

SOCIAL-COGNITIVE CORRELATES OF ADJUSTMENT TO PROSTATE CANCER

KATHERINE J. ROBERTS^{a,*}, STEPHEN J. LEPORE^a and VICKI HELGESON^b

^aTeachers College, Columbia University, USA

^bCarnegie Mellon University, USA

SUMMARY

This study examined whether social support might enhance health-related quality of life in men ($n = 89$) treated for localized prostate cancer by improving their ability to cognitively process their cancer experience. Data were collected using two, structured in-person interviews and abstracting medical records. The baseline interview was within several months (T1) after treatment for cancer, and follow-up was 3 months later (T2). Most men (61.8%) were treated by radical prostatectomy. Results showed that T1 social support was positively related to T2 mental functioning, and this relation appeared to be mediated by T1 indicators of cognitively processing, intrusive thoughts and searching for meaning. These findings suggest that supportive social relations may improve mental functioning by helping men cognitively process their prostate cancer experience. Copyright © 2005 John Wiley & Sons, Ltd.

KEY WORDS: prostate cancer; social support; cognitively processing; quality of life

INTRODUCTION

Long-term survival rates for men with prostate cancer have greatly improved over the past decades, possibly due to earlier detection and improvements in treatment (Brenner, 2002; David *et al.*, 2003). However, the significant bodily impairment, restrictions in role-related activities, and concerns about future health that often accompany prostate cancer and its treatments can greatly undermine men's health-related quality of life (HRQoL; for reviews see Eton and Lepore, 2002; Penson *et al.*, 2003). There has been extensive research documenting HRQoL in men with prostate cancer, but we know relatively little about the predictors of HRQoL in this population (Eton and Lepore, 2002). HRQoL is likely to be affected by psychological and social processes that unfold over time as men manage, learn from, and adjust to the changes caused by prostate cancer and its treatments (Lepore and Eton, 2000).

Understanding these processes can help to identify those patients at high risk for impaired HRQoL and suggest directions for intervention (Germino, 2001).

There is mounting evidence that adjustment to cancer may be mediated by how individuals cognitively process their disease (Lepore, 2001; Lepore and Helgeson, 1998; Redd *et al.*, 2001; Taylor, 1983). Confronting, contemplating, and re-evaluating a stressful event, such as cancer, may facilitate adjustment by either helping people to assimilate the event into their pre-existing mental models or helping them to change their mental models to accommodate the event (Lepore, 2001). When these cognitive processes fail, the cancer experience may remain active in the form of intrusive thoughts (Lepore and Helgeson, 1998).

Intrusive thoughts are considered recurrent, uncontrollable memories, dreams, or flashbacks about an event (Gold and Wegner, 1995; Horowitz, 1986; Vickberg *et al.*, 2000). These thoughts can be viewed as an attempt by an individual to make sense of, or construct meaning about a stressful event, or formulate a narrative account of what happened and why (Horowitz, 1986; Meichenbaum and Fitzpatrick, 1993). We have argued

*Correspondence to: Department of Health and Behavior Studies, Teachers College, Columbia University, Box 114, 525 West 120th Street, New York, NY 10027, USA.
E-mail: roberts@tc.columbia.edu

that intrusive thoughts are a marker of incomplete cognitive processing (Lepore, 1997, 2001; Lepore *et al.*, 1996), signifying that an individual has not made adaptive cognitive adjustments to a stressful event. Experiencing intrusive thoughts of stressful life events is often associated with negative affect and poorer HRQoL. Studies on people with cancer have shown that greater intrusive thoughts are associated with worse mental health (Devine *et al.*, 2003; Lepore and Helgeson, 1998), worse physical functioning (Lewis *et al.*, 2001), greater distress (Lutgendorf *et al.*, 1999), greater depression and less well-being (Manne, 1999).

Whereas intrusive thoughts are often unbidden and somewhat automatic (Horowitz, 1986), the process of assimilation and accommodation can be volitional, as well. For example, it has been observed that people with cancer sometimes engage in a search for meaning (Moadel *et al.*, 1999; Schroevers *et al.*, 2004; Tomich and Helgeson, 2002; Xuereb and Dunlop, 2003). The search for meaning can reflect efforts to make sense of cancer, for example, to identify its causes and implications. It also may reflect efforts to restore a global sense of order and purpose in life (e.g. justice), which often is undermined by a cancer diagnosis (Taylor, 1995). Indeed, Silver *et al.* (1983) note that 'intrusive ruminations may also prompt a need to understand the experience and its persistent effects (e.g. 'Why am I remembering this?')' (p. 88). Empirical evidence suggests that engaging in an ongoing search for meaning following a stressful or traumatic event is associated with poorer psychosocial adjustment (Clark *et al.*, 1991; Silver *et al.*, 1983; Tait and Silver, 1989), whereas finding meaning is associated with better psychosocial adjustment (Davis *et al.*, 1998). In people with cancer, searching for meaning has been shown to predict poor adjustment (Tomich and Helgeson, 2002). Exceptions to this are studies finding no relation between searching for meaning and adjustment (Gotay, 1985; Taylor *et al.*, 1984). Theoretically (Michela and Wood, 1986; Silver *et al.*, 1983; Weiner, 1985), searching for meaning could be associated with better adjustment if, for example, it enabled individuals to find meaning, or to identify benefits or positive outcomes associated with their cancer, such as closer relationships with others, a spiritual reawakening, or a greater appreciation of life. However, to our knowledge, there are no studies that have shown a positive association between searching for meaning and adjustment.

Lepore (2001) has theorized that patients' social environment can have a strong influence on their ability to cognitively process their cancer. Supportive others can help individuals work through their stressful memories and make sense of them (Greenberg, 1995). Discussing thoughts and feelings with others can provide an opportunity to confront the 'why me' questions and enable individuals to gain insight from others and construct meaning (Redd *et al.*, 2001). It has been found that patients who have adequate social support more often disclose their cancer-related concerns than those who have poor social support (Figueiredo *et al.*, 2004; Lepore and Helgeson, 1998).

Having opportunities for safely discussing cancer concerns may increase patients' ability to assimilate or accommodate their cancer experience. Others may provide new perspectives on the illness or its significance, thus reducing the need to search for meaning, or they may provide answers to the questions, helping to find meaning. Once meaning is found, intrusive thoughts and the concomitant need to search for meaning is reduced. In one study of incest survivors, for example, finding meaning significantly reduced (although did not eliminate) the need to search for meaning (Silver *et al.*, 1983). Similarly, intrusive thoughts may decline through talking due to the problem solving nature of conversation. Talking about stressful experiences may serve to engage distressed individuals in a mode of thinking that is different from the repetitive rumination they have been experiencing (Clark, 1993).

The present study was designed to examine whether social support might enhance HRQoL in men treated for prostate cancer by reducing their level of intrusive thoughts and extent of searching for meaning. One part of this question has been addressed in a recent study that tested whether intrusive thoughts mediated the relation between social support and mental and physical functioning in patients with metastatic melanoma or metastatic renal cell cancer (Devine *et al.*, 2003). The study showed that a higher level of social support was associated with a lower level of intrusive thoughts about cancer which, in turn, was associated with a lower level of psychological distress and a higher level of mental functioning. That is, social support appeared to improve psychological adjustment by decreasing intrusive thoughts. Social support was not related to the physical functioning measure, so no mediation

tests were performed. To our knowledge, there have been no studies on the relation between social support and searching for meaning in people with cancer. Thus, our study provides a replication of the work by Devine *et al.*, but in a different cancer population, and it extends work in this area by examining how social support may influence searching for meaning and associated quality of life outcomes.

Hypotheses

We hypothesized that in men treated for localized prostate cancer those with strong social supports would be more likely to cognitively process their cancer experience, as indicated by fewer intrusive thoughts and less searching for meaning, than their counterparts with less adequate social supports. Further, we hypothesized that the positive relations between social support and mental functioning would be mediated by lower levels of intrusive thoughts and searching for meaning. We included an assessment of physical functioning for descriptive purposes. However, based on the work of Devine *et al.* (2003), we did not expect to find a significant relation between our predictors and physical functioning.

METHOD

Participants

The participants were men comprising the usual care control group from a larger randomized controlled trial (see Lepore *et al.*, 2003 for details). Patients were referred to the larger study by 35 physicians from 11 greater-Pittsburgh area urology and radiology clinics and hospitals. In addition to having been treated for localized prostate cancer, each participant had to meet the following eligibility criteria: (1) no history of other cancer; (2) primary residence within 1-h driving distance from intervention sites; and (3) non-metastatic disease at time of diagnosis. Of the 93 participants in the usual care control group, 89 participants (96%) had complete data at both time periods examined in the present study.

Procedures

Data were collected using structured face-to-face patient interviews and review of medical records. A male interviewer conducted the in-home, baseline interview as close as possible to the date the patient's surgery was completed or their radiation regimen had begun. Follow-up interviews were conducted approximately 3 months later. Throughout the trial, patients were not informed of the study hypotheses, and interviewers were blind to experimental condition at baseline.

Measures

We administered the measures described below at both interviews, with the exception of background variables, which were collected only at baseline.

Background variables. We collected demographic and medical information from each participant and verified information about cancer pathology and history through medical chart review.

Health-related quality of life outcomes: Mental and physical functioning. There is general agreement that measures of HRQoL should be comprehensive, encompassing patient outcomes in general physical, mental, social, and role functioning (Bowling, 1991; Cella and Tulsky, 1993; Macdonagh, 1996). All of these outcomes are captured by the 36-item, medical outcome study short form (SF-36; Ware *et al.*, 1993), which was used in the present study to assess HRQoL. The SF-36 assesses patients' status in physical functioning (physical limitations in performing daily activities, role limitations due to physical health, general health perceptions, and bodily pain) and mental functioning (vitality and/or energy level, role limitations due to emotional health, problems in social functioning, and mental health). Two summary scales can be obtained from the SF-36, the physical component summary score (PCS) and the mental component summary score (MCS; Ware *et al.*, 1994). These scores are standardized against normative data from a general population sample. Higher scores indicate better functioning (range = 0–100). In an elderly population (aged 65 and older), evidence for construct validity was

good with the SF-36 distinguishing between those with and without markers of poorer health (Lyons *et al.*, 1994). We used the PCS and MCS scale scores as the primary outcomes in this study.

Intrusive thoughts. We measured the frequency of intrusive thoughts about cancer using the impact of events scale (Horowitz *et al.*, 1979). We adapted the measure to cancer patients. Participants indicated how often during the past month they had experienced intrusive thoughts about cancer, with response ranges from 1 (not at all) to 5 (very often). Construct and predictive validity of the IES has been well documented (Briere, 1997; Horowitz *et al.*, 1979). The intrusive thought scale has displayed acceptable reliability (Cronbach's $\alpha = 0.79$), and a split-half reliability for the whole scale of 0.86 (Horowitz *et al.*, 1979). In the current study, the reliability was high (Cronbach's $\alpha = 0.89$). Higher scores indicate a higher level of intrusive thoughts.

Searching for meaning. We measured searching for meaning using two questions: 'How often have you found yourself searching to make sense of your illness?' and 'How often have you found yourself wondering why you got cancer or asking, "Why Me?"' Men responded to these questions using Likert-type scales ranging from 1 (never) to 5 (very often). The scale has good internal reliability (Cronbach's $\alpha = 0.80$) and test-retest reliability ($r = 0.72$, $p < 0.01$) from time 1 to time 2. The items, which have high face validity, were modeled after those used in other studies on searching for meaning. Silver *et al.* (1983) operationalized searching for meaning with two highly similar questions, asking respondents how often they found themselves wondering 'why me?' and how often they found themselves 'searching for some reason, meaning, or way to make sense out of their experience. Two similar questions to ours were used in a recent study with breast cancer survivors to assess individual's search for meaning (Tomich and Helgeson, 2002). Other studies have also used similar 'why me?' questions (Gotay, 1985; Taylor *et al.*, 1984). One manifestation of the search for meaning following a traumatic or stressful event is to ask 'why me?' (Taylor, 1995). This question implies an upward comparison process in which individuals assess their plight relative to others who have not experienced the traumatic or stressful event and perceive it as unfair (Park and Folkman, 1997). This compar-

ison process can be maladaptive, leading to passivity or helplessness (Gibbons and Gerrard, 1991).

Social support. We used the social provisions scale (SCS; Cutrona and Russell, 1987) to assess men's level of perceived social support. The SCS is based on Weiss' (1974) concept of provisions of social relationships: guidance (advice or information), reassurance of worth (recognition of one's competence), and attachment (emotional closeness). It contains 12 Likert-type items with responses ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate greater perceived social support. Convergent and discriminant validity have been established using data from a population aged 65 or older (Mancini and Blieszner, 1992). Reliability of the total scale has been demonstrated ($\alpha = 0.92$) in an elderly population of men and women aged 60 and older (Cutrona *et al.*, 1986). In the current study, the reliability was adequate (Time 1 $\alpha = 0.78$; Time 2 $\alpha = 0.81$).

RESULTS

Patient characteristics

At the time of the first (T1) interview, participants ranged in age from 49.1 to 79.6 years, with a mean of 65.7 years (S.D. = 6.48). Ninety-one percent were Caucasian and 9% were African American. Half (50.6%) of the men were working—38.2% full-time and 12.4% part-time—and the other half were retired (47.2%) or on disability (2.2%). The sample was generally well-educated: 24.7% had post-graduate training, 25.8% graduated from college (25.8%), 10.1% had some college, 22.5% graduated from high school, and 16.9% had less than high school education as their highest level of education. Most of the men were married (85.4%), 5.6% were widowed, 6.7% were divorced, and 2.2% were never married. The number of days from time of treatment (surgery or first radiation treatment) to first interview (Time 1) ranged from 7 to 120, with a mean of 46.7 days. The second interview (Time 2) was approximately 3 months (mean of 83.6 days) after first interview. Most of the men (61.8%) were treated by radical prostatectomy, 18% had

ADJUSTMENT TO PROSTATE CANCER

brachytherapy (radioactive seeds are implanted into the prostate gland), 13.5% had external beam radiotherapy, and 4.5% had both brachytherapy and external beam radiotherapy.

Quality of life, intrusive thoughts, searching for meaning, and social support over time

Means and standard deviations for the study variables at Time 1 (T1) and Time 2 (T2) are presented in Table 1, as are the results of the paired *t*-test analyses. At T1, mean level of general physical functioning, as measured by the PCS of the SF-36, was 44.7, which is comparable to that of a sample of men from the United States age 55 and older (mean = 44.3; Ware *et al.*, 1994). Nonetheless, participants reported statistically significant improvements in physical functioning by T2. The mean level of general mental functioning at T1, as measured by the MCS of the SF-36, was 50.6, which is slightly worse than that of a sample of men from the United States age 55 and older (mean = 52.1; Ware *et al.*, 1994). Like physical functioning, participants reported statistically significant improvement in mental functioning by T2. At both time points, level of social support was very high, level of intrusive thoughts was very low, and level of searching for meaning was moderate.

Cross-sectional correlation analyses

Cross-sectional correlation analyses at T1 and T2 are presented in Table 2. At T1, as expected, a higher level of intrusive thoughts was significantly related to worse physical and mental functioning, and more searching for meaning. A higher level of

Table 2. Time 1 correlations (below the diagonal) and Time 2 correlations (above the diagonal) Between major study variables (*n* = 89)

| Measure | 1 | 2 | 3 | 4 | 5 |
|--------------------------|---------|---------|---------|---------|---------|
| 1. PCS36 | — | 0.01 | -0.22* | -0.20 | 0.21* |
| 2. MCS36 | 0.21* | — | -0.36** | -0.58** | 0.17 |
| 3. Searching for meaning | -0.24* | -0.51** | — | 0.42** | -0.13 |
| 4. Intrusive thoughts | -0.27** | -0.53** | 0.61** | — | -0.28** |
| 5. Social support | 0.17 | 0.21* | -0.27** | -0.36** | — |

PCS36, physical functioning; MCS36, mental functioning.

**p* < 0.05 two-tailed;

***p* < 0.01 two-tailed.

social support was unrelated to physical functioning, but significantly related to better mental functioning, less searching for meaning and less frequent intrusive thoughts. At T2, the correlations revealed a pattern similar to T1, with some exceptions. Higher level of social support was significantly related to better physical functioning, but not to mental functioning or searching for meaning. Frequency of intrusive thoughts was not related to physical functioning.

Evidence that indicators of cognitive processing might mediate the relation between social support and health-related quality of life

In preliminary analyses, demographic and medical variables were examined to determine whether they should be used as covariates in these analyses. None of the tested variables (age, race, education, marital status, number of days from time of treatment to first interview, number of days post diagnosis, tumor stage, and prostate cancer treatment) was associated with both the predictor and HRQoL outcome variables, and therefore no covariates were identified.

We followed the analytical approach described by Baron and Kenny (1986) to evaluate whether intrusive thoughts and searching for cancer might mediate the relation between social support and HRQoL. The HRQoL outcomes included T2 mental and physical functioning (MCS, PCS). The predictor was T1 social support and the mediators were T1 indicators of cognitive processing, intrusive thoughts and searching for meaning. According to Baron and Kenny (1986), to establish full mediation, all of the following must

Table 1. Means and standard deviations of major study variables (*n* = 89)

| Variable (scale range) | Time 1 | | Time 2 | | <i>t</i> (88) |
|-----------------------------|--------|-------|--------|-------|---------------|
| | Mean | S.D. | Mean | S.D. | |
| Searching for meaning (1-5) | 1.92 | 1.08 | 1.84 | 0.97 | 0.97 |
| Intrusive thoughts (1-5) | 1.64 | 0.71 | 1.53 | 0.77 | 1.84 |
| Social support (1-5) | 4.66 | 0.50 | 4.69 | 0.54 | 0.52 |
| PCS36 (0-100) | 44.68 | 9.47 | 48.91 | 10.02 | 4.72*** |
| MCS36 (0-100) | 50.62 | 10.00 | 53.13 | 9.49 | 2.97** |

PCS36, physical functioning; MCS36, mental functioning.

p* < 0.05; *p* < 0.01; ****p* < 0.001.

occur: Step 1: The predictor (social support) should be significantly associated with the outcomes (mental and physical functioning). Step 2: The predictor should be significantly associated with the mediators (intrusive thoughts, searching for meaning). Step 3: The mediators (intrusive thoughts, searching for meaning) should be significantly associated with the outcomes (mental and physical functioning), after statistically controlling for the predictor (social support). Step 4: The previously significant association between the predictor (social support) and the outcomes (mental and physical functioning) should be reduced and no longer significant, after statistically controlling for the mediators (intrusive thoughts, searching for meaning). If Step 4 reduces the association between the predictor (social support) and outcomes (mental and physical functioning), but does not eliminate it, this potentially constitutes evidence of partial mediation.

Regression techniques were used for testing all four steps in mediation (Baron and Kenny, 1986; Judd and Kenny, 1981). The effects of both Steps 3 and 4 were estimated in the same regression equation. In addition, we used Kenny *et al.*'s (1998) modified Sobel (1982) test to evaluate whether the indirect effect of the mediator was significant.

First, we tested whether T1 intrusive thoughts was a potential mediator of the association between T1 social support and T2 mental functioning. In Step 1 (Equation (1) in Table 3), T1 social support was positively and significantly related to T2 mental functioning ($\beta = 4.08$, $SE \beta = 2.01$, $p < 0.05$), accounting for 5% of the variance. In Step 2 (not shown in table), T1 social support was negatively and significantly related to T1 intrusive thoughts ($\beta = -0.50$, $SE \beta = 0.15$, $p < 0.01$). Step 3 and 4 criteria were tested in the same regression equation (Equation (2) in Table 3). When level of intrusive thoughts was entered into the model with level of social support, the overall model was significant [$F(2, 88) = 13.88$, $\beta = -6.46$, $SE \beta = 1.36$, $p < 0.001$], and accounted for 24% of the variance. T1 social support was not a significant predictor of T2 mental functioning once T1 intrusive thoughts was included in the model, but T1 intrusive thoughts was negatively and significantly related to T2 mental functioning independent of T1 social support ($\beta = -6.46$, $SE \beta = 1.36$, $p < 0.001$). The modified Sobel test revealed that the reduction in the strength of the association between T1 social support and T2

mental functioning that was due to T1 intrusive thoughts was statistically significant ($Z = 2.84$, $p = 0.004$). Therefore, all criteria were met: T1 intrusive thoughts appeared to mediate the positive relation between T1 social support and T2 mental functioning.

Next, we tested whether T1 searching for meaning was a potential mediator of the association between T1 social support and T2 mental functioning. As noted above, in Step 1, T1 social support was positively and significantly related to T2 mental functioning (Equation (1) in Table 3). In Step 2 (not shown in table), T1 social support was negatively and significantly related to T1 level of searching for meaning ($\beta = -0.59$, $SE \beta = 0.22$, $p = 0.01$). Steps 3 and 4 criteria were tested in the same regression equation (Equation (3) in Table 3). When searching for meaning was entered into the model with social support, the overall model was significant [$F(2, 88) = 9.67$, $\beta = -3.41$, $SE \beta = 0.89$, $p < 0.001$], and accounted for 18% of the variance. T1 social support was not significantly related to T2 mental functioning once T1 searching for meaning was included in the model, but T1 searching for meaning was negatively and significantly related to T2 mental functioning independent of T1 social support ($\beta = -3.41$, $SE \beta = 0.89$, $p < 0.001$). The modified Sobel test revealed that the reduction in the strength of the association between level of social support at T1 and level of mental functioning at T2 due to level of searching for meaning at T1 was statistically significant ($Z = 2.18$, $p = 0.03$). Therefore, all criteria for mediation were met. Thus, searching for meaning at T1, like the related intrusive thoughts variable, appeared to mediate the association between social support at T1 and mental functioning at T2.

Table 3. Regression of T2 mental functioning on T1 social support and T1 indicators of cognitive processing (intrusive thoughts and searching for meaning)

| Variable | ΔR^2 | β | SE β | Beta |
|--------------------------|--------------|---------|------------|----------|
| Equation (1) | 0.05 | | | |
| Social support T1 | | 4.08 | 2.01 | 0.21* |
| Equation (2) | 0.20 | | | |
| Social support T1 | | 0.83 | 1.92 | 0.04 |
| Intrusive thoughts T1 | | -6.46 | 1.36 | -0.48*** |
| Equation (3) | 0.14 | | | |
| Social support T1 | | 2.06 | 1.94 | 0.11 |
| Searching for meaning T1 | | -3.41 | 0.89** | -0.39*** |

T1, Time 1; T2, Time 2.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Finally, we found that none of the variables (social support, intrusive thoughts, searching for meaning) was significantly associated with physical functioning. Therefore, mediation was not examined with this outcome.

DISCUSSION

This study examined how perceived social support might affect men's cognitive processing of their cancer experience and concomitant HRQoL outcomes. We found improvements in both mental and physical functioning in this population over time, even though their baseline levels of mental and physical functioning were fairly close to published norms for the general population in this age range. In addition, most of the men reported that they had adequate social support, relatively little searching for meaning, and infrequent intrusive thoughts early after treatment. Despite the positive and rapid adjustment of most of the men in this sample, we found some evidence that social support may improve mental functioning by facilitating cognitive processing. Our two indicators of cognitive processing were intrusive thoughts and searching for meaning. These variables are highly and positively correlated ($r = 0.61$, $p = 0.01$, see Table 2, T1) suggesting that they are measuring similar underlying factors. Nonetheless, they do have some unshared variance; indicating that they have some unique predictive power.

Similar to other studies with men treated for prostate cancer (Deimling *et al.*, 2002; Lepore and Helgeson, 1998), level of intrusive thoughts of the men in this sample was low, both at baseline and follow-up. Although level of searching for meaning was moderate at both times, like intrusive thoughts, there was no significant change over time. One explanation for these findings may be that many of the men in this sample had preexisting schemas that could accommodate their cancer experience and, therefore, had come to terms with their cancer experience by the time of baseline interview. Alternatively, men may have had adequate time since diagnosis to come to terms with the disease. Furthermore, because the men in this study were all diagnosed with localized prostate cancer, which has nearly a 100% 5-year survival rate (Ries *et al.*, 2000), they may not have believed this was a life threatening illness and their

basic assumptions of life may not have been challenged by the event.

Although many men evidenced little need to cognitively process their cancer experience shortly after treatment, as predicted, those with low social support were less likely to have processed their experience. Level of social support was inversely related to level of intrusive thoughts and searching for meaning. In addition, there was evidence that social support may have affected mental functioning through its association with intrusive thoughts and searching for meaning. This is consistent with findings from Devine *et al.* (2003). They found that social support was negatively associated with intrusive thoughts (also see, Schmidt and Andrykowski, 2004). They also found evidence that intrusive thoughts at T2 appeared to mediate the positive relation of social support at T1 and mental functioning quality of life at T3. Furthermore, like us, they found that neither intrusive thoughts nor social support were significant predictors of physical functioning.

Our findings suggest that men who have not cognitively processed their cancer experience may benefit from a psychosocial intervention that provides a supportive forum. Some interventions provide opportunities for men to actively contemplate and discuss cancer-related thoughts and feelings, which can potentially facilitate cognitive processing and enhance HRQoL. For example, Lepore and Helgeson (1999) found that men with prostate cancer who participated in an education plus discussion intervention group had greater improvements in mental functioning, lower distress associated with intrusive thoughts, fewer interpersonal conflicts and larger increases in perceived control over their health and functioning than those in the control group. The intervention was especially beneficial to men with inadequate social support.

There are some limitations of the study that should be noted. One limitation is that we did not have adequate representation of men from minority groups and lower socio-economic status. Thus, we may have underestimated the functional difficulties likely to be found in a more diverse population of men treated for localized prostate cancer. Another potential limitation is that men might have felt compelled to present themselves in a socially desirable manner by under-reporting any psychosocial difficulties they have experienced. Men in general may be uncomfortable reporting distress, even though in actuality they are experi-

encing distress, raising the possibility that this study does not accurately depict men's HRQoL. The fact that we drew data from a sample of men enrolled in the control arm of a randomized clinical trial also may have biased our results. Specifically, men who were particularly distressed at the time of recruitment may have declined randomization because of fear of not getting assigned to an active treatment group. Sampling only men with localized disease also is a limitation, since men with advanced disease may have greater difficulties cognitively processing their disease. Finally, the timing of our measurement is a limitation. Because we only studied men shortly after treatment, we do not know how social-cognitive processes might influence HRQoL during other critical periods, such as the time surrounding diagnosis or follow-up testing for recurrence.

In addition to addressing the limitations noted above, we suggest several directions for future research in this area. First, our findings and those of Devine *et al.* (2003) suggest that social support group interventions might help individuals to deal with existential issues. Interventions aimed at improving less than optimal natural social supports also may enhance patients cognitive processing and HRQoL. Second, we believe that much more can be learned about adjustment to cancer by studying meaning-making processes. There is an increasing number of studies on people with cancer that assess meaning (for review see White, 2004), but we found none that specifically used searching for meaning as an indicator of cognitive processing. Park and Folkman (1997) discuss the issue of meaning and consider it poorly understood and not well-integrated with other mainstream approaches to stress and coping, even though there is evidence suggesting that meaning is a critical aspect of people's existence and their adjustment to life stressors. Ours is just one approach to meaning-making process in people with cancer, a cognitive one, with alternative approaches abound (White, 2004).

In sum, like many other investigators, we have found that a high level of perceived social support predicts better mental functioning among people with cancer. More importantly, we found evidence for a cognitive pathway linking social support to mental functioning: social support is associated with a lower level of intrusive thoughts and searching for meaning which, in turn, are associated with better mental functioning. These

findings replicate similar work with other cancer populations, suggesting that the model has some general utility in psycho-oncology.

ACKNOWLEDGEMENTS

This work was supported by National Institutes of Health Grant CA68354.

REFERENCES

- Baron RM, Kenny DA. 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J Pers Soc Psychol* **51**(6): 1173–1182.
- Bowling A. 1991. *Measuring health: A Review of Quality of Life Measurement Scales*. Oxford University Press: Milton Keynes, England.
- Brenner H. 2002. Long-term survival rates of cancer patients achieved by the end of the 20th century: A period analysis. *Lancet* **360**(9340): 1131–1135.
- Briere J. 1997. *Psychological Assessment of Adult Posttraumatic States*. American Psychological Association: Washington, DC.
- Cella DF, Tulsky DS. 1993. Quality of life in cancer: Definition, purpose, and method of measurement. *Cancer Invest* **11**(3): 327–336.
- Clark LF. 1993. Stress and the cognitive-conversational benefits of social interaction. *J Soc Clin Psychol* **12**(1): 25–55.
- Clark LF, Henry SM, Taylor DM. 1991. Cognitive examination of motivation for childbearing as a factor in adjustment to infertility. In *Infertility: Perspectives Form Stress and Coping Research*, Stanton AL, Dunkel-Schetter C (eds). Plenum: New York; 157–180.
- Cutrona CE, Russell D. 1987. The provisions of social relationships and adaptation to stress. In *Advances in Personal Relationships*, vol. 1, Jones WH, Perlman D. (eds). JAI Press: Greenwich, Conn; 37–67.
- Cutrona CE, Russell D, Rose J. 1986. Social support and adaptation to stress by the elderly. *Psychol Aging* **1**: 47–54.
- David AK, Khwaja R, Hudes GR. 2003. Treatments for improving survival of patients with prostate cancer. *Drugs Aging* **20**(9): 683–699.
- Davis CG, Nolen-Hoeksema S, Larson J. 1998. Making sense of loss and benefiting from the experience: Two construals of meaning. *J Pers Soc Psychol* **75**(2): 561–574.
- Deimling GT, Kahana B, Bowman KF, Schaefer ML. 2002. Cancer survivorship and psychological distress in later life. *Psycho-Oncology* **11**(6): 479–494.

- Devine D, Parker PA, Fouladi RT, Cohen L. 2003. The association between social support, intrusive thoughts, avoidance, and adjustment following an experimental cancer treatment. *Psycho-Oncology* **12**(5): 453–462.
- Eton DT, Lepore SJ. 2002. Prostate cancer and health-related quality of life: A review of the literature. *Psycho-Oncology* **11**(4): 307–326.
- Figueiredo MI, Fries E, Ingram KM. 2004. The role of disclosure patterns and unsupportive social interactions in the well-being of breast cancer patients. *Psycho-Oncology* **13**(2): 96–105.
- Germino BB. 2001. Psychosocial and educational intervention trials in prostate cancer. *Semin Oncol Nurs* **17**(2): 129–137.
- Gibbons FX, Gerrard M. 1991. Downward comparison and coping with threat. In *Social Comparison: Contemporary Theory and Research*, Suls J, Wills TA (eds). Elbaum: Hillsdale, NJ.
- Gold DB, Wegner DM. 1995. Origins of ruminative thought: Trauma, incompleteness, nondisclosure, and suppression. *J Appl Soc Psychol* **25**(14): 1245–1261.
- Gotay CC. 1985. Why me? Attributions and adjustment by cancer patients and their mates at two stages in the disease process. *Soc Sci Med* **20**(8): 825–831.
- Greenberg MA. 1995. Cognitive processing of traumas: The role of intrusive thoughts and reappraisals. *J Appl Soc Psychol* **25**(14): 1262–1296.
- Horowitz MJ. 1986. *Stress Response Syndromes* (2nd edn). Jason Aronson: Northvale, NJ.
- Horowitz MJ, Wilner N, Alvarez W. 1979. Impact of event scale: A measure of subjective stress. *Psychosom Med* **41**(3): 209–218.
- Judd CM, Kenny DA. 1981. Process analysis: Estimating mediation in evaluation research. *Eval Res* **5**: 602–619.
- Kenny DA, Kashy DA, Bolger N. 1998. Data analysis in social psychology. In *The Handbook of Social Psychology*, vol. 2 (4th edn), Gilbert DT, Fiske ST (eds). McGraw-Hill: Boston; 233–265.
- Lepore SJ. 1997. Expressive writing moderates the relation between intrusive thoughts and depressive symptoms. *J Pers Soc Psychol* **73**(5): 1030–1037.
- Lepore SJ. 2001. A social-cognitive processing model of emotional adjustment to cancer. In *Psychosocial Interventions for Cancer*, Baum A, Anderson B (eds). APA: Washington, DC; 99–118.
- Lepore SJ, Eton DT. 2000. Response shifts in prostate cancer patients: An evaluation of suppressor and buffer models. In *Adaptation to Changing Health: Response Shift in Quality-of-Life Research* (1st edn), Schwartz CE, Sprangers M (eds). American Psychological Association: Washington, DC; 37–51.
- Lepore SJ, Helgeson VS. 1998. Social constraints, intrusive thoughts, and mental health after prostate cancer. *J Soc Clin Psychol* **17**(1): 89–106.
- Lepore SJ, Helgeson VS. 1999. Psychoeducational support group enhances quality of life after prostate cancer. *Cancer Res Ther Control* **8**: 81–91.
- Lepore SJ, Helgeson VS, Eton DT, Schulz R. 2003. Improving quality of life in men with prostate cancer: A randomized controlled trial of group education interventions. *Health Psychol* **22**(5): 443–452.
- Lepore SJ, Silver RC, Wortman CB, Wayment HA. 1996. Social constraints, intrusive thoughts, and depressive symptoms among bereaved mothers. *J Pers Soc Psychol* **70**(2): 271–282.
- Lewis JA, Manne SL, DuHamel KN, Vickburg SM, Bovbjerg DH, Currie V *et al.* 2001. Social support, intrusive thoughts, and quality of life in breast cancer survivors. *J Behav Med* **24**(3): 231–245.
- Lutgendorf SK, Anderson B, Larsen K, Buller RE, Sorosky JI. 1999. Cognitive processing, social support coping, and distress in gynecologic cancer patients. *Cancer Res Ther Control* **8**: 123–137.
- Lyons RA, Perry HM, Littlepage BN. 1994. Evidence for the validity of the short-form 36 questionnaire (sf-36) in an elderly population. *Age Ageing* **23**(3): 182–184.
- Macdonagh R. 1996. Quality of life and its assessment in urology. *Br J Urol* **78**(4): 485–496.
- Mancini JA, Blieszner R. 1992. Social provisions in adulthood: Concept and measurement in close relationships. *J Gerontol* **47**(1): P14–P20.
- Manne SL. 1999. Intrusive thoughts and psychological distress among cancer patients: The role of spouse avoidance and criticism. *J Consult Clin Psychol* **67**(4): 539–546.
- Meichenbaum D, Fitzpatrick D. 1993. A constructivist narrative perspective on stress and coping: Stress inoculation application. In *Handbook of Stress: Theoretical and Clinical Aspects* (2nd edn), Goldberger L, Breznitz S (eds). Free Press: New York; 706–723.
- Michela J, Wood J. 1986. Casual attributions in health and illness. *Adv Cognitive Behav Res* **5**: 179–235.
- Moadel A, Morgan C, Fatone A *et al.* 1999. Seeking meaning and hope: Self-reported spiritual and existential needs among an ethnically diverse cancer patient population. *Psycho-Oncology* **8**(5): 378–385.
- Park CL, Folkman S. 1997. Meaning in the context of stress and coping. *Rev Gen Psychol* **1**: 115–144.
- Penson DF, Litwin MS, Aaronson NK. 2003. Health related quality of life in men with prostate cancer. *J Urol* **169**(5): 1653–1661.
- Redd WH, DuHamel K, Johnson Vickberg SM *et al.* 2001. Long-term adjustment in cancer survivors: Integration of classical-conditioning and cognitive-processing models. In *Psychosocial Interventions for Cancer*, Baum A, Anderson B (eds). APA: Washington, DC; 77–98.
- Ries L, Eisner M, Kosary C *et al.* 2000. *Seer Cancer Statistics Review, 1973–1997*. National Cancer Institute: Bethesda, MD.

- Schmidt JE, Andrykowski MA. 2004. The role of social and dispositional variables associated with emotional processing in adjustment to breast cancer: An internet-based study. *Health Psychol* **23**(3): 259–266.
- Schroevers MJ, Ranchor AV, Sanderman R. 2004. The role of age at the onset of cancer in relation to survivors' long-term adjustment: A controlled comparison over an eight-year period. *Psycho-Oncology* **13**(10): 740–752.
- Silver RC, Boon C, Stones MH. 1983. Searching for meaning in misfortune: Making sense of incest. *J Soc Issues* **39**: 81–102.
- Sobel ME. 1982. Asymptomatic confidence intervals for indirect effects in structural models. In *Sociological Methodology*, Leinhardt S. (ed.). Jossey-Bass: San Francisco; 290–312.
- Tait R, Silver RC. 1989. Coming to terms with major negative life events. In *Unintended Thought*, Uleman JS, Bargh JA. (eds). Guilford Press: New York; 351–382.
- Taylor EJ. 1995. Whys and wherefores: Adult patient perspectives of the meaning of cancer. *Semin Oncol Nurs* **11**(1): 32–40.
- Taylor SE. 1983. Adjustment to threatening events: A theory of cognitive adaptation. *Amer Psychol* **38**: 1161–1173.
- Taylor SE, Lichtman RR, Wood JV. 1984. Attributions, beliefs about control, and adjustment to breast cancer. *J Pers Soc Psychol* **46**(3): 489–502.
- Tomich PL, Helgeson VS. 2002. Five years later: A cross-sectional comparison of breast cancer survivors with healthy women. *Psycho-Oncology* **11**(2): 154–169.
- Vickberg SM, Bovbjerg DH, DuHamel KN, Currie V, Redd WH. 2000. Intrusive thoughts and psychological distress among breast cancer survivors: Global meaning as a possible protective factor. *Behav Med* **25**(4): 152–160.
- Ware JE, Kosinski M, Keller SD. 1994. *Sf-36 Physical and Mental Summary Scales: A User's Manual*. The Health Institute, New England Center: Boston.
- Ware JE, Snow KK, Kosinski M, Gandek B. 1993. *Sf-36 Health Survey: Manual and Interpretation Guide*. The Health Institute, New England Medical Center: Boston, MA.
- Weiner B. 1985. An attributional theory of achievement motivation and emotion. *Psychol Rev* **92**: 548–573.
- Weiss RS. 1974. The provisions of social relationships. In *Doing Unto Others*, vol. 17–26, Rubin Z. (ed.). Prentice-Hall: Englewood Cliffs, NJ.
- White CA. 2004. Meaning and its measurement in psychosocial oncology. *Psycho-Oncology* **13**(7): 468–481.
- Xuereb MC, Dunlop R. 2003. The experience of leukaemia and bone marrow transplant: Searching for meaning and agency. *Psycho-Oncology* **12**(5): 397–409.