

# Optimistic Personality and Psychosocial Well-Being During Treatment Predict Psychosocial Well-Being Among Long-Term Survivors of Breast Cancer

Charles S. Carver, Roselyn G. Smith,  
Michael H. Antoni, Vida M. Petronis,  
and Sharlene Weiss  
University of Miami

Robert P. Derhagopian  
South Miami, Florida

In considering well-being among survivors of life-threatening illnesses such as breast cancer, 2 important questions are whether there is continuity between initial adjustment and longer term adjustment and what role personality plays in long-term adjustment. In this research, a sample of 163 early stage breast cancer patients whose psychosocial adjustment was first assessed during the year after surgery completed the same measures 5–13 years after surgery. Initial reports of well-being were relatively strong predictors of follow-up well-being on the same measures. Initial optimism and marital status also predicted follow-up adjustment, even controlling for earlier adjustment, which exerted a substantial unique effect in multivariate analyses. In contrast, initial medical variables played virtually no predictive role. There is substantial continuity of subjective well-being across many years among survivors of breast cancer, rooted partly in personality and social connection.

*Keywords:* breast cancer, quality of life, personality, optimism, long-term survivors

What factors influence adjustment among persons who have been treated for cancer? One well-studied group of cancer patients is women with breast cancer (e.g., Psychological Aspects of Breast Cancer Study Group, 1987), among whom a number of risk and resilience factors have been identified (Glanz & Lerman, 1992; Irvine, Brown, Crooks, Roberts, & Browne, 1991; Moyer & Salovey, 1996). Factors that have been examined include coping reactions (e.g., Ben-Zur, Gilbar, & Lev, 2001; Carver et al., 1993), social support (Bloom & Spiegel, 1984; Helgeson & Cohen, 1996), sexual self-schemas (Andersen & Cyranowski, 1994; Yurek, Farrar, & Andersen, 2000), personality qualities such as optimism (Carver et al., 1993, 1994; Epping-Jordan et al., 1999; Stanton & Snider, 1993), and medical factors such as stage of disease and extent of surgery (Glanz & Lerman, 1992; Irvine et al., 1991; Moyer & Salovey, 1996).

Much of that literature deals with the year after diagnosis. Recent work, however, has begun to turn to long-term cancer survivorship (Bloom, 2002; Deimling, Kahana, Bowman, & Schaefer, 2002; Ferrell, Dow, Leigh, Ly, & Gulasekaram, 1995; Ganz et al., 2002; Ganz, Rowland, Desmond, Meyerowitz, &

Wyatt, 1998; Gotay & Muraoka, 1998; Schag, Ganz, Wing, Sim, & Lee, 1994). No longer is it assumed that following treatment, cancer patients simply resume life where they left off. Questions are being raised about whether treatment—even successful treatment—leaves psychological as well as physical scars (Bloom, 2002; Ganz et al., 1998, 2002; Gotay & Muraoka, 1998; Tomich & Helgeson, 2002).

Some of this emerging literature focuses on normative consequences of having become a cancer survivor, compared with people who have never had cancer (Ganz et al., 1998; Gotay & Muraoka, 1998). Some of it, however, addresses the question of why some people appear to fare better in the long term than others. Much of the latter work focuses on prediction from medical variables (e.g., extent of surgery and adjuvant treatment), and almost all of it focuses on outcomes other than psychological well-being (Brezden, Phillips, Abdoell, Bunston, & Tannock, 2000; Ganz, 2001; Ganz et al., 2002; Partridge, Burstein, & Winer, 2001; Phillips & Bernhard, 2003). In what little research exists on differential long-term emotional and psychological well-being, medical variables prove to play a very small role. Ganz et al. (2002) found that chemotherapy in initial treatment predicted poorer scores at 5–10-year follow-up on a single-item “ladder of life” but not on other measures of mental health (the Mental Health index of the Short-Form General Health Survey) or depression (the Center for Epidemiologic Studies Depression Scale [CES–D]). Kornblith et al. (2003) found that greater long-term distress (20 years after initial treatment) related not to medical variables from early in treatment but to current interference with functioning caused by treatment-related lymphedema and numbness. That study also found more distress among less educated women.

It seems very likely that psychosocial variables play a major role in predicting long-term well-being, just as they do in short-term

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Charles S. Carver, Roselyn G. Smith, Michael H. Antoni, Vida M. Petronis, and Sharlene Weiss, Department of Psychology, University of Miami; Robert P. Derhagopian, independent practice, South Miami, Florida.

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Correspondence concerning this article should be addressed to Charles S. Carver, Department of Psychology, University of Miami, Coral Gables, FL 33124-2070. E-mail: ccarver@miami.edu

well-being. Identifying such variables would seem to be an important priority. As Gotay and Muraoka (1998) put it, such information is "vital to identify groups at risk and target support where and when it is needed" (p. 663).

Helgeson, Snyder, and Seltman (2004) recently reported information on this question. They studied a cohort of women recruited shortly after treatment and assessed seven times over the next 4.5 years. They separated the cohort statistically into groups with differing trajectories over the seven assessments; the groups were then compared on variables collected at baseline. Because one group deteriorated in psychological well-being over time, comparisons focused on distinguishing this one from the others. In a final multivariate analysis, the least distressed group had reported better social support and more personal resources (two aggregated indices) than the most distressed group. In contrast, demographic and disease variables played very little role in predicting differences in psychological well-being.

### Present Research

The research reported here examined several specific psychological variables as potential influences on psychological well-being among long-term survivors of breast cancer. The questions behind this research were these: First, to what extent does poor adaptation of long-term survivors trace to poor adaptation earlier in the cancer experience? Second, to what extent does poor adaptation among long-term survivors reflect aspects of personality (cf. Watson & Pennebaker, 1989)? That is, some people are prone to distress by disposition (Scheier & Carver, 1992; Tellegen, 1985; Watson & Clark, 1984). How much of the variation in psychological well-being among cancer survivors stems from these personality differences? We examine here one personality trait and an attitudinal variable as psychological predictors. We also examine levels of well-being reported shortly after treatment as a predictor of later well-being.

The personality trait we examined is optimism versus pessimism, the generalized expectation of positive versus negative outcomes in important domains of life (Scheier & Carver, 1985). The importance of this trait has been shown in several health-related contexts (Scheier, Carver, & Bridges, 2001). As a broad sense of confidence, optimism keeps people engaged in efforts toward desired goals, resulting in better behavioral outcomes (Carver, Lehman, & Antoni, 2003) and more adaptive coping (Carver et al., 1993; Stanton & Snider, 1993). Optimism has also predicted lower distress in many populations (Scheier et al., 2001), including breast cancer patients studied during the time surrounding diagnosis and through the next year (Carver et al., 1993, 1994; Epping-Jordan et al., 1999; Stanton & Snider, 1993). We predicted that optimism would similarly predict better well-being in the long term.

The attitudinal variable we examined was confidence of remaining cancer free. Cancer-related confidence is a focused sort of optimism. Fear of recurrence is a grave concern among cancer patients, which has been linked to greater distress and to social and sexual disruption (Gotay, 1984; Gotay & Muraoka, 1998; Spencer et al., 1999). It is known that confidence of remaining cancer free relates to less short-term distress (Carver, Harris, et al., 2000). We examined here whether it also predicts similar outcomes in the long term.

Finally, we considered the possibility that adverse emotional reactions following the initial cancer experience may themselves

be diagnostic of similar emotional states in the long term. If so, such early reactions would provide a readily accessible warning sign, not just for well-being in the immediate future but also for later well-being.

To examine the possibility of continuity between short-term and long-term well-being requires a prospective design, assessing the sample early in the cancer experience and again later. Similarly, to be confident about the role of personality requires assessing personality before long-term well-being, establishing temporal precedence. We report here findings from a sample that meets these conditions. Participants were women who had had surgery for early stage breast cancer 5 to 13 years earlier and had participated in studies of psychosocial adjustment at that time. Some had been followed from the point of diagnosis over the next year (Alferi, Carver, Antoni, Weiss, & Durán, 2001; Alferi, Culver, Carver, Arena, & Antoni, 1999; Carver et al., 1993, 1998; Culver, Arena, Antoni, & Carver, 2002). Others were assessed once at either 3, 6, or 12 months postsurgery (Spencer et al., 1999). Years later, many of these women were reassessed. This allowed us to predict their long-term well-being from data collected earlier.<sup>1</sup>

### Method

#### *Participants*

Three earlier projects (with recruitment from 1988 to 1995) enrolled patients at diagnosis and followed them for 1 year. Another project (with recruitment from 1994 to 1996) enrolled patients at either 3, 6, or 12 months postsurgery for a single assessment. Recruitment into those studies began with a brief description of the project by a member of the medical staff. Women interested in knowing more were put in touch with a research assistant, who explained the study in detail, obtained informed consent, and proceeded with data collection (for detail, see reports on the specific studies).

The follow-up that we are reporting here (for which data were collected in 2001) had not been envisioned at the time of the earlier studies. Recruitment began with letters indicating that we wished to examine quality of life of long-term survivors of breast cancer. Women who chose to participate were sent questionnaires and an informed consent form, which they completed and returned by mail (each received \$40). Both the original studies and the follow-up were approved by the university's institutional review board.

Given the considerable time that had elapsed since their initial participation, many participants were hard to locate.<sup>2</sup> We successfully found and recruited 20, 22, and 20 women from the three prospective studies and 101 from the cross-sectional study (from starting samples of 70, 68, 64, and 236, respectively). These women were treated as a single sample of 163 for the analyses reported here (sample sizes for specific analyses vary, owing to occasional missing responses). Medical and demographic characteristics of this sample are listed in Table 1; these data were collected in the initial studies, with the exception of time since treatment.

<sup>1</sup> A subset of these participants had also completed a measure of finding benefit in the experience of cancer; the role of that variable as a predictor of later well-being is discussed elsewhere (Carver & Antoni, 2004).

<sup>2</sup> Extensive efforts were made to locate participants, beginning with mail to addresses that had been obtained during earlier participation. When letters were returned, we searched for newer addresses and information about health status in medical records of the physicians and hospitals used for initial recruitment. Finally, we sought similar information from the Florida Cancer Data System, a statewide tracking system for cancer diagnoses.

Table 1  
Demographic and Medical Variables for Study Sample

Variable	Value
Age at diagnosis	
<i>M</i>	54.18
<i>SD</i>	10.61
Years of education at diagnosis	
<i>M</i>	14.18
<i>SD</i>	3.44
Ethnicity	
Non-Hispanic White	114 (70%)
Hispanic	32 (20%)
African American	17 (10%)
Marital status at diagnosis	
Married or partnered	117 (72%)
Single	46 (28%)
Employed at diagnosis	87 (53%) yes
Stage at diagnosis	
Stage 0	5 (3%)
Stage I	101 (62%)
Stage II	57 (35%)
Nodes (among those positive)	2.77 (2.45)
Procedure	
Mastectomy	77 (47%)
Lumpectomy	86 (53%)
Radiation	81 (50%) yes
Chemotherapy	50 (31%) yes
Tamoxifen	92 (56%) yes
Reconstruction	41 (25%) yes
New cancer or recurrence	21 (13%) yes
Years since surgery	
<i>M</i>	7.40
<i>SD</i>	2.18
Range	5.00–13.00

Note.  $N = 163$ . All measures other than years since surgery were collected at earlier participation.

The women who were re-recruited represent only 37% of participants in the original studies, although most women we reached chose to participate (10 additional women were successfully contacted but declined to participate; 45 more were confirmed to have died; the rest could not be located). Those lost to follow-up for any of these reasons were compared with those who participated on medical variables (stage, positive nodes, surgical procedure, adjuvant chemotherapy, radiation, tamoxifen) and demographic variables (age, marital and employment status at initial assessment, education, ethnicity). They were also compared on the psychological variables used in the analyses reported here.

The women successfully recruited did not differ from those lost to follow-up on any medical variable. However, those who completed follow-ups were more likely to have been partnered at the time of treatment,  $\chi^2(1, N = 163) = 5.26, p < .04$ ; more educated (14.18 vs. 13.18 years),  $F(1, 458) = 9.05, p < .01$ ; and less likely to be Hispanic,  $\chi^2(1, N = 163) = 7.53, p < .01$ . Those lost to follow-up had reported slightly more symptoms of depression at the earlier assessment (11.77 vs. 9.49 on the CES-D),  $F(1, 369) = 4.00, p < .05$ , along with greater social disruption (.08 vs. -.14 on the index described below),  $F(1, 355) = 4.10, p < .03$ . Not surprisingly, participants in the earliest studies were more likely to be lost to follow-up than participants in the more recent study,  $\chi^2(3, N = 464) = 11.63, p < .01$ . The groups did not differ on an index of distress, on rated quality of life, or on optimism or cancer-related confidence. In sum, although there are a few differences to be kept in mind, the participants analyzed here did not differ greatly from those lost to follow-up.

### Psychosocial Predictor Variables

The earlier projects all examined psychosocial adjustment to breast cancer. The protocols included measures of generalized optimism, confidence about remaining cancer free, and several measures of focused aspects of well-being.

**Optimism.** Generalized optimism versus pessimism was assessed in the longitudinal studies by the Life Orientation Test (LOT; Scheier & Carver, 1985) and in the cross-sectional study by the Life Orientation Test—Revised (LOT-R; Scheier, Carver, & Bridges, 1994). The LOT contains eight items; the LOT-R contains six. Both are coded with high scores representing optimism, and each yields a continuous distribution of scores. Items include “In uncertain times, I usually expect the best” and “If something can go wrong for me, it will.” Response choices ranged from *I agree a lot* (1) to *I disagree a lot* (4). These scales are widely used in research on effects of optimism in health-related settings (Scheier et al., 2001). Alpha in the longitudinal subsamples combined was .86 and in the cross-sectional subsample was .74. To combine samples, we standardized LOT scores across the longitudinal studies and separately standardized LOT-R scores in the cross-sectional study. The standardized scores were then used in the data analysis.

**Cancer-related confidence.** The question “To what extent do you believe that you will remain free of cancer in the future?” was answered on a 9-point scale, with 9 labeled *absolutely sure I won't get cancer again*, 5 labeled *I don't know*, and 1 labeled *not at all confident—I expect to get cancer again*. Single items have been found to be as informative as scales when the quality assessed is easy for respondents to understand (Burisch, 1984a, 1984b; Helgeson, 1992), and we regard this concept as easily understood. The longitudinal subsample responded at 3 months postsurgery; the cross-sectional subsample responded at whichever time they completed the other measures (3, 6, or 12 months postsurgery).

**Distress.** Emotional distress was measured in each prior study, but the measures varied. In one prospective subsample, distress was assessed with the Affects Balance Scale (Derogatis, 1975), a series of affect descriptors. The other prospective subsamples and the cross-sectional subsample completed a shorter set of affect descriptors, which correlate quite strongly with scales from the Profile of Mood States (McNair, Lorr, & Droppelman, 1971), as reported elsewhere (Carver, Meyer, & Antoni, 2000). Respondents indicated the extent to which they had the feeling described in each item on a scale from *not at all* (1) to *extremely* (5).

The measures share eight items that reflect distress. To combine samples and to compare absolute values over time, we created a distress index. The items in this index assess anxiety (“tense,” “nervous,” “anxious”), anger (“angry,” “resentful”), and depression (“unhappy,” “worthless,” “hopeless”). There were strong correlations in each study among the affects (ranging from .57 to .67); thus, the eight items were averaged. The longitudinal subsamples completed these items several times across a year; however, to make the data comparable to the average of the cross-sectional subsample, we report analyses only from data collected at 6 months postsurgery. Alphas were .88 across the longitudinal subsamples and .87 in the cross-sectional subsample.

**Depression symptoms.** A second indicator of well-being in all but one earlier study was the CES-D (Radloff, 1977), which measures symptoms of depression. Respondents rated the extent of symptoms within the past week, ranging from *rarely or none of the time* (0) to *most or all of the time* (4). The CES-D was completed at 3 months postsurgery in two of the longitudinal studies (but not the third) and by all participants in the cross-sectional study. Alphas were .77 across the longitudinal subsamples and .86 in the cross-sectional subsample.

**Social disruption.** Two subscales of the Sickness Impact Profile (Bergner, Bobbitt, Carter, & Gilson, 1981) were used to measure adverse impact of breast cancer and its treatment on social and recreational behavior. The Sickness Impact Profile, with 12 areas of impact, has been validated on a variety of patient groups. The scales we used assessed impact on *social activities* and on *recreation and pastime* activities. Par-

ticipants were to report any recent disruption in these activities due to their illness and its treatment. Examples of items reflecting adverse impact on social activities are "I am avoiding social visits from others" and "I talk less with those around me." Examples of items reflecting adverse impact on recreational activities are "I am cutting down on some of my usual recreation and pastimes, for example, watching TV or reading" and "I am doing fewer community activities, for example, going to church or doing volunteer work." Higher scores represent more disruption (each subscale is scored by a weighted formula; Bergner et al., 1981). Because the subscales were strongly correlated, we created a social disruption index by standardizing subscale scores and averaging. This measure was completed by participants in two of the longitudinal studies and by all participants in the cross-sectional study. Alphas were .86 and .85 in the two samples, respectively. As with mood disturbance, we used the 6-month reports from the longitudinal studies.

*Self-rated quality of life.* The women reported feeling a positive versus negative quality of life (QOL) in day-to-day experiences on 10 items selected from a list created by Andrews and Withey (1976), using the stem "How do you feel about. . . ." The items we used address diverse aspects of life (e.g., "how interesting your day to day life is," "the religious or spiritual fulfillment in your life," "the work or home activities that you do"). Respondents indicated how they felt about each domain on a scale ranging from *terrible* (1) to *delighted* (7). The longitudinal studies repeated this measure several times; we used the 6-month data here. Alphas were .83 and .92 in the longitudinal and cross-sectional subsamples, respectively.

### Long-Term Follow-Up Outcome Variables

We assessed follow-up status on the same well-being measures as were just described (alpha reliabilities were slightly higher at retest than in the earlier assessments). The LOT-R was also administered at follow-up, to obtain information on long-term stability of optimism. As a trait, optimism should have substantial test-retest stability. In the full sample, the standardized LOT and LOT-R scores from the initial assessments (from 5 to 13 years earlier) correlated .62 with the retest LOT-R scores. In the cross-sectional subsample ( $n = 101$ ), the LOT-R scores from 5 to 8 years earlier correlated .65 with retest LOT-R scores. These test-retest correlations are very similar to the usual finding for personality measures over a period of 6–10 years among persons in this age range (Roberts & DelVecchio, 2000). Because the cross-sectional subsample completed the identical measure at both times, mean levels could also be compared. The mean tended to fall (over 5–8 years) from 20.13 ( $SD = 3.45$ ) to 19.43 ( $SD = 4.24$ ), but that difference did not reach significance ( $p < .07$ ).

### Analytic Strategy

In analyzing the data, we first examined the possibility of change in well-being over time, then tested initial medical and demographic variables as predictors of later well-being. Of greatest interest were the next analyses, which tested initial psychological variables as predictors of later well-being, first by correlations and then in multivariate regression models that included significant medical and demographic predictors.

## Results

We began by comparing measures of distress, depression, and subjective QOL from the initial assessments with follow-up reports by paired  $t$  tests among participants who completed the measures at both times. These analyses revealed only one significant difference: Distress was significantly higher overall at follow-up ( $M = 2.12$ ,  $SD = 0.60$ ) than earlier ( $M = 1.81$ ,  $SD = 0.73$ ),  $t(157) = 5.41$ ,  $p < .001$ , though the distress being reported was not high in absolute terms. Reports of QOL and depression symptoms did not differ between assessment points. At follow-up,

22% of the sample had CES-D scores at follow-up of 16 or higher, a commonly used criterion for moderate depression.

### Medical and Demographic Variables

Medical and demographic variables were then examined as predictors of follow-up outcomes. A number of demographic variables related to one or more outcome variable. Most striking was the impact of marital status. Women who were in partnered relationships at the initial assessment, compared with those who were not, reported at follow-up less depression,  $r(158) = -.32$ ,  $p < .001$ ; less mood disturbance,  $r(158) = -.19$ ,  $p < .02$ ; better QOL,  $r(156) = .26$ ,  $p < .001$ ; and less social disruption,  $r(152) = -.25$ ,  $p < .002$ .

There were also several other effects for demographic variables. More education at initial assessment related to less follow-up depression,  $r(158) = -.24$ ,  $p < .003$ , and less social disruption,  $r(152) = -.32$ ,  $p < .03$ . Being employed related to reports of greater social disruption,  $r(152) = .17$ ,  $p < .05$ . Ethnicity related to follow-up depression and social disruption, such that Hispanics ( $n = 33$ ) had higher scores than the other groups (Blacks [ $n = 14$ ] and non-Hispanic Whites [ $n = 113$ ]),  $F(2, 157) = 6.65$ ,  $p < .003$ , and  $F(2, 151) = 8.13$ ,  $p < .001$ , respectively. Beyond these relationships, more time elapsed since surgery related to less mood disturbance,  $r(158) = -.20$ ,  $p < .02$ ; less depression,  $r(158) = -.19$ ,  $p < .02$ ; and less social disruption at follow-up,  $r(152) = -.16$ ,  $p < .05$ .

In contrast to the role of demographic variables, only one medical variable predicted any aspect of long-term adjustment. Adjuvant chemotherapy in initial treatment related to greater distress at long-term follow-up,  $r(158) = .16$ ,  $p < .05$ . Twenty-one of the women indicated at follow-up that they had had cancer again since their initial participation, either as a recurrence or as a new cancer. This cancer diagnosis did not, however, relate significantly to any outcome variable at follow-up. Nonetheless, this variable was included as a control in subsequent analyses.

All demographic and medical variables that related significantly to outcome variables were used as predictors in subsequent multivariate analyses of those outcomes to which they related. Ethnicity was treated by dummy coding (Hispanics vs. all others).

### Autocorrelations and Multivariate Tests

Correlations between psychosocial well-being shortly after surgery and the same measures at follow-up (see Table 2) revealed substantial associations for each measure over time. Multiple regression analyses (using simultaneous entry) then tested whether the initial measures predicted follow-ups above and beyond effects of demographic and medical variables. Results of these analyses are summarized in Table 3. In each case, the measure of well-being assessed years earlier was a significant predictor of the same measure at long-term follow-up. The inclusion of medical and demographic variables had little impact on these effects (cf. Table 2).

Several demographic variables retained their predictive role in this multivariate analysis, but not all of them. Marital status remained a significant predictor of all but one outcome, which was near significance. Education remained a significant predictor of lower depression levels, and time since treatment remained a

Table 2  
*Correlations Between Well-Being Measures Collected During Initial Participation and the Same Measures at Long-Term Follow-Up*

Initial measure	Retest <i>r</i>
Distress emotions 3 months postsurgery (158)	.43***
CES-D depression 3 months postsurgery (139)	.46***
Quality of life ratings 3 months postsurgery (156)	.63***
Social disruption 3 months postsurgery (133)	.39***

Note. Sample sizes for specific associations are in parentheses. CES-D = Center for Epidemiologic Studies Depression Scale.  
 \*\*\*  $p < .001$ .

significant predictor of lower levels of mood disturbance. The occurrence of a subsequent cancer event, which had not related significantly to any outcome at the bivariate level, tended toward prediction of two of the outcomes, though neither of these associations attained significance.

#### Generalized Optimism and Cancer-Related Confidence

The final predictors of interest were trait optimism and confidence of remaining cancer free, which were moderately correlated,  $r(136) = .32$ . Initial optimism correlated significantly with all follow-up outcome measures (Table 4, first column of values); cancer-related confidence correlated with two outcomes. A set of hierarchical multiple regression analyses were then conducted. The first step determined whether effects of optimism and cancer-related confidence would remain when entering the demographic and medical variables that had been used as controls in the analyses just described. The effects changed relatively little with the addition of these predictors (Table 4, second column of values), though one of the four effects of optimism faded from significance.

In the next step, these variables were joined by the initial level of the outcome variable. As shown in the third column of values in Table 4, this procedure substantially weakened the effects of the optimism, but the three effects that had been significant to that point remained significant. The effects of cancer-related confidence were all rendered nonsignificant in this step. This pattern is consistent with a mediation model, in which effects of cancer-related confidence on the follow-up outcome occurred via the association of confidence with the initial outcome (Baron & Kenny, 1986). The final column of Table 4 shows the adjusted  $R^2$  values for the final equations.

Table 4 shows how prediction from optimism (and cancer-related confidence) changes when additional variables are entered into the equations. Also noteworthy with regard to the last step in the analysis are the beta weights of the variables representing the initial levels of adjustment. In all cases, the initial level of the variable remained a robust predictor of the later level. For the analyses involving optimism,  $\beta = .41$  for initial distress emotions, .33 for initial CES-D, .56 for initial QOL ratings, and .27 for initial social disruption (cf. the correlations in Table 2).

Finally, it is noteworthy that the effects of initial marital status also remained significant in the final step of these analyses for three of the four outcomes. The beta weights of partner status from the final equations that tested optimism were as follows:  $-.16$  for

the distress index,  $-.24$  for CES-D, .15 for QOL, and .16 for social disruption (only the last failed to reach significance, at  $p = .053$ ).

#### Discussion

In a series of earlier studies, patients who were newly diagnosed with breast cancer reported their levels of generalized optimism, their confidence about remaining free of cancer, and various aspects of emotional and psychosocial well-being. From 5 to 13 years after treatment, some of the same women completed the same measures. In general, the levels of well-being that were reported at long-term follow-up were comparable to those reported during the year after treatment. Only the index of affective distress showed an increase over time, for reasons that are not clear (perhaps stemming from other stressors at the time of the later assessment). On the other hand, those lost to follow-up were slightly more depressed at the earlier assessment than those who constituted the follow-up sample. Thus, the level of distress of this sample is likely an underestimate of distress in this population more generally.

Table 3  
*Summary of Multivariate Analyses (Simultaneous Entry) for Four Follow-Up Outcomes, Incorporating Autocorrelations Plus Significant Bivariate Demographic and Medical Predictors*

Adjusted $R^2$	Predictor variable	$\beta$	<i>t</i>	<i>p</i>
Distress emotion index ( $df = 152$ )				
.29	Initial distress emotions	.48	7.01	.001
	Partnered (2) vs. single (1)	-.18	2.68	.01
	Time since treatment	-.25	3.62	.001
	Chemotherapy	.13	1.83	.07
	Subsequent cancer event	.05	0.80	.43
Depression (CES-D) <sup>a</sup> ( $df = 132$ )				
.35	Initial CES-D	.40	5.43	.001
	Partnered (2) vs. single (1)	-.24	3.38	.001
	Time since treatment	-.07	0.98	.33
	Years of education	-.17	2.27	.03
	Hispanic (2) vs. others (1)	.14	1.88	.07
Subsequent cancer event	.12	1.73	.09	
Quality of life ( $df = 152$ )				
.41	Initial quality of life	.61	9.67	.001
	Partnered (2) vs. single (1)	.15	2.45	.02
	Subsequent cancer event	-.04	0.61	.54
Social disruption <sup>a</sup> ( $df = 125$ )				
.19	Initial social disruption	.29	3.27	.002
	Partnered (2) vs. single (1)	-.16	1.95	.06
	Time since treatment	.01	0.12	.91
	Years of education	.02	0.24	.81
	Employed (2) vs. not (1)	.14	1.65	.11
	Hispanic (2) vs. others (1)	.14	1.51	.14
	Subsequent cancer event	.14	1.73	.09

Note. CES-D = Center for Epidemiologic Studies Depression Scale.  
<sup>a</sup> One subsample did not complete this measure initially.

Table 4  
*Predictive Associations From Initial Optimism and Cancer-Related Confidence to Follow-Up Measures of Adjustment*

Predictor and dependent measure	Simple <i>r</i>	$\beta$ with demographic and medical controls	$\beta$ with controls plus premeasure of outcome	Adjusted $R^2$ for final equation
<b>Optimism</b>				
Distress emotions	-.34***	-.33***	-.16*	.31
CES-D depression	-.33***	-.30***	-.17*	.37
Quality of life ratings	.36***	.33***	.14*	.43
Social disruption	-.17*	-.13	-.06	.19
<b>Cancer-related confidence</b>				
Distress emotions	-.20*	-.14*	-.04	.28
CES-D depression	-.15	-.09	.03	.34
Quality of life ratings	.33***	.28**	.08	.41
Social disruption	-.11	-.08	-.06	.23

Note. CES-D = Center for Epidemiologic Studies Depression Scale.  
 \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

### Prospective Prediction

Our primary interest in this research was whether data collected early in the cancer experience would predict adjustment years later. This was indeed the case. Mood disturbance in the first year postsurgery predicted mood disturbance at long-term follow-up; level of depressive symptoms predicted depressive symptoms at follow-up; subjective QOL predicted subjective QOL at follow-up; and social disruption predicted social disruption at follow-up. All these relationships were moderately strong, and all held when relevant medical and demographic variables were also in the predictive equations. Thus, there appears to be substantial continuity between well-being shortly after treatment for breast cancer and well-being in long-term survivorship. A similar conclusion was reached in an earlier study of a small sample of survivors of diverse cancers (Grassi & Rosti, 1996).

In considerable part, then, long-term well-being after treatment for breast cancer reflects a continuity in experience over time (cf. Diener, Suh, Lucas, & Smith, 1999). Earlier experiences reverberate in later ones, even many years later. Whether the earlier reports of well-being were directly attributable to the confrontation with a breast cancer diagnosis or to other sources, the stability of these reactions is noteworthy.

Initial optimism also predicted the indicators of well-being years later, findings that conceptually replicate Helgeson et al.'s (2004) findings for an index of personal resources. These effects of optimism (except for that on social disruption) held when relevant demographic and medical predictors were included. They also remained significant, though they were substantially reduced, when further controls were included for the earlier levels of well-being.

This pattern suggests that the predictive effects of optimism on long-term adjustment were partly mediated by the association of optimism with shorter term adjustment, but only partly. Some direct effect of optimism remained. Thus, more is involved than a static translation of a trait into a distress level (cf. Carver et al., 1993). Presumably, women who vary in their dispositions responded differently to new challenges and problems over time

(which were not assessed here), resulting in a reordering within the sample that continued to favor the more optimistic women over the less optimistic women.

Cancer-related confidence had weaker prospective effects than generalized optimism. These effects all faded to nonsignificance for all outcomes when earlier levels of the outcome were controlled. Although focused expectancies often represent the best source of prediction, in this context that was not the case.

### Demographic and Medical Variables

Although our primary interest was in the variables just described, the studies also yielded information about the role played by demographic and medical variables in long-term adjustment. There was substantial evidence that being partnered at the time of medical treatment led to better long-term outcomes. Indeed, the effect of having a partner remained significant for three of the four outcomes (and near significant for the fourth), even after controlling for the initial level of the outcome variable, and even after controlling as well for generalized optimism. This effect of partner status is conceptually consistent with evidence reported by Ganz et al. (2002) and with the finding by Helgeson et al. (2004) that having better social resources predicts a trajectory of better psychological well-being over time.

Other demographic variables contributed to prediction of one outcome or another, but not as consistently. Having a higher level of education at the time of treatment predicted less depression at long-term follow-up, but not other outcomes. Longer time since treatment predicted less mood disturbance, but not other outcomes. Effects of other demographic variables were generally nonsignificant when in multivariate equations.

In contrast to all of these effects, medical variables at the time of treatment played virtually no role in the outcomes examined here. Chemotherapy related to higher levels of distress emotion at follow-up, consistent with a prior relation of chemotherapy to ratings on a "ladder of life" (Ganz et al., 2002), but this effect was not significant in the multivariate analysis. Another medical vari-

able that might be expected to matter—renewed experience with cancer since the initial diagnosis—did not relate significantly to any adjustment variable at follow-up, either alone or in multivariate tests.

### *Other Determinants of Psychological Well-Being*

When all of these influences on long-term adjustment are taken into account, what may be most remarkable is that the cumulative effect of the other predictors did not account fully for the predictive relations from prior well-being to later well-being. This leaves unanswered the question of what else might cause the continued reverberation of those earlier experiences in the lives of the women. One possibility is that they reflect personality qualities that have effects similar to those of optimism but are not identical to optimism. One likely candidate is neuroticism or negative emotionality (Tellegen, 1985). This trait is known to reflect a broad proneness to negative emotional experience (Watson & Pennebaker, 1989). High neuroticism relates to pessimism but is not quite the same as pessimism (Scheier et al., 1994). Perhaps the part of neuroticism that does not overlap with pessimism is responsible for this continuity.

Of course, the idea that another trait is responsible for this continuity is only one of many potential sources of this effect. Another source is the quality of the woman's social resources at the time of treatment and afterward (Helgeson et al., 2004). The measure that corresponds to this construct in our data set was quite limited, being only a dichotomous indication of whether the women had partners at the time of treatment. Future work should look more closely at the various elements contributing to the broader sense of social resources.

Indeed, there must also be other influences on long-term adjustment. As a group, the predictor variables examined here yielded impressive results. When all were used in multivariate equations, they accounted for very substantial portions of the variance in the outcome (ranging from 19% to 43%). But there remains a good deal of variance not accounted for.

### *Limitations and Implications*

Some limitations on this study should be noted. The sample reported on here was a sample of volunteers from earlier projects. As a group they were predominately White non-Hispanic and relatively well educated. They were also relatively well off psychologically, both at the time of their original participation and at follow-up. Indeed, they may be better off than those who were lost to follow-up. In addition, we had no measure of long-term side effects of treatment, such as lymphedema or numbness, or of late-emerging health effects from treatment, to be able to account for the impact of such side effects on adjustment (cf. Kornblith et al., 2003). These limitations should be kept in mind in interpreting the findings.

Nonetheless, the findings have what we regard as two important implications. One of them is clinical. Many clinicians hold the implicit assumption that patients' well-being of all sorts, including psychosocial well-being, relates primarily to medical variables. Medical variables, however, played virtually no role in this sample. The effects came from personality, having a partner during

treatment, and psychosocial well-being earlier in treatment. Thus, the clinical implication of the findings is that core psychosocial variables account for a very large proportion of the variance in long-term well-being among cancer survivors. Knowing who is pessimistic about life in general, who lacks a supportive spouse during treatment, or who is adjusting poorly during treatment is likely to be a good guide to who will experience adjustment problems years later (cf. Helgeson et al., 2004).

These results also have an important methodological implication. The study of well-being among cancer survivors is not entirely a matter of comparing survivors with people who never had cancer. It is partly a search for determinants of differential well-being among patient groups. Although there are bound to be many influences, it seems clear that personality (in the form of optimism, in this case) plays an important role in these outcomes (see also Grassi & Rosti, 1996; Helgeson et al., 2004). Even research focused on influences other than personality can benefit from the inclusion of a relevant aspect of personality in the research protocol. Any study on this topic that fails to do so will consign to the error term an important source of systematic variance.

### References

- Alferi, S. M., Carver, C. S., Antoni, M. H., Weiss, S., & Durán, R. E. (2001). An exploratory study of social support, distress, and life disruption among low-income Hispanic women under treatment for early stage breast cancer. *Health Psychology, 20*, 41–46.
- Alferi, S. M., Culver, J. L., Carver, C. S., Arena, P. L., & Antoni, M. H. (1999). Religiosity, religious coping, and distress: A prospective study of Catholic and Evangelical Hispanic women in treatment for early stage breast cancer. *Journal of Health Psychology, 4*, 343–356.
- Andersen, B. L., & Cyranowski, J. M. (1994). Women's sexual self-schema. *Journal of Personality and Social Psychology, 67*, 1097–1100.
- Andrews, F. M., & Withey, S. B. (1976). *Social indicators of well being: Americans' perceptions of life quality*. New York: Plenum Press.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173–1182.
- Ben-Zur, H., Gilbar, O., & Lev, S. (2001). Coping with breast cancer: Patient, spouse, and dyad models. *Psychosomatic Medicine, 63*, 32–39.
- Bergner, M., Bobbitt, R. A., Carter, W. B., & Gilson, B. S. (1981). The Sickness Impact Profile: Development and final revision of a health status measure. *Medical Care, 19*, 787–806.
- Bloom, J. R. (2002). Surviving and thriving? *Psycho-Oncology, 11*, 89–92.
- Bloom, J. R., & Spiegel, D. (1984). The relationship of two dimensions of social support to the psychological well-being and social functioning of women with advanced breast cancer. *Social Science and Medicine, 19*, 831–837.
- Brezden, C. B., Phillips, K. A., Abdolell, M., Bunston, T., & Tannock, I. F. (2000). Cognitive function in breast cancer patients receiving adjuvant chemotherapy. *Journal of Clinical Oncology, 18*, 2695–2701.
- Burisch, M. (1984a). Approaches to personality inventory construction: A comparison of merits. *American Psychologist, 39*, 214–227.
- Burisch, M. (1984b). You don't always get what you pay for: Measuring depression with short and simple versus long and sophisticated scales. *Journal of Research in Personality, 18*, 81–98.
- Carver, C. S., & Antoni, M. H. (2004). Finding benefit in breast cancer

- during the year after diagnosis predicts better adjustment 5 to 8 years after diagnosis. *Health Psychology*, 23, 595–598.
- Carver, C. S., Harris, S. D., Lehman, J. M., Durel, L. A., Antoni, M. H., Spencer, S. M., & Pozo-Kaderman, C. (2000). How important is the perception of personal control? Studies of early stage breast cancer patients. *Personality and Social Psychology Bulletin*, 26, 139–150.
- Carver, C. S., Lehman, J. M., & Antoni, M. H. (2003). Dispositional pessimism predicts illness-related disruption of social and recreational activities among breast cancer patients. *Journal of Personality and Social Psychology*, 84, 813–821.
- Carver, C. S., Meyer, B., & Antoni, M. H. (2000). Responsiveness to threats and incentives, expectancy of recurrence, and distress and disengagement: Moderator effects in early-stage breast cancer patients. *Journal of Consulting and Clinical Psychology*, 68, 965–975.
- Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., et al. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology*, 65, 375–390.
- Carver, C. S., Pozo-Kaderman, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., et al. (1994). Optimism versus pessimism predicts the quality of women's adjustment to early stage breast cancer. *Cancer*, 73, 1213–1220.
- Carver, C. S., Pozo-Kaderman, C., Price, A. A., Noriega, V., Harris, S. D., Derhagopian, R. P., et al. (1998). Concern about aspects of body image and adjustment to early stage breast cancer. *Psychosomatic Medicine*, 60, 168–174.
- Culver, J. L., Arena, P. L., Antoni, M. H., & Carver, C. S. (2002). Coping and distress among women under treatment for early stage breast cancer: Comparing African Americans, Hispanics, and non-Hispanic Whites. *Psycho-Oncology*, 11, 495–504.
- Deimling, G. T., Kahana, B., Bowman, K. F., & Schaefer, M. L. (2002). Cancer survivorship and psychological distress in later life. *Psycho-Oncology*, 11, 479–494.
- Derogatis, L. R. (1975). *The Affects Balance Scale*. Baltimore: Clinical Psychometric Research.
- Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125, 276–302.
- Epping-Jordan, J. E., Compas, B. E., Osowiecki, D. M., Oppedisano, G., Gerhardt, C., Primo, K., & Krag, D. N. (1999). Psychological adjustment in breast cancer: Processes of emotional distress. *Health Psychology*, 18, 315–326.
- Ferrell, B. R., Dow, K. H., Leigh, S., Ly, J., & Gulasekaram, P. (1995). Quality of life in long-term cancer survivors. *Oncology Nursing Forum*, 22, 915–922.
- Ganz, P. A. (2001). Late effects of cancer and its treatment. *Seminars in Oncology Nursing*, 17, 241–248.
- Ganz, P. A., Desmond, K. A., Leedham, B., Rowland, J. H., Meyerowitz, B. E., & Belin, T. R. (2002). Quality of life in long-term, disease-free survivors of breast cancer: A follow-up study. *Journal of the National Cancer Institute*, 94, 39–49.
- Ganz, P. A., Rowland, J. H., Desmond, K. A., Meyerowitz, B. E., & Wyatt, G. E. (1998). Life after breast cancer: Understanding women's health-related quality of life and sexual functioning. *Journal of Clinical Oncology*, 16, 501–514.
- Glanz, K., & Lerman, C. (1992). Psychosocial impact of breast cancer: A critical review. *Annals of Behavioral Medicine*, 14, 204–212.
- Gotay, C. C. (1984). The experience of cancer during early and advanced stages: The views of patients and their mates. *Social Science in Medicine*, 18, 605–613.
- Gotay, C. C., & Muraoka, M. (1998). Quality of life in long-term survivors of adult-onset cancers. *Journal of the National Cancer Institute*, 90, 656–667.
- Grassi, L., & Rosti, G. (1996). Psychosocial morbidity and adjustment to illness among long-term cancer survivors: A six-year follow-up study. *Psychosomatics*, 37, 523–532.
- Helgeson, V. S. (1992). Moderators of the relation between perceived control and adjustment to chronic illness. *Journal of Personality and Social Psychology*, 63, 656–666.
- Helgeson, V. S., & Cohen, S. (1996). Social support and adjustment to cancer: Reconciling descriptive, correlational, and intervention research. *Health Psychology*, 15, 135–148.
- Helgeson, V. S., Snyder, P., & Seltman, H. (2004). Psychological and physical adjustment to breast cancer over 4 years: Identifying distinct trajectories of change. *Health Psychology*, 23, 3–15.
- Irvine, D., Brown, B., Crooks, D., Roberts, J., & Browne, G. (1991). Psychosocial adjustment in women with breast cancer. *Cancer*, 67, 1097–1117.
- Kornblith, A. B., Herndon, J. E., II, Weiss, R. B., Zhang, C., Zuckerman, E. L., Rosenberg, S., et al. (2003). Long-term adjustment of survivors of early-stage breast carcinoma, 20 years after adjuvant chemotherapy. *Cancer*, 98, 679–689.
- McNair, D., Lorr, M., & Droppelman, L. (1971). *Profile of Mood States manual*. San Diego, CA: EdITS.
- Moyer, A., & Salovey, P. (1996). Psychosocial sequelae of breast cancer and its treatment. *Annals of Behavioral Medicine*, 18, 110–125.
- Partridge, A. H., Burstein, H. J., & Winer, E. P. (2001). Side effects of chemotherapy and combined chemohormonal therapy in women with early-stage breast cancer. *Journal of the National Cancer Institute*, 30, 135–142.
- Phillips, K. A., & Bernhard, J. (2003). Adjuvant breast cancer treatment and cognitive function: Current knowledge and research directions. *Journal of the National Cancer Institute*, 95, 190–197.
- Psychological Aspects of Breast Cancer Study Group. (1987). Psychological response to mastectomy: A prospective comparison study. *Cancer*, 59, 189–196.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385–401.
- Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin*, 126, 3–25.
- Schag, C. A. C., Ganz, P. A., Wing, D. S., Sim, M.-S., & Lee, J. J. (1994). Quality of life in adult survivors of lung, colon, and prostate cancer. *Quality of Life Research*, 3, 127–141.
- Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology*, 4, 219–247.
- Scheier, M. F., & Carver, C. S. (1992). Effects of optimism on psychological and physical well-being: Theoretical overview and empirical update. *Cognitive Therapy and Research*, 16, 201–228.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*, 67, 1063–1078.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (2001). Optimism, pessimism, and psychological well-being. In E. C. Chang (Ed.), *Optimism and pessimism: Implications for theory, research, and practice* (pp. 189–216). Washington, DC: American Psychological Association.
- Spencer, S. M., Lehman, J. M., Wynings, C., Arena, P., Carver, C. S., Antoni, M. H., et al. (1999). Concerns about breast cancer and relations to psychosocial well-being in a multiethnic sample of early stage patients. *Health Psychology*, 18, 159–168.
- Stanton, A. L., & Snider, P. R. (1993). Coping with a breast cancer diagnosis: A prospective study. *Health Psychology*, 12, 16–23.
- Tellegen, A. (1985). Structure of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In A. H. Tuma &



- J. D. Maser (Eds.), *Anxiety and the anxiety disorders* (pp. 681–706). Hillsdale, NJ: Erlbaum.
- Tomich, P. L., & Helgeson, V. S. (2002). Five years later: A cross-sectional comparison of breast cancer survivors with healthy women. *Psycho-Oncology, 11*, 154–169.
- Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin, 96*, 465–490.
- Watson, D., & Pennebaker, J. W. (1989). Health complaints, stress, and distress: Exploring the central role of negative affectivity. *Psychological Review, 96*, 234–254.
- Yurek, D., Farrar, W., & Andersen, B. L. (2000). Breast cancer surgery: Comparing surgical groups and determining individual differences in postoperative sexuality and body-change stress. *Journal of Consulting and Clinical Psychology, 68*, 697–709.

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