FIVE YEARS LATER: A CROSS-SECTIONAL COMPARISON OF BREAST CANCER SURVIVORS WITH HEALTHY WOMEN

PATRICIA L. TOMICH and VICKI S. HELGESON*

Psychology Department, Carnegie Mellon University, Pittsburgh, PA USA

SUMMARY

Although a number of studies have focused on initial adjustment to cancer, less is known about long-term survival issues. The present study compared breast cancer survivors with age-matched healthy controls ($N = 328$) in terms of more subtle indicators of psychological well-being as well as their general quality of life 5 yrs post-diagnosis. Results indicated survivors generally perceive the world as less controllable and more random compared to healthy women. However, survivors perceive the same control over their daily lives as healthy women. Beliefs about personal control are most strongly associated with quality of life in both groups of women. Survivors also indicated that they derived some benefits from their experience with cancer, but these benefits had only a modest impact on quality of life. However, the belief that the experience had lasting harmful effects was associated with poor quality of life for survivors. In both groups, a continued search for meaning in life had a negative impact on quality of life. The strongest and most consistent correlate of quality of life for both survivors and healthy women was having a sense of purpose in life. Copyright © 2002 John Wiley & Sons, Ltd.

INTRODUCTION

One in three women and one in two men in the United States will be diagnosed with cancer at some point in their lifetime (American Cancer Society, 1999a). Of those, 60% will survive at least 5 yrs. The growing population of cancer survivors is due to the technology in detection that has facilitated the identification of cancer (e.g. mammograms) and the technology in treatment that has prolonged life (e.g. chemotherapy). Women with breast cancer are one of the largest groups of cancer survivors. Most breast cancers are diagnosed at an early stage, and 96% of those with local disease and 77% of those with regional disease will survive at least 5 yrs (American Cancer Society, 1999b).

Despite this large and growing population of cancer survivors, the majority of studies of people with cancer focus on psychological responses to the diagnosis, symptom management, and treatment coping strategies. The emphasis has been on the initial phase of the disease and psychological reactions to diagnosis and treatment. Researchers have been less likely to focus on the experience of surviving cancer. Literature reviews of the psychosocial issues confronted by people with cancer typically examine three time periods: reactions to the initial diagnosis, reactions to treatment, and reactions to recurrence. There is another phase—the survival period. Long-term survival is just now receiving increased attention from investigators.

There are a number of studies of cancer survivors (Abbey, 1997; Breaden, 1997; Carter, 1993; Dirksen, 1995; Fredette, 1995; Kennedy *et al.*, 1976; Holzner *et al.*, 2001; Loescher *et al.*, 1990; Pelusi, 1997; Saleeba *et al.*, 1996; Wyatt *et al.*, 1993), but most of these studies suffer from methodological weaknesses. The majority of studies are qualitative in nature, relying on interviews and focus group discussions, and basing their claims on small numbers of cancer survivors. Studies of survivors also typically include people whose diagnosis occurred over a varying time

*Correspondence to: Psychology Department, Carnegie Mellon University, Pittsburgh, PA 15213, USA. Tel.: 412-268-2624; fax: 412-268-8280; e-mail: vh2e@andrew.cmu.edu

frame. The time-frame of one study, for example, ranged from 5 to 48 yrs (Halstead and Fernsler, 1994). The issues that a 48-yr survivor face may differ from those of a 5-yr survivor. In addition, the majority of studies do not include a comparison group of healthy women.

There are a few more recent studies that are methodologically stronger. Ganz and her colleagues published a series of studies examining psychosocial issues and quality of life of breast cancer survivors, using time frames that ranged from 1 to 5 yrs (Bower et al., 2000; Ganz et al., 1996, 1998; Meyerowitz et al., 1999). Cancer survivors were compared to age-matched population norms of healthy women and other patients with chronic medical conditions. Although breast cancer survivors reported more physical symptoms than healthy women (Ganz et al., 1998), there were no differences in quality of life. There also were no differences reported in fatigue between breast cancer survivors and healthy women (Bower et al., 2000). When cancer survivors were compared to a group of chronically ill women, the survivors actually reported better physical and emotional functioning (Ganz et al., 1996).

In another recent study, Dorval et al. (1998) studied quality of life of breast cancer survivors 8–9 yrs after initial diagnoses in comparison to age-matched control women who had never confronted cancer. Control women were identified using random-digit dialing and were roughly matched on age (6 age groups) and residence (6 areas of Quebec). Similar to the previous studies, cancer survivors' quality of life was similar to that of healthy controls, although survivors had more arm problems.

Three of the more recent reports have focused on the impact of breast cancer on sexual functioning (Dorval et al., 1998; Ganz et al., 1998; Meyerowitz et al., 1999). In all three studies, breast cancer survivors reported similar levels of sexual functioning as healthy women, but in one study, married survivors reported less sexual satisfaction than healthy controls (Dorval et al., 1998).

The current study is designed to examine long-term survivorship issues in a relatively large group of people who are homogeneous with respect to time since diagnosis, having just passed the 5-yr milestone. Although this milestone is no longer regarded as seriously by the medical community, it is still meaningful to many survivors because cancer survival rates have traditionally been expressed in terms of '5-yr survival' (Gotay and Muraoka, 1998). Another strength of this study is the use of a healthy control group. The comparison group we selected is likely to reflect a demographically similar group of women as they were obtained from the same neighborhoods as the cancer survivors.

What are the important issues to study among people who have survived cancer? One important issue to address is whether the experience has had a lasting effect on people's quality of life. Research is fairly clear that severe psychopathology is not a major problem in long-term survivors of cancer (Cella, 1987; Quigley, 1989; Schmale et al., 1983). In a review of the literature, Cella (1987) noted that previous research has found few differences in psychological functioning between cancer survivors and healthy populations, but these studies are limited by their reliance on instruments used to distinguish psychiatric populations from healthy populations. More recent studies also have concluded that there are no overall differences in quality of life between survivors and healthy controls (e.g. Dorval et al., 1998). Although major psychological and functional disturbances have not been identified, more subtle differences in distress may exist (e.g. Cella and Tross, 1986; Schmale et al., 1983). In the present study, we measured global quality of life with a broad-based instrument that has been used with healthy populations as well as cancer survivors, but also measured more specific aspects of psychological functioning that may be affected by a diagnosis of cancer.

One aspect of psychological functioning that is expected to be affected by cancer is people's views of the world and themselves. The diagnosis and treatment for cancer can be construed as a traumatic event. The literature on adjustment to trauma suggests that basic assumptions about the world and self are violated (Janoff-Bulman and Frieze, 1983). For example, a traumatic event challenges people's beliefs that the world is a meaningful and comprehensible place. According to Lerner (1980), a sensible world is a 'just world.' In a just world, good things happen to good people and bad things happen to bad people. However, most people diagnosed with cancer do not feel that they deserved the illness nor—in the case of breast cancer—can they typically locate a cause for the illness. Thus, it may be difficult to make sense of the experience. Traumatic events may also shatter a person's sense of invulner-

ability. Prior to victimization, most people feel a sense of control over the events that happen to them and perceive that they can avoid negative events (Taylor and Brown, 1988). A diagnosis of cancer may permanently threaten perceptions of invulnerability; even after treatment ends, the threat of recurrence remains.

A key question is whether the diagnosis and treatment for breast cancer permanently alters these assumptions about the world and self. Although Janoff-Bulman (Janoff-Bulman and Frieze, 1983; Janoff-Bulman, 1992) suggests that traumatic events can have lasting effects on people's beliefs about the world and self, few studies have actually tested this hypothesis by comparing these beliefs among people who have and have not sustained traumatic events. In one study, Janoff-Bulman (1989) showed that undergraduates who had suffered a traumatic event in the past (e.g. death of a parent, rape, serious accident leading to disability) had lower levels of perceived self-worth, a greater belief in chance as determining their outcomes, and a view of the world as less benevolent compared to undergraduates who did not report such a trauma. One limitation of this study is that the amount of time that had passed since the traumatic event for the victims was not taken into consideration.

There are no data on whether long-term survivors of cancer have different views of the world and of themselves compared to people who have not faced such an experience. In the current study, we compare breast cancer survivors to a healthy comparison group on a set of assumptions about the world and self. The world assumptions that are examined include beliefs that the world is a benevolent place, the world is just, what happens in the world is controllable, and what happens in the world is random. Self assumptions that are examined include beliefs that one has control over what happens to oneself and that one is a lucky person.

Most of the research on adjustment to cancer focuses on negative outcomes. Among survivors, it may be important to examine positive outcomes. Two recent reviews of the literature concluded that researchers need to examine positive aspects of cancer survivorship (Gotay and Muraoka, 1998; Leedham and Ganz, 1999). One way people make sense of traumatic events is to construe some positive meaning from the experience (Taylor, 1983). During the initial adjustment period, people may be too busy coping with the diagnosis and treatment to consider the meaning of the experience. Later, people may reflect on the meaning of the experience in their lives. Bettelheim (1979) described this issue when he wrote about surviving a concentration camp:

> Unless philosophically inclined, people are content to take life as it comes when things go reasonably well, preferring to evade the troublesome question of life's purpose or meaning ....In times of trouble, however, the problem of life's purpose or meaning forces itself on our awareness. The greater the hardship we experience, the more pressing the question becomes for us. It makes good sense psychologically that we begin to worry about life's meaning when we already suffer from serious trials and tribulations, because then our search for answers has a purpose. (p. 3)

Thus, finding purpose or meaning in the experience may be important for cancer survivors.

To date, research that has investigated meaning following traumatic events has been conceptually and methodologically unclear. However, a couple of important distinctions have been made. First, researchers have distinguished between the search for meaning and the finding of meaning, suggesting that the search for meaning is only adaptive when meaning is found (Silver *et al.*, 1983; Thompson, 1991). Finding meaning in victimization has been associated with less psychological distress, greater social adjustment, and higher self-esteem (Silver *et al.*, 1983; Thompson, 1991). An endless search for meaning is not only *not* helpful, but continued attempts to search for meaning may be maladaptive (Silver *et al.*, 1983).

What does it mean to say that someone has found 'meaning' in their experience? Finding meaning in a traumatic event is much more than understanding the cause of the event. Meaning has been conceptualized by Thompson and Janigian (1988) as a sense of order and purpose: 'An event is meaningful when we understand how it follows in an orderly fashion from our views and beliefs and when it has a purpose whose value we recognize.' According to these researchers, there are two philosophical ways of finding meaning. One way is to change one's perception of an event. For example, individuals may emphasize the positive aspects of traumatic events, thereby finding purpose in the events. There is some research on cancer survivors that suggests cancer may have a positive impact on people's lives

(Abbey, 1997; see Gotay and Muraoka, 1998, for a review). A second way to find meaning is to change one's life schemes. For example, individuals may change their personal priorities or their views of the world to accommodate traumatic events. Studies report that cancer survivors have a greater appreciation of life (Charles et al., 1996; Dirksen, 1995; Ferrans, 1994; Ganz et al., 1996, 1998; Kennedy et al., 1976; Wyatt et al., 1993), and that patients reprioritize their lives, placing more importance on relationships and less importance on resolving or getting disturbed by trivial problems (Dirksen, 1995; Ferrans, 1994; Ganz et al., 1996, 1998; Kennedy et al., 1976; Pelusi, 1997). None of these studies, however, compared these ways of finding meaning in cancer survivors to that of controls.

Only one study compared cancer survivors to a healthy comparison group and found that survivors (testicular cancer) were able to place other problems in perspective and that other problems were small compared to 'cancer' (Rieker et al., 1989). In the current study, we examine survivors' search for meaning, perceptions of benefit and harm from the event, and domains of positive growth. For comparison purposes, we asked the same questions of healthy controls with respect to a significant life stressor.

Another way that people find purpose or meaning in life is through spirituality. In Fredette's (1995) interviews with 14 breast cancer survivors, each of them cited spirituality as a way of coping with their illness. Similarly, Johnson and Spilka (1991) reported that 85% of the women in their study who were diagnosed with breast cancer ($n = 103$) said religion helped them cope with their illness. Philosophical or spiritual views of life have been identified as areas of great concern for women who are long-term survivors of cancer (Ferrans, 1994; Wyatt and Friedman, 1996). However, researchers have neglected this domain of functioning in quality of life research. We will compare the spirituality of breast cancer survivors to that of a healthy comparison group.

In summary, there were two goals of the present study. First, we sought to compare breast cancer survivors with healthy controls in terms of their general quality of life as well as more subtle indicators of psychological well-being. Second, we examined the relation of beliefs about the world and the self, meaning in life, and spirituality to the quality of life of both cancer survivors and healthy controls.

METHOD

Participants

Participants were 164 women diagnosed with Stage I ($n = 50$), Stage II ($n = 106$), and Stage III ($n = 8$) breast cancer five and a half years ago. All of the women were treated with surgery followed by adjuvant chemotherapy. Breast cancer survivors' ages ranged from 33 to 81, with a mean of 54.4 (S.D. = 8.84). The majority was Caucasian (94.5%). Education was: 3% less than high school; 34% graduated from high school; 27% had some college education; 21% graduated from college; and 15% had post-graduate training. The age-matched healthy control women's ages ranged from 26 to 84, with a mean of 52.71 (SD = 11.42). The majority was Caucasian (95.1%). Education was: 6% less than high school; 29% graduated from high school; 23% had some college education; 24% graduated from college; and 17% had post-graduate training. There were no differences in age, race, or education between the breast cancer survivors and the healthy comparison group. The results of the present paper are based on an ongoing study of survivors and controls. To date, interviews have been conducted with 164 of the 271 survivors and their healthy counterparts.

All of the breast cancer survivors participated in a randomized clinical trial of a support group intervention (see Helgeson et al., 1999), in which women were randomly assigned to 1 of 4 conditions: peer group discussion, education, education plus peer group discussion, or control. Each intervention group was comprised of 8–12 women and met weekly for 8 weeks. A detailed description of study recruitment procedures and characteristics of respondents and non-respondents is provided elsewhere (Helgeson et al., 1999, 2000). Briefly, there were no differences in quality of life between respondents and non-respondents, but non-respondents were less interested in health issues and less educated than respondents. The response rate in the study was 70%. Quality of life was measured before, immediately after, and 6 months after the intervention, and then on an annual basis. The results of the intervention showed that the education-based group interventions had a positive impact on quality of life immediately and 6 months after the interventions (Helgeson et al., 1999). Some of these effects have been maintained for 3 yrs (Helgeson et al.,

in press). No benefits of peer discussion have been documented.

Procedure

Breast cancer survivors who had not sustained a recurrence were contacted by phone to schedule their annual interview. The interviews took place in their homes and lasted about 90 min. All of the instruments used were administered orally. Respondents were provided with response cards (e.g. 1 = not at all; 2 = a little bit; 3 = a lot) to indicate their answers to close-ended questions.

We recruited an age-matched healthy comparison group of women by using the neighborhood control method (Talbott, 1981; Talbott et al., 1993). Neighborhood controls have the advantage of being representative of the population of cases. We used the Coles Directory to identify 10 households that were located within 2 blocks of the cancer survivor's home. We sent letters to these households asking if there was a woman in the home plus or minus 10 yrs in age from the target woman. We contacted each household by phone until we determined that there was a woman in the household who was eligible for the study (within the age range, same race as target, no history of cancer) and the woman agreed. If we did not find a match within the first 10 households, another 10 letters were sent. Ten letters were sufficient to recruit 89% of the healthy controls. Neighborhood controls were only interviewed once—within 2 months of the 5-yrs follow-up interview of the breast cancer survivors.

Instruments

World and self assumptions. To assess individuals' assumptions about the world and themselves, participants completed six of the eight scales from the World Assumptions Scale (Janoff-Bulman, 1989). Scales that tapped assumptions about the world included the world is benevolent (e.g. "The world is a good place."); just (e.g. "People will experience good fortune if they themselves are good."); controllable (e.g. "When bad things happen, it is typically because people have not taken the necessary actions to protect themselves."); and random (e.g. "In general, life is mostly a gamble."). Scales that tapped assumptions about the self included beliefs that one has

control over what happens to oneself (e.g. "I take the actions necessary to protect myself against misfortune."); and one is a lucky person (e.g. "When I think about it, I consider myself very lucky."). Janoff-Bulman (1989) empirically distinguished the assumptive domains from one another by factor analysis and reported that several of these scales successfully discriminated between victims of traumatic events and non-victims. Each scale consists of four items, each of which is rated on a five-point disagree–agree scale. All of the alphas exceeded 0.70 except justice, which was 0.64 for cancer survivors and 0.63 for healthy controls. In addition, randomness was 0.56 for survivors but 0.70 for healthy controls.

Meaning in life. Four questions were developed for the current study to assess the meaning of individuals' stressful experiences in their lives. The breast cancer survivors responded to these questions with respect to being diagnosed with cancer. So that we could compare survivors' answers to these questions to the answers of healthy controls, controls were asked to identify the most stressful event that happened to them around 5 yrs ago. The questions were as follows: (1) "In the past month, how much energy have you spent trying to figure out why (the event) happened to you?"; (2) "In the past month, how much have you found yourself searching to make some sense of or find meaning in your experience?"; (3) "How much good has come out of [the event]?" and (4) "How much harm or bad has come out of [the event]?". Participants responded to each question on a scale from 1 (none) to 5 (a lot).

Responses to the first two questions (why event happened and searching to make sense) were highly related, $r = 0.67$, $p < 0.001$. Therefore, these two items were averaged to form a composite score reflecting individuals' search for meaning. Although there was an inverse relation between how much good and how much harm has come out of individuals' experiences, $r = -0.14$, $p < 0.05$, the magnitude of this relation was low. Therefore, we evaluated answers to these two items (referred to as benefit and harm) separately.

In addition to the four meaning questions, we identified a number of ways that cancer could have had a positive impact on people's lives. Positive growth domains that were represented included personal priorities, daily activities, future plans, self-views, world views, and relationships. These items were adapted from Behr's positive

contributions scale used with parents of disabled children (Behr *et al.*, 1991). Participants rated the extent to which 18 attitudes and behaviors had changed as a result of their stressful experience (1 = not at all; 5 = very much). Breast cancer survivors responded to this measure with respect to being diagnosed with cancer; healthy controls responded with respect to the most stressful event that occurred to them approximately 5 yrs ago.

To determine whether the instrument was unidimensional or multi-dimensional, we conducted a principal components analysis followed by varimax rotation on the 18 items. Three factors with eigenvalues greater than 1.0 resulted. The first factor, personal growth, accounted for 22% of the variance and represented items that indicated positive personal changes and relationship changes (e.g. "[The event] has made me more productive."; 9 items). The second factor, acceptance, also accounted for 22% of the variance and contained items that represented patience and acceptance of the experience (e.g. "[The event] has helped me take things as they come."; 7 items). Two items loaded on a third factor that was not interpretable and was discarded from subsequent analyses. Cronbach's alphas for the cancer survivors and healthy controls were 0.89 and 0.86 for personal growth and 0.88 and 0.87 for acceptance, respectively.

Spirituality. All participants completed the Spiritual Well-Being Scale of the Functional Assessment of Chronic Illness Therapy (Brady *et al.*, 1999). Participants rated 12 items on five-point scales, with higher scores indicating stronger spiritual beliefs. Prior research has reported that this measure has two factors (Brady *et al.*, 1999). One factor, faith, reflects finding comfort and strength from religion (4 items) and the other, purpose, reflects feeling a sense of purpose in life more generally (8 items). In previous research, the scale was correlated with satisfaction with quality of life independent of other domains of functioning (Brady *et al.*, 1999). Cronbach's alphas for the cancer survivors and healthy controls were 0.93 and 0.90 for faith and 0.87 and 0.86 for purpose, respectively.

Quality of life. Participants completed the SF-36 from the medical outcomes study (Ware *et al.*, 1993) to measure health-related quality of life.

This instrument has excellent reliability and validity and has been used to evaluate functional status in depressed, chronically ill, and healthy populations (Wells *et al.*, 1989). The SF-36 contains eight multi-item scales: physical functioning, role limitations due to physical problems, bodily pain, general health perceptions, role limitations due to emotional problems, social functioning, vitality, and general mental health. Principal component analysis, followed by varimax rotation of the 36 items, revealed eight factors with eigenvalues greater than 1.0. Items loaded on their respective eight scales. The alphas for these eight scales ranged from 0.66 to 0.90. The authors have derived factor weights for the eight scales so that a physical health component score (PCS) and a mental health component score (MCS) can be created (Ware *et al.*, 1995). Weights are assigned to all eight scales to create PCS and MCS. The variables with the highest loading on PCS (in order from highest to lowest) are physical functioning, role limitations due to physical problems, bodily pain, and general health perceptions. The variables with the highest loading on MCS are mental health, vitality, social functioning, and role limitations due to emotional problems. We examine each of the eight scales when we compare survivors' and healthy controls' quality of life because we are interested in discerning whether breast cancer has long-lasting effects on specific domains of functioning. When we evaluate links between psychosocial variables and quality of life among survivors and healthy controls, we only examine the two composite indices (MCS and PCS) to reduce the number of analyses.

Participants also completed the two 10-item positive and negative affect scales from the PANAS (Watson *et al.*, 1988) to measure their mood during the previous week. Items were rated on five-point scales from 1 (not at all) to 5 (extremely). Cronbach's alphas for the cancer survivors and healthy controls were 0.93 and 0.89 for positive affect and 0.95 and 0.85 for negative affect, respectively. The two scales were moderately correlated, $r = -0.32$, $p < 0.001$.

Statistical methods

The first goal of the current study was to compare long-term survivors of breast cancer with healthy individuals in terms of their views about the world and themselves, meaning in life,

spirituality, and quality of life. Since some of the women with breast cancer participated in the education interventions which had a positive impact on quality of life, we examined the two groups of survivors separately (i.e. those who were and were not exposed to the education interventions) when making comparisons to healthy controls. Chi-squared tests were used to determine whether there were significant differences between the two groups of cancer survivors and healthy controls on categorical demographic variables (e.g. race, religion, marital status, occupation). One-way analyses of variance were used to test for differences between the three groups on continuous demographic variables (e.g. age, education, number of children). There were no differences between the three groups on any of these variables, with the exception that healthy individuals identified a more distant event ($M = 6.64$ yrs ago) than the two groups of cancer survivors (education: $M = 5.49$; no education: $M = 5.55$), $F(2, 325) = 8.47$, $p < 0.001$. Controlling for differences in time since the event did not alter any of the results. We also measured perceived stressfulness of being diagnosed with breast cancer and the events healthy controls recollected; there were no differences between the three groups. In addition, we measured the number of other health problems breast cancer survivors and healthy controls reported; there were no differences between the three groups.

We used multivariate analyses of variance to test for group differences in conceptually related sets of variables (e.g. world and self-assumptions). If the multivariate effect was significant, we then examined the univariate F-tests to determine which outcomes revealed group differences. A significant univariate F was followed up with Tukey's post hoc comparisons to determine which groups differed from one another.

The second goal of this study was to investigate whether a set of psychosocial variables is associated with quality of life among breast cancer survivors and healthy controls. To determine whether demographic variables or medical variables (e.g. stage of disease) were associated with psychosocial and quality of life variables, we used Pearson correlation coefficients for continuous independent variables and analyses of variance for categorical independent variables. We statistically controlled for variables that showed relations to at least one independent variable and one

dependent variable.[†] Among these, age, education, and race met this criterion.[‡] For breast cancer survivors, participation in the education intervention also met this criteria. Thus, participation in the education intervention was also statistically controlled in analyses for breast cancer survivors.

Partial correlations were computed to examine whether the psychosocial variables were associated with quality of life for breast cancer survivors (see Table 2) and for healthy individuals (see Table 3), controlling for relevant variables. In addition, regression analyses were performed for both breast cancer survivors and healthy controls to determine which psychosocial variables were the strongest predictors of quality of life. For these analyses, covariates were entered on the first step of the equation (breast cancer survivors: age, education, race, intervention; healthy controls: age, educa-

---

[†] We also statistically controlled for variables one might expect to confound the results (i.e. stage of disease, type of surgery), although they did not meet our criteria of being statistically associated with one independent variable and one dependent variable. The use of these statistical controls did not alter the results.

[‡] For breast cancer survivors, age was related to less time spent searching for meaning during the past month, $r = -0.25$, $p < 0.001$, perceiving less harm from their experience, $r = -0.23$, $p < 0.01$, and having stronger spiritual beliefs on both components of spiritual functioning (faith: $r = 0.26$, $p < 0.001$; Purpose: $r = 0.16$, $p < 0.05$). Age was also related to worse physical functioning, $r = -0.35$, $p < 0.001$, but better mental functioning, $r = 0.19$, $p < 0.05$, and less negative affect, $r = -0.20$, $p < 0.01$. Education was associated with more time spent searching for meaning, $r = 0.16$, $p < 0.05$, less perceived personal growth, $r = -0.20$, $p < 0.01$, less faith, $r = -0.17$, $p < 0.05$, and better physical functioning, $r = 0.21$, $p < 0.01$. Caucasians viewed the world as more random, $t(155) = 2.40$, $p < 0.05$, they perceived less personal growth from their experience, $t(161) = -2.40$, $p < 0.05$, and they had better mental functioning, $t(160) = 2.05$, $p < 0.05$, in comparison to other ethnic groups. We did not need to control for religion, marital status, number of children, or occupation in the analyses.

For healthy controls, age was related to the belief that the world is a benevolent place, $r = 0.25$, $p < 0.01$, more acceptance, $r = 0.23$, $p < 0.01$, and having stronger spiritual beliefs on both components of spiritual functioning (faith: $r = 0.35$, $p < 0.001$; purpose: $r = 0.18$, $p < 0.05$). Age was also related to worse physical functioning, $r = -0.19$, $p < 0.05$, but less negative affect, $r = -0.22$, $p < 0.01$. Education was associated with less faith, $r = -0.22$, $p < 0.01$, and more positive affect, $r = 0.16$, $p < 0.05$, but it was also associated with more negative affect, $r = 0.15$, $p < 0.05$. For healthy controls, race was not associated with any of the independent or dependent variables, but we controlled for it so that the analyses for healthy controls would be consistent with those for breast cancer survivors. We did not need to control for religion, marital status, number of children, or occupation in the analyses.

tion, race) and the significant psychosocial corre-
lates were entered on the second step.

RESULTS

Comparison of Cancer Survivors to Healthy Controls

Differences between breast cancer survivors who
received the education intervention, those who did
not receive the education intervention, and healthy
controls on world and self-assumptions, meaning
in life, spirituality, and quality of life are shown in
Table 1.

World and self-assumptions. The multivariate
analysis of variance revealed a significant F
statistic, $F(12, 612) = 2.09$, $p < 0.05$. Univariate
analyses showed that breast cancer survivors who
did not receive the education intervention viewed
the world as significantly less controllable than did
healthy controls. The mean for breast cancer
survivors in the education intervention fell be-

Table 1. Means and univariate F-test results for differences between breast cancer survivors and healthy controls

	Education intervention survivors M	Non-education intervention survivors M	Healthy controls M	Univariate tests F
World and self-assumptions				
World: benevolent	4.62a	4.46a	4.47a	$F(2, 312) = 1.39$
World: just	2.15a	2.12a	2.19a	$F(2, 312) = 0.16$
World: controllable	2.78a,b	2.66b	3.00a	$F(2, 312) = 4.07*$
World: random	3.32b	3.13b	2.80a	$F(2, 312) = 7.22***$
Self: controllable	4.42a	4.41a	4.47a	$F(2, 312) = 0.34$
Self: luck	4.08a	4.12a	3.88a	$F(2, 312) = 1.89$
Meaning in life				
Search for meaning	1.17b	1.28a,b	1.42a	$F(2, 318) = 3.80*$
Benefit	4.21b	4.14b	3.63a	$F(2, 318) = 7.65***$
Harm	1.94a	2.03a	2.11a	$F(2, 318) = 0.60$
Personal growth	2.25a	2.42a	2.25a	$F(2, 318) = 1.30$
Acceptance	2.99a,b	3.08b	2.73a	$F(2, 318) = 6.19**$
Spirituality				
Faith	3.03a	3.21a	2.97a	$F(2, 321) = 1.62$
Purpose	3.22a	3.12a	3.15a	$F(2, 321) = 0.58$
Quality of life				
PF	85.07a,b	82.35b	88.84a	$F(2, 322) = 3.57*$
RP	81.62a	84.14a	84.91a	$F(2, 322) = 0.27$
BP	76.84a	73.87a	75.04a	$F(2, 322) = 0.33$
GH	77.50a	79.93a	77.63a	$F(2, 322) = 0.48$
RE	87.75a	84.95a	87.60a	$F(2, 322) = 0.34$
SF	86.95a	91.13a	92.23a	$F(2, 322) = 2.18$
VT	61.99a	62.90a	64.97a	$F(2, 322) = 0.61$
MH	78.77a	79.10a	78.88a	$F(2, 322) = 0.01$
Positive affect	3.79a	3.73a	3.56a	$F(2, 322) = 3.19*$
Negative affect	1.64a	1.68a	1.66a	$F(2, 322) = 0.12$

N's range from 65 to 68 for survivors who participated in the education intervention, from 89 to 93 for survivors who did not
participate in the education intervention, and from 161 to 164 for healthy controls. Within each row, means with different
subscripts are significantly different from each other. PF = physical functioning; RP = role limitations due to physical problems;
BP = bodily pain; GH = general health; RE = role limitations due to emotional problems; SF = social functioning; VT = vitality;
MH = mental health.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

tween the two groups and did not significantly differ from either. Both groups of breast cancer survivors, regardless of intervention status, viewed the world as more random than did healthy controls. The three groups had similar views of the world as benevolent and just. They also had similar beliefs in the personal control they had over their lives and views of the self as lucky.

To make sure that the difference between breast cancer survivors' and healthy controls' beliefs about controllability and randomness of the world was not due to an aberrant category of stressor that some healthy controls experienced, we assigned the stressful events identified to five categories and examined whether differences appeared between those categories. Ninety-three percent (93%) of healthy controls identified a stressor that could be classified into one of the following categories: personal health problems (13%), others' health problems (54%), personal relationship problems (13%), others' relationship problems (7%), and work difficulties (5%). There were no differences in world or self-assumptions among people who identified each of these five categories of stressors.

Meaning in life. The multivariate analysis revealed a significant F statistic for the five meaning in life questions, $F(10, 626) = 3.51$, $p < 0.001$. Univariate analyses revealed that breast cancer survivors in the education intervention reported searching for meaning less often than did healthy controls. The mean for survivors who did not receive the education intervention fell between the two groups and did not differ significantly from either. Breast cancer survivors, regardless of whether they were in the education intervention, reported more benefit from their experience than did healthy controls. Survivors who did not receive the education intervention reported being more accepting of their experiences than did healthy controls. The mean for breast cancer survivors who received the education intervention fell between the two groups and did not differ from either. There were no differences between the three groups in reports of harm from their experience or personal growth.

Spirituality. There were no differences between breast cancer survivors and healthy controls on the two components of spirituality.

Quality of life. The multivariate analysis of the eight quality of life domains revealed a significant F statistic, $F(20, 624) = 1.82$, $p < 0.05$. However, only one univariate effect was significant. Breast cancer survivors who did not receive the education intervention reported worse physical functioning than did controls. The physical functioning of the survivors who received the education intervention fell between the two groups and did not differ from either. The univariate effects for positive and negative affect indicated a significant difference for positive affect. However, Tukey's post hoc comparison test showed no significant difference between any of the groups and only a marginal trend ($p = 0.06$) for breast cancer survivors who received the education intervention to have more positive affect than healthy controls.

Survivors' quality of life

The relations of breast cancer survivors' world and self assumptions, meaning in life, and spirituality to their quality of life are shown in Table 2.

World and self-assumptions. The assumption most strongly related to quality of life was that the self has control over one's outcomes. Beliefs in personal control were associated with higher levels of mental functioning, more positive affect, and less negative affect. The belief that the world is a benevolent place and the belief that the self is lucky were associated with more positive affect. The belief that the world is just was associated with less negative affect. In addition, survivors' beliefs that the world is controllable was associated with better physical functioning. Assumptions about randomness of the world were not associated with quality of life.

Meaning in life. Survivors who were still searching for meaning had poorer mental functioning, less positive affect, and more negative affect. Perceiving the experience as harmful was more consistently related to quality of life than perceiving the experience as beneficial. The more harm survivors reported, the worse their physical and mental functioning, the less their positive affect, and the more their negative affect. Perceiving a benefit was associated with better physical functioning and more positive affect. Surprisingly, the

Table 2. Partial correlations of world and self assumptions, meaning, and spirituality with quality of life for survivors, controlling for age, education, race, and education intervention

	Quality of life			
	PCS	MCS	PA	NA
World and self-assumptions				
World: benevolent	0.06	0.09	0.20*	−0.11
World: just	0.08	0.11	0.14	−0.17*
World: controllable	0.21*	0.10	0.13	−0.10
World: random	−0.05	−0.10	−0.07	0.10
Self: controllable	0.14	0.22**	0.23**	−0.27***
Self: luck	−0.02	0.10	0.21**	−0.13
Meaning in life				
Search for meaning	−0.06	−0.22**	−0.18*	0.32***
Benefit	0.17*	0.04	0.30***	−0.12
Harm	−0.20*	−0.24**	−0.36***	0.27***
Personal growth	−0.02	−0.10	0.12	0.06
Acceptance	−0.01	−0.04	0.09	−0.06
Spirituality				
Faith	−0.02	0.15	0.38***	−0.16*
Purpose	0.17*	0.62***	0.69***	−0.57***

N's range from 148 to 156. PCS = physical health component score; MCS = mental health component score; PA = positive affect; NA = negative affect.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

two domains of positive growth, personal growth and acceptance, were not associated with quality of life.

Spirituality. Both components of spiritual functioning, faith and purpose, were associated with more positive affect and less negative affect. A sense of purpose was also associated with better physical and mental functioning. Purpose was more strongly associated with all four quality of life indices than faith, as indicated by t-tests that compared each of the four pairs of correlations (all p's < 0.01).

Longitudinal analyses. Since we had indicators of baseline quality of life among the women with breast cancer, we also examined whether the psychosocial variables were associated with changes in quality of life over the 5 yrs since their diagnoses. When baseline quality of life was statistically controlled, the results in Table 2 were largely the same. One new effect emerged: belief in a just world was associated with more positive affect. The only effect that disappeared was the

relation of faith to positive affect. Some of the findings become stronger and a few findings were reduced to marginal significance (3 of 4 correlates of physical functioning). These analyses do not shed any further light on the direction of causality—world assumptions could lead to changes in quality of life, or changes in quality of life could lead to world assumptions.

Healthy controls' quality of life

The relations of healthy controls' world and self-assumptions, meaning in life, and spirituality to their quality of life are shown in Table 3.

World and self-assumptions. The assumption most strongly related to quality of life for healthy controls was that the self has control over one's outcomes. Beliefs in personal control were associated with higher levels of mental functioning, more positive affect, and less negative affect. The belief that the world is a benevolent place was associated with more positive and less

Table 3. Partial correlations of world and self assumptions, meaning, and spirituality with quality of life for healthy controls, controlling for age, education, and race

	Quality of life			
	PCS	MCS	PA	NA
World and self-assumptions				
World: benevolent	0.02	0.15	0.27***	−0.16*
World: just	−0.05	0.06	0.03	−0.03
World: controllable	0.10	0.00	0.09	0.00
World: random	0.10	0.00	0.01	0.03
Self: controllable	0.10	0.28***	0.32***	−0.21**
Self: luck	0.02	0.12	0.15	−0.05
Meaning in life				
Search for meaning	−0.02	−0.23**	−0.04	0.33***
Benefit	0.12	0.12	0.24**	0.02
Harm	−0.10	−0.19*	−0.14	0.15
Personal growth	−0.13	−0.14	0.12	0.20**
Acceptance	−0.14	−0.08	0.12	0.15
Spirituality				
Faith	0.05	0.15	0.23**	−0.11
Purpose	0.03	0.52***	0.58***	−0.53***

N's range from 153 to 155. PCS = physical health component score; MCS = mental health component score; PA = positive affect; NA = negative affect.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

negative affect. Beliefs that the world is just, controllable and random or the self is lucky were not associated with healthy controls' quality of life.

Meaning in life. Healthy controls who were still searching for meaning had poorer mental functioning and more negative affect, similar to the results for survivors. Unlike the results for survivors, however, perceived harm was not as strongly associated with quality of life. Perceived harm was associated with worse mental functioning, and perceived benefit was associated with more positive affect. Surprisingly, perceived personal growth was associated with more negative affect. Acceptance of the experience was not associated with quality of life.

Spirituality. A sense of purpose was associated with better mental functioning, more positive affect, and less negative affect. Faith was only associated with more positive affect. Purpose was more strongly associated with mental functioning, positive affect, and negative affect than faith, as

indicated by *t*-tests that compared each pair of correlations (all p's < 0.001).

Strongest predictors of quality of life

Regression analyses were performed to determine the strongest predictors of quality of life for both breast cancer survivors and healthy controls. For physical functioning, the only significant predictor for breast cancer survivors was the belief that the world is controllable (beta = 0.15, $p < 0.05$). None of the psychosocial variables predicted the physical functioning of healthy controls. For mental functioning, purpose was the only significant predictor for both breast cancer survivors (beta = 0.55, $p < 0.001$) and healthy controls (beta = 0.48, $p < 0.001$). For positive affect, purpose was a significant predictor for both survivors (beta = 0.61, $p < 0.001$) and controls (beta = 0.50, $p < 0.001$). In addition, perceptions of harm predicted less positive affect for survivors (beta = −0.16, $p < 0.05$) and benefit predicted more positive affect for controls (beta = 0.13, $p < 0.05$).

For negative affect, purpose again was a significant predictor for both survivors (beta $= -0.54$, $p < 0.001$) and controls (beta $= -0.56$, $p < 0.001$). For survivors, faith also predicted more negative affect (beta $= 0.19$, $p < 0.05$). The reversal of sign of this correlate is likely due to suppressor effects that stem from multicollinearity among predictor variables. For healthy controls, personal growth (beta $= 0.25$, $p < 0.001$) and searching for meaning (beta $= 0.18$, $p < 0.01$) also predicted increased negative affect.

DISCUSSION

Comparison of cancer survivors to healthy controls

Previous work on adjustment to traumatic events has suggested that important assumptions about the self and the world are violated (Ganz et al., 1996; Janoff-Bulman and Frieze, 1983). This research, however, has failed to examine whether such changes are lasting. The results of the present study suggest that a traumatic event, such as the diagnosis of breast cancer, may have lasting effects on some views of the world but not others. The experience of breast cancer did not appear to alter women's views of the world as a good place or a just place. However, cancer survivors appeared to view the world in general as more random and less controllable. This is not surprising as the diagnosis of breast cancer is an experience for which a cause typically cannot be assigned. There is little women can do to prevent breast cancer, for example. It is interesting, however, that cancer survivors who participated in an education intervention did not show the same distinction from healthy controls in beliefs about lack of controllability of the world. This may be regarded as an additional benefit of the education intervention. This finding is particularly interesting in light of the fact that the theme of the education intervention was 'control.' Women were provided with information and coping strategies to enhance their feelings of personal control over the breast cancer experience.

Did breast cancer have a long lasting impact on views of the self? In particular, did the experience of breast cancer lead women to perceive that they have less control over the events that happen to them on a daily basis? The answer is 'no.' Although breast cancer survivors (who did not participate in the education intervention) viewed the world as less controllable than did healthy women, their own beliefs in personal control were not undermined. This is important, because as will be discussed, beliefs about personal control were critical to quality of life. There were also no differences between survivors' and controls' perceptions of the self as a lucky person.

Regarding meaning in life, many researchers conducting studies of cancer survivors have remarked that survivors experience a greater appreciation of life and enhanced relationships (Charles et al., 1996; Dirksen, 1995; Ferrans, 1994; Ganz et al., 1996, 1998; Kennedy et al., 1976; Wyatt et al., 1993). Others suggest that breast cancer survivors find purpose or meaning in life through spirituality (Ferrans, 1994; Fredette, 1995; Johnson and Spilka, 1991; Wyatt and Friedman, 1996). These studies, however, have not been able to compare such benefits among survivors to those of a control group. One strength of this study is that we had healthy controls identify the most significant stressor that occurred to them during a similar time frame (about 5 years ago). This enabled us to compare controls' responses to questions measuring meaning, personal growth, and spirituality to those of breast cancer survivors. There was no indication that survivors showed a greater orientation toward religion (faith) or found life to be more meaningful (purpose) than controls. In addition, there were no differences between survivors and controls in terms of perceiving positive changes in the self or one's relationships. Further, there were no differences in perceptions of harm. On the single benefit-finding item, survivors reported greater benefits than controls. Survivors not exposed to the education intervention also reported greater acceptance of the experience than controls. Thus, there was little evidence that someone who survives breast cancer experiences more personal growth or derives more meaning in life than someone who faces other stressful events. These findings may simply imply that breast cancer is not unique from other stressors in its ability to elicit benefits such as positive changes in the self. Alternatively, it is possible that people—breast cancer survivors as well as others who face life stressors—do not change as much as they think they do. One study showed that positive changes in the self that people perceived after major life stressors were largely illusory (McFarland and Alvaro, 2000). People's enhanced view of their current self after the stressor was a function of derogating their past

self. In that study, there was no evidence for any real changes in the self.

Keep in mind that the healthy controls in our study were not chosen *because* they faced major life stressors. It is true that all of the healthy controls were able to identify a stressor, and they rated their stressor just as severe as the survivors rated their breast cancer. At first glance, this finding may seem surprising. Does this mean that our control group was unusual in some way—that they were a highly stressed group? Given our rigorous methodology in selecting controls, we would find that to be quite unlikely. We asked people to identify the *most* stressful event that had happened to them about 5 yrs ago. Perceptions of the severity of the personal stressors they identified were likely to be influenced by all of the stressors that they had experienced to date. Consistent with Rieker *et al*. (1989) finding that cancer survivors were able to place other problems in perspective and that other problems were small compared to 'cancer,' we concede that if the healthy controls were to be diagnosed with breast cancer, the ratings of some of the stressors that they described to us in this study would be reduced.

It is important to point out that aside from these interesting similarities and differences in views of the world and the self and meaning in life, the quality of life of breast cancer survivors and healthy controls was largely the same. There were no differences, for example, in general health perceptions, no differences on any indicator of psychological or mental functioning, and no differences in the extent to which physical health impacted daily activities (role limitations due to physical problems). Breast cancer survivors who did not participate in the education intervention, however, reported lower levels of physical functioning than controls. This finding is consistent with those of recent reports that breast cancer survivors have more physical symptoms than healthy women (Dorval *et al*., 1998; Ganz *et al*., 1998). The fact that breast cancer survivors who participated in the education intervention did not have significantly lower levels of physical functioning than controls may be another benefit of the education intervention. An important question for future research to address is to what extent the treatment for breast cancer has long-lasting effects on physical functioning and to what extent support interventions can ameliorate them.

Quality of life

Among the assumptions about the world and self, the one most strongly tied to the quality of life of survivors and controls was perceptions of personal control. The finding that perceptions of personal control are associated with positive indicators of quality of life replicates a large literature (see Helgeson and Reynolds, in press, for a review). Personal control is one dimension upon which survivors and controls did not differ. Thus, it is not surprising that there were few differences in the overall quality of life between cancer survivors and healthy controls. The assumptions about the world and self upon which survivors differed from healthy women (world random, world controllable) were rarely associated with quality of life.

In terms of meaning in life, there was little evidence that deriving something positive from the stressful experience was associated with the quality of life of survivors or controls. We administered a scale that identified domains of positive growth. The two factors that emerged, personal growth and acceptance, were never associated with quality of life for survivors. Among controls, personal growth was associated with one of four quality of life outcomes and in a direction opposite to prediction. When participants were simply asked a single item about whether benefits had emerged from the experience, perceived benefits were modestly associated with quality of life for survivors and controls. By contrast, there was much greater evidence that quality of life suffered among women who had found lasting harms from their experiences. In addition, for both survivors and controls, those who were still searching for meaning in the experience had impaired quality of life. These findings are consistent with Leedham and Ganz's (1999) contention that finding a new sense of meaning in the illness experience may be an important aspect of the recovery process for many breast cancer survivors. Our findings suggest that this also may be the case for people who face other stressful life events.

Meaning was most strongly associated with quality of life when it was construed in broader terms as spirituality rather than specific benefits derived from breast cancer or a stressful life event. Among the two domains of spirituality, the one most strongly related to quality of life for both cancer survivors and healthy controls was a sense that life was purposeful, rather than religious faith.

Thus, the women who have the highest quality of life are the ones who find life to be meaningful in general, regardless of the benefits derived from their experience with breast cancer or another life stressor.

Limitations and conclusions

There are several limitations to this study. One limitation has to do with the demographics of the sample. Our sample was primarily Caucasian. Future studies should examine the impact of ethnic and cultural factors on world and self assumptions, construals of meaning, and their impact on quality of life. Another limitation of this study is that all of the breast cancer survivors agreed to participate in a randomized trial of a support intervention. We know that they were more interested in health and better educated than people who chose not to participate. However, we also note that respondents did not differ in baseline quality of life compared to non-respondents and that we had a high response rate in the study. Finally, our healthy controls are only healthy with respect to cancer. That is, they could have other health problems. One might wonder whether it would be useful to examine a comparison group of truly healthy women who do not have any other health problems. There are two flaws with this idea. First, how representative of the population would this group be? Second, a substantial number of the women with breast cancer also had other health conditions. The comparison group of women who participated in the current study seems appropriate because they were different from the cancer survivors only with respect to the cancer diagnosis and they did not report having any more (or less) health problems than the cancer survivors.

In summary, surviving breast cancer appears to affect some interesting domains of psychological thought. Survivors perceive the world in general as less controllable and more random compared to other women. However, survivors are as likely to believe that they have control over their own daily lives as other women and it is these beliefs about personal control that are associated with quality of life. Survivors may derive some benefits from the experience that other women do not gain, but there is no evidence that these benefits are associated with quality of life. Instead, the quality of life of cancer survivors is negatively associated with the belief that the experience has had lasting harmful effects. In addition, for both survivors and controls, a continued search for meaning in life is related to poorer quality of life. An enhanced quality of life for both survivors and controls is most strongly associated with perceiving that life in general is meaningful and has purpose. Overall, the findings of this study are comparable to others in showing that general quality of life is not impaired among survivors of breast cancer. Future researchers may want to narrow the scope of their investigations to identify subgroups of women who sustain lasting difficulties.

ACKNOWLEDGEMENTS

REFERENCES

Abbey M. 1997. Surviving cancer: A review of the impact and consequences. *Nurs Stand* **12**: 44–47.

American Cancer Society. 1999a. *Cancer Facts & Figures—1999*. Author: Atlanta, GA.

American Cancer Society. 1999b. *Breast Cancer Facts & Figures*. Author: Atlanta, GA.

Behr SK, Murphy DL, Summers JA. 1991. *Kansas Inventory of Parental Perceptions*. University of Kansas: Lawrence, KS.

Bettelheim B. 1979. *Surviving and Other Essays*. Alfred A Knopf: New York.

Bower JE, Ganz PA, Desmond KA, Rowland JH, Meyerowitz BE, Belin TR. 2000. Fatigue in breast cancer survivors: Occurrence, correlates, and impact on quality of life. *J Clin Oncol* **18**: 743–753.

Brady MJ, Peterman AH, Fitchett G, Mo M, Cella D. 1999. A case for including spirituality in quality of life measurement in oncology. *Psycho-Oncology* **8**: 417–428.

Breaden K. 1997. Cancer and beyond: The question of survivorship. *J Adv Nurs* **26**: 978–984.

Carter BJ. 1993. Long-term survivors of breast cancer: A qualitative descriptive study. *Cancer Nurs* **16**: 354–361.

Cella DF. 1987. Cancer survival: Psychosocial and public issues. *Cancer Invest* **5**: 59–67.

Cella DF, Tross S. 1986. Psychological adjustment to survival from Hodgkin's disease. *J Consult Clin Psychol* **54**: 616–622.

Charles K, Sellick SM, Montesanto B, Mohide EA. 1996. Priorities of cancer survivors regarding psychosocial needs. *J Psychosoc Oncol* **14**: 57–72.

Dirksen SR. 1995. Search for meaning in long-term cancer survivors. *J Adv Nurs* **21**: 628–633.

Dorval M, Maunsell E, Deschenes L, Brisson J, Masse B. 1998. Long-term quality of life after breast cancer: Comparison of 8-year survivors with population controls. *J Clin Oncol* **16**: 487–494.

Ferrans CE. 1994. Quality of life through the eyes of survivors of breast cancer. *Oncol Nurs Forum* **21**: 1645–1651.

Fredette SL. 1995. Breast cancer survivors: Concerns and coping. *Cancer Nurs* **18**: 35–46.

Ganz PA, Coscarelli A, Fred C, Kahn B, Polinsky ML, Petersen L. 1996. Breast cancer survivors: Psychosocial concerns and quality of life. *Breast Cancer Res Treat* **38**: 183–199.

Ganz PA, Rowland JH, Desmond K, Meyerowitz BE, Wyatt GE. 1998. Life after breast cancer: Understanding women's health-related quality of life and sexual functioning. *J Clin Oncol* **16**: 501–514.

Gotay CC, Muraoka MY. 1998. Quality of life in long-term survivors of adult-onset cancers. *J Natl Cancer Inst* **90**: 656–667.

Halstead MT, Fernsler JI. 1994. Coping strategies of long-term cancer survivors. *Cancer Nurs* **17**: 94–100.

Helgeson VS, Cohen S, Schulz R, Yasko J. 1999. Education and peer discussion group interventions and adjustment to breast cancer. *Arch Gen Psychiatry* **56**: 340–347.

Helgeson VS, Cohen S, Schulz R, Yasko J. 2000. Group support interventions for women with breast cancer: Who benefits from what? *Health Psychol* **19**: 107–114.

Helgeson VS, Cohen S, Schulz R, Yasko J. 2001. Long-term effects of educational and peer discussion group support interventions on adjustment to breast cancer. *Health Psychol* **20**: 387–392.

Helgeson VS, Reynolds K. Social psychological aspects of chronic illness. In *Chronic medical disorders: Behavioral medicine's perspectives*. Christensen A, Antoni M (eds). Blackwell Publishers Limited: Oxford, England, in press.

Holzner B, Kemmler G, Kopp M, *et al.* 2001. Quality of life in breast cancer patients—not enough attention for long-term survivors? *Psychosomatics* **42**: 117–123.

Janoff-Bulman R. 1989. Assumptive worlds and the stress of traumatic events: Applications of the schema construct. *Social Cognition* **7**: 113–136.

Janoff-Bulman R. 1992. *Shattered Assumptions: Towards a New Psychology of Trauma*. The Free Press: New York.

Janoff-Bulman R, Frieze IH. 1983. A theoretical perspective for understanding reactions to victimization. *J Soc Issues* **39**: 1–17.

Johnson SC, Spilka B. 1991. Coping with breast cancer: The roles of clergy and faith. *J Religion Health* **30**: 21–33.

Kennedy BJ, Tellegen A, Kennedy S, Havernick N. 1976. Psychological response of patients cured of advanced cancer. *Cancer* **38**: 2184–2191.

Leedham B, Ganz PA. 1999. Psychosocial concerns and quality of life in breast cancer survivors. *Cancer Invest* **17**: 342–348.

Lerner MJ. 1980. *The Belief in a Just World*. Plenum: New York.

Loescher LJ, Clark L, Atwood JR, Leigh S, Lamb S. 1990. The impact of the cancer experience on long term survivors. *Oncol Nurs Forum* **17**: 223–229.

McFarland C, Alvaro C. 2000. The impact of motivation on temporal comparisons: Coping with traumatic events by perceiving personal growth. *J Pers Soc Psychol* **79**: 327–343.

Meyerowitz BE, Desmond KA, Rowland JH, Wyatt GE, Ganz PA. 1999. Sexuality following breast cancer. *J Sex Marital Ther* **25**: 347–250.

Pelusi J. 1997. The lived experience of surviving breast cancer. *Oncol Nurs Forum* **24**: 1343–1353.

Quigley KM. 1989. The adult cancer survivor: Psychosocial consequences of cure. *Semin Oncol Nurs* **5**: 63–69.

Rieker PP, Fitzgerald EM, Kalish LA *et al.* 1989. Psychosocial factors, curative therapies, and behavioral outcomes. *Cancer* **64**: 2399–2407.

Saleeba AK, Weitzner MA, Meyers CA. 1996. Subclinical psychological distress in long-term survivors of breast cancer: A preliminary communication. *J Psychosoc Oncol* **14**: 83–93.

Schmale AH, Morrow GR, Schmitt MH *et al.* 1983. Well-being of cancer survivors. *Psychosom Med* **45**: 163–169.

Silver RL, Boon C, Stones MH. 1983. Searching for meaning in misfortune: Making sense of incest. *J Soc Issues* **39**: 81–102.

Talbott EO. 1981. Sudden unexpected death in women: Biological and psychosocial origins. *Am J Epidemiol* **114**: 671–682.

Talbott EO, Norman SA, Baffone KM, *et al.* 1993. Selection of neighborhood controls for a study of factors related to the diagnosis of cervical cancer. *J Clin Epidemiol* **46**: 1277–1287.

Taylor SE. 1983. Adjustment to threatening events: A theory of cognitive adaptation. *Am Psychol* **38**: 1161–1173.

Taylor SE, Brown JD. 1988. Illusion and well-being: A social psychological perspective on mental health. *Psychol Bull* **103**: 193–210.

Thompson SC. 1991. The search for meaning following a stroke. *Basic Appl Soc Psychol* **12**: 81–96.

Thompson SC, Janigian AS. 1988. Life schemes: A framework for understanding the search for meaning. *J Soc Clin Psychol* **7**: 260–280.

Ware JE, Kosinski M, Keller SD. 1995. *SF-36 Physical and Mental Health Summary Scales: A User's Manual*. The Health Institute: Boston.

Ware JE, Snow KK, Kosinski M, Gandek B. 1993. *SF-36 Health Survey: Manual and Interpretation Guide.* Nimrod: Boston.

Watson D, Clark LA, Tellegen A. 1988. Development and validation of brief measures of positive and negative affect: The PANAS scales. *J Pers Soc Psychol* **54**: 1063–1070.

Wells KB, Stewart A, Hays RD *et al.* 1989. Detection of depressive disorder for patients receiving prepaid or fee-for-service care: Results from the medical outcomes study. *J Am Med Assoc* **262**: 914–919.

Wyatt G, Friedman LL. 1996. Long-term female cancer survivors: Quality of life issues and clinical implications. *Cancer Nurs* **19**: 1–7.

Wyatt G, Kurtz ME, Liken M. 1993. Breast cancer survivors: An exploration of quality of life issues. *Cancer Nurs* **16**: 440–448.