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Social support, social constraint, and affect in spouses of women with breast cancer: The role of cognitive processing

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──────── ABSTRACT ────────

Social support and constraint may impact cognitive processing of traumatic or stressful events, thereby influencing adjustment. This study tested a path model accounting for positive and negative affect in male spouses of women with breast cancer (*N* = 105). The model examined support and constraint from the patient and others, as well as mediators of cancer-related intrusive thoughts and avoidance. Constraint from the patient was associated with affect in the healthy spouse. The relationship with positive affect was mediated by avoidance, while the relationship with negative affect was mediated by intrusive thoughts. Support from others was directly linked to positive affect. Spouses who perceive social constraint from the patient may experience poorer psychological adjustment due to impeded cognitive processing of the cancer experience.

Receiving a diagnosis of breast cancer can be a traumatic experience
(Andrykowski, Cordova, Studts, & Miller, 1998; Cordova et al., 1995;
Cordova et al., 2007). The stress of cancer, however, may extend beyond the
individual diagnosed to those close to the patient (e.g., Mellon & Northouse,
2001; Mellon, Northouse, & Weiss, 2006; Segrin, Badger, Sieger, Meek, &
Lopez, 2006). The spouse of a woman diagnosed with breast cancer may be
called upon to provide various forms of support to his wife, while dealing
with his own emotional reactions and potentially new roles and demands
produced by the cancer experience (Northouse & Swain, 1987). Conse-
quently, the healthy spouse dealing with the crisis of breast cancer also may
require support (Northouse, 1988), not only from friends and family, but
also from his wife, the breast cancer patient. While several studies have
examined the role of social support from the perspective of the cancer
patient (e.g., Cordova, Cunningham, Carlson, & Andrykowski, 2001; Manne,
1999), fewer studies have explored the role of social support in the psycho-
logical adjustment of the spouses of those with cancer. The aim of the
present study was to examine the relationships between social support,
affect, and cognitive processing in 105 male spouses of women treated for
early-stage breast cancer.

Northouse (1988) indicates that social support is an important factor in
adjustment to the breast cancer experience, not only for patients, but also
for spouses. While women typically rely on their friends, as well as their
spouses, as important sources of support during difficult times, men may rely
less on outside sources of support and more on their spouses (Harrison,
Maguire, & Pitceathly, 1995; Van Fossen, 1981). Understandably, when a
male's primary source of support has been diagnosed with breast cancer,
psychological adjustment to this experience may be complicated.

Social-cognitive processing model

In attempting to explain the relationship between social support and psycho-
logical adjustment to a traumatic experience, Lepore, Silver, Wortman, and
Wayment (1996) developed the social-cognitive processing model. Accord-
ing to this model, social support may enhance one's psychological adjust-
ment during a crisis by facilitating cognitive processing. As summarized by
Lepore and Helgeson (1998), cognitive processing refers to "mental activi-
ties that help people to interpret traumatic events in personally meaning-
ful terms, integrate threatening or confusing aspects of the experience into
a coherent and nonthreatening conceptual framework, and reach a state of
emotional acceptance, (pp. 90–91). Interactions within a supportive environ-
ment that allow one to openly express feelings and beliefs related to a
stressful event can assist in the cognitive processing of that experience
(Lepore, 2001).

While much attention has been focused on the importance of supportive behaviors from others during a crisis, the impact of socially constraining behaviors has been often overlooked. A social constraint results from an interpersonal experience which leads an individual to feel unsupported or discouraged from further discussion of a trauma (Lepore et al., 1996). For instance, attempts to discuss a trauma may be met with responses that seem insensitive or critical, or communicate discomfort with the topic (Lepore et al., 1996; Manne, 1999). Lepore et al. (1996) also point out that the sharing of thoughts and feelings about a traumatic event may be discouraged by friends and family members who try to minimize the event or act overly optimistic. As opposed to the positive impacts of social support, social constraints may deter the discussion and cognitive processing of a trauma, thereby impeding psychological adjustment (Lepore, 2001). Such constraining behaviors from others have been shown to have a negative association with psychological adjustment in cancer patients (Manne, 1999).

Intrusive thoughts and avoidance

The cognitive processing of a stressful or traumatic experience involves phases of intrusive thoughts (i.e., repetitive, unbidden trauma-related thoughts or images) and avoidance (i.e., responses which serve to distance the individual from trauma-related thoughts and feelings), as described by Horowitz (1997; Horowitz, Wilner, & Alvarez, 1979). Avoidance may provide temporary relief from distressing emotions elicited by intrusive thoughts; however, intrusive thoughts may recur and prolonged avoidance of experiencing or discussing the thoughts and emotions related to a stressful event would prevent adequate cognitive processing (Horowitz, 1997).

Thus, intrusive thoughts and avoidance may serve as indicators of incomplete cognitive processing (Horowitz, 1997) and have been implicated in the link between social interactions and psychological adjustment to stressful events such as a cancer experience (Lepore, 2001). For example, in a sample of married cancer patients, the association of negative spouse behaviors with increased patient distress was mediated by higher reports of avoidance in the patient (Manne & Glassman, 2000). When testing the social-cognitive processing model in breast cancer survivors, Cordova et al. (2001) found intrusions mediated the relationship between social constraints and depression. Similarly, findings from a study of patients with metastatic cancer (Devine, Parker, Fouladi, & Cohen, 2003) suggested that social support reported at treatment initiation was negatively associated with distress one month after treatment, and this relationship was mediated by intrusive thoughts and avoidance at the end of treatment. These studies suggest that social support may improve later adjustment in cancer patients, at least in part, through its impact on decreasing intrusive thoughts and avoidance.

The present study

Whereas the social-cognitive processing model has been tested in patients with breast cancer, it has not been examined in the spouses of women

dealing with breast cancer. It is important to understand the mechanisms by which distress occurs in healthy spouses in order to facilitate psychological adjustment in both the patient and the spouse. Prior research suggests that poor emotional adjustment in a healthy spouse is associated with negative spouse behaviors toward the patient (Manne, Alfieri, Taylor, & Dougherty, 1999) and poorer patient adjustment to an illness such as cancer (Moser & Dracup, 2004; Northouse, Templin, & Mood, 2001; Segrin, Badger, Dorros, Meek, & Lopez, 2007).

The present cross-sectional study examined the relationships between social support, cognitive processing, and affect in male spouses of women treated for early-stage breast cancer. Cognitive processing was measured by reports of cancer-related intrusive thoughts and avoidance. It was hypothesized that perceived social support from the patient and from others would be associated with higher levels of positive affect and lower levels of negative affect in the spouses of the patients. Conversely, perceived social constraint was expected to be associated with lower levels of positive affect and higher levels of negative affect in the spouses. The above relationships were hypothesized to be mediated by intrusions and avoidance of cancer-related thoughts (see Figure 1).

Methods

Participants

This study included 105 male spouses of women with non-metastatic breast cancer (15% Stage 0, 43% Stage I, 38% Stage II, and 4% Stage III) diagnosed 1.4–28.6 months earlier (mean = 9.1, SD = 6.7). The participants were between the ages of 36 and 79 years old (mean = 54.4, SD = 8.9) and primarily Caucasian (n = 96), with four identifying as a minority (two Native American and two of mixed/other ethnicity), and five choosing not to identify ethnicity. The majority (n = 72) reported having an Associate degree or higher level of education.

Procedures

Women with breast cancer taking part in a larger study conducted through two cancer centers in the northeastern US were asked for permission to contact their spouses to inform them of an opportunity to participate in the present study. Of 195 patients with an eligible spouse, 77.4% (n = 151) provided consent to contact that individual. The spouses were contacted and informed of the study by phone. Of those spouses approached for the study, 137 (90.7%) expressed interest in participating and were mailed study materials. Signed informed consent and completed questionnaires were returned by 105 spouses (69.5% of those approached), who were offered $10 as compensation for their time.

FIGURE 1
Hypothesized model
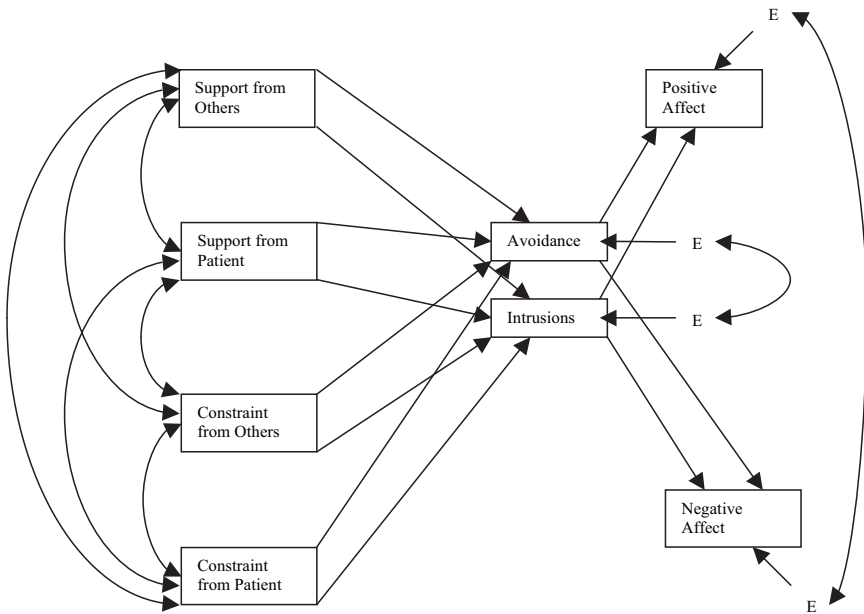
Note. E = residual error term.

Measures

Spouse demographics. A brief measure was used to obtain demographic and background information including spouse's date of birth, education, and ethnicity.

Patient medical information. Information regarding the breast cancer patient's disease stage and time of diagnosis was gathered by reviewing medical records.

Social support and constraint. The spouse's perceived social support and social constraint from (i) the cancer patient and (ii) other family and friends were assessed using the Social Support and Constraint Questionnaire (SSCQ), which was designed for this study and based on a similar measure previously developed by one of the authors for use with cancer patients (Pierce, Glinder, & Compas, 2000). The validity of the original measure has been demonstrated through the prediction of anxiety and depression scores in breast cancer patients (Pierce et al., 2000). The spouse SSCQ includes 12 items, six measuring social support and six measuring social constraint. Each item consists of two parts, with the participant reporting whether (i) his loved one with cancer and/or (ii) his other family and friends engaged in the behaviors described such as "encourage you to freely express your

feelings or beliefs" (support-scale item) and "react to your spouse's cancer with forced cheerfulness and optimism" (constraint-scale item). The participants indicated if the patient or others engaged in each of the six supportive and six constraining behaviors. Behaviors identified as not occurring received an item score of 0. For endorsed items, the participant was asked to rate how helpful (support-scale items) or upsetting (constraint-scale items) each behavior was to him on a scale of 1 (*a little*) to 5 (*extremely*). Therefore, the scores for each item could range from 0 to 5. Four scales demonstrating good internal consistency, Support from Patient (Cronbach's $\alpha = .89$), Support from Others ($\alpha = .91$), Constraint from Patient ($\alpha = .82$), and Constraint from Others ($\alpha = .84$), were derived from this measure.

Intrusions and avoidance. The Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979) is a widely used measure of intrusive thoughts and avoidance in response to a stressful event, with reliability and validity established in a variety of post-trauma populations (Sundin & Horowitz, 2002, 2003). The IES was used in this study to assess the spouse's intrusive thoughts and avoidance related to his wife's breast cancer. The IES consists of 15 items, seven assessing intrusive thoughts ($\alpha = .81$) and eight assessing avoidance ($\alpha = .70$), rated on a scale of 1 (*not true at all*) to 4 (*often true*). Higher scores represent greater intrusions and avoidance.

Positive and negative affect. The Positive and Negative Affect Schedule – Expanded Form (PANAS-X; Watson & Clark, 1999) consists of 60 words and short phrases denoting different feelings and emotions. The participant rated the extent to which he had experienced each feeling/emotion during the past week on a scale of 1 (*very slightly or not at all*) to 5 (*extremely*). Positive Affect ($\alpha = .87$) and Negative Affect ($\alpha = .86$) scores were each derived from 10 items embedded in the 60 items. These scales have well-established reliability and validity (Watson, Clark, & Tellegen, 1988) and have been used with various populations including cancer patients (Voogt et al., 2005) and male partners of women with breast cancer (Segrin et al., 2006).

Results

Descriptive statistics
Means, standard deviations, sample ranges, and zero-order correlations for relevant variables are reported in Table 1. Examination of the descriptive statistics showed that Negative Affect and Avoidance were positively skewed, while Support from Patient was negatively skewed. Square root transformations were used on Avoidance and Support from Patient, while an inverse transformation was used on Negative Affect, in order to normalize the distributions.

Constraint from Patient and Constraint from Others also were each positively skewed; however, due to the extreme skew of these L-shaped

TABLE 1
Zero-order correlations and descriptive statistics for variables in the model

	1	2	3	4	5	6	7	8	Mean	SD	Range
1. Positive Affect	–	–.31**	–.24*	–.36***	–.27**	–.24*	.42**	.48**	32.72	6.59	17–50
2. Negative Affect[a]		–	.41**	.32**	.26*	.14	–.19	–.09	16.04	5.57	10–36
3. Intrusions			–	.39**	.33**	.28**	–.02	–.08	9.99	7.00	0–27
4. Avoidance[a]				–	.26**	.22*	–.18	–.12	8.03	6.22	0–29
5. Constraint from Patient[b]					–	.51**	–.38**	–.28**	1.53	3.56	0–24
6. Constraint from Others[b]						–	–.26**	–.31**	1.75	3.81	0–21
7. Support from Patient[a]							–	.53**	21.04	8.02	0–30
8. Support from Others								–	15.20	9.03	0–30

[a]Correlation of variable after transformation. [b]Spearman's Rho; 0 = no constraint, 1 = some constraint.
*p < .05; **p < .01.

distributions, typical transformation techniques could not be used on these variables. In each case, approximately two-thirds of the sample indicated experiencing none of the six constraint behaviors assessed on the given scale (68.6% and 67.0%, respectively), resulting in a total scale score of 0. For the remaining one-third of the sample on each scale, the respondents endorsed a median of two of the six possible constraint behaviors from either patient or others (ranging from one to six behaviors endorsed on the given scale). The average rating for endorsed items was modest (Constraint from Patient, 2.02; Constraint from Others, 1.95). Given the low prevalence of perceived social constraint behaviors and modest ratings when spouses endorsed constraint items, scores on both constraint variables were dichotomized. Scores reflect an absence of social constraint (i.e., no constraint behaviors endorsed, coded "0") or the presence of social constraint (i.e., at least one constraint behavior endorsed, coded "1"). This approach has been previously discussed as an appropriate transformation of extremely skewed variable distributions (MacCallum, Zhang, Preacher, & Rucker, 2002; Streiner, 2002). Dichotomized scores for Constraint from Patient and Constraint from Others were used in all subsequent analyses.

Missing values analysis indicates, overall, only 3.22% of missing data for the eight key variables and the five potential control variables. Only 2.62% of data were missing for key constructs of Social Support, Social Constraint, Intrusions, Avoidance, and both Positive and Negative Affect. A total of 4.19% of data were missing for spouse demographics (i.e., age, education, and ethnicity) and information pertaining to the patient's cancer (i.e., stage of cancer and number of days since diagnosis), which were considered as potential control variables.

When examining the potential control variables, descriptive analyses revealed little variance with respect to ethnic group, with only four spouses identifying themselves as other than Caucasian. This near constant was excluded from further analyses. Other spouse demographic variables were found to be significantly correlated with Positive Affect ($r = .23$, $p < .05$ for education) and Negative Affect ($r = -.29$ and $-.24$, $ps < .05$ for education and age, respectively), but not with other key variables in the model. The stage of the wives' breast cancer was significantly correlated with both spouse Intrusions ($r = .38$, $p < .001$) and Positive Affect ($r = -.22$, $p < .05$); however, the number of days since the cancer diagnosis was not significantly correlated with any of the key study variables (absolute $rs < .17$, $ps > .09$). None of the potential control variables were significantly correlated with social interaction measures. Based on the significant correlations identified, spouse age and education, as well as patient cancer stage, were retained as control variables. Our primary analyses were subsequently conducted both with and without the inclusion of these three control variables in the path model, as described below.

Pearson and Spearman rho correlations (for categorical variables) for the remaining variables of interest are presented in Table 1. The correlations suggest that the four support and constraint scales are all significantly intercorrelated, as are the two cognitive processing variables and the two

measures of affect. Furthermore, Support from Patient and Support from Others are each significantly correlated with Positive Affect but not Negative Affect, nor with either of the two cognitive processing variables. In general, Constraint from Patient and Constraint from Others are significantly correlated with cognitive processing and affect measures, with the exception of Constraint from Others and Negative Affect.

As set forth by Baron and Kenny (1986), preliminary criteria indicating the potential of a mediated relationship include a significant association between the two primary variables of interest (i.e., the predictor and criterion variables), and a significant association of each of those variables with the potential mediator. Our correlations provide evidence that these preliminary requirements for mediation have been met with regard to the potential mediation effects of the cognitive processing variables on the relationship between social constraint and affect. However, the weak correlations of the social support measures with each of the cognitive processing measures, as well as with Negative Affect, do not support the likelihood of the mediated relationships hypothesized for this set of variables. These preliminary correlational findings were more fully examined with path analysis to determine the specific direct and indirect effects among the variables of interest.

Path model estimation and mediation analyses

Path analyses were conducted with EQS 6.1 software (Bentler, 2006). To retain all cases and maximize the power of analyses, parameters were estimated with the Full Information Maximum Likelihood (FIML) approach. To assess model goodness of fit, the comparative fit index (CFI), the Tucker Lewis index (TLI, also known as the non-normed fit index, NNFI), the root mean square error of approximation (RMSEA), as well as the chi-square statistic, were considered. The CFI and the TLI vary from 0 to 1, with values greater than .90 and .95 typically considered indicative of acceptable and excellent fit. Values of less than .05 and .08 on the RMSEA are taken as indicating close fit and reasonable fit.

A model representing the hypothesized mediated relationships (Figure 1) was first tested. The chi-square statistic and additional fit indices suggest that this first model fit the data poorly, $\chi^2(8, N = 105) = 35.54$, $p < .001$, CFI = .87, TLI = .54, and RMSEA = .18. Lagrange Multiplier tests indicated that adding a direct path from Support from Others to Positive Affect would significantly improve the model, $\chi^2(1, N = 105) = 19.73$, $p < .001$. Allowing this path to vary in a second path analysis produced a model that adequately fit the data, $\chi^2(7, N = 105) = 7.62$, $p = .37$, CFI = 1.00, TLI = 1.00, and RMSEA = .03. However, because of the small size of the available sample, it was important to minimize the number of parameters estimated in the model (Kline, 2005). The Wald test was consulted to identify parameters deemed to fall below the .05 significance level, which could be set to zero to maximize the case-to-parameter ratio (Tabachnick & Fidell, 2007). A total of seven paths were set at zero. This included the six paths from Support from Patient, Support from Others, and Constraint from Others to both of the cognitive processing variables, Intrusions and Avoidance. The

path between Intrusions and Positive Affect was also set at zero. The revised, more parsimonious model (see Figure 2) demonstrated excellent fit to the data, $\chi^2(14, N = 105) = 14.55$, $p = .41$, CFI = 1.00, TLI = 1.00, and RMSEA = .02.

Examination of specific relationships and mediations. When interpreting results for the model presented in Figure 2, it is important to consider the significant positive correlations among different sources of Support ($r = .53$, $p < .001$) and Constraint ($r = .51$, $p < .001$), as well as significant negative correlations between Support and Constraint measures (rs ranging from $-.26$ to $-.38$, $ps < .01$). Thus, those paths between the social interaction measures and the cognitive processing variables that are estimated to be no different from zero do not indicate the absence of a significant association between these variables. Rather, they suggest that these types of social interactions do not uniquely contribute to Intrusions and Avoidance, when taking into account the correlation among the Support and Constraint measures. Significant paths from Constraint from Patient to both Intrusions and Avoidance in the revised path model (Figure 2) suggest that Constraint from Patient is the social interaction factor that most strongly accounts for these cognitive processing variables ($R^2 = .11$ for Intrusions and .08 for Avoidance). The model also suggests that both Intrusions and Avoidance

FIGURE 2
Final model
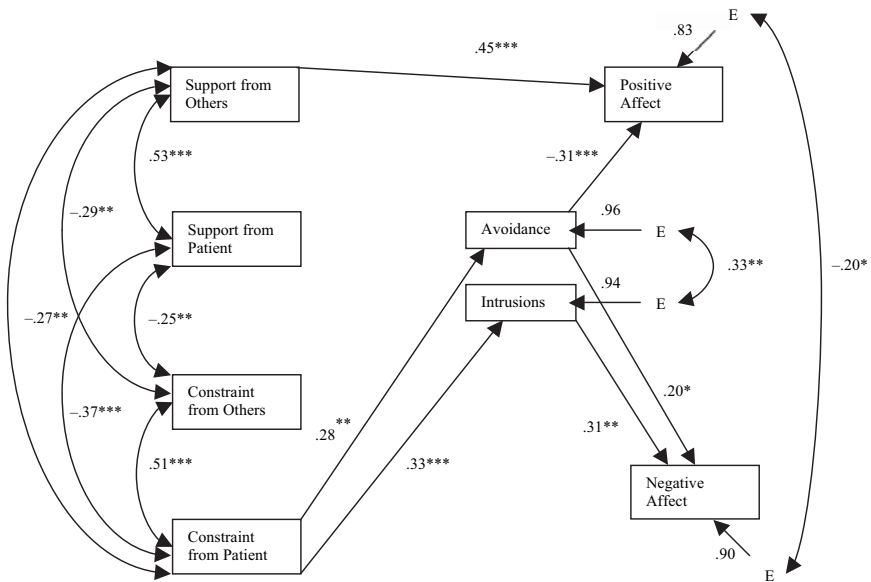
Note. Parameter estimates are standardized path coefficients.
* = $p < .05$; ** = $p < .01$; *** = $p < .001$.

are uniquely associated with greater Negative Affect (total $R^2 = .19$), whereas Avoidance is the only cognitive processing variable that significantly contributes to explain Positive Affect.

Estimates for this path model also indicate that, among social interaction variables, Support from Others significantly and directly contributes to explaining Positive Affect. In addition, Constraint from Patient indirectly contributes to explaining Positive Affect through the mediator of Avoidance (indirect effect = –.09, Sobel statistic = 2.31, $p < .05$, total $R^2 = .32$ for Positive Affect; Baron & Kenny, 1986; Preacher & Leonardelli, 2006; Sobel, 1982). Furthermore, Constraint from Patient indirectly explained Negative Affect through a significant mediation by Intrusions (indirect effect = .10, Sobel = 2.42, $p < .05$), yet the potential mediation of this association by Avoidance failed to attain the .05 significance level (indirect effect = .06, Sobel = 1.73, $p = .08$).

Control variables. Additional models were fitted to the data to control for possible effects that might be accounted for by spouse demographic variables and the stage of the patient's cancer. A first model included estimates for paths suggested by significant zero-order correlations between each of the three control variables (spouse age, education, and patient cancer stage) and the key variables. Based on the resultant Wald test, a more parsimonious model was subsequently fitted to the data, dropping non-significant paths stemming from control variables. This model showed excellent fit to the data, $\chi^2(37, N = 105) = 39.69$, $p = .35$, CFI = 1.00, TLI = .99, and RMSEA = .03. Path estimates indicate that patient cancer stage significantly contributes to explain both spouse Intrusions (*Std B* = .35, $p < .001$) and Positive Affect (*Std B* = –.23, $p < .01$), increasing their R^2 to .22 and .36, respectively ($\Delta R^2 = .11$ and .05, respectively). Greater spouse education also accounts for less Negative Affect (*Std B* = –.21, $p < .05$, $R^2 = .22$, $\Delta R^2 = .03$). However, the correlations and path estimates reported in Figure 2 remain essentially unchanged by the inclusion of control variables (mean absolute $\Delta R^2 = .002$ and mean absolute $\Delta Std\ B = .008$). The largest change was observed for the path from Intrusions to Negative Affect, decreasing from .31 to .28. Nonetheless, the mediation of the link between Constraint from Patient and Negative Affect by Intrusions remained significant (indirect effect = .09, Sobel = 2.34, $p < .05$).

Discussion

According to the social-cognitive processing model, when dealing with a traumatic event, social support may enhance psychological adjustment, while unsupportive reactions from others can constrain the expression of thoughts and feelings and, therefore, interfere with one's cognitive processing of the event (Lepore et al., 1996). Intrusions and/or avoidance of thoughts related to the event may be indicative of incomplete processing and have been related to poorer emotional adjustment (Lepore, 2001).

While the impacts of social support and social constraint on psychological adjustment to the cancer experience have been examined from the perspective of cancer patients, it is important to examine these relationships in spouses of those with cancer as well. The experience of distress may hinder the spouse's ability to provide positive support to the patient. Thus, assessing and addressing issues related to support, constraint, and affect in spouses of women with breast cancer may help facilitate the psychological adjustment of both the patient with breast cancer and her spouse.

In our sample of male spouses, support from friends and other family was directly linked with positive affect. Contrary to our expectations, path analysis detected no evidence of mediation of this relationship through the cognitive processing variables of intrusions or avoidance. As discussed by Lepore (2001), the beneficial effects of supportive interactions may take many forms including, for instance, an enhanced self-concept. Thus, several other potential mediators not examined in this study may serve as the explanatory mechanism underlying the significant association of social support with positive affect. It is somewhat surprising that perceived support from the patient was not significantly linked to positive affect of the spouse in our final model. It is important to keep in mind, however, that path analysis accounts for correlations among the various social interaction variables. Accordingly, our findings do not indicate an absence of relationship between patient support and spouse positive affect, but suggest that, in the context of all of the social interaction types included in our model, supportive interactions with the patient do not uniquely account for spouse affect. The spouses in our sample reported generally high levels of support from the patients. While this is a positive finding in itself, we note the limited variability in the nature of reported interactions with the patients, as opposed to friends and other family. This limited variability, as well as the correlation between the two support variables, is likely to explain why support from the patient was less powerful in accounting for the variability in spouse positive affect. These data do indicate that support from friends and other family may play a greater role in the psychological adjustment of healthy males dealing with their spouses' breast cancer than would be suggested by previous literature.

Conversely, when considering social constraint, it is constraint experienced from the patient that plays a unique role in explaining spouse adjustment, as indicated by associations with lower levels of positive affect and higher levels of negative affect. In accounting for positive affect, avoidance was found to mediate the relationship with patient social constraint. This suggests that spouses who experienced no social constraint from their wives were less likely to engage in avoidance of thoughts, feelings, and discussions related to the breast cancer, presumably resulting in greater active cognitive processing of the cancer experience and, therefore, more positive affect. Results of the path analysis indicate that the relationship between perceived constraint from the patient and spouse negative affect was mediated by intrusive thoughts. More specifically, spouses indicating any social constraint from the patient also reported greater negative affect, and this association

was accounted for by the experience of greater cancer-related intrusive thoughts.

Interestingly, these results suggest that avoidance plays a unique role in explaining positive affect, while intrusive thinking is the stronger mechanism underlying the prediction of negative affect in the spouses of women with breast cancer. These findings are distinctive in that few previous studies have examined both intrusions and avoidance concurrently. As intrusions and avoidance tend to be moderately correlated, the examination of only one of these variables may present an incomplete portrait of the role that each plays in the cognitive processing of the cancer experience. In considering our findings, it appears that avoidance operates by blocking opportunities to process the cancer experience and improve emotional well being; thus, while not actively producing negative affect, lower levels of positive affect are observed in those spouses engaging in avoidance of the cancer experience. In contrast, intrusive thoughts, by their nature of being unbidden and unpleasant thoughts or images, are understandably associated with increased negative affect.

Limitations

A notable limitation to the current findings is the cross-sectional design of this study. Due to this, causality among these relationships cannot be assumed. It has been noted that constraining behaviors may actually be a response of others to one's affect, rather than causing the reported affect (Manne, Taylor, Dougherty, & Kemeny, 1997). Nonetheless, as these relationships have not been explored previously in male spouses of women with breast cancer, this study provides an important preliminary look at how the social-cognitive processing model may be applied to this population.

Also, the generalizability of these data may be limited due to the relatively low level of constraints reported by our study participants and the resultant need to dichotomize this variable. In some respects, our data suggest that few spouses experience social constraint from the patient and close others. That is, the experience of social constraint may be atypical and unusual in such circumstances rather than a normative and normally distributed construct. It is plausible that the study participants had generally supportive interactions with their spouses and outside relationships. Notably, the level of spouse constraint perceived by breast cancer patients also has been reported to be relatively low, but meaningfully related to patient psychological adjustment (Manne & Glassman, 2000). However, we cannot rule out the possibility that constraint may have been underreported by our participants due to the nature of the study (i.e., male spouses may feel guilty identifying unsupportive or constraining behaviors from a wife who is battling a life-threatening illness). It is also possible that the behaviors identified and the response scale used to assess social constraint were not sufficiently sensitive to reliably discriminate between low levels of constraint (Streiner, 2003), producing a floor effect on the measure.

Although we cannot be sure of the reason for the minimal variability in levels of constraint reported in our sample, it may have influenced the relationships detected with the other variables in the models and may limit the generalizability of the results. It is important to accurately interpret significant paths in our models from social constraint from the patient to the two mediators. That is, significantly higher mean differences in levels of intrusive thoughts and avoidance were found for spouses who experience some constraint from the patient, regardless of how upsetting the constraint behavior, compared to those who say they experience no social constraint from the patient. Additional research is needed to determine if varying degrees of social constraint from patients are associated with different levels of intrusive thoughts and avoidance experienced by spouses.

In addition, the relatively small sample size in relation to the number of parameters tested in our models must be mentioned. The entire sample was retained for path analyses, although a small percentage of data was missing, by using the FIML estimation strategy. Consistent with results of Wald tests and zero-order correlations, the most parsimonious models possible were fitted to the data and retained. Yet, it remains that the path analysis reported in Figure 2 relies on a small case-to-parameter ratio (5.8:1), whereas this ratio is even smaller for the model including control variables (4.8:1). Kline (2005) suggests that researchers aim for a 10:1 case/parameter ratio, and cautions that ratios below 5:1 may yield imprecise statistical estimates. Future research should seek to replicate these findings with larger samples to confirm the mediator role of cognitive processing in the association between social constraint from the patient and spouse's affective adjustment. Although a larger sample would allow for stronger conclusions, these relationships have not been explored previously in this population; therefore, these data may provide some direction and preliminary information for future studies.

Finally, it is important to note that the results of this study may be limited only to the population studied. Only males were assessed in this study; therefore, the results may not apply to female partners or non-intimate caregiver relationships. In addition, while most cancers can be considered traumatic, having a partner with breast cancer may create stressors that are unique to that experience (e.g., stress in the intimate relationship due to the loss or deformity of the breast) in comparison to other types of cancer.

Conclusions and implications

Despite these limitations, the findings of this study highlight how the cancer experience extends beyond that of the patient. Only a small number of studies have examined how the cancer experience affects the spouses and loved ones of cancer patients. In addition to the fears and threats cancer can bring into a family, spouses of those with cancer may be confronted with new demands, such as the role of caregiver to the patient. In those relationships in which the wife traditionally took care of the husband and family (e.g., cooking, cleaning, primary child care, financial matters, etc.),

once she has been diagnosed with cancer, the husband may have to assume some of those previously unfamiliar duties. The stress of the change in family and/or relationship roles may compound the stress of having a loved one with cancer. Add to this the important fact that the patient herself may be the spouse's primary support person, and the picture becomes even more complex. Hence, it is important to more fully understand not only support and adjustment in cancer patients, but also in their spouses and significant others as they are an intricate part of the cancer experience. This is made particularly salient when considering the potential effects of a spouse's adjustment on interactions with the breast cancer patient (Manne et al., 1999) and the patient's own emotional adjustment to a medical illness (Moser & Dracup, 2004; Northouse, Templin, & Mood, 2001; Segrin et al., 2007).

As shown in this study, social support and social constraint are each associated with psychological adjustment in the male spouses of women with breast cancer. In the case of social constraint, this can be explained by the mechanism of cognitive processing of the cancer experience. Although overall levels of reported social constraint were low, in cases where some degree of constraint was perceived from the patient, it was associated with a negative psychological outcome (i.e., greater negative affect and lower positive affect). The role of cancer-related intrusive thoughts and avoidant coping mechanisms in mediating these associations implies that the social constraint of the patient may limit the husband from fully processing the cancer experience.

These findings suggest the importance of allowing the healthy male spouse the opportunity to openly discuss and process his feelings related to his wife's battle with cancer. Attending to spouse's fears and concerns is likely to be ultimately beneficial to both spouse and patient. Health care providers might assist by encouraging the breast cancer patient to involve her spouse in the treatment process and by providing opportunities for her spouse to address his questions and concerns. Educating the breast cancer patient about the importance of open and non-critical communication with her spouse also may be essential to enhancing the psychological adjustment of both members of the couple. This may be particularly important for the male spouse, as men tend to be more vulnerable than women to distress as the result of social constraints from their partner (Zakowski et al., 2003). In addition, the spouses of women with breast cancer should be encouraged to talk with other family and friends about their feelings and experiences in order to gain social support that may directly bolster positive affect.

A unique contribution of this study is the consideration of both intrusions and avoidance as potential mediators, as few studies have examined the roles of both of these related cognitive processing variables concurrently. Findings from this study indicate that avoidance plays a unique role in explaining variability in positive affect, while the mechanism of intrusions is stronger in accounting for negative affect. Additional research examining both the variables of intrusions and avoidance in concert with one another will enhance our understanding of the different role each plays in the processing of and adjustment to a traumatic event such as a cancer experience.

In summary, the findings of this study provide partial support for the hypothesized social-cognitive processing model. Specifically, male spouses who perceive some degree of social constraint from the breast cancer patient are also likely to report greater negative affect and lower positive affect, and these links may be explained by their experience of greater cancer-related intrusive thoughts and avoidance. Based on our findings, it appears that the psychological adjustment of male spouses of breast cancer patients may be impeded by decreased cognitive processing of cancer-related events if they do not have the opportunity to openly discuss the cancer experience with their wives.

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