

# Curvilinear Associations Between Benefit Finding and Psychosocial Adjustment to Breast Cancer

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Two previously studied cohorts of women with nonmetastatic breast cancer ( $Ns = 230$  and  $136$ ) were reexamined. Participants were assessed during the year after surgery and 5–8 years later. Associations were examined between benefit finding (BF) and several indicators of psychosocial adjustment (e.g., perceived quality of life, positive affect, negative affect, social disruption, and intrusive thoughts). Significant curvilinear relations between BF and other outcomes were observed cross-sectionally during initial assessment and at long-term follow-up in both samples. Compared with the intermediate BF group, low and high BF groups had better psychosocial adjustment. Further analyses indicated that the high BF group reported higher optimism and more use of positive reframing and religious coping than the other BF groups. Discussion highlights the need to examine nonlinear as well as linear relationships.

*Keywords:* benefit finding, growth, adjustment, quality of life, breast cancer

A growing literature documents that, despite the adversity associated with cancer diagnosis, treatment, and survivorship, positive life changes may also accompany this experience. Such benefit-finding (BF; Tomich & Helgeson, 2004) or stress-related growth (Park, Cohen, & Murch, 1996) can include better relationships with family and friends, a sense of competence, shifts in priorities, enhanced emotional strength, deepened spirituality, and the desire to live each day to its fullest (Taylor, 1983). BF is by no

means rare; in two studies, 53% (Taylor, Lichtman, & Wood, 1984) and 84% (Collins, Taylor, & Skokan, 1990) of women with breast cancer reported finding benefit in the cancer experience.

## Relationship of BF to Other Psychosocial Outcomes

It was originally assumed that the ability to find benefits from an illness would contribute to better adjustment to the illness. In persons with various cancers, links have emerged between BF and lower distress (Fife, 1995; Ho, Chan, & Ho, 2004; Katz, Flasher, Cacciapaglia, & Nelson, 2001; Taylor et al., 1984; Urcuyo, Boyers, Carver, & Antoni, 2005; Vickberg, Bovbjerg, DuHamel, Currie, & Redd, 2000; Vickberg et al., 2001), higher self-esteem, less anxiety (Lewis, 1989), greater well-being (Carpenter, Brockopp, & Andrykowski, 1999; Curbow, Somerfield, Baker, Wingard, & Legro, 1993; Urcuyo et al., 2005), more positive mood (Carver & Antoni, 2004; Katz et al., 2001; Sears, Stanton, & Danoff-Burg, 2003; Tomich & Helgeson, 2002), and higher current life satisfaction and estimates of future life satisfaction (Curbow et al., 1993).

However, a number of studies of women with breast cancer have obtained discrepant findings. In some cases, BF related to more distress or poorer quality of life (Tomich & Helgeson, 2004). In others, no relation emerged between BF and distress or well-being (Antoni et al., 2001; Cordova, Cunningham, Carlson, & Andrykowski, 2001; Curbow et al., 1993; Fromm, Andrykowski, & Hunt, 1996; Schulz & Mohamed, 2004; Sears et al., 2003; Tomich & Helgeson, 2002; Widows, Jacobsen, Booth-Jones, & Fields, 2005).

These puzzling inconsistencies have generated much comment among BF researchers (for a review, see Stanton, Bower, & Low, 2006). It is clear from previous research in psycho-oncology that different people have different patterns of responses to diagnosis

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and treatment (Holland & Breitbart, 1998). We wondered whether there might be subsets of women who responded differently to the experience of breast cancer and whether observable relationships between BF and outcomes were being obscured by combining these different subsets into one sample.

We reasoned that perhaps the experience of breast cancer causes some women to experience mostly distress (with less BF) and causes others to experience mostly BF (with less distress). This divergence of reactions would yield an inverse relation between outcomes, producing the linear relationship that has been observed in some studies. However, there may also be a third group of women who experience little or no sense of crisis in response to breast cancer and therefore have low levels of distress. Without a sense of crisis, this subgroup also would not engage in a search for meaning and therefore would not experience BF (Tedeschi & Calhoun, 1996; Lechner & Antoni, 2004). This group thus would display neither BF nor distress. If all three of these sorts of women were combined together into a given sample, then the graph of their responses would show a curvilinear (U-shaped) relation between BF and other outcomes. The curve would travel from women with very low levels of distress and low BF, through women with a little BF but mostly distress, to women with higher levels of BF and lower distress (e.g., see Figure 1).

It would be important to try to characterize these three subsets of women to determine whether any of the postulated predictors of BF could differentiate groups. In line with existing theory that emphasizes the importance of preexisting resources, we examined the personality trait of dispositional optimism, use of coping strategies, and perceptions of social support (Tedeschi & Calhoun, 2004; Janoff-Bulman, 2004). Thus, the first aim of the study was to determine whether there was indeed a quadratic relationship between BF and adjustment indexes. Given the evidence that negative and positive outcomes may vary somewhat independently and may have different determinants (e.g., Zautra, 2003), we examined them separately. The second aim was to determine whether there was a way to characterize the women in the various groups that create this quadratic relationship.

Furthermore, this line of inquiry raised another important conceptual question: Is the relation between BF and outcomes perhaps different at different phases of dealing with the disease? How do time since diagnosis and the demands of treatment versus the

demands of returning to “real life” affect BF and adjustment? How does BF affect adjustment in women who are newly diagnosed versus women who have just completed adjuvant treatment as compared with women who are considered long-term survivors? Given what we know about psychological adjustment at these different phases of the continuum, we might expect different patterns at these times. Of even more importance, prospective analyses could be highly informative in identifying women who might be more likely to benefit from the sort of interventions that have been developed for breast cancer survivors (Antoni et al., 2001; Andersen et al., 2004).

The possibility of finding benefit in having had cancer is relevant over a considerable length of time. Persons with cancer may find benefits while they are in the process of adjusting to physical changes from the surgery and adjuvant treatment. However, women who have been successfully treated for breast cancer may also perceive benefits as long-term survivors (Dow, Ferrell, Leigh, Ly, & Gulasekaram, 1996; Fredette, 1995; Tomich & Helgeson, 2002; Wyatt, Kurtz, & Liken, 1993), though long-term benefits may differ in some ways from those in the shorter term (Lechner & Zakowski, 2001). There is little systematic information, however, on how BF relates to other psychosocial outcomes among long-term survivors.

An important question that can be asked about cancer survivors is whether benefits that were found earlier—during treatment—relate to better well-being in the longer term. As with cross-sectional associations, the evidence on this question (what little exists) is mixed. Sears et al. (2003) found no relation between BF at roughly 7 months postdiagnosis and distress a year later. Tomich and Helgeson (2004) found that BF at roughly 4 months postdiagnosis predicted greater distress 9 months later. Carver and Antoni (2004) found that BF in the year postsurgery related to less distress and better quality of life 5–8 years after surgery.

Information from other populations, such as bereaved individuals (Davis, Nolen-Hoeksema, & Larson, 1998) and victims of sexual assault (Frazier, Conlon, & Glaser, 2001), suggests that initial BF may enhance later well-being and that the manner in which BF develops and changes over time is differentially associated with distress levels. Early reports of BF, particularly changes in one’s sense of self, life appreciation, and spiritual BF, measured at a time shortly following a sexual trauma (2 weeks posttrauma) were an important predictor of distress recovery at 1-year posttrauma (Frazier et al., 2001). Similarly, Davis et al. (1998) showed that BF at various time points following the expected loss of a family member was associated with lower distress concurrently and prospectively. Again, the inconsistencies raise the possibility that the relationships are more complex than previously appreciated.

### The Present Research

The analyses reported here examined concurrent and prospective relationships between BF and other outcomes in two cohorts of women recruited shortly after diagnosis and surgery for breast cancer. Women in Study 1 were part of a natural history study that assessed adjustment to breast cancer at 3, 6, or 12 months following surgery (referred to here as the initial assessment) and then again at 5–8 years postdiagnosis (Carver & Antoni, 2004). Study 2 examined women recruited 2–8 weeks after surgery for a psychosocial intervention

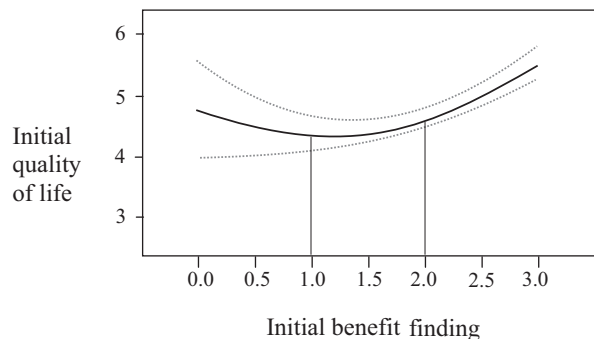


Figure 1. Quadratic relation of concurrent benefit finding to perceived quality of life at the time of initial assessment, from 3 to 12 months postsurgery, in Study 1. Dotted lines represent 95% confidence intervals.

study (Antoni et al., 2001). They were assessed several times in that study and again 5 years after treatment.

We tested both samples for quadratic relations between BF and concurrent psychosocial outcomes early in treatment. Then, the relationship between BF and outcomes was examined at long-term follow-up (5 years postdiagnosis). We also tested for quadratic relations between BF in the first year and other outcomes at long-term follow-up. Finding such relations, we explored potential differences between women who reported low, intermediate, and high levels of BF.

This exploration relied on a literature concerning possible determinants of BF (Tedeschi & Calhoun, 1996, 2004). Theory and evidence suggest that having personal resources, or using effective coping strategies, may lead to greater finding of benefits. Resources include social support (Park & Folkman, 1997) and personality qualities, such as optimism (Carver, 1998; Curbow et al., 1993; Stanton & Snider, 1993). Demographic variables, such as age and education, have also been suggested as relevant, though findings are mixed (Antoni et al., 2001; Ganz et al., 2002; Lechner, Zakowski, Antoni, Greenhawt, & Block, 2003; Tomich & Helgeson, 2004; Urcuyo et al., 2005). Disease-related factors, such as stage of disease and adjuvant treatment, may also matter, with greater BF emerging at stages where there is more prognostic uncertainty (Jacobsen et al., 1999; Lechner et al., 2003; Tomich & Helgeson, 2004). Thus, we expected that individuals in the high BF–high adjustment group would show greater use of adaptive coping strategies and reliance on social support than the other groups. This was based on the rationale that the intermediate group was not using adaptive coping strategies or relying on others and was therefore experiencing greater distress and the low BF group had less need of using coping strategies and turning to others because the experience was less challenging. These notions were tested in the samples described in this article.

## Study 1

### Method

#### Participants and Procedures

Participants were 230 women with early-stage breast cancer recruited through medical practices in the Miami area and the local American Cancer Society office. This was the sample reported in Urcuyo et al. (2005; see that article for details on recruitment). For reasons unrelated to this report, the study examined variation across time since surgery. Thus, assessment occurred at 3 months, 6 months, or 12 months postsurgery, in roughly equal numbers.<sup>1</sup> Sample characteristics on medical and demographic variables are shown in Table 1.

The sample used for follow-up analyses is the one reported on previously by Carver and Antoni (2004). Of the starting sample, 101 (44%) were located and completed reassessment between 5–8 years postsurgery. Of the 101 who participated in the follow-up, 5 had not fully completed the initial BF measure; they were omitted from the analyses reported here. Thus, the final sample for this follow-up was 96.<sup>2</sup> Of these, 13 reported having had a recurrence or new primary cancer when completing the follow-up. Other sample characteristics are in Table 1.

Women lost to follow-up did not differ significantly from those who completed the follow-up on any medical or demographic variables nor on any outcome measure presented here. Thus, the follow-up subsample was generally representative of the full initial sample.

#### Outcome Measures: Initial Participation

At the time of their initial participation, women completed a measure of BF as well as measures of psychosocial adjustment (e.g., depression, distress, and quality of life). They also completed other measures that might represent antecedents of successful adjustment. Descriptive information on BF and the measures of adjustment appears in Table 1.

**BF.** BF was measured in the initial study by 17 items with the stem “Having had breast cancer. . .” and ending with a benefit that might plausibly follow a cancer experience (Tomich & Helgeson, 2004). The items pertained to family and social relations, life priorities, spirituality, career goals, self-control, and acceptance of life circumstances. Response options ranged from 0 (*I disagree a lot*) to 3 (*I agree a lot*). Participants could also indicate that an item was not applicable. To score the scale, “not applicable” responses are dropped and the average is computed from the remaining responses. This item set overlaps extensively (11 items) with that of Tomich and Helgeson (2004), though not completely.

**Perceived quality of life.** A measure of the extent to which the women reported feeling a positive quality of life in their day-to-day experiences consisted of 10 items selected from a broader set developed by Andrews and Withey (1976). The items of this scale address diverse aspects of satisfaction in life, including whether the participant’s home life and work life are interesting, challenging, enjoyable and fulfilling. Participants considered each item and indicated how they felt about that domain of life. Response options ranged from 1 (*terrible*) to 7 (*delighted*), and responses were averaged across items.

**Distress.** Distress emotions were assessed with a brief series of descriptive adjectives (taken from Carver et al., 1993). Participants indicated the degree to which they had experienced each feeling “during the past week including today.” Response options were on a 5-point scale from 1 (*not at all*) to 5 (*extremely*). Items assessed depression (“helpless,” “unhappy,” “worthless,” and “hopeless”), anxiety (“tense,” “nervous,” and “anxious”), and anger (“angry,” “resentful,” and “grouchy”). In a sample of 235 students, these item sets correlated .87, .93, and .87, respectively, with comparable scales from the Profile of Mood States (McNair, Lorr, & Droppelman, 1971). Item responses were averaged.

**Depressive symptoms.** Depressive symptoms were measured with the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). Participants indicate the extent to which they had a variety of depression-related experiences (e.g., “I felt depressed”) within the past week. Response options ranged from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). Responses were summed. The CES-D correlated .75 with the distress index. Nearly a third of the women ( $n = 72$ ) had CES-D scores of 16 or above, which is the usual cutoff for moderate depression (Myers & Weissman, 1980; Radloff, 1977).

**Disruption of social and recreational activities.** Illness-related disruptions in social and recreational activities were assessed using two subscales of the Sickness Impact Profile (Bergner, Bobbitt, Carter, & Gilson, 1981). The subscales measure the adverse impact of the illness or its treatment on social activities (e.g., “I am doing fewer social activities with groups of people”) and recreational pastimes (e.g., “I am not doing any of my usual recreation and pastimes, for example, watching TV or reading”). These scales were strongly correlated ( $r = .70$ ); thus, they were standardized and averaged as an index of social disruption.

<sup>1</sup> This variable played no role in any results reported here and is not mentioned further.

<sup>2</sup> Because of occasional missing responses,  $N$ s vary slightly from one analysis to another throughout this article.

Table 1  
*Sample Characteristics at Initial Participation (N = 230) and Long-Term Follow-Up (N = 96), Study 1*

Characteristic	Initial				Long-term follow-up			
	<i>M</i>	<i>SD</i>	%	$\alpha$	<i>M</i> or <i>N</i>	<i>SD</i>	%	$\alpha$
Age (years)	53.45	12.34			59.14	10.03		
Education (years)	14.20	2.91			14.30	3.04		
Ethnicity								
Non-Hispanic White	145		63		64		67	
Hispanic	61		27		21		22	
African American	24		10		11		11	
Marital status <sup>a</sup>	163		71		71		74	
Employed <sup>b</sup>	121		53		50		52	
Stage at diagnosis								
Stage 0	10		4		3		3	
Stage I	133		58		59		61	
Stage II	87		38		34		35	
Procedure								
Mastectomy	94		41		37		39	
Lumpectomy	131		57		59		61	
Not reported	5		2					
Radiation <sup>c</sup>	136		59		59		61	
Chemotherapy <sup>c</sup>	88		38		37		39	
Antiestrogen medication <sup>c</sup>	85		37		37		39	
Reconstruction <sup>c</sup>	51		22		24		25	
Benefit finding	2.15	0.63		.91	2.33	0.93		.94
Distress emotion	0.82	0.75		.90	1.22	0.65		.87
Positive emotion					2.66	0.67		.96
Quality of life	4.84	1.02		.92	5.03	1.02		.92
Depression (CES-D)	12.4	11.13		.92	11.50	10.45		.91
Social disruption <sup>d</sup>	0.01	0.90		.88	0.01	.91		.91

Note. CES-D = Center for Epidemiological Studies Depression Scale.

<sup>a</sup> Values are numbers and percentages of participants who self-identified as married-partnered. <sup>b</sup> Values are numbers and percentages of participants who were employed. <sup>c</sup> Values are numbers and percentages of participants who had undergone radiation, chemotherapy, antiestrogen medication, or reconstruction. <sup>d</sup> Social disruption scores are standardized.

### Additional Measures: Initial Participation

Several other measures that had been collected in the initial study were examined for their potential use in differentiating subgroups.

**Optimism.** Optimism versus pessimism was assessed with the Life Orientation Test—Revised (LOT-R; Scheier, Carver, & Bridges, 1994). The LOT-R has six coded items, three phrased positively (e.g., “In uncertain times I expect the best”) and three negatively (e.g., “If something can go wrong with me, it will”). Response options ranged from 1 (*I agree a lot*) to 4 (*I disagree a lot*). Items are summed after appropriate reversals. Optimism is a reliable predictor of psychological outcomes (Scheier & Carver, 1992; Scheier, Carver, & Bridges, 2001), including adaptation to breast cancer (Carver et al., 1993; Stanton & Snider, 1993). Cronbach’s alpha was .71 in this sample ( $M = 19.89$ ,  $SD = 3.49$ ).

**Investment in body image.** The extent to which a woman is invested in her body as a basis for feelings of self-worth was assessed with the Measure of Body Apperception (MBA; Carver et al., 1998). This measure reflects dependence of self-esteem on physical appearance and on the sense of body integrity, in separate scales. Participants indicated their agreement with statements on a scale ranging from 1 (*I agree a lot*) to 4 (*I disagree a lot*); item responses are summed. In this sample, alphas were .75 and .67 for Investment in Physical Appearance ( $M =$

9.63,  $SD = 3.18$ ) and Sense of Body Integrity ( $M = 8.63$ ,  $SD = 3.36$ ), respectively.

**Coping.** Coping responses were assessed using the situational version of the Brief COPE (Carver, 1997), an abbreviated version of the COPE Inventory (Carver, Scheier, & Weintraub, 1989). The Brief COPE has 14 scales of two items each. We examined scales found previously to represent effective coping among persons with cancer (Carver et al., 1993): Acceptance, Active Coping, Humor, Positive Reframing, Religious Coping, and Use of Emotional Support. Participants rated how much they used the response to try to deal with stresses related to their diagnosis and surgery. Response options ranged from 0 (*I haven’t been doing this at all*) to 3 (*I’ve been doing this a lot*). Scales were scored by averaging the relevant item responses. All alphas exceeded .68.

### Outcome Measures: Long-Term Follow-Up

Several of the same outcome measures were completed again at long-term follow-up. These included the CES-D, the measure of quality of life, and the measure of social disruption. The BF items were also repeated, but by this time the project had shifted to the use of a different set of response options. Respondents indicated extent of agreement using response options

from 0 (*not at all*) to 4 (*extremely*), again with an option to indicate “not applicable.”<sup>3</sup>

Positive and negative affect were measured with the Affects Balance Scale (ABS; Derogatis, 1975). This measure has scales to assess negative affects, such as depression, hostility, guilt, and anxiety, as well as positive affects, such as affection, contentment, vigor, and joy. Positive and negative subtotals can also be computed (Derogatis, Abeloff, & Melisaratos, 1979). Items are adjectives; participants indicate the extent to which they have been feeling the emotion portrayed on a scale from 0 (*never*) to 4 (*always*). We created the ABS positive affect index as suggested by the scale’s authors. As did Carver and Antoni (2004), we used only the subset of negative affect items that overlapped with the measure used earlier. In both cases, relevant item responses were averaged.

### Results

Linear and quadratic components of the relationship between BF and the other well-being variables were examined by hierarchical multiple regression, testing a linear model, then adding the quadratic component of the predictor (BF centered, then squared). We statistically controlled medical and demographic variables related to BF.

#### Cross-Sectional Analyses at Initial Assessment

We first examined the data collected early in the cancer experience, testing cross-sectional effects (with four outcome variables). Controls were included for stage (which related positively to BF), age, and education (which related inversely). Previously reported linear effects were observed for quality of life, CES-D, and negative affect but not social disruption (Urcuyo et al., 2005).

There was a quadratic effect for quality of life ( $\beta = .20$ ),  $t(220) = 2.69$ ,  $p < .009$ ,  $\Delta R^2 = .028$  (see Figure 1). Women who reported low and high levels of BF reported higher quality of life; women who reported intermediate levels of BF reported poorer quality of life. Positive affect was not measured at the initial assessment and could not be examined. There were no quadratic relations between BF and CES-D, negative affect, or social disruption (all  $ps > .3$ ).

#### Cross-Sectional Analyses at Long-Term Follow-Up

The next set of analyses examined the subset of women who completed a further assessment 5–8 years after treatment. In this later assessment, participants again completed the BF items (though using a different response scale, as noted earlier) along with other measures. Among measures administered at both times, the retest correlation for BF was .62, for perceived quality of life was .65, for CES-D was .46, and for negative affect was .47.

Tests of cross-sectional associations of BF with five measures at this later time point (with control for education) yielded both linear and quadratic effects. Analyses of linear effects, as reported in Carver and Antoni (2004), showed that long-term BF was associated with long-term quality of life, positive affect, negative affect, and social disruption but not long-term CES-D. Quadratic effects were observed in all five variables. As shown in Figure 2, the quadratic relationship between BF and perceived quality of life that had existed during the first year after diagnosis replicated 4–5 years later ( $\beta = .45$ ),  $t(87) = 4.94$ ,  $p < .001$ ,  $\Delta R^2 = .174$ . Again, reports of higher quality of life came from women who reported

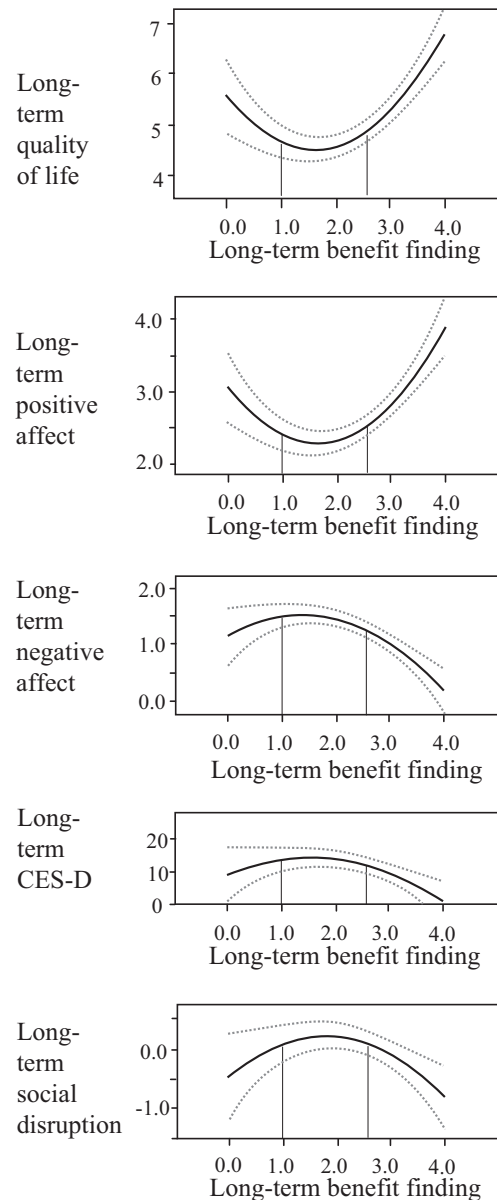


Figure 2. Quadratic relations of concurrent benefit finding to rated quality of life, positive affect, negative affect, depressive symptoms, and social disruption at long-term follow-up, 5–8 years postsurgery, in Study 1. Dotted lines represent 95% confidence intervals. CES-D = Center for Epidemiological Studies Depression Scale.

the lowest and highest levels of BF, with poorer quality of life reported by those intermediate in BF. A curvilinear relation also emerged with regard to the ABS index of positive affect ( $\beta = .48$ ),  $t(86) = 4.95$ ,  $p < .001$ ,  $\Delta R^2 = .195$  (see Figure 2).

<sup>3</sup> The correlation of initial BF with long-term BF was .62. This appears to suggest that the relatively minor change in response format had no substantive effect. Study 2 used the changed format in both assessments; the retest correlation in Study 2 (over a shorter time) was .71, which is not appreciably higher than was obtained in Study 1.

In addition to these two effects for positive outcomes, cross-sectional curvilinear effects also emerged for the three indicators of adverse reactions: the index of negative affect, CES-D scores, and the index of social disruption. The quadratic effect for negative affect was ( $\beta = -.32$ ),  $t(87) = 3.15$ ,  $p < .003$ ,  $\Delta R^2 = .086$ ; for CES-D was ( $\beta = -.22$ ),  $t(89) = 2.18$ ,  $p < .04$ ,  $\Delta R^2 = .043$ ; and for social disruption was ( $\beta = -.26$ ),  $t(86) = 2.43$ ,  $p < .02$ ,  $\Delta R^2 = .060$ . The pattern in each case was opposite that observed for the positive outcomes (see Figure 2).

### Prospective Analyses

We also examined longitudinal links from earlier reports of BF to outcomes at long-term follow-up (controlling for education, age, and stage, which had correlated with initial BF as well as initial values of the outcome variables). BF at the initial assessment predicted better quality of life, lower depressive symptoms, and less negative affect at long-term follow-up, as reported in Carver and Antoni (2004). Social disruption was unrelated to BF, and positive affect was not assessed at the initial assessment (Carver & Antoni, 2004). Two quadratic effects (from the five tested) were marginally significant. Initial BF tended to have curvilinear relations to positive affect at long-term follow-up ( $\beta = .22$ ),  $t(87) = 1.86$ ,  $p < .07$ ,  $\Delta R^2 = .032$ , and to quality of life at long-term follow-up ( $\beta = .22$ ),  $t(88) = 1.92$ ,  $p < .06$ ,  $\Delta R^2 = .034$ . These effects took the same general form as the pattern in the cross-sectional relationships described above.

### What Differentiates Subsets?

Exploratory analyses were done to gain further insight into how to interpret the quadratic associations. We divided the range of BF scores into three segments: regions in which low BF related to high quality of life, high BF related to high quality of life, and moderate BF related to lower quality of life. We did so on the basis of areas where the slope of the line varied appreciably, as in the use of the scree test in factor analysis. Though obviously inexact, this pro-

cedure seemed preferable to using predefined portions of the BF range because our principal goal was to determine how women in whom well-being coincided with high BF scores differed from those in whom well-being coincided with low BF scores.

We began with the full sample at initial assessment. The vertical lines on Figure 1 indicate the points at which the sample was split. The three regions were quite uneven in size. The low benefit group was small, only 6% of the sample ( $n = 13$ ); the high benefit group constituted 62% of the sample ( $n = 143$ ); and the intermediate group was 32% of the sample ( $n = 74$ ). We compared groups on a number of other available variables to see how they might differ using analyses of variance (ANOVAs) and chi-square tests. These variables included demographic characteristics (age, years of education, ethnicity, marital status, and employment status), medical characteristics (stage, chemotherapy history, radiation history, type of surgical procedure, use of antiestrogen therapies, and reconstructive surgery), personality characteristics (optimism), and coping styles (positive reframing, religious coping, acceptance coping, active coping, humor, and use of emotional support). As noted previously, these analyses were quite exploratory.

There were three significant ANOVAs, which were followed by Duncan multiple range post hoc comparisons. Table 2 shows significant group differences. The high BF group had levels of optimism that were significantly higher than those of the intermediate group; the low BF group fell between these two, not differing significantly from either. The high BF group reported more positive reframing coping and more religious coping than the other groups.

Three more differences emerged in chi-square tests. One was a difference in ethnicity,  $\chi^2(4, N = 230) = 11.66$ ,  $p < .03$ . The low BF group had no Hispanics, who were 30% of the intermediate group and 27% of the high BF group. There was also a difference in chemotherapy history,  $\chi^2(2, N = 229) = 8.60$ ,  $p < .02$ . Among the high BF group, 46% had had chemotherapy compared with 27% of the intermediate group and 23% of the low group. Third, there was a difference in stage at diagnosis,  $\chi^2(4, N = 229) =$

Table 2  
Variables Assessed at Initial Participation That Differentiated Three Levels of Benefit Finding (BF) as Reported Initially and at 5–8 Years Postsurgery, Study 1

Variable	Low BF (1)	Moderate BF (2)	High BF (3)	<i>p</i>	Post hoc difference	Effect size ( $\eta^2$ )
BF at initial assessment ( $N = 230$ )						
Optimism	19.15	18.70	20.57	.002	3 > 2	.06
Positive Reframing	1.23	1.33	2.07	.001	3 > 1,2	.12
Religious Coping	1.31	1.33	1.99	.001	3 > 1,2	.08
BF at 5–8-year follow-up ( $N = 96$ )						
Optimism	19.80	19.11	21.40	.01	3 > 2	.10
Positive Reframing	1.67	1.54	2.26	.01	3 > 1†,2	.12
Religious Coping	1.83	1.46	2.20	.02	3 > 2†	.09
Acceptance	2.56	2.47	2.83	.01	3 > 2	.10
Concern physical integrity	5.70	8.51	8.95	.03	1 < 2,3	.08

Note. All variables other than follow-up BF were assessed in the initial study.

†  $p < .06$ .

19.09,  $p < .001$ . The high BF group had an elevated proportion of women with Stage II disease (44.4% compared with 23.1% of the low BF group and 28.4% of the intermediate group), the intermediate group had an elevated proportion of Stage I disease (70.3% compared with 53.8% and 51.4%), and the low BF group had an elevated proportion of Stage 0 disease (23.1% compared with 1.4% and 4.2%).<sup>4</sup> Other variables, comprising demographic, medical, personality, and coping measures, as listed above, did not differentiate the groups.

We repeated this process with reports of BF in the subsample assessed at long-term follow-up. The vertical lines on Figure 2 indicate the points at which this subsample was divided. Group sizes were 10 (low BF), 46 (intermediate BF), and 40 (high BF). Analyses yielded several differences, some replicating those just described (see Table 2). The high BF group had higher initial optimism than the intermediate group and reported more positive reframing than both other groups and more religious coping than the intermediate group. They also reported more acceptance than the intermediate group, a difference that had not reached significance in the full sample ( $p < .09$ ). One other difference emerged that had not appeared in the full sample: The low BF group reported less concern about physical integrity on the MBA than the other two groups. Effects of ethnicity, chemotherapy history, and stage failed to replicate in this subsample.

## Study 2

### Method

#### Participants and Initial Procedure

The second sample ( $N = 136$ ) came from a study of stress management training for women being treated for breast cancer (see Antoni et al., 2001, for recruitment and patterns of attrition). Inclusion criteria were breast cancer at Stage II or below, with surgery within the past 8 weeks. Exclusion criteria were prior cancer, prior psychiatric treatment for serious disorder, major concurrent disease, and lack of fluency in English. Sample characteristics are presented in Table 3.

Four assessments took place: initial (about 2 months after surgery), postintervention (5 months postsurgery), 3 months postintervention (8 months postsurgery), and 9 months postintervention (14 months postsurgery). After initial assessment, participants were randomized to a group for stress management intervention or a control condition. Women assigned to the intervention participated in 10 weeks of group sessions after the initial assessment (for details, see Antoni et al., 2001). Women in the control condition were offered a 1-day seminar 16–18 weeks postsurgery.

#### Procedures of 5-Year Follow-Up

Participants were contacted for long-term follow-up approximately 5 years after surgery. This is the first report of data from the follow-up. Follow-up questionnaires were completed and returned by 74 of the women who completed the earlier study (54%). Fifty-eight women could not be contacted, presumably because of relocation (and their mortality status could not be confirmed). Three were confirmed to have died. One participant was reached but declined participation. Of those who participated at follow-up, 11 had had additional experience with cancer (a recurrence or new primary). Characteristics of this subsample are listed in Table 3.

Those lost to follow-up did not differ significantly from those who completed the follow-up on intervention condition, any medical or demo-

graphic variables (i.e., stage at diagnosis, type of surgical procedure, menopausal status, marital status, employment, insurance, ethnic-racial background, years of education; all  $ps > .10$ ), with the exception of age (women lost to follow-up were slightly younger at study entry: 48.3 years vs. 51.8 years). With regard to psychosocial variables, women lost to follow-up reported greater BF at baseline. Women lost to follow-up differed on certain coping strategies, but they followed no discernable pattern.

### Measures

In the initial study, this sample completed many of the same measures as used in Study 1. These included the CES-D, the measure of quality of life, the index of social disruption, and the index of negative affect; they also reported BF using the response options used in the follow-up assessment of Study 1 (see Table 3 for descriptive data). This study had one more outcome, the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979), a measure with two subscales. The Intrusion scale measures experience of unwanted thoughts and images related to a particular life stressor (e.g., "I had trouble falling asleep or staying awake because pictures or thoughts about it came into my mind"). The Avoidance scale assesses the extent to which respondents consciously take action to distract themselves to avoid thinking about a situation (e.g., "I tried not to think about it"). The IES was keyed here to the experience of diagnosis and treatment for breast cancer. Responses were coded as specified by Horowitz et al. (1979) and summed.

Participants also completed measures of optimism, coping, and emotional processing, which we examined as constructs that might differentiate low, moderate, and high BF groups. LOT-R responses were from the initial assessment ( $M = 19.78$ ,  $SD = 12.28$ ,  $\alpha = .80$ ). The Brief COPE at the initial assessment was used ( $\alpha$ s for the scales examined were above .65, except for Active Coping, which was .54). Participants also responded to items assessing emotional processing coping (Stanton, Kirk, Cameron, & Danoff-Burg, 2000) using the same scale as the Brief COPE. There were scales for examining emotions (e.g., "I've been taking time to figure out what I'm really feeling;"  $\alpha = .90$ ) and expressing emotions (e.g., "I've been taking time to express my emotions;"  $\alpha = .94$ ). Five-year follow-up assessment used the same measures as were used in Study 1.

## Results

### Cross-Sectional Analyses at Initial Assessment

Analyses of Study 2 followed procedures similar to those of Study 1. First, we conducted cross-sectional analyses of relations between BF and six separate outcomes at the initial time point. Lower age, being African American, and intent to have chemotherapy all related to higher initial BF and were controlled. As noted by Antoni et al. (2001), BF was not related in a linear fashion to negative affect, CES-D depression, IES Avoidance, or IES Intrusion (though Antoni et al., 2001, did not examine perceived quality of life or social disruption). However, when the quadratic relationships between BF and these outcomes were examined in the present study, several findings emerged.

There were significant quadratic relationships between BF and social disruption ( $\beta = -.19$ ),  $t(129) = 2.18$ ,  $p < .04$ ,  $\Delta R^2 = .034$ ;

<sup>4</sup> This finding raises the possibility that the curvilinear effects depend on the inclusion of Stage 0 participants in the sample. To test this, all regression analyses from both studies were repeated omitting these participants. Very little changed. The curvilinear pattern does not depend on the inclusion of Stage 0 participants.

Table 3  
*Sample Characteristics at Initial Assessment (N = 136) and 5-Year Follow-Up (N = 74), Study 2*

Characteristic	Initial				5-year follow-up			
	M or N	SD	%	$\alpha$	M or N	SD	%	$\alpha$
Age (years)	50.25	9.15			51.81	9.59		
Education (years)	15.23	2.46			15.04	2.62		
Ethnicity								
Non-Hispanic White	100		73		60		81	
Hispanic	24		18		11		15	
African American	12		9		3		4	
Marital status								
Partnered	96		71		51		69	
Not partnered	40		29		23		31	
Employed <sup>a</sup>	108		79		62		84	
Stage at diagnosis								
Stage 0	16		12		6		8	
Stage I	64		47		35		47	
Stage II	56		41		33		45	
Procedure								
Mastectomy	73		54		38		51	
Lumpectomy	63		46		36		49	
Radiation <sup>b</sup>	58		43		36		49	
Chemotherapy <sup>b</sup>	57		42		31		42	
Antiestrogen medication <sup>b</sup>	52		38		37		50	
Reconstruction <sup>b</sup>	34		25		21		28	
Benefit finding	2.16	0.88		.93	2.24	1.09		.96
Distress emotion	0.89	0.58		.83	1.18	0.72		.94
Positive emotion					2.57	0.66		.95
Quality of life	4.62	0.94		.92	4.83	0.93		.90
Depression (CES-D)	12.67	9.60		.92	10.26	10.68		.92
Social disruption <sup>c</sup>	0.00	0.91		.86	-0.01	0.93		.89
IES Avoidance	11.39	8.12		.79				
IES Intrusion	14.20	8.37		.82				

Note. CES-D = Center for Epidemiological Studies Depression Scale; IES = Impact of Event Scale.

<sup>a</sup> Values are numbers and percentages of participants who were employed. <sup>b</sup> Values are numbers and percentages of participants who had undergone radiation, chemotherapy, antiestrogen medication, or reconstruction. <sup>c</sup> Social disruption scores are standardized.

IES Avoidance ( $\beta = -.21$ ),  $t(128) = 2.34$ ,  $p < .03$ ,  $\Delta R^2 = .040$ ; and IES Intrusion ( $\beta = -.18$ ),  $t(128) = 2.06$ ,  $p < .05$ ,  $\Delta R^2 = .031$ . There were marginal quadratic associations with negative emotions ( $\beta = -.17$ ),  $t(129) = 1.91$ ,  $p < .06$ ,  $\Delta R^2 = .027$ ; and quality of life ( $\beta = .16$ ),  $t(128) = 1.82$ ,  $p < .08$ ,  $\Delta R^2 = .024$ . The quadratic association of BF with CES-D reached only the level of  $p < .10$ . In all cases, the adverse responses were lowest among women who reported the most and the least benefit and highest among women who reported intermediate benefit (see Figure 3).

#### Cross-Sectional Analyses at 5-Year Follow-Up

The next set of analyses examined the subset who completed an assessment 5 years after having been treated for cancer. Participants again completed the same set of BF items, along with other measures. Among measures that were administered both in the initial study and at follow-up, the retest correlation from the initial assessment to the 5-year point for BF was .58, for perceived quality of life was .35, for CES-D was .43, for negative affect was .51, and for social disruption was .32.

We conducted analyses of concurrent linear relationships between BF and quality of life, positive affect, negative affect,

CES-D, or social disruption at long-term follow-up. Only long-term positive affect showed a linear relationship with long-term BF ( $\beta = .24$ ),  $t(70) = 2.10$ ,  $p < .05$ ,  $\Delta R^2 = .058$ . However, tests of concurrent associations of BF with these five measures at long-term follow-up yielded one significant curvilinear relationship and two that were marginally significant. Only condition was controlled in these analyses, as no other variable correlated with long-term BF. As Figure 4 shows, the quadratic relationship between BF and the ABS index of positive affect was significant ( $\beta = .36$ ),  $t(70) = 2.88$ ,  $p < .006$ ,  $\Delta R^2 = .098$ . A similar but weaker association emerged with regard to perceived quality of life ( $\beta = .26$ ),  $t(70) = 1.96$ ,  $p < .05$ ,  $\Delta R^2 = .052$ ; and social disruption ( $\beta = -.25$ ),  $t(69) = 1.82$ ,  $p < .08$ ,  $\Delta R^2 = .046$ . There were no quadratic effects for negative affect or CES-D.

#### Prospective Analyses

We also looked for prospective relations from BF early in the cancer experience to outcomes at 5 years, using BF scores from the 6-month assessment to predict five outcome variables at the 5-year point (reducing the  $N$  to 70). We chose 6 months as being the closest match to prospective analyses of Study 1, in which initial

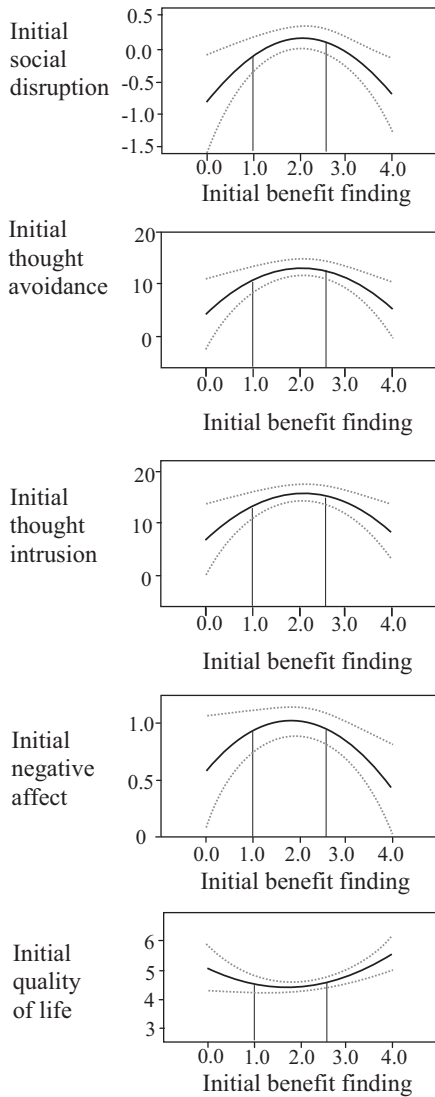


Figure 3. Quadratic relations of concurrent benefit finding to perceived quality of life, negative affect, social disruption, and thought intrusion at initial assessment, 2 months postsurgery, in Study 2. Dotted lines represent 95% confidence intervals.

assessment varied from 3 to 12 months postsurgery. We first examined the linear relationships. All analyses controlled for the 6-month values of the outcome variable. Analyses with positive affect are not reported because this variable was not assessed at the earlier time point and thus the earlier score could not be controlled. BF scores at the 6-month assessment did not predict long-term positive affect, quality of life, social disruption, negative affect, or CES-D in a linear manner.

Regarding nonlinear relationships, there was a quadratic relation between 6-month BF and 5-year social disruption (see Figure 5), which remained significant when 6-month disruption was controlled ( $\beta = -.31$ ,  $t(64) = 2.44$ ,  $p < .02$ ). The quadratic association with perceived quality of life at 5-year follow-up faded when 6-month quality of life was controlled. Prospective prediction of

perceived quality of life, CES-D, and distress were not significant. Again, 6-month positive affect was not assessed, so this analysis is not included here.

*What Differentiates Subsets?*

To explore the meaning of the quadratic effects, we divided the sample into segments on the basis of BF scores at the initial assessment, as in Study 1. The vertical lines in Figure 3 indicate the points at which the sample was split. The distribution in this sample was weighted more to the low end than in Study 1. The low BF group was 19% of the sample ( $n = 26$ ), the high BF group was 32% of the sample ( $n = 43$ ), and the intermediate group was 49% of the sample ( $n = 67$ ).

ANOVAs yielded several significant effects (from among 14 variables tested), which were followed by Duncan comparisons. Table 4 shows the significant differences. The high BF group had optimism levels that were significantly higher than those of the intermediate group; the low BF group fell between these two, not differing significantly from either. The high BF group reported more active coping, positive reframing, and more religious coping than did either of the other groups. The low BF group reported the lowest levels of examining feelings, lower than either of the other groups. The high BF group had a significantly higher number of positive nodes on average than the other groups.

We repeated this process with the subsample that was reassessed at 5-year follow-up. Group sizes were 15 (low BF), 26 (intermediate BF), and 33 (high BF). ANOVAs yielded two differences (see Table 4). Unlike previous analyses, the BF groups did not differ on initial optimism. The high BF group did, however, report

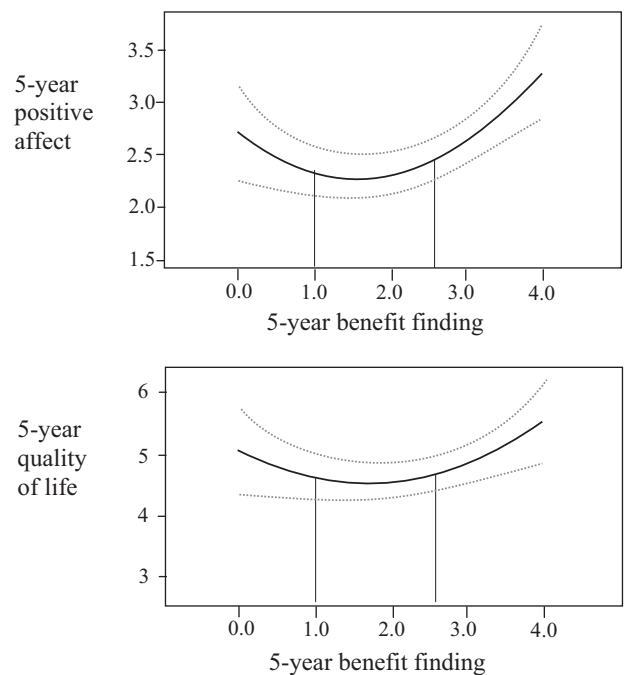


Figure 4. Quadratic relations of concurrent benefit finding to perceived quality of life and positive affect at long-term follow-up, 5 years postsurgery, in Study 2. Dotted lines represent 95% confidence intervals.

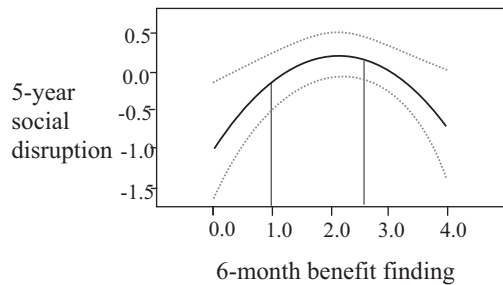


Figure 5. Quadratic relations of benefit finding at 6 months postsurgery to perceived quality of life, positive affect, and social disruption at 5-year follow-up in Study 2. Dotted lines represent 95% confidence intervals.

more positive reframing than the low BF group and tended to exceed the intermediate group in that respect ( $p < .07$ ). The high BF group tended to report more religious coping than the intermediate group.

Four other differences in this subsample were revealed by chi-square tests: type of surgery,  $\chi^2(2, N = 74) = 6.32, p < .05$ ; history of receiving chemotherapy,  $\chi^2(2, N = 74) = 9.23, p < .01$ ; history of receiving radiation,  $\chi^2(2, N = 74) = 10.59, p < .005$ ; and stage of disease,  $\chi^2(4, N = 74) = 13.99, p < .01$ . The patterns indicated that the low BF group was predominantly Stage I disease and unlikely to have had chemotherapy. The intermediate group was predominantly Stage II disease and likely to have had chemotherapy. The high BF group was more evenly distributed among stages, particularly likely to have had radiation, and likely to have had a lumpectomy rather than mastectomy.

### General Discussion

We examined two samples of women who were treated for breast cancer, relating BF to other outcomes. Our main goal was to test the possibility that BF relates to other indicators of adjustment in a nonlinear way. Significant curvilinear relations between BF

and several other psychosocial outcomes were observed cross-sectionally in both samples at two different points in time. Longitudinal relations were marginal in Study 1 and significant in Study 2. Women with low or high BF had better adjustment than those with intermediate BF. Though BF early in the experience of cancer had curvilinear relations to other outcomes years later, there was little evidence that the quadratic component predicted change in well-being (i.e., after controlling for earlier outcomes).

The curvilinear patterns tended to be larger at long-term follow-up for positive outcomes (positive affect and quality of life) than negative ones. In Study 1, the quadratic effect accounted for an average of 18.5% of the variance of positive outcomes at long-term follow-up; in Study 2, it accounted for an average of 7.5% of the variance of positive outcomes at long-term follow-up. In Study 2, the prospective effect from 6 months to 5 years accounted for an average 9.5% of the variance in positive outcomes, though prospective effects in Study 1 were not significant—perhaps because the timing of initial assessment in Study 1 varied from 3 to 12 months. In general, quadratic effects for negative outcomes averaged around 3% of the variance in the short term.

Why did the associations seem more robust among positive than negative outcomes? It is widely acknowledged today that these classes of outcomes may vary somewhat independently and may have different determinants (e.g., Zautra, 2003). It seems likely that the experience of finding benefit, which is intrinsically a positive one, may relate more naturally to other positive outcomes than to the relative absence of negative outcomes. This notion has been discussed in detail in other sources as well (e.g., Stanton et al., 2006).

### Why the Curvilinear Relations?

What is the meaning of these curvilinear relations? In the introduction, we posed a possible basis for such associations. We suggested that some women react to the cancer with relatively larger elevations in distress and smaller elevations in BF, whereas

Table 4  
Variables Assessed at Initial Assessment That Differentiated Three Levels of Benefit Finding (BF) Concurrently and at 5 Years Postsurgery, Study 2

Variable	Low BF (1)	Moderate BF (2)	High BF (3)	$p$	Post hoc difference	Effect size ( $\eta^2$ )
BF at initial assessment ( $N = 136$ )						
Optimism	20.00	19.04	20.79	.03	3 > 2	.05
Active Coping	1.73	2.28	2.37	.006	1 < 2,3	.08
Positive Reframing	1.23	1.63	2.21	.001	3 > 2 > 1†	.14
Acceptance	2.31	2.34	2.70	.02	3 > 1,2	.06
Religious Coping	1.29	1.77	2.24	.001	1 < 2 < 3	.10
Examining feelings	1.21	1.70	2.05	.004	1 < 2,3	.08
No. of positive nodes	0.31	0.78	2.37	.05	3 > 1,2	.05
BF at 5-year follow-up ( $N = 74$ )						
Positive Reframing	1.13	1.58	2.09	.005	3 > 1, 2†	.15
Religious Coping	1.70	1.58	2.21	.05	3 > 2†	.08

†  $p < .06$ .

others react with substantial BF and smaller elevations in distress. We suggested that yet other women react with neither elevated distress nor elevated BF, perhaps because they fail to experience the event as a crisis. Without the sense of crisis, there would be little reason for either distress or finding of benefits.

To try to gain information on what might differentiate the people who occupy these regions of the curve from one another, we created artificial groups, representing areas of the BF distribution where the relation of BF to other outcomes was positive, negative, and negligible. We then compared the groups on a set of variables that have been suggested as influencing BF.

The least intuitive group is the women who report low benefit but high well-being. Our characterization of them must be very tentative, because many of the findings pertaining to them are ephemeral, not replicating across samples or analyses within a sample, and because they were the smallest group in each sample. In various analyses, these women had less advanced disease (lower stage and fewer positive nodes), were less likely to be exposed to chemotherapy, and reported being less concerned about damage to their body. They appeared to be engaged in less "psychological work" surrounding the breast cancer experience, reporting less examining of their feelings, less reframing, less religious coping, and (in Study 2) less active coping. Our inference is that, being less threatened by the disease, they may have been less inclined to search for benefits. As noted earlier, a degree of life threat may be a necessary condition for the growth process to unfold in persons with major illness (Tedeschi & Calhoun, 2004).

If one compares the other two groups with each other, the picture is more intuitive. Women in the intermediate BF range had worse psychosocial profiles. They had higher levels of intrusive thoughts about breast cancer (and more effort to avoid such thoughts), greater distress and social disruption, and less self-reported quality of life than women who reported greater benefit. Those who reported greater benefit (and higher well-being) were higher in optimism, and they reported more use of coping strategies, such as positive reframing, acceptance, and religious coping (cf. Park et al., 1996). Notably, however, the coping differences that emerged between these groups were consistently restricted to these particular aspects of coping. If one considered only these two groups, higher levels of BF appear to be one element in a more general picture of greater psychosocial well-being. The effect sizes for these ANOVAs were in the small range, on average, suggesting that there are other, yet unexamined factors that are contributing to the variance. Future research should identify these factors and analyze them in combination with the variables that were examined here.

The samples were less consistent in the roles played by medical variables. In Study 1, the high BF group had evidence of higher disease severity (consistent with the finding of Lechner et al., 2003). In Study 2, however, this was not the case. There is preliminary evidence to suggest that the findings from Lechner et al. (2003) may have been mediated by levels of threat associated with Stage II disease, a variable that was not assessed in these studies. Future research in other samples with all four stages of cancer should examine this possibility in greater detail.

### *Methodological Implications*

These results have potentially important methodological implications for future BF research. Most simply, they indicate that linear models, as are typically used in ANOVA and regression, do not always provide a complete picture of the relationships among these variables. Our own prior analyses of some of these data, in which only linear effects were tested, clearly missed part of the picture (Antoni et al., 2001; Carver & Antoni, 2004; Urcuyo et al., 2005).

However, another methodological issue also follows from this point. If the pattern of a quadratic relationship between BF and outcomes generalizes more broadly, then it means that the direction of observed linear associations of BF with other outcomes depends on quirks of a particular sample, even as the true (curvilinear) relationship is identical across samples. That is, if a given sample happens to incorporate a larger proportion of persons falling toward one end of this relationship, then there will be positive relations between BF and well-being (as reported by Urcuyo et al., 2005). If the sample happens to have a larger proportion of persons falling toward the other end, then there will be inverse relations between BF and well-being. If neither of these happens, then there will be no relationship (as reported by Antoni et al., 2001). This is an important issue for researchers to consider in future studies of BF.

### *Clinical Implications*

The work reported here does not permit the inference that BF has a causal influence on the other outcome variables to which we linked it. However, consistent with data from other sources, the findings do suggest that the experience of BF is one element of a more general sense of well-being in a person who is actively engaged in the attempt to deal with a serious health threat. More precisely, this appears to be the case if, and only if, the person is experiencing the health threat as a serious adversity. This pattern does appear to have some clinical implications.

It seems reasonable to suggest that strategies aimed at fostering the experience of gain from a health threat would be beneficial for persons who are already experiencing the event as a serious challenge. As Tedeschi and Calhoun (2004; Calhoun & Tedeschi, 1999) have noted, interventions aimed at promoting BF are scarce. Nonetheless, some interventions contain techniques that arguably promote BF as one pathway to better outcomes. Examples include cognitive restructuring (Beck, 1981) to increase positive reframing and decrease pessimistic appraisals. Expressive writing (Stanton, Danoff-Burg, & Huggins, 2002; Smyth, Stone, Hurewitz, & Kaell, 1999; Ullrich & Lutgendorf, 2002) and supportive expressive therapy techniques (Spiegel, Bloom, Kramer, & Gottheil, 1989) may increase the degree to which people process the emotions surrounding the illness, which may also promote BF. The very consistent association of religious coping with high levels of BF suggests that approaches that address the use of religion as a coping strategy among persons with a religious commitment may also promote BF.

In contrast, those who do not exhibit significant signs of distress and have a positive medical prognosis may experience positive psychosocial outcomes without appreciable BF. Some of these

women may not experience the cancer diagnosis as a crisis. Intervening with these women to facilitate BF may have little impact on their psychosocial adjustment, and thus certain types of interventions may not be indicated for them.

### *Limitations, Future Directions, and Conclusions*

This work has several limitations that should be noted. We used convenience samples of women with breast cancer, most of whom were well educated and nonminority. It is unclear to what extent the results would generalize to other groups. Formal statistical techniques were not used to identify the groups for our comparisons, and it might be argued that where we separated the groups was somewhat arbitrary. Future work might use strategies, such as cluster analysis, to identify groups of women with different adaptational outcomes.

Another limitation is that we treated BF as a unidimensional construct. Although the alpha reliabilities were high in our samples, new research is beginning to question whether multidimensional models may better fit BF data (Weaver et al., 2005). Future work will need to examine whether the nonlinear relations we observed occur with subdomains of BF.

Nonetheless, this study contributes to the BF literature by examining in new ways the relationships between BF and psychosocial adjustment among women dealing with breast cancer. Nonlinear relations between BF and indicators of adjustment emerged both cross-sectionally and over time (though not for change in adjustment per se). Women at different places on the curves differed on several key psychosocial variables related to the emotional and cognitive processing of breast-cancer-related stressors. Future work should test for nonlinear relationships between BF and other aspects of psychosocial adjustment in other samples and continue to search for individual differences that can explain distinct patterns of adjustment following diagnosis and treatment for breast cancer and other major illnesses.

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