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Positive and Negative Health Behavior Changes in Cancer Survivors

A Stress and Coping Perspective

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Abstract

Cancer survivors often make health behavior changes in response to their increased risk for subsequent health problems. However, little is known about the mechanisms underlying these changes or whether they differ for positive and negative changes. This cross-sectional study applied a stress and coping model to examine both positive and negative health behavior changes in 250 middle-aged cancer survivors. A structural equation model showed that social support, sense of control over illness course, life meaning, and approach coping were related to positive health behavior changes; a lack of life meaning and avoidance coping were related to negative health behavior changes.

Keywords

- *Health behaviours*
- *Cancer survivors*
- *Behavior change*
- *Coping*
- *Life meaning*

CANCER survivors are at increased risk for recurrence and second primary cancers as well as many other serious diseases and health conditions, including osteoporosis, obesity, diabetes, and cardiovascular disease (see Demark-Wahnefried, Aziz, Rowland, & Pinto, 2005, for a review). In response to their increased vulnerability, survivors often make positive changes in their lifestyles to enhance their health. However, negative health behavior changes are also common (e.g. Blanchard et al., 2003; Ganz et al., 2002). Cancer survivors' health behaviors have important implications for their morbidity and mortality, yet surprisingly little is known about these changes. The present study applied a stress and coping model to examine survivors' positive and negative health behavior changes.

Survivors' health behaviors

Despite their heightened health risks, cancer survivors do not necessarily engage in healthy behavior. In fact, they generally engage in health risk behaviors at about the same levels as the general population (e.g. Bellizzi, Rowland, Jeffery, & McNeel, 2005). Despite few mean differences in health behavior between survivors and those without cancer, studies have demonstrated that a cancer diagnosis often serves as an impetus for making health behavior changes (Mullens, McCaul, Erickson, & Sandgren, 2004; Rabin & Pinto, 2005). For example, studies that specifically asked about dietary behavior change show that around a third to a half of survivors report positive dietary change (Maunsell, Drolet, Brisson, Robert, & Deschenes, 2002; Salminen et al., 2002). There appear to be great individual differences in implementing lifestyle changes (Carver, 2005); thus, aggregated reports obscure the direction and amount of change made by individual survivors.

Are positive and negative health behavior change distinct?

Most research on survivors' health behavior change focuses on adaptive changes, such as increasing exercise (e.g. Blanchard et al., 2003). However, given the possibility for negative as well as positive health behavior change, important questions arise regarding the characterization of health behaviors. First, do positive change and negative change cluster across behaviors? That is, is someone who makes positive change on one health behavior more likely to do so on another? Second, to the extent that

positive and negative behavior change both occur within a sample, are there different pathways leading to positive and to negative change? Although little research has examined this issue, if direction of behavior change is consistent across behaviors, and if positive and negative change are different phenomena, there may be different pathways leading to these health behavior changes.

A stress and coping model of survivors' health behavior change

A stress and coping perspective is useful for examining survivors' implementation of health behavior change. As noted earlier, many survivors live with a continued sense of vulnerability regarding their health. There is evidence that stress and distress may impede adaptive health behavior change in cancer survivors. For example, in a study of young adult survivors of pediatric cancer, higher levels of life stress were related to higher levels of risky health behaviors (Tercyak, Donze, Prahlad, Mosher, & Shad, 2006). A stress and coping model posits that the ways that individuals manage these stressful feelings may influence their ability to make and sustain health behavior change. In particular, this model proposes that the extent to which more adaptive, versus maladaptive, coping is used to deal with these lingering stressors will be related to reports of positive versus negative health behavior change. Further, survivors' psychosocial resources will determine, in part, the types of coping in which they engage, thereby indirectly influencing health behavior changes.

Although few studies have examined aspects of resources and coping on survivors' health behavior change, some information can be gleaned from research on lifestyle changes in other populations and on adjustment in cancer survivors. In the context of cancer, coping is typically categorized as active approach (e.g. problem-solving, reappraisal) versus avoidance (e.g. mental and behavioral disengagement) strategies (Bellizzi & Blank, 2006). Studies of people dealing with cancer suggest that approach-focused coping is generally helpful, while avoidance coping strategies tend to be related to poorer outcomes (e.g. Roesch et al., 2005). However, few studies have examined whether coping is related to health behavior change. One exception is a cross-sectional study of breast cancer survivors, which found that active coping was related to positive changes in diet and exercise (Reardon & Aydin, 1993). Given the

generally positive influence of active coping on other aspects of survivorship adjustment (e.g. Bellizzi & Blank, 2006; Roesch et al., 2005), we hypothesized that approach coping would be related to adaptive health behavior change, while avoidant coping would be related to more negative health behavior change.

Two psychosocial resources related to health behavior change in both the general population and cancer survivors are perceived control and social support. Perceived control is a major determinant of how people deal with health issues, including cancer (e.g. Wallston & Wallston, 1982; Watson, Greer, Pruyun, & van den Borne, 1990). The extent to which survivors feel they can control their health is associated with actually making health behavior changes. One study found breast cancer survivors' higher beliefs that their health behavior was linked with the cause of their cancer or would prevent recurrence were related to improved diet and increased exercise (Rabin & Pinto, 2005). We hypothesized that more perceived control would lead to more positive health behavior change (Masters & Wallston, 2005; Wallston & Wallston, 1982), and further, that this influence would be mediated through active coping (e.g. Haugli, Steen, Finset, & Nygaard, 2000).

Perceived social support is linked to increased health behavior (specifically exercise) in cancer survivors (Pinto, Trunzo, Reiss, & Shiu, 2002; Reardon & Aydin, 1993). We hypothesized that higher social support would be related to more positive health behavior change and less negative health behavior change, perhaps through encouragement, role models, or a partner with whom to engage in healthy behaviors. Further, the influence of social support on positive behaviors may, in part, be due to facilitating approach coping with the stressors associated with cancer survivorship (Luszczynska, Mohamed, & Schwarzer, 2005).

In addition, we examined a third psychosocial resource, a sense of meaning in life. Although not commonly assessed as a determinant of health behavior change, meaning in life has been shown to be related to many favorable outcomes in cancer survivors (Laubmeier, Zakowski, & Bair, 2004; see Powell, Shahabi, & Thoresen, 2003), an effect proposed to be mediated through more adaptive coping (Breitbart, 2002). We reasoned that a sense of life meaning would lead to motivation to better self-care, and, therefore, to more positive health behavior changes.

The present study

The present study examined psychosocial factors and coping behavior associated with both positive and negative health behavior changes. Building on previous research, we examined a wider range of behaviors than that often reported (e.g. only one behavior such as diet). Further, we focused on reports of actual change rather than intentions to make changes, given that these have been shown to have different predictors (e.g. Mullen et al., 2004). In addition, although it has been suggested that health behavior changes in cancer survivors tend to cluster together (Demark-Wahnefried, Peterson, McBride, Lipkus, & Clipp, 2000; Mullens et al., 2004; Pinto & Trunzo, 2005), this proposition has rarely been examined. Therefore, we examined the extent to which positive or negative changes in four different health behaviors formed distinct factors and whether the pathways to each differed.

Method

The present study was part of a larger investigation of cancer survivorship and quality of life in younger (under aged 55) adults diagnosed with cancer in the past three years. Participants were recruited through the Cancer Registry at Hartford Hospital in Hartford, Connecticut, USA. The study was approved by the Institutional Review Boards of both the university and the hospital and conducted with strict adherence to ethical guidelines. Of the 600 questionnaires mailed, 250 completed questionnaires were returned. Approximately 50 packets were undeliverable or the intended recipient was deceased, leaving us with a return rate of approximately 42 percent, comparable to other studies using cancer registries for recruitment (e.g. Bellizzi & Blank, 2006).

Participants

The sample comprised 172 women and 78 men (mean age = 45.2). The racial/ethnic makeup of the sample was 89 percent White, five percent Latino, three percent African-American, and two percent Native American. Most (73%) were married/living with a partner. The household income of the majority (81%) of the sample was > \$50,000, and 72.7 percent had at least a college education. The five most common cancer sites were breast (46%), prostate (12%), colon/rectal (6%), cervix/uterus (5%), and lymph nodes (5%). Primary

treatment types varied: 5 percent received chemotherapy only, 53 percent surgery only, 12 percent combination of surgery and radiation, and 23 percent combination of chemotherapy and surgery and/or radiation. Mean time since completing primary treatment was 1.56 years.

Measures

Psychosocial resources

Perceived control over one's cancer was assessed with the Control of Course subscale of the Cancer Locus of Control scale (CLOC; Watson et al., 1990), a seven-item scale (1 = 'strongly disagree' to 4 = 'strongly agree') assessing control beliefs about the course of one's cancer (e.g. 'I can influence the course of my illness by fighting against it', 'By taking extra care of myself, I can influence the course of my illness'). The CLOC is often used with cancer populations in the USA and Europe, with demonstrated validity and reliability (Henderson & Donatelle, 2003). Cronbach's α in the present study was .72.

Social support was measured with the appraisal, belonging, and tangible support subscales of the Interpersonal Support Evaluation List (ISEL; Cohen, Mermelstein, Kamarck, & Hoberman, 1985), a self-report measure of participants' perception of available instrumental and emotional social support. Participants rated the extent to which each item described their access to social support on a scale (1 = 'probably false' to 4 = 'definitely true'). The ISEL has demonstrated good psychometrics in varied populations (Cohen & Wills, 1985). Because of the high intercorrelation ($R = .67$) between the subscales, a total social support score comprised of 12 items (four per subscale) was calculated by summing the three subscale scores. Cronbach's α for the total social support score in the present study was .87.

Meaning in Life was measured by the existential well-being subscale of the Functional Assessment of Chronic Illness Therapy—Spiritual Well-Being (FACIT-Sp-12; Peterman, Fitchett, Brady, Hernandez, & Cella, 2002) Meaning/Peace subscale. This eight-item subscale measures the extent to which participants experienced their life as meaningful in the past week (0 = 'not at all'; 4 = 'very much') (e.g. 'I have a reason for living'). Cronbach's α in the present study was .90.

Health Behavior Changes were assessed by asking participants to report their change on each of four health behaviors (diet, exercise, sleep, and stress management) 'as a result of your cancer experience'. These behaviors are commonly assessed

in cancer survivor research and are considered important for survivors' well-being (Demark-Wahnefried et al., 2005; Mulhern et al., 1995). Participants rated changes (1 = 'much worse now', 2 = 'worse now', 3 = 'a little worse now', 4 = 'no change', 5 = 'a little better now', 6 = better now, 7 = 'much better now') (adapted from Mullens et al., 2004 and Rabin & Pinto, 2005). These types of direct and simple self-report items have been shown to have fairly good correspondence with more detailed assessments of those changes, such as diet and exercise (e.g. Mullens et al., 2004; Wayne et al., 2004). Items were rescaled to create a positive and a negative change score for each health behavior. The positive score rescaling assigned a score of 0 to any change that was not positive as defined by the numerical labels (1 = 0, 2 = 0, 3 = 0, 4 = 0, 5 = 1, 6 = 2, 7 = 3), and the negative score was rescaled similarly, in the reverse order (1 = 3, 2 = 2, 3 = 1, 4 = 0, 5 = 0, 6 = 0, 7 = 0). Positive and negative change latent variables were created from the eight rescaled items, errors were correlated between the positive and negative of each item ($r = -.28$ to $-.31$). The two latent variables were negatively related ($r = -.26$).

Coping was assessed with the Brief COPE scale (Carver, 1997) and the two highest loading items from Stanton, Danoff-Burg, Cameron, and Ellis' (1994) emotional processing and emotional expression subscales. Participants rated how they were currently coping with the stress in their life associated with cancer on a scale from 1 = 'I haven't been doing this at all' to 4 = 'I have been doing this a lot'. The Brief COPE consists of 28 items that tap into 14 types of coping (active coping, planning, suppression of competing activities, restraint coping, seeking instrumental social support, seeking emotional social support, positive reinterpretation, acceptance, turning to religion, venting of emotions, denial, behavioral disengagement, mental disengagement, and alcohol and drug use). Stanton et al.'s emotional expression and emotional processing subscales complement the types of coping assessed on the COPE, and were interspersed with COPE items (Stanton et al., 1994; Stanton, Danoff-Burg, & Huggins, 2002). These subscales have been shown to have acceptable internal consistency (e.g. Park & Fenster, 2004).

We based our approach and avoidance subscales on a factor analysis of long-term cancer survivors conducted by Bellizzi and Blank (2006), who, in a sample from the same registry as the current study, found an 'active/adaptive' and a 'maladaptive/avoidant' factor. We used the highest-loading subscales on each factor;

thus, in our study, the approach-oriented factor was comprised of emotional processing, active coping, seeking instrumental support, and positive reinterpretation, while avoidant coping was comprised of the subscales of denial, behavioral disengagement, and self-blame. We did not use the alcohol/drugs subscale in order to keep the conceptual distinction between coping and health behaviors.

Results

Descriptive information on health behavior changes

Seventy-five percent of the sample reported at least some positive change on at least one of the four dimensions (mean = 2.6 out of 12 possible; SD = 2.5; Range = 0–12), while 38.5 percent reported at least some negative change on at least one of the four dimensions (mean = 1.17 out of 12 possible; SD = 2.0; Range = 0–10). Finally, 14 percent reported no change at all. The sample mean of total (absolute) change (positive and negative) = 3.76 (SD = 2.74). The most commonly reported positive change was dietary (mean = .96; SD = .96), while the most commonly reported negative change was in sleep (mean = .40; SD = .83).

Structural equation to test a stress and coping model

The hypothesized structural equation model was tested using Amos 5 (Arbuckle, 2003). The full information maximum likelihood (FIML) estimation method was used to generate the standardized parameter estimates because it is robust to violations of multivariate normality and performs well for model estimation with missing data by estimating variable means and intercepts (Okleshen-Peters & Enders, 2002). In this study, the presumed relationships were specified in the structural model. Before relevant pathways between factors were examined, confirmatory factor analysis (CFA) was used to verify empirically whether the proposed factors themselves were well defined. Model specification used CFA to test the overall measurement model of latent and observed variables (resources, coping, and health behavior change). Additional significant explanatory paths were added to the theoretical model. Model modifications were conducted using an interactive process that involved removing paths with nonsignificant *t* values when considered in the context of unspecified paths, then re-estimating the model.

Confirmatory factor analysis for coping factors

To assess whether the observed indicators of the proposed approach and avoidant coping factors reliably reflected the hypothesized latent variables, a confirmatory factor analysis was conducted. The values of the fit indices in the CFA model indicated good fit ($\chi^2(13) = 20.93, p > .05; \chi^2/\text{d.f.} = 1.61; \text{CFI} = .98; \text{RMSEA} = .05$). Further, the two factors yielded good discriminant validity ($r = -.44$).

Measurement model

The hypothesized measurement model was tested to assess whether it was appropriate to test the hypothesized structural equation model. The measurement model fit was adequate to continue ($\chi^2(113) = 179.7, p < .01; \chi^2/\text{d.f.} = 1.6; \text{CFI} = .94; \text{RMSEA} = .05$).

Theoretical model

The hypothesized structural equation model showed adequate fit ($\chi^2(123) = 208.45, p < .01; \chi^2/\text{d.f.} = 1.7; \text{CFI} = .92; \text{RMSEA} = .05; \text{PCLOSE} = .33$), which was a significant improvement to the measurement model ($\chi^2 \text{ diff. } (10) = 28.75, p < .01$). However, upon testing unspecified paths, two of the specified paths (perceived control over disease course and social support to negative coping) were not significant and, thus, were trimmed. The alteration to the model did not significantly affect overall fit ($\chi^2(125) = 212.0, p < .01; \chi^2/\text{d.f.} = 1.7; \text{CFI} = .92; \text{RMSEA} = .05; \text{PCLOSE} = .33; \chi^2 \text{ diff. } (2) = 3.55, p > .05$). Also, the unspecified paths test suggested the inclusion of a path from meaning in life to the negative health behaviors variable. When included, the fit of the model improved significantly ($\chi^2 \text{ diff. } (1) = 11.7, p < .001$), suggesting a direct effect of meaning in life on reducing negative health behavior change which was partially mediated by decreased negative coping. The standardized regression weight of the direct path from meaning in life to negative health behavior change decreased from $-.67$ to $-.35$, but remained statistically significant, when avoidant coping was introduced to the model in the post hoc test for mediation. The Sobel test indicated a significant effect ($p < .01$) of meaning in life on negative health behavior change through decreased avoidance coping (Baron & Kenny, 1986).

Final model

The final trimmed model (see Fig. 1) showed good fit ($\chi^2(124) = 200.3, p < .01; \chi^2/\text{d.f.} = 1.62; \text{CFI} = .93; \text{RMSEA} = .05 (.04-.06); \text{PCLOSE} = .49$).

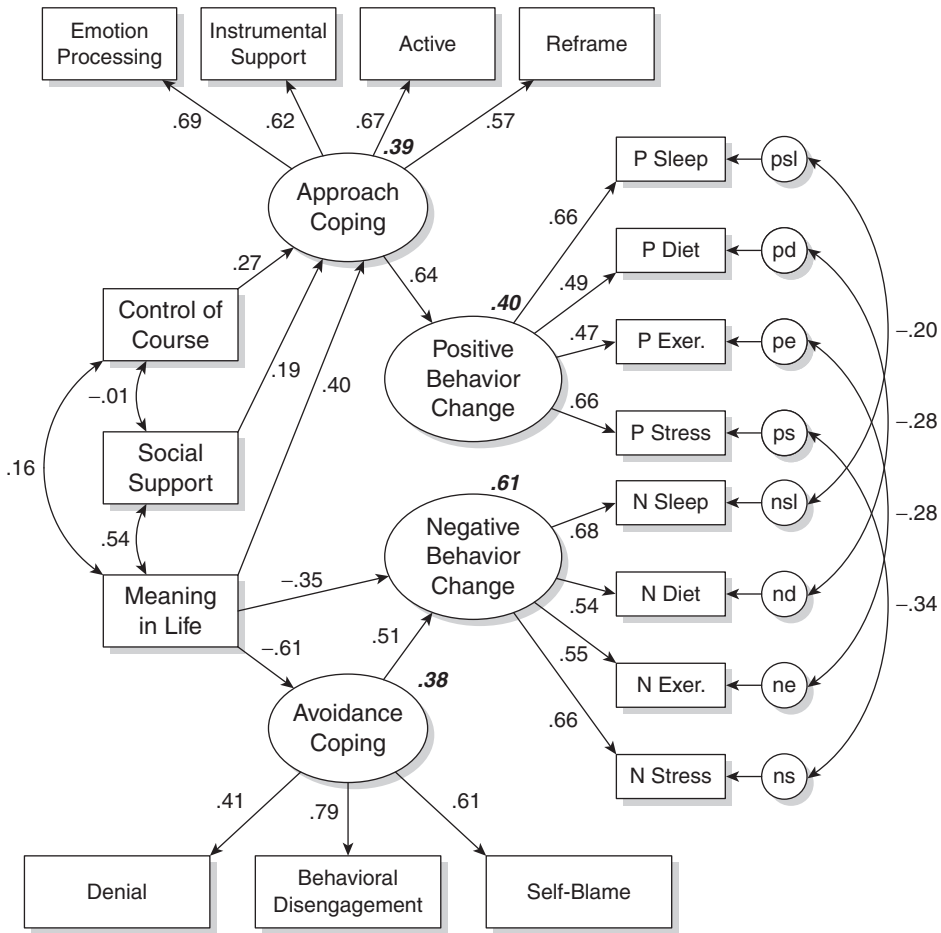


Figure 1. Final structural equation model of relationships among psychosocial variables, coping, and behavior change.

Discussion

We applied a stress and coping perspective to conceptualize correlates of positive and negative health behavior changes. Our results suggest that this perspective is useful for understanding behavior change in cancer survivors. The proposed model was supported, suggesting that behavior change can be predicted from resources and coping and that positive and negative behavior change are distinct phenomena. Given the heightened health vulnerabilities of cancer survivors and the documented need for improvements in health behaviors, these results have important implications for subsequent research and interventions.

Our results are consistent with the proposal that a cancer diagnosis can be a ‘teachable moment’

(Demark-Wahnefried et al., 2005). That is, most participants reported making at least some adaptive change. Further, as in much prior research, positive changes were more commonly reported than were negative changes (e.g. Salminen et al., 2002; Wayne et al., 2004). On the other hand, many respondents reported making negative health behavior changes, indicating that both types of changes are common, although neither is at a very high level of change. This suggests that future research should attend to both, attending to individual variation in amount of change. In addition, the fact that multiple health behavior changes clustered together in terms of positive change and negative change suggests that future interventions may effectively simultaneously target multiple behaviors (Glasgow, Klesges, Dzewaltowski, Bull, & Estabrooks, 2004; Nigg, Allegrate, & Ory, 2002).

Our model of resources, coping and health behavior changes was mostly consistent with our hypotheses. In particular, approach coping was strongly related to positive health behavior change and mediated the influence of all three psychosocial resources on positive health behavior change. Further, avoidant coping was strongly related to negative health behavior change. Interestingly, however, approach coping was unrelated to negative change and avoidant coping was unrelated to positive change. Further, neither a sense of control nor perceived social support was related to avoidant coping or negative health behavior change. Meaning in life was fairly strongly related, inversely, to negative health behavior change, an effect partially mediated by avoidant coping. These findings suggest that positive and negative health behavior change are not simply the inverse of one another, and that the resources and coping linked with positive health behavior change differ systematically from those linked to negative health behavior change.

In addition, all three resources were associated with positive change. Those who perceive more control and more social support implemented more positive health behaviors. Both perceived control and social support have been shown in previous research to positively influence health and health behavior (e.g. Haugli et al., 2000), effects often mediated through more adaptive coping (e.g. Bellizzi & Blank, 2006; Luszczynska et al., 2005). These resources may play important roles in implementing positive changes by giving survivors needed support and agency. Some prior research has shown that having a sense of meaning in life is related to better health in cancer survivors (Jaarsma, Pool, Ranchor, & Sanderman, 2007; Vickberg et al., 2001), but its role in health behavior change has seldom been documented. In our sample, the link with positive health behavior change appeared to be the strongest of the three resources assessed, and was the only one that was also related to avoidant coping and negative health behavior change.

The limitations of this study make the results suggestive rather than definitive, and call for future research to address the shortcomings of the present study and to venture further into the realm of health behavior change. This study was designed as an exploratory foray into fairly uncharted territory, and as such, is limited in its design and measurement. This study was cross-sectional, and therefore open to the standard criticisms of cross-sectional research, such as inability to determine causality

and multiple plausible models (see Aldwin, 2007, for a review). However, by basing our study on the theoretically specified relationships derived from a stress and coping framework, the results are promising, especially since the point in time we assessed is roughly the period of transition from patient to long term survivor (Hewitt, Greenfield, & Stovall, 2005), and indicate that future longitudinal research examining resources and coping with the stresses of cancer survivorship may lead to important insights regarding health behavior changes. Longitudinal measures that track the processes of stress and coping over time will provide much richer information about the trajectories of positive and negative health behavior change.

Clearly, our measures of health behavior change, while the state of the art in psychosocial research (e.g. Mullens et al., 2004; Rabin & Pinto, 2005), are crude. Although studies have demonstrated reasonably good correspondence between self-reports of behavior change and more objective indices (Mullens et al., 2004; Williams et al., 2002), there is evidence that survivors may overestimate their change (Wayne et al., 2004). Future studies should also employ more sophisticated measures of health behavior and health behavior change, including calculation of behavior change and objective indices of health behavior as well as reports of change.

In addition, future research should examine the nature and extent of the stresses with which survivors are coping. It may be that survivors who are particularly concerned with recurrence or other health issues may be those most likely to make adaptive changes (e.g. Mullens et al., 2004), an effect that may, in fact, be moderated by psychosocial resources such as perceived control over one's health (i.e. those who are most worried but also feel that they are able to influence the course of their health may be those most likely to make adaptive changes).

In spite of these limitations, the present results are important in that they suggest the need to look more closely at negative as well as positive change and to examine it in the context of survivors' ongoing concerns and stresses. Little is known about the factors that facilitate or impede health behavior change in survivorship, and this study contributes to this literature as well as highlighting useful avenues for future research. A better understanding of these processes should lead to more effective post-treatment interventions targeting survivors with different patterns of needs, vulnerabilities, and strengths. Facilitating adaptive health behavior change, and

minimizing maladaptive behavior change, could improve the quality of life of millions of survivors and, in so doing, may have a significant impact on public health (Demark-Wahnefried et al., 2005).

References

- Aldwin, C. M. (2007). *Stress, coping, and development*, 2nd edn. New York: Guilford.
- Arbuckle, J. L. (2003). *Amos 5.0 update to the Amos user's guide*. Chicago, IL: SPSS Inc.
- 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.
- Bellizzi, K. M., & Blank, T. O. (2006). Understanding the dynamics of post-traumatic growth in breast cancer survivors. *Health Psychology*, *25*, 47–56.
- Bellizzi, K. M., Rowland, J. H., Jeffery, D. D., & McNeel, T. (2005). Health behaviors of cancer survivors: Examining opportunities for cancer control intervention. *Journal of Clinical Oncology*, *23*, 8884–8893.
- Blanchard, C. M., Baker, F., Denniston, M. M., Courneya, K. S., Hann, D. M., Gesme, D. H. et al. (2003). Is absolute amount or change in exercise more associated with quality of life in adult cancer survivors? *Preventive Medicine*, *37*, 389–395.
- Breitbart, W. (2002). Spirituality and meaning in supportive care: Spirituality- and meaning-centered group psychotherapy interventions in advanced cancer. *Supportive Care in Cancer*, *10*, 272–280.
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief COPE. *International Journal of Behavioral Medicine*, *4*, 92–100.
- Carver, C. S. (2005). Enhancing adaptation during treatment and the role of individual differences. *Cancer*, *S11*, S2602–S2607.
- Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H. (1985). Measuring the functional components of social support. In I. Sarason (Ed.), *Social support: Theory, research, and applications* (pp. 73–94). The Hague, The Netherlands: Martinus Nijhoff.
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, *98*, 310–357.
- Demark-Wahnefried, W., Aziz, N., Rowland, J., & Pinto, B. M. (2005). Riding the crest of the teachable moment: Promoting long-term health after the diagnosis of cancer. *Journal of Clinical Oncology*, *23*, 5814–5830.
- Demark-Wahnefried, W., Peterson, B., McBride, C., Lipkus, I., & Clipp, E. (2000). Current health style behaviors and readiness to pursue life-style changes among men and women diagnosed with early stage prostate and breast carcinomas. *Cancer*, *88*, 674–684.
- 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.
- Glasgow, R. E., Klesges, L. M., Dzawaltowski, D. A., Bull, S. S., & Estabrooks, P. (2004). The future of health behavior change research: What is needed to improve translation of research into health promotion practice? *Annals of Behavioral Medicine*, *27*, 3–12.
- Haugli, L., Steen, L. E., Finset, A., & Nygaard, R. (2000). Agency orientation and chronic musculoskeletal pain: Effects of a group learning program based on the personal construct theory. *Clinical Journal of Pain*, *16*, 281–289.
- Henderson, J. W., & Donatelle, R. J. (2003). The relationship between cancer locus of control and complementary and alternative medicine use by women diagnosed with breast cancer. *Psycho-Oncology*, *12*, 59–67.
- Hewitt, M., Greenfield, S., & Stovall, E. (Eds.). (2005). *From cancer patient to cancer survivor: Lost in transition*. Washington, DC: Institute of Medicine.
- Jaarsma, T. A., Pool, G., Ranchor, A. V., & Sanderman, R. (2007). The concept and measurement of meaning in life in Dutch cancer patients. *Psycho-Oncology*, *16*, 241–248.
- Laubmeier, K. K., Zakowski, S. G., & Bair, J. P. (2004). The role of spirituality in the psychological adjustment to cancer: A test of the transactional model of stress and coping. *International Journal of Behavioral Medicine*, *11*, 48–55.
- Luszczynska, A., Mohamed, N. E., & Schwarzer, R. (2005). Self-efficacy and social support predict benefit finding 12 months after cancer surgery: The mediating role of coping strategies. *Psychology, Health, & Medicine*, *10*, 365–375.
- Masters, K. S., & Wallston, K. A. (2005). Canonical correlation reveals important relations between health locus of control, coping, affect and values. *Journal of Health Psychology*, *10*, 719–731.
- Maunsell, E., Drolet, M., Brisson, J., Robert, J., & Deschenes, L. (2002). Dietary change after breast cancer: Extent, predictors, and relation with psychological distress. *Journal of Clinical Oncology*, *20*, 1017–1025.
- Mulhern, R. K., Tyc, V. L., Phipps, S., Crom, D., Barclay, D., Greenwald, C. et al. (1995). Health-related behaviors of survivors of childhood cancer. *Medical and Pediatric Oncology*, *25*, 159–165.
- Mullens, A., McCaul, K., Erickson, S., Sandgren, A. K. (2004). Coping after cancer: Risk perceptions, worry, and health behaviors among colorectal cancer survivors. *Psycho-Oncology*, *13*, 367–376.
- Nigg, C. R., Allegrante, J. P., & Ory, M. (2002). Theory-comparison and multiple-behavior research: Common themes advancing health behavior research. *Health Education Research*, *17*, 670–679.
- Okleshen-Peters, C., & Enders, C. K. (2002). A primer for the estimation of structural equation models in the presence of missing data: Maximum likelihood algorithms.

- Journal of Targeting, Measurement, and Analysis for Marketing*, 11, 81–95.
- Park, C. L., & Fenster, J. A. (2004). Stress-related growth: Predictors and processes. *Journal of Social and Clinical Psychology*, 23, 195–215.
- Peterman, A., Fitchett, G., Brady, M. J., Hernandez, L., & Cella, D. (2002). Measuring spiritual well-being in people with cancer: The Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-Sp). *Annals of Behavioral Medicine*, 24, 49–58.
- Pinto, B. M., & Trunzo, J. J. (2005). Health behaviors during and after a cancer diagnosis. *Cancer*, 104, 2614–2623.
- Pinto, B., Trunzo, J., Reiss, P., & Shiu, S. (2002). Exercise participation after diagnosis of breast cancer: Trends and effects on mood and quality of life. *Psycho-Oncology*, 11, 389–400.
- Powell, L. H., Shahabi, L., & Thoresen, C. E. (2003). Religion and spirituality: Linkages to physical health. *American Psychologist*, 58, 36–52.
- Rabin, C. S., & Pinto, B. (2005). Cancer-related beliefs and health behavior change among breast cancer survivors and their first-degree relatives. *Psycho-Oncology*, 15, 344–354.
- Reardon, K. K., & Aydin, C. E. (1993). Changes in lifestyle initiated by breast cancer patients: Who does and who doesn't? *Health Communication*, 5, 263–282.
- Roesch, S. C., Adams, L., Hines, A., Palmores, A., Vyas, P., Tran, C. et al. (2005). Coping with prostate cancer: A meta-analytic review. *Journal of Behavioral Medicine*, 28, 281–293.
- Salminen, E., Heikkilä, S., Pousa, T., Lagstrom, H., Saario, R., & Salminen, S. (2002). Female patients tend to alter their diet following the diagnosis of rheumatoid arthritis and breast cancer. *Preventative Medicine*, 34, 529–535.
- Stanton, A. L., Danoff-Burg, S., Cameron, C. L., & Ellis, A. P. (1994). Coping through emotional approach: Problems of conceptualization and confounding. *Journal of Personality and Social Psychology*, 66, 350–362.
- Stanton, A. L., Danoff-Burg, S., & Huggins, M. E. (2002). The first year after breast cancer diagnosis: Hope and coping strategies as predictors of adjustment. *Psycho-Oncology*, 11, 93–102.
- Tercyak, K. P., Donze, J. R., Prahla, S., Mosher, R. B., & Shad, A. T. (2006). Multiple behavioral risk factors among adolescent survivors of childhood cancer in the Survivor Health and Resilience Education (SHARE) Program. *Pediatric Blood & Cancer*, 47, 825–830.
- Vickberg, S. M. J., Duhamel, K. N., Smith, M. Y., Manne, S. L., Winkel, G., Papadopoulos, E. B., & Redd, W. H. (2001). Global meaning and psychological adjustment among survivors of bone marrow transplant. *Psycho-Oncology*, 10, 29–39.
- Wallston, K. A., & Wallston, B. S. (1982). Who is responsible for your health? The construct of health locus of control. In G. Sanders & J. Suls (Eds.), *Social psychology of health and illness* (pp. 65–95). Hillsdale, NJ: Erlbaum.
- Watson, M., Greer, S., Pruy, J., & van den Borne, B. (1990). Locus of control and adjustment to cancer. *Psychological Reports*, 66, 39–48.
- Wayne, S. J., Lopez, L. T., Butler, L. M., Baumgartner, K. B., Baumgartner, R. N., & Ballard-Barbash, R. (2004). Changes in dietary intake after diagnosis of breast cancer. *Journal of the American Dietetic Association*, 104, 1561–1568.
- Williams, G. C., Minicucci, D. S., Kouides, R. W., Levesque, C. S., Chirkov, V. I., Ryan, R. M., & Deci, E. L. (2002). Self-determination, smoking, diet and health. *Health Education Research*, 17, 512–521.

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