Cognitive Therapy and Research, Vol. 23, No. 2, 1999, pp. 169-180

A Prospective Study of Coping, Perceived Control, and Psychological Adaptation to Breast Cancer

Dana M. Osowiecki[1] **and Bruce E. Compas**[1,2]

Coping, perceived control, and symptoms of anxiety/depression were assessed in 70 women with breast cancer near their diagnosis and at 3- and 6-month follow-ups. Multiple regression equations were constructed to investigate the effects of coping, perceived control, and their interaction on anxiety/depression symptoms. Problem-focused engagement coping was related to lower anxiety/depression symptoms near diagnosis; emotion-focused disengagement coping was related to more anxiety/depression symptoms at 6 months, controlling for initial anxiety/depression; and problem-focused engagement was marginally related to lower anxiety/depression symptoms at 6 months controlling for initial anxiety/depression. There were no main effects for perceived control. The interaction of problem-focused engagement coping and perceived control was a significant predictor of lower anxiety/depression symptoms only near the time of diagnosis. Thus, the goodness-of-fit effect, in which problem-focused coping interacts with perceived control to predict lower levels of anxiety/depression, was replicated cross-sectionally, but not prospectively.

KEY WORDS: coping; breast cancer; control; anxiety; depression.

Adjustment to breast cancer is best viewed as a process of adaptation that involves the complex interaction of the characteristics of cancer and its treatment, cognitive appraisals, and coping efforts. Changing demands of the stress of breast cancer include shock of the diagnosis, various aspects of treatment, and continued uncertainty about the future. The changing nature of breast cancer and its treatment offer differing opportunities for patients to develop cognitive appraisals of control and cope with the disease. Some patients experience high levels of perceived control, whereas others experience breast cancer as relatively uncontrollable. Because coping efforts reflect attempts to address specific situational demands and appraisals of these demands, coping also varies at different points in the process, and the efficacy of different coping responses may differ as demands and appraisals change. Previous research on individuals with cancer has shown that symptoms of psycholog-

[1]University of Vermont.
[2]Address correspondence to Bruce E. Compas, Department of Psychology, University of Vermont, Burlington, Vermont 05405; e-mail: bruce.compas@uvm.edu

0147-5916/99/0400-0169 $16.00/0

ical distress, stress appraisals, and coping responses are heightened at the time of diagnosis and through the early phases of cancer, but decrease over time (e.g., Andersen, Anderson, & deProsse, 1989; Carver et al., 1993; Stanton & Snider, 1993). Not only do responses to the situation decrease in intensity over time, but different coping responses may also be effective at different time points (e.g., Carver et al., 1993). Thus, when investigating coping strategies of cancer patients, it is important to consider the changing demands of the stressor and stress appraisals.

Both appraisals of control and coping efforts have been shown to be important predictors of psychological adjustment to breast cancer. For example, Taylor, Lichtman, and Wood (1984) found a main effect for personal control beliefs in predicting psychological adjustment to cancer. The belief that one could control one's cancer and the belief that others could control the cancer were significantly associated with better psychological adjustment. Thompson, Sobolew-Shubin, Galbraith, Schwankovsky, and Cruzen (1993) found that cancer patients with greater perceptions of control reported fewer symptoms of depression, with the stronger effects for patients' beliefs that they could control their daily emotional reactions and physical symptoms than for perceived control over the course of the disease. Process research on coping with cancer has shown that coping responses and their association with emotional distress change over the course of cancer diagnosis and treatment. For example, in a study of breast cancer patients, Carver et al. (1993) found that acceptance predicted less distress postsurgery, and denial and behavioral avoidance were predictors of psychological distress at 6 months. However, coping was not a significant predictor of psychological distress at 3 and 12 months. Stanton and Snider (1993), in a prospective study of women before and after a breast biopsy, found that cognitive avoidance was the only unique predictor of emotional distress over time.

Although these studies suggested that both perceptions of control and coping have direct associations with psychological adjustment to cancer, studies of individuals coping with other types of stress found that coping and control beliefs interact in their association with emotional distress (e.g., Compas, Malcarne, & Fondacaro, 1988; Conway & Terry, 1992; Forsythe & Compas, 1987; Hynes, Callan, Terry, & Gallois, 1992; Masel, Terry, & Gribble, 1996; Terry & Hynes, 1998; Vitaliano et al., 1990; Weisz, McCabe, & Dennig, 1994). These investigations examined whether there is a goodness-of-fit between coping and control, such that active problem-oriented coping responses are more adaptive in response to stressors that are perceived as controllable, whereas coping efforts directed at emotional regulation and palliation are more effective in response to stressors that are appraised as beyond personal control. In spite of the intuitive appeal of the idea that coping and control interact in their effects on adaptation to stress, empirical support for the interaction of coping and control has been mixed. Generally, stronger support has been found for the adaptive effects of problem-oriented coping in response to controllable stressors and less support for the efficacy of emotion-focused coping in response to uncontrollable stress (e.g., Forsythe & Compas, 1987). More recently, Terry and Hynes (1998) found that it is important to make more fine-grained distinctions between types of coping. In a study of women coping with an uncontrollable stressor, unsuccessful *in vitro* fertilization, they found that problem management was related to more distress, problem-appraisal was related to less distress,

emotional-approach coping was related to less distress, and emotional avoidance to more distress (Terry & Hynes, 1998). These findings are consistent with the distinction between engagement and disengagement coping efforts (Compas, Connor, Osowiecki, & Welch, 1997; Tobin, Holroyd, Reynolds, & Wigal, 1989). Engagement coping includes those responses that are oriented toward the problem or one's emotions but involve active attempts at problem or emotion management; disengagement coping involves attempts to avoid either the problem or one's emotions.

Only one study has examined the interaction of coping and control in cancer patients. Osowiecki and Compas (1998) investigated the interaction of coping with control in a sample of individuals with heterogeneous cancer diagnoses. They found that the combination of high perceived control and the use of more problem-focused coping was associated with less psychological distress; however, the interaction of control beliefs and emotion-focused coping was not significant. Furthermore, the interaction of perceptions of control and problem-focused coping was significant near the time of patients' diagnoses, but not in prospective analyses 3 months later controlling for initial distress. This study was limited in several ways, however. The sample was heterogeneous, as it included both men and women who had been diagnosed with a variety of different types of cancer. The initial assessment occurred approximately 10 weeks after patients were diagnosed, and therefore did not reflect their initial efforts to cope with their cancer. Furthermore, Osowiecki and Compas (1998) used an interview measure of coping that did not allow for analyses of subtypes of problem- and emotion-focused coping.

The present study was designed to examine perceptions of control, coping efforts, and emotional distress in a prospective study of women with newly diagnosed breast cancer. Patients were assessed close to the time of their diagnosis and at 3- and 6-month follow-ups. Coping was assessed with an instrument that distinguished between engagement and disengagement responses that were problem- and emotion-focused coping in their intent. It was hypothesized that high perceived control and the use of problem-focused engagement coping (problem solving and cognitive restructuring) would be associated with lower psychological distress, and low perceived control and emotion-focused engagement (emotional expression and seeking social support coping) would be associated with lower distress. Problem-focused disengagement (avoidance and wishful thinking) and emotion-focused disengagement coping (social withdrawal and self-criticism) were not expected to interact with control beliefs, as both of these types of coping were expected to be related to higher symptoms of emotional distress. These effects were examined both cross-sectionally near the time of diagnosis and at follow-up, controlling for initial levels of distress.

METHOD

Subjects

Participants were 70 women newly diagnosed with breast cancer, participating in a longitudinal study of individual coping and adjustment to breast cancer. Patients

had a mean age of 54.86 years (SD = 10.01, range = 36–80). Patients' mean years of education were 14.17 years (SD = 3.30, range = 7–27). Sixty-seven percent were either married or living with a partner, and 89% had children. Diagnoses included 61% with stage I breast cancer, 30% with stage II, and 9% with stage III. Comparisons were made between the 70 patients who had complete data at all three assessments and the 40 patients for whom partial data were missing. Patients 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 characteristics (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 the Vermont Cancer Center. Patients were approached near the time of their diagnosis by a member of the medical staff about participating {mean time from diagnosis to interview was 10.8 days (SD = 10.8, range = 0–43)}, and were referred to a research assistant who obtained written consent from those willing to participate. Patients either were interviewed in person or completed a telephone interview within a few days of providing consent. Each participant completed a structured interview and written questionnaires assessing psychological variables. Initial follow-up interviews were conducted either when the patients returned for a medical check-up or over the phone approximately 3 months after their diagnosis (mean time from diagnosis = 112 days, or 3.7 months; SD = 24.3 days, range = 110–179). A second set of follow-up interviews was conducted approximately 6 months postdiagnosis (mean time from diagnosis = 199 days, or 6.6 months; SD = 25.8, range = 160–266).

Measures

Structured Interview

A structured interview was developed for this study to collect information on patient demographics and perceptions of control. Portions of the interview were based on prior research by Taylor et al. (1984) and Osowiecki and Compas (1998). Trained interviewers administered the protocol and recorded the participants' responses. Perceptions of control were assessed with the following question: "How much control do you believe you have over the symptoms of your cancer?" Patients rated their perception of their control on a Likert scale ranging from 1 (not at all) to 4 (a great deal). Although the reliability of this single item measuring perceived control could not be determined, this approach has been used to measure control in a number of other studies (e.g., Taylor et al., 1985).

Affective Distress

Symptoms of emotional distress were measured by the Symptom Checklist-90-Revised (SCL-90-R; Derogitis & Spencer, 1982). The SCL-90-R 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 used as an index of patients' 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 patients' cancer or their treatment. The two scales were converted to normalized T scores based on the normative data from a community sample of adult women reported by Derogatis (1983); the mean of the anxiety/depression T scores was used in all analyses. Internal consistency reliabilities for the present sample were $\alpha = .88$ to .91 anxiety sclae, and $\alpha = .90$ to .92 for the depression scale. The anxiety and depression subscales were significantly correlated at all three time points in the present sample, with correlations ranging from .81 to .83.

Coping

Coping was assessed by the Coping Strategies Inventory (CSI; Tobin, Holroyd, Reynolds, & Wigal, 1989), 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, cancer. Scores from the four secondary scales, problem- and emotion-focused engagement, and disengagement coping, were used. Problem-focused engagement is composed of two primary scales: problem solving and cognitive restructuring ($\alpha = .85$ in the present sample). Problem-focused disengagement is composed of two primary scales: avoidance and wishful thinking ($\alpha = .81$). Emotion-focused engagement is composed of the primary scales social support and expressed emotion ($\alpha = .89$). Emotion-focused disengagement is composed of social withdrawal and self-criticism ($\alpha = .91$). Because patients differed in the total amount of coping they reported, proportion scores for each of the four types of coping were constructed. These scores reflect the proportion of each patient's total coping responses that was represented by each of the four types of coping (see Vitaliano et al., 1990).

RESULTS

Descriptive Statistics

Means, standard deviations, and ranges for psychological variables are displayed in Table I. MANOVAs were performed on coping and control variables, and there were no significant changes in the levels of these variables over time.

Although norms are not available for the combined anxiety and depression symptom scales, the anxiety and depression symptom T scores were averaged for each patient, resulting in an overall mean for this sample of 58.7 at time 1, indicating that patients in this study had elevated scores on anxiety/depression (i.e., approximately 1 SD above the mean for a community sample of women). The means for anxiety/depression decreased over time, with a mean of 55.06, or 1/2 SD above the mean, at time 2; and a mean of 53.57, or less than 1/2 SD above the mean, at time 3.

Table I. Means and Standard Deviations of Demographic and Psychological Variables at Times 1, 2, and 3

	Mean	*SD*
Stage	1.49	0.65
Age	54.76	9.97
Education	14.26	3.35
Anxiety–depression T-score		
Time 1	58.70	8.56
Time 2	55.06	8.91
Time 3	53.57	9.86
Perceived control		
Time 1	3.00	0.98
Time 2	2.90	0.95
Time 3	2.96	0.94
Problem-focused engagement coping		
Time 1	6.48	1.27
Time 2	5.88	1.17
Time 3	5.30	1.52
Emotion-focused engagement coping		
Time 1	5.89	1.51
Time 2	5.33	1.39
Time 3	4.59	1.56
Problem-focused disengagement coping		
Time 1	4.13	1.04
Time 2	4.29	0.97
Time 3	4.05	1.11
Emotion-focused disengagement coping		
Time 1	3.04	0.81
Time 2	2.90	0.78
Time 3	3.04	1.16

Correlational Analyses

The cross-sectional correlations of anxiety/depression symptoms with perceptions of control and problem- and emotion-focused engagement and disengagement coping at times 1, 2, and 3 are presented in Table II. Perceived control was not significantly related to anxiety/depression symptoms at any of the three assessments. Problem-focused engagement also was not significantly related to anxiety/depres-

Table II. Cross-Sectional Correlations of Anxiety/Depression Symptoms with Perceived Control, and Problem- and Emotion-Focused Engagement and Disengagement Coping

Anxiety/ depression symptoms	Perceived control	Problem-focused engagement	Emotion-focused engagement	Problem-focused disengagement	Emotion-focused disengagement
Time 1	−.07	.04	.36[a]	.23	.39[a]
Time 2	−.22	.14	.32[a]	.42[b]	.36[a]
Time 3	−.08	.07	.20	.48[b]	.75[b]

[a] $p < .01$.
[b] $p < .001$.

sion in the simple correlation analyses at any of the three time points. In contrast, emotion-focused engagement coping and both problem- and emotion-focused disengagement coping were associated with anxiety/depression symptoms at all three assessments. In every case, the use of these forms of coping was significantly related to higher levels of symptoms.

The stability of perceived control and the four coping variables were also examined. Perceptions of control were moderately stable across the three assessments, with correlations ranging from .30 to .36. The coping variables were moderately to highly stable, and all of the time 1–time 2, time 1–time 3, and time 2–time 3 correlations were significant. The correlations for problem-focused engagement ranged from .27 to .57; for emotion-focused engagement correlations ranged from .52 to .69; or problem-focused disengagement correlations ranged from .43 to .59; and for emotion-focused disengagement correlations ranged from .65 to .72.

Multiple Regression Analyses

A series of linear multiple regression equations were constructed at each time point to examine the effects of demographic variables, stage, perceived control, problem-focused coping, and the interaction of coping and control on psychological distress. The coping variable used was the proportion of problem-focused engagement or problem-focused disengagement strategies relative to all coping strategies endorsed. Coping and control variables were centered before entering these into the interaction term in the regression equations.

Time 1 (Near Diagnosis)

The first equation examined the interaction of problem-focused engagement coping and perceived control near the time of patients' diagnoses (Table III). The overall equation was significant, $F\,(69) = 3.41$, $p < .01$. A main effect was found for problem-focused engagement coping ($beta = -.44$, $sr^2 = .13$, $p < .001$). The interaction of problem-focused engagement and control was also significant ($beta = -.32$, $sr^2 = .09$, $p < .01$). The overall equations for problem-focused disengagement, emotion-focused engagement, and emotion-focused disengagement were not significant.

Table III. Linear Multiple Regression Predicting Time 1 Anxiety/Depression Symptoms

$F = (63,6)\ 3.41$, $R^2 = .25$, $p < .005$ Predictors	Beta	sr^2
Stage	−.09	.008
Age	−.19	.037
Education	−.11	.011
Perceived control	.003	.000
Proportion problem-focused engagement coping	−.44	.133[a]
Interaction of coping and control	−.321	.078[b]

[a] $p < .001$.
[b] $p < .01$.

Time 2 (3 Months Postdiagnosis)

Prospective analyses at time 2, controlling for time 1 anxiety/depression symptoms, were constructed in the same manner as the linear multiple regression equations as time 1, using time 2 coping and control variables. At time 2, all of the overall equations were significant, but this was attributable to a significant main effect for time 1 anxiety/depression. There were no main effects for coping or control and no interaction effects at this time point. The first equation examined the interaction of problem-focused engagement coping and perceived control. The overall equation was significant, $F(69) = 5.34$, $p < .0001$. There was a main effect for time 1 anxiety/depression ($beta = .38$, $sr^2 = .11$, $p < .002$), no other main effects and no interaction effect was found. The next equation examined problem-focused disengagement coping. The overall equation was significant, $F(69) = 5.10$, $p < .0001$. There was a main effect for time 1 anxiety/depression ($beta = .45$, $sr^2 = .14$, $p < .001$). There was no interaction between focused problem/disengagement coping and perceived control. The overall equation for emotion-focused engagement coping was significant, $F(69) = 4.92$, $p < .0001$. There was a main effect for time 1 anxiety/depression ($beta = .42$, $sr^2 = .14$, $p < .001$). There was no interaction between emotion-focused engagement coping and perceived control.

Time 3 (6 Months Postdiagnosis)

Prospective analyses were completed at time 3 controlling for time 1 anxiety/depression symptoms (Table IV). The overall equation for problem-focused engagement was significant, $F(69) = 5.68$, $p < .0001$. Main effects were found for time 1 anxiety/depression ($beta = .47$, $sr^2 = .18$, $p < .0001$) and a marginal effect for time 3 problem-focused engagement coping ($beta = -.19$, $sr^2 = .03$, $p < .08$). Thus, when time 1 levels of emotional distress were controlled for, there was a marginal effect for problem-focused engagement coping to be related to lower levels of time 3 anxiety/depression symptoms. The next equation examined problem-focused disengagement coping (Table V). The overall equation was significant, $F(69) = 5.11$, $p < .0001$. The only significant main effect seen was for time 1 anxiety/depression ($beta = .51$, $sr^2 = .21$, $p < .0001$). However, the interaction of problem-focused disengagement coping and control approached significance ($beta = .87$,

Table IV. Linear Multiple Regression Predicting Time 3 Anxiety/Depression Symptoms, Controlling for Initial Levels of Anxiety/Depression

$F = (63,6)\ 3.41$, $R^2 = .25$, $p < .005$ Predictors	Beta	sr^2
Time 1 anxiety/depression	.47	.176[a]
Stage	.07	.004
Age	−.017	.000
Education	−.190	.032
Perceived control	−.005	.000
Proportion problem-focused engagement coping	−.194	.031[b]
Interaction of coping and control	.004	.000

[a] $p < .0001$.
[b] $p < .08$.

Table V. Linear Multiple Regression Predicting Time 3 Anxiety/Depression Symptoms, Controlling for Initial Levels of Anxiety/Depression

$F = (63,6)$ 3.41, $R^2 = .25$, $p < .005$ Predictors	Beta	sr^2
Time 1 anxiety/depression	.471	.196[a]
Stage	.066	.004
Age	−.044	.002
Education	−.170	.026
Perceived control	−.049	.002
Proportion emotion-focused disengagement coping	.407	.153[a]
Interaction of coping and control	−.114	.012

[a] $p < .0001$.

$sr^2 = .04$, $p = .08$). The interaction reflected a trend in which higher perceived control and the use of more problem-focused disengagement coping predicted increases in anxiety/depression symptoms from time 2 to time 3. The overall equation for emotion-focused engagement coping was significant, $F(69) = 5.37$, $p < .0001$. The only main effect was for time 1 anxiety/depression ($beta = .52$, $sr^2 = .24$, $p < .0001$). The overall equation for emotion-focused disengagement coping was significant, $F(69) = 9.42$, $p < .0001$. Main effects were seen for time 1 anxiety/depression ($beta = .47$, $sr^2 = .20$, $p < .0001$) and emotion-focused disengagement coping ($beta = .40$, $sr^2 = .15$, $p < .0001$). Thus, when controlling for initial levels of distress, emotion-focused disengagement coping was related to higher levels of emotional distress.

DISCUSSION

The results of the present study provide further evidence regarding the role of perceptions of control and coping in the process of adaptation to breast cancer. Patients' perceptions of control were not associated with symptoms of anxiety/depression near diagnosis or at the 3- and 6-month follow-ups. Coping was related to anxiety/depression symptoms near diagnosis and again at the 6-month follow-up. Specifically, in the multiple regression analyses, problem-focused engagement coping (including problem solving and cognitive restructuring) was associated with lower symptoms of distress near diagnosis and this association approached significance at 6 months, controlling for initial levels of distress. Emotion-focused disengagement coping (social withdrawal and self-criticism) was related to higher symptoms of anxiety/depression at 6 months, controlling for initial symptom levels. Only one interaction between perceived control and coping was significant, however. The interaction of perceived control and problem-focused engagement coping was related to lower symptoms of anxiety/depression near the time of diagnosis. However, this effect was not significant in the follow-up analyses when initial distress was controlled. It is noteworthy that the interaction of perceived control and problem-focused disengagement coping approached significance at time 3 ($p < .10$), indicating the opposite pattern. That is, perceptions of greater control and the use of

problem-focused disengagement coping (avoidance and wishful thinking) predicted increased anxiety/depression symptoms from time 2 to time 3.

These findings replicate and extend those reported by Osowiecki and Compas (1998), with a sample of men and women coping with a variety of different types of cancer. Consistent with this previous study, the present findings offer support for an interaction betewen appraisals of control and problem-focused but not emotion-focused coping. This pattern is consistent with studies of other types of stressors in which the interaction of coping and *perceptions* of control have been examined (e.g., Forsythe & Compas, 1987). The present study clarified that this association was limited to problem-focused engagement coping (problem solving and cognitive restructuring) and not problem-focused disengagement coping (problem avoidance and wishful thinking). However, as in the Osowiecki and Compas (1998) study, this effect was only found in cross-sectional analyses near the time of diagnosis. No evidence was found for the effects of this interaction on increases in anxiety/depression symptoms assessed at follow-up. Therefore, the combination of high perceived control and the use of problem-focused is associated with lower concurrent symptoms of distress but does not contribute to decreases in distress over the course of adaptation to breast cancer.

This study adds to previous research suggesting that active problem-solving coping is related to lower levels of distress (e.g., Kant, D'Zurilla, & Maydeu-Olivares, 1997). A main effect was found for problem-focused engagement coping, which includes cognitive restructuring and seeking information, near the time of diagnosis; a marginal effect was found prospectively 6 months later. The idea that certain strategies, such as self-criticism and social withdrawal, may be related to higher levels of distress was also supported. Six months after diagnosis, emotion-focused disengagement coping was related to higher levels of anxiety/depression, even when initial levels of distress were taken into consideration. Furthermore, there was a trend indicating that problem-focused disengagement coping (avoidance and wishful thinking) may contribute to increases in distress when these coping strategies are used in conjunction with perceptions of control. The distinction between engagement and disengagement coping proved useful in this study. In addition to the coping findings mentioned, correlational analyses suggested that the engagement/disengagement distinction had a greater impact on the relationship to affective distress than the problem/emotion-focused distinction.

This study used a more refined measurement of coping that allowed for distinctions between subtypes of problem- and emotion-focused coping. Other measures that make even further discriminations among types of problem solving may be useful in understanding the relationship between problem-focused coping and control (e.g., D'Zurilla & Nezu, 1990). Furthermore, these data suggest that the measurement of perceived control may require further development beyond the single scale used in this and in previous studies (Forsythe & Compas, 1987; Osowiecki & Compas, 1998). In previous studies and in the current study, perceived control was measured with only one item, typically assessed on a Likert scale. It may be that important information was missed with such broad questions. For example, do patients find that there are greater opportunities for control at different times in treatment? Perhaps there is little one could do to control the outcome of

surgery, but there are different opportunities to gain control during subsequent treatment.

Substantial evidence suggests that the interaction of coping and control is a reliable effect that can be found in a variety of settings at a variety of time points. However, interaction effects are difficult to detect by multiple regression in quasi-experimental designs (McClelland & Judd, 1993). This study provided support for the interaction of coping efforts and perceived control; however, the effect only was significant at the first time point measured. The effect size for the interaction at time 1 accounted for 6% of the variance in anxiety/depression symptoms, which is considered a moderate effect and, in regards to McClelland and Judd's analysis, a robust effect. However, the interaction of coping and control was not found prospectively at 3 or 6 months postdiagnosis.

Why would perceptions of control only interact with coping efforts at the time of diagnosis? It may be that during treatment the situation offers less opportunities to exercise control, and after treatment is finished, there is less overall distress. Although this study did not find evidence for the interaction of coping and control prospectively, it will be important to follow this up with larger samples to ascertain whether this is a problem of statistical power or if, indeed, the effect is only found cross-sectionally. One reason that it may only be seen in the cross-sectional analyses is that at the later time points the dependent variable is the change in anxiety/depression over time, because initial levels of anxiety/depression are controlled. The interaction of coping and control may be able to account for initial levels of distress, but not be powerful enough to predict change over time. That is, the interaction between coping and control may be linked only to current functioning. It is also important to consider the possibility that distress may be predictive of coping and control. That is, individuals who are less distressed may feel more in control and may be able to mobilize coping efforts more effectively.

In summary, the interaction of problem-focused coping and perceived control at the time of diagnosis suggests that if perceived control is high and active problem-focused strategies are used, then distress is lower. Alternatively, if distress is low, then perceptions of control may be higher and opportunities to actively solve problems may be greater. In light of the fact that the interaction of problem-focused engagement coping and control has received additional support, it suggests it is useful and appropriate to teach active problem-solving skills and strategies for ascertaining opportunities for control to individuals who are confronted with a diagnosis of cancer and its subsequent treatments. It may also be useful to assess how much control patients perceive in regard to their diagnosis or treatment, and tailor interventions accordingly. It may be necessary to help patients find opportunities for gaining control, even in a relatively uncontrollable situation.

ACKNOWLEDGMENTS

This research was supported by grant number MH43819 from the National Institute of Mental Health and grant number P30CA 22435 from the National Cancer Institute. Its contents are solely the responsibility of the authors and do not necessar-

ily represent the official views of the National Cancer Institute. The authors are grateful to numerous individuals for their assistance in carrying out this research, including research assistants Sandra Baker, Sydney Ey, Laurie Raezer, Stacy Shortle, Miriam Stoll, and Amy Williard.

REFERENCES

Andersen, B. L., Anderson, B., & deProsse, C. (1989). Controlled prospective longitudinal study of women with cancer: II. Psychological outcomes. *Journal of Consulting and Clinical Psychology, 57,* 692-697.

Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., Moffat, F. L., & Clark, K. C. (1993). How coping mediates the effects of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology, 65,* 375-391.

Compas, B. E., Connor, J., Osowiecki, D. M., & Welch, A. (1997). Effortful and involuntary responses to stress: Implications for coping with chronic stress. In B. Gottlieb (Ed.), *Coping with Chronic Stress.* New York: Plenum.

Compas, B. E., Malcarne, V. L., & Fondacaro, K. M. (1988). Coping with stressful events in older children and young adolescents. *Journal of Consulting and Clinical Psychology, 56,* 405-411.

Conway, T. J., & Terry, D. J. (1992). Appraised controllability as a moderator of the effectiveness of different coping strategies: A test of the goodness of fit hypothesis. *Australian Journal of Psychology, 44,* 1-7.

Derogatis, L. R., Morrow, G. R., Fetting, J., Penman, D., Piasetsky, S. S., Schmale, A. M., Henrichs, M., & Carnicke, C. L. M. Jr. (1983). The prevalence of psychiatric disorders among cancer patients. *Journal of the American Medical Association, 249,* 751-757.

Derogatis, L. R. & Spencer, P. M. (1982). *The Brief Symptom Inventory (BSI): Administration, scoring, and procedures manual-I.* Baltimore: Clinical Psychometric Research.

D'Zurilla, T. J., & Nezu, A. M. (1990). Development and preliminary evaluation of the Social Problem-Solving Inventory. *Psychological Assessment, 2,* 156-163.

Forsythe, C. J., & Compas, B. E. (1987). Interaction of cognitive appraisals of stressful events and coping: Testing the goodness of fit hypothesis. *Cognitive Therapy and Research, 11,* 473-485.

Hynes, G. J., Callan, V. J., Terry, D. J., & Gallois, C. (1992). The psychological well-being of infertile women after a failed IVF attempt: The effects of coping. *British Journal of Medical Psychology, 69,* 269-278.

Kant, G. L., D'Zurilla, Y. J., & Maydeu-Olivares, A. (1997). Social problem solving as a mediator of stress-related depression and anxiety in middle-aged and elderly community residents. *Cognitive Therapy and Research, 21,* 73-96.

Masel, C. N., Terry, D. J., Gribble, M. (1996). The effects of coping on adjustment: Re-examining the goodness of fit model of coping effectiveness. *Anxiety, Stress, and Coping, 9,* 279-300.

McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties in detecting interactions and moderator effects. *Psychological Bulletin, 114,* 376-390.

Osowiecki, D. M., & Compas, B. E. (1998). Psychological adjustment to cancer: Coping and control beliefs in adult cancer patients. *Cognitive Therapy and Research, 22,* 483-499.

Stanton, A. L., & Snider, P. R. (1993). Coping with a breast cancer diagnosis: A prospective study. *Health Psychology, 12,* 16-23.

Taylor, S. E., Lichtman, R. R., Wood, J. V., Bluming, A. Z., Dosik, G. M., & Leibowitz, R. L. (1985). Illness-related and treatment-related factors in psychological adjustment to breast cancer. *Cancer, 55,* 2506-2513.

Terry, D. J., & Hynes, J. (1998). Adjustment to a low-control situation: Reexamining the role of coping responses. *Journal of Personality and Social Psychology, 74,* 1078-1092.

Thompson, S. C., Sobolew-Shubin, A., Galbraith, M. E., Schwankovsky, L., & Cruzen, D. (1993). Maintaining perceptions of control: Finding perceived control in low-control circumstances. *Journal of Personality and Social Psychology, 64,* 293-304.

Vitaliano, P. P., DeWolfe, D. J., Maiuro, R. D., Russo, J., & Katon, W. (1990). Appraised changeability of a stressor as a modifier of the relationship between coping and depression: A test of the hypothesis of fit. *Journal of Personality and Social Psychology, 59,* 582-592.

Weisz, J. R., McCabe, M., & Dennig, M. D. (1994). Primary and secondary control among children undergoing medical procedures: Adjustment as a function of coping style. *Journal of Consulting and Clinical Psychology, 62,* 324-332.