Couples and Breast Cancer: Women's Mood and Partners' Marital Satisfaction Predicting Support Perception

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Women who are diagnosed with breast cancer can experience an array of psychosocial difficulties; however, social support, particularly from a spouse, has been shown to have a protective function during this time. This study examined the ways in which a woman's daily mood, pain, and fatigue, and her spouse's marital satisfaction predict the woman's report of partner support in the context of breast cancer. Pretest data from a larger intervention study and multilevel modeling were used to examine the effects of women's daily mood, pain, and fatigue and average levels of mood, pain, and fatigue on women's report of social support received from her partner, as well as how the effects of mood interacted with partners' marital satisfaction. Results show that on days in which women reported higher levels of negative *or* positive mood, as well as on days they reported more pain and fatigue, they reported receiving more support. Women who, on average, reported higher levels of positive mood tended to report receiving more support than those who, on average, reported lower positive mood. However, average levels of negative mood were not associated with support. Higher average levels of fatigue but not pain were associated with higher support. Finally, women whose husbands reported higher levels of marital satisfaction reported receiving more partner support, but husbands' marital satisfaction did not moderate the effect of women's mood on support. Implications of these findings are discussed relative to assisting couples during this difficult time in their lives.

Keywords: couples, breast cancer, social support, mood, marital satisfaction

Women who are diagnosed with breast cancer can experience an array of psychosocial difficulties, including depression, anxiety, body image concerns, and sexual dysfunction (Baucom, Porter, Kirby, Gremore, & Keefe, 2005; O'Mahoney & Carroll, 1997). During such challenging times, social support has been shown to serve a protective function (e.g., Bloom, Stewart, Johnston, Banks, & Fobair, 2001; Helgeson & Cohen, 1996; Holland & Holahan, 2003), with the most profound source of support being from one's spouse (Figueiredo, Fries, & Ingram, 2004; Neuling & Winefield, 1988). However, spouses might find it difficult to provide support due to their own levels of distress or the strain the breast cancer can place on the relationship (e.g., sexual difficulties, negotiating new roles and responsibilities; Wagner, Bigatti, & Storniolo, 2006). Therefore, there are reasons to believe that during difficult

times, only some spouses are able to continue to provide much needed social support to their wives. To better aid couples facing breast cancer, it becomes necessary to understand the factors that contribute to the level of social support a partner provides to the female with breast cancer.

Social support is generally thought of as a transactional process, dependant on the dynamics between the support recipient and the support provider (e.g., Pearlin & McCall, 1990). Thus, a number of factors might influence whether support is provided. One proposed model of support provision suggests that support is contingent on factors related to the stressor (e.g., degree to which stressor is unambiguous), support recipient (e.g., distress level and coping), support provider (e.g., personal distress), and the relationship between the recipient and provider (e.g., relationship satisfaction and intimacy; Dunkel-Schetter & Skokan, 1990). Few studies have evaluated this model to date, but those that have overall support the model, with the exception of factors related to the support provider (e.g., Iida, Seidman, Shrout, Fujita, & Bolger, 2008; Knoll, Burkert, Luszczynska, Roigas, & Gralla, 2011). The present investigation therefore sought to evaluate whether factors related to the stressor (i.e., cancer-related pain and fatigue), support recipient (i.e., positive and negative mood), and relationship (i.e., marital satisfaction) predict support in the context of breast cancer.

Previous research has clearly supported the notion that indicators of higher stress experienced by the support recipient tend to be

associated with more support provision (e.g., Iida et al., 2008). For example, men who report a higher frequency of incontinence after radical prostatectomy also report receiving more support from their partners (Knoll et al., 2011). Additionally, higher levels of physical impairment in the context of breast cancer are associated with more support provision (Bolger, Foster, Vinokur, & Ng, 1996). Similarly, higher pain levels in the morning for women with metastatic breast cancer are associated with increased feelings of tired mood during the day, which in turn is associated with more provision of social support in the evening by their male partners (Badr, Laurenceau, Schart, Basen-Engquist, & Turk, 2010).

In terms of the role of recipient factors, such as mood, in predicting support, findings are inconsistent. For example, whereas recipient negative affect is not associated with support provision following radical prostatectomy (Knoll et al., 2011), daily recipient distress predicts more support in the context of daily stressors and when preparing for the state bar exam (Iida et al., 2008). However, previous research has primarily focused on the effects of psychopathology (e.g., depression) or personality traits (particularly neuroticism and extraversion) on the provision of social support, rather than mood of the support recipient, per se. Fortunately, these lines of research suggest what patterns to expect when considering mood itself.

Recipient characteristics such as distress or neuroticism are often associated with decreased support provision, suggesting that recipient negative mood may also be associated with lower levels of partner support. While low to moderate levels of psychological distress often lead to the mobilization of social support, severe and persistent levels of distress diminish social support and amplify negative responses (Dunkel-Schetter & Skokan, 1990; Gurung, Taylor, & Seeman, 2003; Segrin, 2001). This can occur in a variety of contexts, including that of breast cancer (Bolger et al., 1996; Moyer & Salovey, 1999). Moreover, studies of depression suggest that people often avoid or respond negatively to depressed individuals, perhaps at the time the depressed person most needs support (Finch, 1998; Gurtman, 1986; Pasch, Bradbury, & Davila, 1997; Wade & Kendler, 2000). Finally, women high in neuroticism, a personality trait characterized by negative affect (Clark, Watson, & Mineka, 1994; Costa & McCrae, 1980), both receive less support and perceive that less support is available to them (Kendler, Gardner, & Prescott, 2003; Kitamura et al., 2002; Pasch, Bradbury, & Sullivan, 1997).

In contrast, recipient positive affect should heighten the chances that a partner will provide social support. Women who experience more positive emotions may engage in more positive relationship behaviors, strengthening their romantic bonds; this may, in turn, prompt more positive behaviors, such as support, from their partner. For instance, laughter and smiling during times of adversity enhance social relations and network size (Keltner & Bonanno, 1997; Papa & Bonanno, 2008). In addition, recipient extraversion, which is highly correlated with positive affect, is associated with higher levels of both perceived social support and support provision (Swickert, Rosentreter, Hittner, & Mushrush, 2002; Von Dras & Siegler, 1997).

Although the literature above suggests that recipient characteristics akin to positive affect are associated with higher social support and recipient characteristics similar to negative affect are associated with less support *across* persons, it remains unclear to what extent the same pattern might hold with regards to "within-person fluctuations" in mood over time. That is, on days in which a given woman experiences more positive and less negative mood than she typically does, does her spouse provide more support? How does the level of her partner's support provision change as her mood fluctuates from day to day? Previous research has mostly relied on cross-sectional designs, which are able to identify which persons are most likely to experience diminished support (i.e., "between-person" effect) but do little to illuminate what a given woman may expect day-to-day (i.e., "within-person" effect). Thus, this study seeks to build on previous research by attempting to understand not only how differences in mood *across* women influences support but also the ways in which day-to-day changes in mood are associated with support provision *within* a given dyad. In addition, this study focuses on mood rather than overall psychopathology or personality and also includes the often neglected positive affect.

The research discussed thus far predicts that the level of social support women report receiving is directly related to their levels of pain, fatigue, and positive affect and inversely related to their level of negative affect. However, the relationship between the final factor, marital satisfaction, and support may be more complex. For men, perceptions of social support received during a given interaction are often based on *distal* factors, such as marital satisfaction, rather than what occurs during that *specific* interaction (Carels & Baucom, 1999). It is possible that males also utilize marital satisfaction in their decision to provide support, a notion supported by several studies (e.g., Cutrona & Suhr, 1994; Verhofstadt, Buysse, Devoldre, & De Corte, 2007).

Indeed, marital satisfaction can highly influence appraisals of, and behaviors toward, spouses (Pasch et al., 1997; Waldinger & Schulz, 2006). Thus, husbands who are highly satisfied with their marriages may continue to think and behave positively toward their spouses despite high levels of negative emotions, or low levels of positive emotions, from their wives. For example, one investigation found that the more a patient's cancer restricted their caregiver's time and interfered with their activities, the more the caregiver responded negatively to the patient (e.g., criticized or avoided), but this was found only for those caregivers who were less satisfied in their marriages (Manne, Alfieri, Taylor, & Dougherty, 1999). This finding is consistent with long term models of relationship functioning, such as the bank account model (Gottman, 1998), which proposes that if a couple experiences long term good will and satisfaction in their relationship, then when one person is struggling, needs assistance, or is more negative, the other partner will respond positively due to this long term "bank account" of good will. Thus, men who are highly satisfied in their relationship may provide high levels of support, irrespective of their wives' mood, but men who are less satisfied in their marriage may be more reactive to their wives' mood.

The current investigation was based both on the model of support provision put forth by Dunkel-Schetter and Skokan (1990) and the bank account model (Gottman, 1998) and used daily diary methodology to investigate the associations between women's pain, fatigue, and mood and support received from male partners in the context of breast cancer. Pain and fatigue were included as a way of replicating previous findings; it was expected that higher levels of pain and fatigue would be associated with more support provision, when considering both within and between-person comparisons. It was further hypothesized that women who reported

more positive and less negative mood would also report receiving more support (between-person comparisons), but that men's marital satisfaction would moderate this effect. That is, it was predicted that men who were highly satisfied in their marriage would provide support irrespective of their wives' mood. Men who were less satisfied in their marriage, however, would provide more support if their wives reported high levels of positive mood, and less support if their wives reported high levels of negative mood. Likewise, it was hypothesized that on days in which women reported more positive and less negative mood, they would report receiving more support (within-person comparison), but this relationship would be moderated by men's marital satisfaction such that men who were more satisfied in their marriages would provide support regardless of their wives' daily fluctuations in mood. Thus, the same moderating effect of marital satisfaction was predicted for both the between-person and within-person effects.

Method

Participants

Participants were heterosexual couples confronting early stage breast cancer. Couples were recruited from two major medical centers in the context of a larger treatment-outcome study. Recruiters reviewed medical records to determine eligibility; inclusion criteria included (a) a recent diagnosis of Stage 0 (DCIS), I, II, or IIIa breast cancer, no history of prior breast cancer, and no history of other cancer within the last 5 years (basal cell carcinoma excluded); (b) currently being married or living with a male partner in a committed relationship for at least 1 year; and (c) both partners being willing to participate and able to speak English. Eligible couples received letters describing the study and stating that a recruiter would contact them to discuss their possible participation in the study. A total of 1,385 couples were contacted and 161 couples agreed to participate, which corresponds to a response rate of 11.6%.

Of the 161 women in this study, 85% were White, 10% were Black, 2.5% were Hispanic, and 2.5% were Asian or Pacific Islander. They tended to be middle aged; ages ranged from 25 to 82 years old, with a median of 52.5 years old. The median level of education was 16 years (i.e., college-educated), and the range was 11 to 26 years. Participants' household income ranged from (a) $10,000 to $14,999 to (b) over $250,000, with the median income range being $100,000 to $249,999. Women had been married or living together in a committed, heterosexual relationship for 1 to 56 years, with a median of 22 years.

Materials

Daily Diary Measures

Women were asked to complete several daily diary measures by phone everyday for 30 days following the couple's initial assessment. Of the 161 couples, 158 women completed daily diary measures. The following daily diary measures were utilized in this investigation.

Source-Specific Social Provisions Scale (Cutrona, 1989). The amount of daily partner support, and satisfaction with that support, were assessed with questions modeled roughly after the Source-Specific Social Provisions Scale, adapted for use on a daily basis. The current investigation utilized the three questions regarding the amount of daily support. These include (a) "How much did your partner help out with chores or routine tasks today?" (b) "How much did your partner support you emotionally today?" and (c) "How much did your partner help you make decisions or give you useful advice today?" Reponses range from 0 (*not at all*) to 5 (*a great deal*). A summary score was created for each day by summing the items. The reliability of the scale within this study was high ($\alpha = .80$).

Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988). An adapted version of the Positive and Negative Affect Schedule was used to assess daily levels of positive affect (PA) and negative affect (NA). Participants rated the extent to which they experienced various mood states that day from 0 (*not at all*) to 5 (*extremely*). The scale included five PA items ("happy," "joyful," "calm," "enjoyment or fun," and "pleased") and six NA items ("depressed," "unhappy," "worried or anxious," "angry or hostile," "guilty," and "frustrated"). Ratings were summed to form two subscales (PA and NA). Other daily diary studies have used similar scales and report high reliability ($\alpha = .88$ for PA; $\alpha = .89$ for NA; Gil et al., 2004). In the present study, reliabilities were similar ($\alpha = .90$ for PA; $\alpha = .86$ for NA).

Brief Pain Inventory (Cleeland & Ryan, 1994) and Brief Fatigue Inventory (Mendoza et al., 1999). Daily pain levels were assessed with one question from the Brief Pain Inventory: "What was your average amount of cancer-related pain during the past 24 hours?" Daily fatigue was assessed using one question from the Brief Fatigue Inventory: "What was your average amount of fatigue, weariness, or tiredness during the past 24 hours?" Participants rated these items from 0 (*no pain or fatigue*) to 9 (*as bad as you can imagine*).

Baseline Measure: Quality of Marriage Index (QMI: Norton, 1983)

Couples completed several baseline questionnaires at their initial assessment; the present investigation utilizes one of these. Of the 161 couples who participated, 159 men completed the Quality of Marriage Index (QMI). Both partners completed the questionnaire, but only male partners' QMIs were utilized for this study, keeping in line with the bank account model predictions. The QMI is a 6-item self-report measure of marital satisfaction. Participants rate five items on a scale from 1 (*very strong disagreement*) to 7 (*very strong agreement*). The sixth item ("Circle the number that best describes the degree of happiness, everything considered, in your marriage or relationship") is rated on a 10-point scale from 1 (*very unhappy*) to 10 (*very happy*). Thus, higher scores indicate greater quality of marriage. The QMI has well-established psychometric properties, with high reliability ($\alpha = .97$) and excellent convergent validity (Heyman, Sayers & Bellack, 1994). In the present study, reliability was similar ($\alpha = .96$).

Procedure

Following recruitment, couples completed an initial assessment. In this session, a research staff member obtained informed consent, and couples completed a number of baseline questionnaires and videotaped interaction tasks. The couples were then assigned to

one of three treatment conditions: relationship enhancement (a couple-based cognitive–behavioral therapy), couple-based cancer education (in which a therapist did not provide therapy but met with couples to provide information regarding breast cancer and treatment), or treatment-as-usual (in which couples received written materials about breast cancer and a list of community resources). The couples were paid $40 for the initial assessment session. The current investigation utilized data from one of these baseline questionnaires, as indicated in the measures section.

In addition to the baseline questionnaires, women completed a daily diary. Women were instructed to choose a time slot after 5:00 p.m., and they called at this time everyday for 30 days beginning the day after their initial assessment. A recorded voice asked for their ID number, provided instructions regarding the phone system, and read the items. After the recording read each item, participants responded using the telephone key pad. The Voice-Guide interactive voice response system automatically entered the data into a computerized database. The database was monitored to ensure compliance with these procedures. Weekly phone calls by research assistants were utilized to reinforce calling and to address any deviations from the protocol that occurred. The study was approved by the local university's Institutional Review Board.

In total, there were 3,771 observations across 161 women. Three women did not complete any daily dairy data. Of the 158 women who did complete daily diaries, women called between 2 and 30 days, with the mean number of days being 25.2 (out of a total of 30). This corresponds to a compliance rate of 84%.

Statistical Analyses

Multilevel modeling (MLM) was utilized following the guidelines put forth by Raudenbush and Bryk (2002) in order to evaluate the effects of women's pain, fatigue, and mood and men's marital satisfaction on the amount of social support provided to women with breast cancer over a span of 30 days. A primary advantage of this statistical technique is that it incorporates full case data and allows unequal spacing of assessments over time (in contrast to more traditional repeated measures tools, such as ANOVA). Thus, even if a woman missed some of her daily assessments, her data could still be utilized. Additionally, this technique allowed examination of the ways in which both within- and between-person factors predicted changes in social support over time. That is, the effects of daily levels of pain, fatigue, and positive and negative mood (within-person effects) were examined, as well as average levels of pain, fatigue, and positive and negative mood across persons (between-person effects). It should be noted that all within-person variables were person-centered, and all between-person variables were grand-mean-centered, in order to facilitate interpretation of results. Thus, all interpretations are for a woman of the average age who is at her average level of pain, fatigue, positive mood, and negative mood and whose husband is at the average level of marital satisfaction. Age was included as a control variable only.

Several preliminary analyses were conducted prior to examining the main study hypotheses. Means, standard deviations, and correlations among study variables were examined, and diagnostics were conducted (see Table 1).[1] On average, men reported high levels of marital satisfaction, and women reported moderate levels of positive affect, and relatively low levels of negative affect, pain,

and fatigue. Given that distributions of mood and marital satisfaction were somewhat skewed, the variables were log transformed, and the distributions were reexamined. The log transformation did not result in normally distributed variables; thus, the more parsimonious original variables were utilized in the analyses. Correlations using aggregate data (means over the 30-day period) indicated that women's positive mood and men's marital satisfaction were associated with higher levels of support; women's negative mood was associated with lower support. Women's average pain and fatigue were not significantly associated with support.

Prior to testing predictors of support, an empty random-effects ANOVA with a serial correlation structure was conducted to decompose the within- and between-person variability in support. The serial correlation structure was utilized because it was believed that the error structure of support would not be independent; rather, it was thought that errors would be correlated across days. Given the largest correlation was small, $r = .02$, and the overall error structure was nonsignificant, it was removed, and the more parsimonious model of independent errors was utilized in all further models. The random-effects ANOVA was recalculated after removing the serial correlation structure. This resulted in an intraclass correlation of .49, which indicates that 49% of the variance in social support was accounted for by between-person differences. Also, this indicates a moderate correlation of within-person differences. Thus, there was a moderate amount of dependence in the data, and approximately half of the variance was accounted for by within-person differences. Table 2 presents the fixed and random effects.

Following preliminary analyses and models, the main study hypotheses were examined using MLM. First, women's pain and fatigue were included in the model, controlling for women's age. Next, women's positive and negative moods, the main variables of interest, were included in the model. Finally men's marital satisfaction and the interaction of men's marital satisfaction and women's mood were added. Note that in order not to overtax the model, random slopes were included for the main variables of interest, positive and negative mood, but not for pain and fatigue. Next, although compliance rates were relatively high (as previously reported), there was concern that those individuals who completed very few of the daily diaries might have skewed the results. Therefore, a sensitivity analysis was conducted by reexamining the final model, excluding cases for which there were fewer than 20 data points. Results were consistent with those under complete case data (i.e., not excluding cases who completed fewer than 20 data points); therefore, results are reported using full case data. Finally, two exploratory interactions were tested to see if the effects of positive mood depended on levels of negative mood. These include the interaction between daily positive and daily negative mood, as well as the interaction between average positive mood and average negative mood.

Results

As noted previously, a series of models was tested using MLM to examine study hypotheses. First, women's pain and fatigue were included in the model, controlling for women's age. Table 2

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[1] Diagnostics indicated that there were no outliers and that the data did not violate model assumptions.

Table 1
Correlations, Means, Standard Deviations, and Possible Range of Primary Study Variables

Variable	Women's pain	Women's fatigue	Women's positive mood	Women's negative mood	Men's marital satisfaction	Women's perceived support
1. Women's pain	—					
2. Women's fatigue	.57**	—				
3. Women's positive mood	−.27**	−.32**	—			
4. Women's negative mood	.45**	.43**	−.60**	—		
5. Men's marital satisfaction	−.05	−.04	.25**	−.16*	—	
6. Women's perceived support	−.14	−.04	.52**	−.28**	.41**	—
Mean	1.80	3.51	14.66	5.94	38.70	9.74
Standard deviation	1.61	1.74	3.66	3.93	7.05	2.65
Possible range	0–9	0–9	0–25	0–30	6–45	0–15

Note. $N = 158$ women for pain, fatigue, positive mood, negative mood, and support; $N = 159$ men for marital satisfaction. Means, standard deviations, and correlations were calculated using average levels of women's pain, fatigue, positive mood, negative mood, and support.
* $p < .05.$ ** $p < .01.$

presents the fixed effects of this model. As can be seen, none of these predictors were significant. Of the between-person variance in support unaccounted for in the empty model, only 4% was accounted for by age, pain, and fatigue. Next, women's positive and negative moods, the main variables of interest, were included in the model. Thus, women's daily reports of partner support were predicted from women's daily pain, fatigue, and negative and positive mood, as well as women's aggregated pain, fatigue, and positive and negative mood, controlling for age. Table 2 presents the fixed and random effects of this model. As can be seen, the effects of fluctuations in daily pain, fatigue, positive mood, and negative mood (within-person effects) were all significant and indicate that higher levels of daily pain, fatigue, positive mood, and negative mood predicted higher levels of support provision.

Women's positive mood and women's negative mood accounted for 17% of the within-person variance in support unaccounted for in the previous model.

In addition, mean levels of fatigue and positive mood (between-person effects) were significantly associated with support, but mean levels of pain and negative mood were not. Thus, women who reported higher average levels of positive mood tended to report receiving more support, as did women who reported higher average levels of fatigue. Women who reported higher average levels of pain or negative mood did not report receiving more or less support than women who reported lower average levels of pain or negative mood. Of the between-person variance unaccounted for in the previous model, 29% was accounted for by mean levels of positive mood and negative mood.

Table 2
Fixed Effects (Top) and Variance-Covariance Estimates (Bottom) for Models Predicting Social Support Provision

Parameter	Model 1 β (*SE*)	Model 2 β (*SE*)	Model 3 β (*SE*)	Model 4 β (*SE*)
Fixed effects				
Intercept	9.75 (.21)**	9.72 (.22)**	9.70 (.18)**	9.70 (.18)**
Age		.02 (.02)	.01 (.02)	.01 (.02)
Daily pain		.04 (.04)	.09 (.04)*	.08 (.04)*
Daily fatigue		.04 (.03)	.22 (.03)**	.21 (.03)**
Daily positive mood			.24 (.02)**	.24 (.02)**
Daily negative mood			.04 (.02)*	.04 (.02)*
Agg. pain		−.21 (.17)	−.17 (.15)	−.15 (.14)
Agg. fatigue		.11 (.15)	.33 (.13)*	.30 (.13)*
Agg. positive mood			.45 (.06)**	.40 (.06)**
Agg. negative mood			.05 (.06)	.03 (.06)
Men's marital satisfaction				.11 (.03)**
Daily Pos. Mood × Satisfaction				−.00 (.00)
Daily Neg. Mood × Satisfaction				.00 (.00)
Agg. Pos. Mood × Satisfaction				−.01 (.01)
Agg. Neg. Mood × Satisfaction				.00 (.01)
Random effects				
Intercept/intercept	6.45 (.79)**	6.20 (.79)**	4.43 (.57)**	3.82 (.51)**
Pos. mood/intercept			−.06 (.05)	−.04 (.05)
Pos. mood/pos. mood			.03 (.01)**	.04 (.01)**
Neg. mood/intercept			.02 (.03)	−.01 (.03)
Neg. mood/pos. mood			.00 (.00)	.00 (.00)
Neg. mood/neg. mood			.01 (.00)**	.01 (.00)**

Note. Agg = aggregated across days (i.e., overall mood levels); Pos. = positive; Neg. = negative.
* $p < .05.$ ** $p < .01.$

Taken together, results indicate that the inclusion of mood variables explained a significant portion of both within- and between-person variability in support. More specifically, results suggest that women who reported higher average levels of positive mood generally reported receiving more support than those women who reported lower average levels of positive mood, but all women received more support on days in which they displayed more affect, both positive and negative. Further, although pain and fatigue did not predict support on their own, results suggest that when considering a more complete model, women who reported higher average levels of fatigue generally reported receiving more support than those women who reported lower average levels of fatigue, but women in general received more support on days in which they experienced more pain and fatigue.

Next, men's marital satisfaction and the interaction of men's marital satisfaction and women's mood were added to the model. Thus, women's report of spousal support provision was predicted from women's daily pain, fatigue, positive mood, and negative mood, women's mean levels of pain, fatigue, positive mood, and negative mood, men's marital satisfaction, the interactions between daily mood and men's marital satisfaction, and the interactions between mean mood levels and men's marital satisfaction, controlling for age. The fixed effect for men's marital satisfaction was significant (see Table 2) and indicates that when men reported higher levels of relationship satisfaction in general, their wives reported higher levels of support received. However, the interaction effects were not significant, indicating that the effects of women's mood on support did not depend on how satisfied men were in their marriages. Of the within-person variance in support unaccounted for in the previous model, 2% was accounted for by men's marital satisfaction. Also, of the between-person variance unaccounted for in the previous model, 14% was accounted for by men's marital satisfaction. Thus, men's marital satisfaction explained a significant portion of both within- and between-person variability in support, but mostly accounted for between-person variability.

Finally, two exploratory interactions were tested to see if the effects of positive mood depended on levels of negative mood. These include the interaction between daily positive and daily negative mood, as well as the interaction between average positive mood and average negative mood. In an effort not to overtax the model, the nonsignificant interactions between marital satisfaction and negative and positive mood from the previous model were removed. The interaction between daily positive and negative mood was nonsignificant, $t(3,285) = -.72$, $p = .47$, which suggests that the effects of daily positive mood on social support do not depend on the level of daily negative mood. The interaction between average positive and average negative mood only trended toward significance, $t(133) = -1.89$, $p = .06$. Given this effect was nonsignificant and the effect size was small, these results are consistent with the previous model, suggesting that only average levels of positive mood predict social support, not negative mood.

Taken together, results indicate that on days in which women experienced more positive or negative mood, they reported receiving more support from their husbands. Likewise, on days in which women experienced more pain or fatigue, they reported receiving more support from their husbands. In addition, women who (a) reported higher average levels of fatigue, (b) reported higher average levels of positive mood, and (c) had husbands who re-

ported higher levels of marital satisfaction also reported receiving more support.

Discussion

Although the benefits of social support in the context of breast cancer are well-established, less is known about the predictors of social support. This study explored factors related to the stressor (i.e., pain and fatigue), support recipient (i.e., positive and negative mood), and relationship (i.e., marital satisfaction), utilizing the model put forth by Dunkel-Schetter and Skokan (1990) and the bank account model (Gottman, 1998) of relationship behavior. Although previous research suggests that factors related to the stressor and relationship satisfaction do predict support, few studies have examined recipient mood and those that have report somewhat inconsistent results. Further, studies tend to examine between-person differences (e.g., depression) and therefore little is known about the processes that occur day-to-day within a dyad. Furthermore, the bank account model predicts that the effects of women's mood may actually depend on men's "bank account" of good will (i.e., marital satisfaction), which has previously not been explored. This study built on previous literature by using daily diary methodology and multilevel modeling to better understand these important issues.

Turning first to stress factors, results suggest that on days in which women report more pain or fatigue (within-person effect), they report receiving more support. Additionally, women who, on average, report experiencing more fatigue also report receiving more support, although women who, on average, report experiencing more pain do not report more or less support than those who experience less pain. It is unclear why average levels of fatigue but not pain predict support. However, overall it is clear that women's physical functioning in the context of breast cancer is associated with support provision. Perhaps pain and fatigue enhance the salience of the stressful nature of breast cancer for a given person on a given day and, thus, increase the likelihood of a provider appraising the recipient in need of assistance. Likewise, men may see women who are overall more fatigued as being in greater need of assistance. Given this study is correlational, it is also possible that the effect occurs in the reverse direction. That is, perhaps higher levels of support highlight for women their need for support, and their own pain and fatigue therefore become more salient.

Turning next to results regarding recipient mood, the results support the hypothesis that women who report higher average levels of positive mood report receiving more partner support, and that on days in which women experience more positive mood, they also report receiving more support. Interestingly, between-person analyses indicated that women's average level of negative mood was *not* associated with average levels of support, whereas within-person analyses indicated that on days that women experienced more negative mood, they reported receiving *more* support. This is in contrast to the study's hypotheses and also differs from simple correlational analyses. These findings suggest that only considering average levels of negative affect does not provide a full explanation of the relationship between mood and support. Rather, including positive mood and decomposing the within- versus between-person effects was highly valuable in discerning the relationship between mood and support.

Considering first the within-person effects, the results support the notion that in the context of breast cancer, women's daily mood influences the amount of support they receive. That is, on days in which women experience more positive or negative affect, they also report receiving more support. Although the effect of negative mood on support was unanticipated, these results are consistent with a growing body of literature that indicates that higher levels of support can be associated with *higher* levels of distress. One model that has been proposed to explain such results is the triage model, which holds that when individuals are more distressed, they receive more support as a result of need (Lepore, Glaser, & Roberts, 2008). Perhaps in the context of breast cancer, women's experience of negative or positive affect on a given day cues her partner into whether and what kind of support is needed. For example, women who are experiencing higher levels of affect on a given day may engage in more support elicitation strategies, and husbands respond to these strategies rather than mood per se. Alternatively, women may engage in mood-congruent behaviors, which then indirectly cue male partners' to provide support. To further explore these possibilities, future research should include measures of not only women's mood but her behaviors, as well as men's report of support provision.

Whether women display higher levels of positive mood or negative mood may also impact the aim of support provided. Social support can have two aims or goals: (a) to comfort or assist someone during a challenging time or (b) to assist someone in their efforts to grow, explore, and achieve their personal goals (i.e., "secure base support," Feeney, 2004; Feeney & Thrush, 2010). Although the present investigation focused on the former, it may be that both aims are operating in the current context. It could be that, whereas higher levels of negative mood on a given day cue men into breast cancer patients' distress on that day, prompting comfort-based support, higher levels of positive mood may cue men to provide secure base support. In light of a breast cancer patient's "good day" indicated through positive mood, perhaps men encourage women to complete previously enjoyed tasks, engage in pleasurable activities, or to work on goals that are personally meaningful but difficult to accomplish on "bad days."

It is important to note that all explanations thus far detail the ways in which mood may be influencing levels of support provision; however, given the correlational nature of this study, it is possible that support is influencing mood rather than the reverse. For instance, the level of support a woman receives on a given day may alter her cognition about her relationship and her health, and her mood and behavior may then shift based on these appraisals. That is, on days in which a given woman receives more support from her spouse, she may hold more favorable views of her spouse and relationship, and therefore may experience higher levels of positive affect. At the same time, receiving more support may cue her into the fact that her current health status necessitates this level of support, which in turn may lead to increased feelings of negative affect. Given that support was measured via women's report in this study, another alternative explanation of the findings is that women are simply perceiving more support when experiencing higher levels of affect, even if they are not actually receiving more support.

Turning to between-person effects, the findings suggest that although our results highlight the importance of daily mood on support provision within a given dyad, only average levels of positive mood (between-persons), but not negative mood, are associated with support. Women who, on average, report higher levels of positive mood tend to report receiving more support than those who, on average, report less positive mood. It may be that women who experience more positive affect are easier to approach and to support during such a challenging time. It could also be that men are providing secure base support rather than comfort based support, as discussed previously. Also, given the correlational nature of the study, it could be that women who receive more support also then experience more positive affect.

The lack of effect for average levels of negative affect is notable, especially given that previous research has suggested that levels of distress, depression, and neuroticism are all associated with lower levels of support across persons. One possibility is that average levels of negative affect found in this study are not representative of these women's mood more broadly; that is, their level of negative affect may be somewhat transient, characteristic of this particularly difficult time period only. Men may therefore attribute women's negative mood to a justified situational factor, breast cancer, and therefore continue to provide support. Alternatively, it is possible that spouses are simply accustomed to their wives' typical levels of negative affect, and therefore only react (i.e., provide support) when their wives display higher levels of negative affect than usual. A change in negative affect may be a better indicator of distress and need for support. The lack of effect may also be because women, on average, reported low levels of negative affect in the present investigation. Perhaps findings would differ at times when woman report higher levels of negative affect (e.g., at time of diagnosis). Given cancer is now seen as a chronic disease, it would be valuable to examine how mood relates to support in a longitudinal study of cancer survivors and to determine whether negative affect may actually impact couples at a different timeframe.

Finally, turning to men's marital satisfaction, findings suggest that when men are more satisfied in their marriages, women report receiving more support, but women's mood is associated with support regardless of men's level of satisfaction. That is, contrary to our hypothesis and contrary to what was predicted by the bank account model, an interaction between marital satisfaction and affect was not supported at either the within-person or between-person level. This suggests that even when men are highly satisfied in their marriages, female partners will perceive their partner to be more supportive of them when they are experiencing higher levels of negative and positive mood. One potential explanation for the lack of interaction between marital satisfaction and mood is that there may not have been enough variability in marital satisfaction to find the expected moderation. Alternatively, it may be that the "bank account" of good will (i.e., marital satisfaction) becomes more necessary when women have been ill longer. Unfortunately, information related to illness length was not available for analysis in the present investigation.

Several limitations of this investigation should be noted. First, support was measured via women's self-reports, but women's perceptions of support receipt may have been influenced by their mood, which was assessed at the same time and in the same way as support received. However, women reported higher levels of support when in a negative mood, and it is unlikely that negative mood caused women to over-report the amount of support they received. In addition, our sample was predominately white, highly

educated, and upper-middle class, and it is therefore unclear to what extent these results may generalize to other populations. Likewise, men in our sample reported high in marital satisfaction overall, and women reported relatively low levels of negative affect, pain, and fatigue. Thus, results may differ with a somewhat sicker and less satisfied population. Finally, given this study was based on a daily diary in which the needs to be both thorough and brief must be balanced, both pain and fatigue were measured by single-item measures, which are inherently less reliable than multi-item measures. Likewise, three aspects of support were measured by one item each and then combined to form a support scale. Although combining support items created a more normally distributed and reliable variable, this approach precluded examining results by type of support.

Despite these limitations and the need for a longitudinal investigation of these factors over time, this investigation provides promising findings with regard to clinical practice. One advantage of decomposing between and within-person effects is that between-person effects provide information on which couples to target, and within-person effects provide information of what to target within treatment for a given couple. This study suggests that women who are, on average, higher in positive affect and/or fatigue, and whose husbands are higher in marital satisfaction tend to receive more support on average. Thus, women who are, on average, lower in positive affect and/or fatigue, or whose husbands are not highly satisfied in their relationship, may represent an "at risk" group who should be particularly targeted. Further, several treatment targets are suggested. First, strengthening the couple's relationship broadly may increase men's marital satisfaction and, thus, increase the likelihood that men will provide more support to their wives. Also, enhancing women's expression of emotions (positive or negative) or disclosure of pain or fatigue could lead to increases in women's social support receipt, given the important cuing function they appear to serve. Thus, addressing couple's communication around women's experiences and needs for support may be important.

Whether these same factors may also be important to consider when treating couples in which one partner has another form of cancer or chronic illness is unclear. Interestingly, findings regarding situational (i.e., pain and fatigue) and relationship (i.e., marital satisfaction) characteristics were overall consistent with previous research, even though results regarding recipient affect were not. This suggests that enhancing relationship functioning and communication around situational factors (e.g., characteristics of the particular cancer or illness) may be important in the treatment of other illnesses. However, the relationship between recipient positive and negative mood with support is likely more complex, depending on factors such as stressor type (e.g., cancer vs. daily stressors) and gender of the support provider and recipient. Future research should further examine recipient mood in the context of other illnesses to further elucidate the relationship between affect and support.

Social support provides an invaluable protective function in the context of breast cancer, particularly if it comes from spouses. To better aid couples during this challenging time, it is imperative that we examine the potential factors that influence support. This study highlights the fact that not only situational and relationship characteristics should be considered, but recipient characteristics as well. Overall, this study strongly suggests that mood may be an essential component of the support process, and it is therefore important for researchers and clinicians alike to consider this when working with breast cancer patients.

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