that other factors, including personal coping efforts, have on emotional distress.

The pattern at 6 months is similar to the pattern at diagnosis, although anxiety and depression symptoms 3 months earlier are additional significant predictors at this time point. Coping responses reemerge as important predictors of emotional distress. Emotion-focused disengagement coping has the strongest relationship with anxiety/depression symptoms at 6 months, but emotion-focused engagement coping (emotional ventilation and seeking social support), problem-focused disengagement coping (avoidance and wishful thinking), and problem-focused engagement coping (problem solving and cognitive restructuring) are also important at this time point. Although the two forms of emotion-focused coping and problem-focused disengagement coping are related to increased distress, problem-focused engagement coping is once again related to lowered distress. Dispositional optimism (measured at diagnosis) has resumed its role as a significant predictor of emotional distress, both directly and indirectly, through emotion-focused disengagement coping. A major difference between the data at diagnosis and 6 months is the reduced role of age and intrusive thoughts at the follow-up assessment. By 6 months postdiagnosis, younger women are no longer at heightened risk and intrusive thoughts are not substantially related to emotional distress.

Although this study prospectively examined women with newly diagnosed breast cancer, it is important to note its restrictions and limitations. The sample is less demographically varied than those served by urban medical centers and cannot be generalized to more diverse economic and ethnic groups. Furthermore, without a control group, one cannot conclude that the source of participants' emotional distress was the breast cancer diagnosis and resulting treatments. Alternatively, individuals were assessed on average less than 2 weeks after diagnosis, and in this respect this study is at a distinct advantage relative to much prior work in the area. Although the study is prospective, the association between the proximal variables, most notably intrusive thoughts and coping, with anxiety/depression symptoms could operate in the opposite direction from the paths tested in the model. That is, it is plausible that symptoms of anxiety/depression lead to increased intrusive thoughts and the use of certain types of maladaptive coping. Finally, the relatively small sample size in relation to the number of participants included in the regression analyses warrants caution in interpreting these results. There may have been several paths that did not achieve statistical significance because of inadequate power to detect small effects. Replication of these findings in future studies will be important.

The present study suggests important areas for further research on the process of psychological adjustment to breast cancer. First, it will be important to further examine the process of adjustment during adjuvant treatment, because the present data did not fully account for emotional distress during this time. Second, we were unable to identify any predictors of problem-focused engagement coping, the only type of coping that was associated with lower levels of emotional distress. Analyses with the larger sample that substituted missing data found an effect of optimism on problem-focused engagement coping, suggesting that this is a relatively small effect that requires greater statistical power to reliably detect. Other personal factors (e.g., perceptions of control) or external resources (e.g., access to information) may also be important in understanding the use of this important type of coping. Third, the process of adjustment needs to be examined over a more extended period of time, as adjustment and the predictors of adjustment may continue to change in the subsequent months and years after a diagnosis of breast cancer.

These findings also provide a number of hypotheses that could be tested in clinical trials research (Compas, Haaga, Keefe, Leitenberg, & Williams, 1998). Interventions that assist patients in managing intrusive thoughts about their cancer, that increase patients' use of problem-focused engagement coping (cognitive restructuring and planful problem-solving), and that decrease patients' reliance on emotion-focused disengagement coping (self-criticism and social withdrawal) and problem-focused disengagement coping (avoidance and wishful thinking) could be evaluated for their impact on emotional distress. These data further suggest that it may be important to implement these interventions early, near the time of diagnosis, as the impact of proximal responses on emotional distress is evident at this early point in the process. It is possible that early interventions of this type might promote rapid return to psychological health and, consequently, reduce the emotional burden of breast cancer.

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