COUPLE CONNECTION AND CANCER: UNDERSTANDING THE MECHANISMS OF PARTNER SUPPORT FOR WOMEN WITH BREAST CANCER

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Abstract

NICOLE D. PUKAY-MARTIN: Couple Connection and Cancer: Understanding the Mechanisms of Partner Support for Women with Breast Cancer

(Under the direction of Donald Baucom)

Previous research has demonstrated that social support can be an effective tool for women with breast cancer to cope with negative outcomes due to the disease. Interventions have been created to increase social support for women with breast cancer; however, these interventions have produced inconsistent findings. To create a successful support intervention, research should first identify malleable factors that could lead to changes in support. Communication and relationship schematic processing (RSP) are two such potential factors. The current study investigated the relationship between (a) communication and RSP, (b) partner support satisfaction, and (c) outcomes in women with breast cancer to determine whether communication and RSP are related to support satisfaction, which relates to outcomes. Seventy-eight couples participated in this study as part of a larger intervention study. Couples participated in a videotaped decision-making interaction task, which was observationally coded for communication and RSP. Couples also completed self-report questionnaires, and women completed daily diaries after the assessment. Path analyses suggested that negative couple communication is associated with lower levels of support satisfaction, which is related to less positive mood, higher negative mood, lower role functioning, and less relationship satisfaction in women with breast cancer. Post hoc analyses suggested that, when RSP pull is included in the model, male RSP quality and RSP pull

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for males are both related to higher support satisfaction, which is related to greater positive mood, less negative mood, higher role functioning, and greater relationship satisfaction. On the other hand, RSP pull for females is associated with lower support satisfaction, which is related to less positive mood, higher negative mood, lower role functioning, and less relationship satisfaction. Implications of these findings, limitations, and future directions are discussed.

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Couple Connection and Cancer:

Understanding the Mechanisms of Partner Support for Women with Breast Cancer

Breast cancer is a serious disease that affects numerous women and their partners. Approximately one in eight women will develop breast cancer at some point in their lives (American Cancer Society, 2009); however, a breast cancer diagnosis is no longer a death sentence. Due to advances in technology, the 5-year survival rate for breast cancer has surpassed 85%, although the experience of cancer continues to be defined by challenges and stressors ranging from physical to psychological complications (Bloom, 2002; Irvine, Brown, Crooks, Roberts, & Browne, 1991). Research examining factors that may decrease negative effects of stressful events suggests that social support from partners may be of particular importance to women with breast cancer (Neuling & Winefield, 1988; Sandgren, Mullens, Erickson, Romanek, & McCaul, 2004; Wimberly, Carver, Laurenceau, Harris, & Antoni, 2005). The partner relationship has an effect that other relationships cannot counterbalance or equal; when the couple's relationship is strong, there are many positive implications for the woman's adaptation to cancer, and when the relationship is distressed, there are just as many negative implications (Pistrang & Barker, 1995; Pukay-Martin et al., 2007).

Because of the empirical evidence pointing to the importance of social support, multiple interventions have attempted to change social support within the context of breast cancer (Blanchard, Toseland, & McCallion, 1996; Helgeson & Cohen, 1996; Manne et al., 2005); however, these efforts have typically failed to increase support. Given these findings and the importance of having a strong, supportive partner relationship while experiencing breast cancer, it is important to identify factors, especially malleable ones, which lead to social support. The general couples literature contains evidence of factors that contribute to social support and positive relationship outcomes. Communication and Relationship Schematic Processing (RSP) are two such factors that might facilitate partner support, and both have been amenable to change through couple-based interventions (Epstein & Baucom, 2002). First, communication is strongly related to relationship satisfaction; couples who communicate more constructively are generally happier (Epstein & Baucom, 2002). Second, Relationship Schematic Processing (RSP) also appears to be related to relationship satisfaction in general (Sullivan & Baucom, 2005). RSP can be conceptualized as seeing the world through a "relational lens." This way of processing events may be especially crucial for couples facing breast cancer because it allows couples to approach the cancer as a team with a unified approach, potentially making the couple more resilient to the disease (Skerrett, 1998; Weihs & Reiss, 1996). Communicating clearly and approaching breast cancer as a team may enable partners to support each other successfully through adversity, and this support then may lead to positive psychological and physical health outcomes. Thus, the proposed study examined the associations among communication, RSP, support, and individual and dyadic outcomes for women with breast cancer.

Background

Negative Effects of Cancer

Due to increases in screening, early detection, and technology, women with breast cancer are living much longer; however, they continue to face many psychosocial difficulties related to the experience of having breast cancer. The most common psychological effects of breast cancer diagnosis and treatment are depression, anxiety, self-image concerns, and fear

of recurrence (Bloom, 2002; Burgess et al., 2005; Irvine et al., 1991). These women may have trouble concentrating on the tasks of daily living and/or difficulty sleeping due to intrusive, cancer-related thoughts (Backus, 2002). Other effects include a reduction in energy level, decreases in physical, social, and role functioning, and distress caused by cancerrelated symptoms (Aranda et al., 2005; Bloom, 2002; Luoma & Hakamies-Blomqvist, 2004). A year from diagnosis, many of these negative effects improve; however, survivors continue to report decreased levels of energy and physical functioning and negative body image. In addition, many physical and psychosocial problems related to breast cancer continue to affect women well after treatment completion (Ganz et al., 1996). Further, psychosocial effects may depend on the type of treatment women receive (Glanz & Lerman, 1992). A typical treatment plan for a woman with breast cancer consists of breast surgery, which may be followed by radiation and/or chemotherapy. Women who have undergone breast surgery suffer most often from decreased body image and inhibited sexual functioning. These negative psychosocial consequences may then be combined with negative effects from radiation, such as fatigue, breast soreness, anxiety, depression, and disruption in daily activities. Alternatively, surgery may be followed by chemotherapy, the side effects of which include fatigue, nervousness, and acute depression and anxiety. Even two years after treatment, women continue to report some psychosocial difficulties related to chemotherapy treatment (Meyerowitz, Watkins, & Sparks, 1983). Clearly, the experience of breast cancer involves many negative psychosocial and physical consequences, which may negatively impact the women's career, personal life, family, and marriage (Backus, 2002).

Because women are living longer and are struggling with these negative psychosocial experiences, research has turned to investigating factors that may help protect patients from

the harmful effects of cancer. One of these potential safeguards is social support, which has been shown to protect people from various stressful life events, including health-related stressors (Cohen & Wills, 1985). Social support can be defined as functions that are carried out by significant others (e.g., family, friends, health care professionals) for an individual who is under stress (Nelles, McCaffrey, Blanchard, & Fuckdeschel, 1991). Numerous measures of social support are related to physical and psychosocial adjustment in various health contexts, such as stroke, hypertension, and heart disease (see Dunkel-Schetter, 1984). *Social Support and Psychosocial Effects of Breast Cancer*

Since breast cancer is clearly a stressful life event, it would make sense that social support may help protect women with breast cancer from negative psychological experiences. In fact, many researchers have investigated whether social support is related to better psychosocial outcomes in patients with breast cancer (e.g., Funch & Mettlin, 1982; Helgeson & Cohen, 1996; Koopman, Hermanson, Diamond, Angell, & Spiegel, 1998; Lichtman, Taylor, & Wood, 1988; Primomo, Yates, & Woods, 1990), and, overall, these studies provide evidence that social support does reduce the negative psychosocial consequences of breast cancer. Women who perceive greater levels of social support experience higher levels of positive affect and lower levels of negative affect (Funch & Mettlin, 1982). Women who report receiving more support from family, friends, and significant others experience greater psychosocial adaptation (Kulik & Kronfeld, 2005) and less psychological distress (Gilbar, 2005). Even for women with metastatic (i.e., advancedstage) breast cancer, greater levels of social support are associated with better mood (Koopman et al., 1998). Currently, there seems to be a consensus in the literature that social support may help shield women from the deleterious psychological effects of breast cancer.

Partner Support during Breast Cancer

One specific support provider that seems to be vitally important in outcomes with breast cancer is the spouse. Not surprisingly, 90.7% of married women designate their husbands as their most supportive family member (Neuling & Winefield, 1988), and the majority of women with breast cancer select their spouse as their main confidant (Sandgren et al., 2004). However, having a good helping relationship with an alternative person does not compensate for a problematic partner relationship (Pistrang & Barker, 1995). This suggests that the partner relationship has an effect that other relationships cannot counterbalance or equal. Furthermore, because of its effects on sexuality, breast cancer is a unique disease that might affect the couple as a unit more than most types of cancer do. When investigating the psychological effects and treatment of breast cancer, the couple's relationship may be an important context within which to understand the disease.

In the few existing studies that examine partner support in breast cancer, partner support has been found to reduce negative psychosocial outcomes in women (Hoskins et al., 1996; Pistrang & Barker, 1995; Wimberly et al., 2005). Women who report more support and more satisfaction with support also report better mood and less pain, suggesting that women's amount of and satisfaction with support may help protect women from the negative impact of breast cancer (Pukay-Martin et al., 2007). Similarly, satisfaction with the partner helping relationship is associated with greater psychological well-being (Pistrang & Barker, 1995). Women involved with a partner who listens to their worries and concerns and who helps around the house experience less depression than women who do not have such a partner (Maly, Umezawa, Leake, & Silliman, 2005). In addition, women with breast cancer who perceive more positive emotional involvement from their partner experience greater

well-being over time (Wimberly et al., 2005). Similarly, women with husbands who offer support and empathy report better adjustment; alternatively, husbands' inability to offer support during the breast cancer experience results in women experiencing higher levels of distress (Peters-Golden, 1982). This suggests that inadequate support from a partner is linked to problems with adjustment. These studies demonstrate that support from a spouse is effective in combating negative outcomes in breast cancer and that a lack of support may be linked to greater negative effects. Due to the emotional intimacy and physical proximity of spouses in a marital relationship, partner support may be particularly salient and important to women with breast cancer.

Social Support Interventions

Due to these important findings, many interventions have been created to change social support within the context of cancer (Blanchard et al., 1996; Helgeson & Cohen, 1996; Manne et al., 2005); however, positive findings for these studies are mixed. A number of interventions have been designed to provide social support through group discussion with other cancer patients and survivors, and these programs have been mostly unsuccessful in providing benefits in terms of women's well-being and adjustment (Bloom, Ross, & Burnell, 1978; Helgeson, Cohen, Schulz, & Yasko, 2000; Lonnqvist, Halttunen, Hietanen, Sevila, & Heinonen, 1986; Morgenstern, Gellert, Walter, Ostfeld, & Siegel, 1984). However, these programs attempted to add outside support, rather than changing women's existing social support networks. Correlational research demonstrating the relationship between support and positive outcomes has indicated that support from family and friends is extremely important. Support from other cancer patients or survivors (i.e., peer support) in group interventions may not be as effective as support from family and friends because peer support is usually of

shorter duration or because the peer relationship is less intimate and seems artificial when occurring in an intervention (Helgeson & Cohen, 1996). In addition, peer support is likely to be cancer-focused support, whereas support from family and friends is likely to be more holistic and comprehensive, responding to multiple aspects of women's lives in order to be helpful.

Interventions specifically targeting changes in existing social support networks have also been largely unsuccessful in increasing support. Rosberger, Edgar, Collet, and Fournier (2002) evaluated two workshops focused on coping strategies, and neither program increased women's behavior of seeking social support. Simpson, Carlson, Beck, and Patten (2002) found that participation in a psychoeducational intervention did not cause changes in social support one or two years later. In contrast, women who participated in a self-help program reported more improvement of the quality of their interpersonal relationships than did control patients; however, they did not report changes in the structure of the social support network (Badger, Braden, Longman, & Mishel, 1999). None of the interventions described above directly utilized the family context of breast cancer to aid in patient improvement, a factor that has been shown to be especially relevant (Manne et al., 2005). Interventions that include the spouses of breast cancer patients seem to be more effective than individual interventions.

A few studies have attempted to change partner support by targeting only the spouses of patients, and these have led to mixed results (Blanchard et al., 1996; Bultz, Speca, Brasher, Geggie, & Page, 2000), as have interventions delivered to both partners together (Christensen, 1983; Manne et al., 2005; Nezu, Nezu, Felgoise, McClure, & Houts, 2003). Women who participated in a communication intervention with their spouses reported greater sexual satisfaction and less emotional discomfort and depression than control patients

(Christensen, 1983). However, a different couple-focused group intervention had an impact on women's depressive symptoms, but did not affect any other reports of women's distress or well-being (Manne et al., 2005). It is unclear why some interventions produce positive results, while others do not seem to be effective. In fact, many of the studies do not specify the proposed underlying mechanisms of their interventions, making it difficult to propose explanations for the varied results.

Given these mixed findings and the importance of having a strong, supportive partner relationship while experiencing breast cancer, it is important to identify factors that can be altered in order to change social support. Once these factors that impact social support are recognized, researchers will be able to create more successful interventions for women with breast cancer and their partners. Two potential factors from the general couples literature, communication and relationship schematic processing (RSP), might contribute to partner support, and both have been amenable to change through couple-based interventions (Epstein & Baucom, 2002).

Communication

Constructive communication skills consist of expressing thoughts and feelings in an open, respectful, and non-defensive manner and empathically listening to the partner; in contrast, destructive communication is characterized by sweeping generalizations, statements of absolute truths, criticism, hostility, and judgment of the partner's message. For a comprehensive definition and discussion of communication, see Epstein and Baucom (2002). Communication is strongly related to relationship satisfaction; couples who communicate more constructively are generally happier (Epstein & Baucom, 2002). In fact, distressed couples are characterized by higher negative affect, greater negative communication, and

more negative problem solving than nondistressed couples. Correspondingly, nondistressed couples are characterized by greater positive affect, more positive communication, and more constructive problem solving (Schaap, 1984). In light of these findings, many couple interventions have focused on improving communication between two partners, and many studies have demonstrated the effectiveness of these interventions in decreasing destructive communication, increasing constructive communication, and increasing marital satisfaction (Baucom & Lester, 1986; Baucom, Sayers, & Sher, 1990; Halford, Sanders, & Behrens, 1993).

In the breast cancer population, relatively little is known about communication between partners (Manne, 1998); however, many women with breast cancer report difficulties in communication with their partners (Walsh, Manuel, & Avis, 2005). One quarter of the women in this study indicated that relational strain from communication problems was unavoidable, and 35% reported that their partners were emotionally unavailable and unwilling to discuss their concerns about cancer. Qualitatively, communication difficulties around discussions of cancer risk and related issues lead to decreased adjustment in women with breast cancer (Mireskandan et al., 2006). In fact, many men act as buffers for the women; the men think that discussing breast cancer will upset their partners, so they avoid the topic at all costs, suppressing their feelings as part of their "protective role" (Manne, Dougherty, Veach, & Kless, 1999; Sabo, Brown, & Smith, 1986; Worby & Babineau, 1974). The adoption of this "protective role" allows men to deny their feelings and the seriousness of their wives' condition, while also hindering communication between the partners (Sabo et al., 1986). Men, however, are not the only spouses to assume the protector role. Women breast cancer patients also attempt to shield their husbands from

their fears and concerns about breast cancer by avoiding discussions of breast cancer, and this silencing may also lead to increased distress for the women (Manne et al., 2007).

Examining communication patterns in couples facing breast cancer, a few studies suggest that open communication may facilitate adaptation to the disease (Gotcher, 1992; Lichtman et al., 1988; Stern & Pascale, 1979). Demand withdrawal patterns and avoidance of communication are related to higher levels of distress and lower relationship satisfaction (Manne et al., 2005). Couples who discuss cancer-related emotions navigate role changes due to breast cancer more successfully (Vess, Moreland, & Schwebel, 1985). Thus, research suggests that discussing concerns and feelings related to breast cancer may facilitate adjustment; however, many couples have difficulties communicating openly around breast cancer topics, and this lack of open communication may lead to increased distress in both partners.

Communication between partners may be especially important as a means of eliciting support from each other. Discussing worries and concerns and increased self-disclosure have been found to elicit support from a partner (Cutrona, 1996; Cutrona, Suhr, & MacFarlane, 1990; Pistrang & Barker, 1992). Given the prevalent difficulties in communication between breast cancer patients and their partners, it is not surprising that many women are not satisfied with the amount or form of support that they receive from their spouses, even when they rate their relationship as good overall (Hoskins, 1995; Lichtman et al., 1988). In fact, Bolger, Foster, Vinokur, and Ng (1996) found that partners increase support when women are physically impaired, but decrease support when women are psychologically distressed. This finding suggests the need for communication as a method for increasing support. If partners can communicate around the kinds of support that they find helpful, these open

discussions will make the support process more understandable, and both partners are more likely to receive the type of support they need and will consequently be more satisfied with the support they receive.

Relationship Schematic Processing

In addition to communication, Relationship Schematic Processing (RSP) may also help to facilitate the support process. RSP can be defined as the extent to which an individual processes information in terms of his or her romantic relationship (Sullivan & Baucom, 2004). This construct can be conceptualized as a measure of whether and to what extent one is looking at the world through "relationship-colored glasses."

Differences in relationship schematic processing are fairly common in married couples (Sullivan & Baucom, 2004). Some partners tend to give relationship meaning to a variety of events, while others make few connections between events that have occurred and their romantic relationship. In fact, partners may process the same event in very different ways, giving extremely different meanings to the event. For example, if an individual leaves his socks on the floor on a frequent basis, his partner may give relationship meaning to this event, thinking that he expects her to be the maid and feeling disrespected. However, the individual may not give relational meaning to this event and may not understand why his partner is becoming upset, leading him to think his partner is overreacting to the situation. Thus, different levels of relationship schematic processing can lead to very different interpretations of life events. Furthermore, some partners tend to think frequently about the relationship or interactions between the two partners, while other partners give little thought to what is happening in the relationship. These differences refer to the quantity of RSP that an individual engages in. People may also differ in the degree of quality of RSP, or how well

they engage in RSP. Individuals with low quality RSP may incorrectly interpret behaviors, use distorted relationship cognitions, interpret events in an extremely superficial manner, or use RSP in a manipulative or destructive manner. On the opposite end of the spectrum, individuals with high quality RSP interpret relational events with a great deal of accuracy, depth, and complexity, and use RSP in a healthy, constructive manner.

Research suggests that both quantity and quality of RSP may be important in relationships; however, the effects appear to differ by gender (Sullivan & Baucom, 2005). Women tend to engage in more frequent and higher quality RSP than men. Additionally, males are more satisfied with their relationship when their wives utilize more frequent and higher quality RSP; whereas, women are more satisfied with their relationship when their husbands utilize higher quality RSP. They are satisfied even when their husbands demonstrate only a moderate amount of RSP. Even more importantly, RSP appears to be changeable by psychological intervention. Sullivan and Baucom (2001) found that, after treatment with Cognitive-Behavioral Couple Therapy, husbands' quantity and quality of RSP increased significantly. In addition, when husbands processed in relational terms more often and with better quality, their wives were more satisfied with their relationship.

Given findings that RSP is related to general relationship satisfaction, it logically follows that RSP should be related to specific aspects of a couple's relationship. If partners consider relational information and interpret cues accurately, then they should be able to determine what kind of support their partner needs, even in the absence of explicit requests for communication. Furthermore, couples who are higher in RSP would approach stressors as a team, with a sense of unity and togetherness. This united approach may be important in the

support process, helping partners to feel as if they are not alone in facing a frightening and difficult situation.

In fact, findings in the breast cancer literature suggest that couples who are able to keep a couple focus while facing breast cancer adjust better to the disease (Weihs & Reiss, 1996). People who made the strongest adaptation during breast cancer viewed the couple context as a critical coping resource (Skerrett, 1998). These couples actively redefined their identities as individuals and as a couple and created meaning for the experience together. In contrast to the "we-ness" of resilient couples, couples who had more difficulty in adjustment lacked a unified coping strategy and were not able to construct a united outlook. This lack of togetherness leads to helplessness, isolation, and a lack of connection. Thus, interpreting breast cancer as a relational experience and facing the disease as a team seems to have positive implications for adjustment, potentially because this unified coping strategy allows both partners to provide support for each other during a difficult time.

Summary

In summary, women with breast cancer are living and surviving much longer; however, they continue to face psychosocial and physical stressors, such as difficulties with mood, role functioning, fatigue, and pain. Multiple studies suggest that social support may protect women from these deleterious effects of breast cancer, especially support from a partner. Many interventions have attempted to directly provide support for women with breast cancer or increase support in the network by encouraging support seeking; however, these interventions have demonstrated mixed results, at best. Interestingly, the majority of these programs do not take the family context of breast cancer into account when intervening

on just the individual woman. The few studies including the partner in the intervention, however, provide mixed results as well.

Given the failings of many of these breast cancer support programs, it is vital that researchers begin to understand mechanisms underlying these interventions. Investigators must find malleable factors that can change social support in order to create interventions that are more successful. Given that social support is a relational process, it makes sense to examine relational factors when attempting to change social support. Communication and relationship schematic processing are two relational factors that may be linked to social support. Open communication allows partners to self-disclose and ask for support they need from each other, and RSP permits couples to face breast cancer as a team, supporting each other through adversity and understanding what the other person needs.

Current Study

The next wave of research in the area of breast cancer and psychosocial interventions will focus on factors that may increase functioning and resiliency within the couple as a unit, thereby increasing functioning and resiliency for the woman with breast cancer. Partner support is one psychosocial construct that has clear demonstrated utility within couples literature. Although the mechanisms by which we can change social support are unknown, communication and RSP are potential factors that may lead to changes in partner and social support. Thus, the current study examined the associations among communication, RSP, support, and individual and dyadic outcomes for women with breast cancer. Partners who communicate more clearly may be able to tell each other what they need to cope. Thus, good communication should make the support process more transparent and could lead to each partner receiving the type of support that they want and need. Better relationship schematic

processing indicates that partners can read and understand relationship information more skillfully. Consequently, a partner who is higher in RSP should be able to read his/her partner's cues and provide needed support accordingly. In this way, better communication and higher RSP should lead to greater satisfaction with support. Social support then should lead to better individual and couple outcomes. In sum, the relationship between (a) communication and RSP with (b) individual and couple functioning will be mediated by (c) support satisfaction (see Figure 1). Consistent with this theory, two hypotheses are posited. *Hypotheses*

Hypothesis 1. Previous studies have found that more open, constructive communication leads to better adjustment and marital satisfaction and that negative or avoidant communication leads to poorer adjustment (Gotcher, 1992; Lichtman et al., 1988; Manne et al., 2005; Stern & Pascale, 1979; Vess et al., 1985). In addition, women with breast cancer are frequently dissatisfied with the communication and the support they receive from their partners (Bolger et al., 1996; Hoskins, 1995; Lichtman et al., 1988; Walsh et al., 2005). Open communication should allow partners to discuss their wants and needs during this stressful experience, enabling the support process. Thus, it is hypothesized that communication will be related to women's individual and couple functioning. This relationship will be mediated by support satisfaction. Greater support satisfaction indicates that women receive the amount and type of support they need and want from their partners. Better communication by both partners should lead to greater support satisfaction in women, which should lead to better functioning in women.

Hypothesis 2. Previous studies also have found that approaching the experience of breast cancer as a team facilitates adjustment (Skerrett, 1998; Weihs & Reiss, 1996).

Figure 1. Path model showing the proposed relationship between male and female communication and RSP, partner support satisfaction, and outcomes in women with breast cancer.



Processing events in relational terms may allow individuals to read important cues and help them determine how to support their partner. Thus, it is predicted that relationship schematic processing will be related to individual and couple functioning. This relationship will be mediated by support satisfaction, as well. Better relationship schematic processing by both partners, but especially men, should lead to greater support satisfaction in women, which should then lead to better functioning in women. Because the investigation focused on women's support satisfaction and functioning, men's ability to read their partners, provide support, and approach breast cancer as a team with their partner is considered to be especially important. Furthermore, both quantity and quality of men's relationship schematic processing may be important in predicting women's support satisfaction and functioning. Previous studies have indicated that quality of men's RSP plays a much larger role in women's relationship satisfaction than does quantity. Therefore, this investigation focused on the quality of men's RSP.

The hypothesized model was tested within a breast cancer population; however, the model is not specific to the case of breast cancer. It is a more general model that could easily be applied to other populations. Couples with breast cancer were chosen as the population in which to test this model because, as outlined in the literature review above, partner support seems particularly salient within couples facing breast cancer. When first testing a new model of factors related to partner support, it is critical to examine the model within a population for whom the construct of partner support is especially pertinent. Therefore, in the current study, a general model of factors related to support and outcomes was tested within a specific population of women with breast cancer and their partners.

Method

Participants

Participants were 78 couples in which the female had been recently diagnosed with early-stage breast cancer. These participants were part of a larger study focused on treating heterosexual couples in which the female has breast cancer. Participants were recruited at the University of North Carolina (UNC) Hospital, Duke University Medical Center (DUMC), and various cancer clinics in the same geographic area. Women and their partners were eligible to participate if the following criteria had been met: (a) the woman had been diagnosed with Stage I, II, or IIIa breast cancer within one calendar year of the recruitment date, and the diagnosis had never exceeded Stage IIIa, (b) the woman had no prior history of breast cancer unless it occurred in the past year in which the invasive cancer was diagnosed, (c) the woman had not had any form of cancer (except basal cell carcinoma) within five years of their breast cancer diagnosis, (d) the couple was married or living together in a committed relationship for 12 months or more, (e) both the woman and her partner were willing to participate, and (f) both partners spoke English.

In order to determine if a couple was eligible for the study, the research team reviewed potential participants' medical records. For couples who met inclusion criteria, a letter from the attending physician was sent to the couples, briefly informing them about the study. Then, each woman was approached by members of the research team during her following appointment at the breast clinic at UNC Hospitals or at the Duke University Medical Center. The team provided the woman and her partner with information about the study and a brochure and asked the woman to complete a form allowing the research team to contact her about participating in the study. If the research team was unable to meet with the woman at her appointment, the research team contacted her by telephone in order to describe the study. These procedures were approved by UNC and DUMC's Institutional Review Boards.

Data from 78 couples were included in the study. The following demographic information describes these participants. Of the women, 84.6% were white; 9.0% were African-American; and 6.4% were Asian or Pacific Islander. Of the men, 83.3% were white, 9.0% were African-American, 5.1% were Asian or Pacific Islander, and 2.6% indicated "other" for their race. Women's ages ranged from 29 to 76 years with a median age of 52, and men's ages ranged from 26 to 85 with a median age of 53. Women had a median education level of 16 years (i.e., college educated), and education ranged from 12 to 26 years. Men had a median education level of 16 as well, ranging from 3 to 24 years. Couples' household income ranged between (a) \$10,000 to \$14,999 and (b) over \$250,000, with a median income range of \$100,000 to \$249,999. Couples had been married or living together in a committed relationship between 1 and 56 years with a median of 21 years. Couples' number of children ranged from 0 to 9 with a median of 2 children.

The women's medical status and treatments were as follows. By pretest assessment, 6 women had been diagnosed with Stage 0 breast cancer, 25 with Stage I, 21 with Stage IIA, 15 with Stage IIB, and 11 with Stage IIIA breast cancer. The women had been diagnosed an average of 116.63 days (range = 20.0 to 445.0) prior to assessment. Before assessment, 67 women (85.9% of the sample) had undergone surgery. Forty-one women had breast conserving treatment, 21 had undergone mastectomy without reconstruction, and 7 had a

mastectomy with anticipated reconstruction. In terms of adjuvant therapies, 51.3% of the women had undergone chemotherapy, 15.4% had undergone radiation, 17.9% had taken hormone therapy, and 2.6% had had biological treatment (e.g., Herceptin) by assessment. Thirty eight and a half percent of the women were premenopausal at the time of diagnosis, and one third of these premenopausal women had experienced menopausal symptoms by this point in their cancer treatment. Medical data were missing for 1 woman, as she had received care at an institution outside of UNC or Duke, and her data were not available.

Procedure

As part of a larger study (see Baucom et al., 2005 for details), participants were recruited as described above. Following recruitment, women and their partners completed an initial assessment session, consisting of a number of baseline questionnaires assessing individual and couple functioning and videotaped interaction tasks. At the beginning of the initial assessment session, a trained assessor met with the couple, explained the study, and obtained informed consent from the couple. The assessor then asked the couple to complete the baseline questionnaires individually without consulting with each other to encourage honest and accurate results and left the couple alone to finish the measures. These measures consisted of questions regarding the couples' history, their current relationship, their overall individual well-being, support received around the cancer, and body image and physical symptoms (women only). These questionnaires required approximately 45 minutes for couples to complete.

Following completion of the questionnaires, the couple then participated in three seven-minute videotaped conversations regarding breast cancer. One of these conversations consisted of a decision-making discussion regarding a decision that the couple had to make

related to breast cancer. This conversation was coded for the current investigation using two coding systems described below. The couple also completed two support conversations, which were not included in the current study. The order of these three conversational tasks was counterbalanced throughout the study.

Following the conversational task, the assessor introduced the couple to the daily diary system described below. The couple was then assigned to one of three experimental conditions (i.e., Relationship Enhancement, a couple-based cognitive behavioral therapy with a focus on cancer-related issues; couple-based Cancer Education, in which couples received medical information about breast cancer; or Treatment-as-Usual, in which couples received written materials about breast cancer and a list of community resources). The couple received \$40 for completing the initial assessment session.

For 30 days following initial assessment, women completed daily measures by utilizing the daily diary system. During the initial assessment, participants chose a fifteenminute time slot during which they called the daily diary telephone system. Various call rules were created to minimize memory bias and effects created by the time of day. Participants were trained regarding the daily diary system during the initial assessment session and were given a handout containing the items assessed by phone and the call rules. Participants completed the daily diary once daily for the 30 days following initial assessment. During this 30-day period, women in the Relationship Enhancement or Cancer Education conditions completed no more than two sessions with a therapist. Therefore, the intervention was not expected to have a significant effect at this point of data collection. In order to encourage daily diary completion, participants received \$20 for completing the daily diary period.

Data for the daily diary were collected utilizing the VoiceGuide Interactive Voice Response (IVR) system. After the participants entered all their information by phone, the system automatically entered the data into a computerized database. This database was checked every two to three days to ensure the women were adhering to the daily diary procedure correctly. In order to increase compliance, women also received a weekly phone call designed to increase contact with the women during the 30-day period.

Materials

Communication

Interactional Dimensions Coding System – Revised (IDCS-R; Julien, Markman, & Lindahl, 1989; Julien, Markman, Lindahl, Johnson, & Van Widenfelt, 1989; Kline et al., 2004). The IDCS-R, based on the IDCS (Julien, Markman, Lindahl, et al., 1989; Kline et al., 2004) and revised for the current study, is a global observational coding system that was designed to assess both affective and behavioral components of couple interactions. This coding system consisted of eleven individual codes for which each partner received a separate rating for the entire interaction. These codes include six positive (Positive Affect, Animation, Problem Solving Skills, Support Validation, Affection, and Communication) and five negative (Negative Affect, Dominance, Conflict, Defensiveness, and Withdrawal) communication codes. There are also two dyadic codes (Positive Escalation and Negative Escalation), which were assigned to each couple. Each IDCS-R code was rated on a 9-point scale, ranging from 1 ("minimal evidence of" or "an absence of" the behavior being coded) to 9 ("strong and pervasive evidence of" the behavior being coded). Five positive communication codes (i.e., Positive Affect, Problem Solving Skills, Support Validation, Affection, and Communication) were summed to create a positive communication score for

each individual, and the five negative communication codes were summed to create a negative communication score for each individual. Animation was not included in the positive communication score because animation can be considered to be a measure of intensity of affect, and so, can be either positive or negative. Since animation does not clearly fall within a positive or negative category, it was excluded from the summary scores. The dyadic codes were not included in the summary scores because the summary scores were assigned at the level of the individual, not the couple.

As described in the *Procedure* section, each couple participated in a 7-minute videotaped decision-making interaction task. These videos were later coded using the IDCS-R by senior-level undergraduate psychology students for both male and female communication. The students met with the current investigator two times weekly for a semester in order to be trained to utilize the IDCS-R. They coded a number of tapes for practice until their interrater reliability assessed using the Rater Agreement Index (RAI; Burry-Stock, Shaw, Laurie & Chissom, 1996) was determined to be high enough to code the interactions used in the current investigation (RAI = .91, which is less than a 0.75 point discrepancy on average). The RAI measures the degree to which coders agree on their ratings in reference to the possible range of ratings. The index ranges from 0 to 1, with 1 indicating perfect agreement. The RAI was utilized because it measures the degree to which coders agree on particular ratings without taking into account the consistency of the relationship between the coders' ratings, as do other measures of reliability (i.e., intraclass correlation coefficients). That is, coder A may rate one item "4", and coder B may rate it "5." Then, coder A may rate the next item "5" and coder B may rate it "4." The RAI reflects that coders were within one point of each other, while other measures of reliability would indicate that

the two coders did not rate the items consistently. After reliability was established, the undergraduates continued to meet weekly with the current investigator in order to discuss consensus codes and to control coder drift.

Each videotaped interaction was coded separately by two coders, and the pairings of coders were counterbalanced throughout. Once both coders had completed an interaction, they compared codes. If the ratings were 0 or 1 point apart on a particular code, the ratings were averaged to create a consensus code. If the ratings were more than one point apart, the two coders discussed their reasoning behind their ratings and re-watched the video if necessary until they agreed on a consensus code. For the few videos for which coders could not agree on a consensus code, ratings were discussed in the entire coding group. The team watched the interaction together and then decided on a consensus code. Reliability was monitored throughout the coding and remained high. RAIs for individual codes ranged from .88 to .96 with an average overall RAI of .92, which is a 0.65-point discrepancy (with possible scores ranging from 1 to 9).

Relationship Schematic Processing

Global Relationship-Schematic Processing Coding System (GRSP; Pukay-Martin, Hudepohl, & Baucom, 2008). This coding system, based on the established Relationship-Schematic Processing coding system (RSP; Sullivan & Baucom, 2004), was developed for the current investigation. Reliability for the Relationship Schematic Coding System, assessed using the Rater Agreement Index (RAI; Burry-Stock et al., 1996), is high. RAIs ranged from .63 to 1, with the average of the RAIs for all items being .86 (Sullivan & Baucom, 2004).

The new GRSP is a macro-analytic coding system designed to assess overall Relationship Schematic Processing. This coding system consisted of three individual codes

(quantity, quality, and pull) for which each partner received a separate rating. Quantity refers to the frequency with which an individual utilizes a relationship schema while speaking. Quality indicates how skillfully an individual uses RSP. An individual may exhibit poor quality in a number of ways, including failing to gather or interpret relationship information accurately or reasonably, integrating information in an odd or unusual manner that seems unlikely to be true, or using relationship information in a maladaptive or hurtful manner when it does not appear to be accurate. At a high level of quality, an individual processes relationship events with a great deal of depth, complexity, and accuracy, and uses relationship schemas in a healthy, constructive, helpful manner for the relationship and partner. Pull refers to how much the context of the conversation induces an individual to be relationship schematic. Some topics may be centered around the relationship, which would pull for greater relationship schematic processing than topics that are only peripherally related to the relationship. In addition, if an individual's partner uses a great deal of relationship schematic processing, the conversation would pull for the individual to respond with relationship schematic processing in return. Each GRSP code was rated on a 5-point scale, ranging from 1 ("minimal evidence of" or "an absence of" the construct being coded) to 5 ("strong and pervasive evidence of" the construct being coded).

As described in the *Procedure* section, each couple participated in a 7-minute videotaped decision-making interaction task. Using the GRSP, these videos were coded for both male and female relationship schematic processing by a graduate student considered expert in coding relationship schematic processing. Twenty percent of these videos were also coded by the current investigator in order to ensure reliability. RAIs ranged from .69 to .78, with the average of the RAIs for all items being .75, indicating that codes were 1 point apart

on average.

Daily Measures

Daily Measure of Breast Cancer Experience. Female participants completed brief scales of individual items assessing daily relationship satisfaction, daily partner support, daily mood, daily pain and fatigue, and daily role functioning once a day for 30 days following initial assessment. The Daily Measure of Breast Cancer Experience consisted of 23 items, divided into five parts. As participants were expected to complete the scale daily, the measure was brief and took only five to ten minutes to complete. In general, items were selected from existing measures based on brevity, relevance to the current study, and content validity.

Source Specific Social Provisions Scale. To assess daily partner support, participants completed the Source Specific Social Provisions Scale (SPS; Cutrona, 1989), adapted for use on a daily basis. These items measured general social support in terms of how much partners helped with routine chores or tasks, how much partners supported the women emotionally, how much partners helped with decision making, and how satisfied the women were with each type of support. These support items were rated on a 6-point scale ranging from 0 ("not at all") to 5 ("a great deal"). Ratings were summed to create two subscales: amount of support (3 items) and satisfaction with support (3 items). Daily scores for amount of support were averaged over the 30 days to create an overall average support amount for each woman. Daily scores for satisfaction for each woman. Given that this was an adaptation of the Source Specific SPS for daily use, no reliability or validity statistics exist; however, internal reliability for the male partner source-specific SPS is high ($\alpha = .78$), and these scores have a

significant relationship with the original SPS (r = .31, p < .001; Cutrona, 1989). Cronbach's alpha coefficients for individual subscales in the original SPS range from .64 to .76 (Cutrona & Russell, 1987).

Positive and Negative Affect Schedule. Daily mood was assessed by a brief mood scale adapted from the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The scale used in the current study included five positive affect items ("happy", "joyful", "calm", "enjoyment or fun" and "pleased") and six negative affect items ("depressed", "unhappy", "worried or anxious", "angry or hostile", "guilty" and "frustrated"). These items were rated on a 6-point scale from 0 ("not at all") to 5 ("extremely"). Ratings were summed to form two subscales, positive affect (PA) and negative affect (NA). Daily scores for positive mood were averaged over the 30 days to create an overall average positive mood score for each woman. Daily scores for negative mood were also averaged over the 30 days to create an overall average negative mood score for each woman. Similar scales have been used previously in a number of daily studies (Gil et al., 2004; Porter, Gil, Carson, Anthony, & Ready, 2000; Porter et al., 2003; Porter & Stone, 1995), and these studies have reported high reliability for both mood scales (for PA, $\alpha = .88$; for NA, $\alpha = .89$; Gil et al., 2004).

Brief Pain Inventory and Brief Fatigue Inventory. In order to assess daily symptoms associated with cancer, participants rated one question from the Brief Pain Inventory ("What was your average amount of cancer-related pain during the past 24 hours?"; BPI; Cleeland & Ryan, 1994) and one question from the Brief Fatigue Inventory ("What was your average amount of fatigue, weariness, or tiredness during the past 24 hours?"; BFI; Mendoza et al., 1999). These items were rated on a 10-point scale ranging from 0 ("no pain or fatigue") to 9

("as bad as you can imagine"). Daily ratings of pain were averaged over the 30 days to create an overall average pain score for each woman. Daily ratings of fatigue were averaged over the 30 days to create an overall average fatigue score for each woman.

Functional Assessment of Cancer Therapy. Daily role functioning was assessed by three items from the Functional Well-Being Subscale of the Functional Assessment of Cancer Therapy (FACT-B; Cella, 1994). This measure assessed perceived quality of life in several domains, including emotional and functional. The Daily Measure of Breast Cancer Experience scale contained the following questions from the FACT-B: "How much were you able to work today, including work in the home?", "How much were you able to do things today that you enjoy?", and "How content were you with the quality of your life today?" These items were rated on a 5-point scale ranging from 0 ("not at all") to 4 ("very much"). Daily scores of role functioning were averaged over the 30 days to create an overall average role functioning score for each woman. Given that this measure was adapted for daily use, no reliability or validity statistics exist; however, the Functional Well-Being Subscale demonstrates good internal consistency ($\alpha = .80$; Cella & Bonomi, 1996).

Quality of Marriage Index. Daily relationship satisfaction was measured with one item (i.e., "All things considered, what was your degree of happiness with your relationship today?"), rated on a 7-point scale from 0 ("extremely unhappy") to 6 ("extremely happy"). Daily scores of relationship satisfaction were averaged over the 30 days to create an overall average relationship satisfaction score for each woman. This item was selected from the Quality of Marriage Index (QMI; Norton, 1983). The QMI has demonstrated good reliability and validity, correlating highly with longer, well-validated measures of marital adjustment such as the Dyadic Adjustment Scale (Heyman, Sayers, & Bellack, 1994).
Data Analytic Plan

In order to evaluate the hypotheses of this investigation, path analysis (PA) was utilized to estimate various models to fit the data. PA is a data analytic technique used when there is a single measure for each theoretical variable and *a priori* hypotheses regarding the causal relationships among these variables (Kline, 2005). An important advantage of PA over multiple regression is that mediational models can be evaluated in one analysis, with the mediator represented as *both* a predictor and a criterion variable. Thus, the significance of indirect paths can be statistically evaluated in one analysis, taking into account indirect, direct, and total paths all at once. If using a regression analysis, these paths would have to be analyzed in three separate analyses.

The path analyses were conducted utilizing Mplus Version 5.2 (Muthén & Muthén, 1998-2008). Maximum likelihood (ML) was used as the method of estimation. ML estimation, which is a commonly used method of estimating models in PA, computes estimates that maximize the likelihood that the data were drawn from the population of interest. To evaluate the indirect effects accurately, bias corrected bootstrap confidence intervals were used. An indirect effect is the product of the estimates for the direct path from the predictor to the mediator and the direct path from the mediator to the outcome. Because indirect effects are products of normal variables, the distributions of indirect effects are not normally distributed, especially in small samples (MacKinnon & Dwyer, 1993). When symmetric confidence intervals are constructed under assumptions of normality, these intervals tend to be too wide in the direction of the null hypothesis that an indirect effect is 0 and too narrow in the direction of the alternative hypothesis (Shrout & Bolger, 2002). These findings suggest that statistical tests of the indirect effect calculated in this manner will lack

power to detect an indirect effect. An alternative approach to constructing confidence intervals is the bootstrap method. In this method, observations are repeatedly sampled from the data set, creating multiple random samples, which can be combined to create a distribution of samples. The 2.5 and 97.5 percentile values of this distribution are then determined to construct 95% confidence intervals, which corresponds to an α value of .05. If the confidence interval does not contain 0, then the indirect effect is said to be significant at α = .05. These confidence intervals are asymmetric around the parameter estimate, due to the skewed distribution of the indirect effect (Mallinckrodt, Abraham, Wei, & Russell, 2006). For small samples (*N* < 80), a further bias correction to the confidence interval is necessary. Because the sample in the current study (*N* = 78) is considered small, bias corrected bootstrap confidence intervals were used to evaluate the indirect effects. Thus, in all the analyses conducted in this investigation, the bootstrap method was used and bias corrected bootstrap confidence intervals were obtained for all effects in the models.

In order to evaluate model fit, a number of indices that are routinely used in the literature were chosen: model χ^2 , Comparative Fit Index (CFI; Bentler, 1990), Tucker-Lewis Index (TLI or Nonnormed Fit Index, NNFI; Tucker & Lewis, 1973), Standardized Root Mean Square Residual (SRMR; Jöreskog & Sörbom, 1981), and Root Mean Square Error of Approximation (RMSEA; Steiger & Lind, 1980). Hu and Bentler (1999) recommended general use of the TLI and CFI, especially with maximum likelihood estimation. These indices are sensitive to model misspecification and are not sensitive to sample size. These should be close to 1.0 in order to indicate "good" fit. Hu and Bentler also suggested that values of .08 and lower for the SRMR and .06 and lower for the RMSEA were indication of "good" or "acceptable" model fit.

Results

Means and standard deviations for the communication, relationship schematic processing, partner support, and outcome variables are presented in Table 1. Examining these means relative to the possible ranges of the variables, it appears that both males and females exhibit a moderate level of positive communication, a low level of negative communication, and a moderate quality level of relationship schematic processing. Females appear to perceive a high level of partner support and report moderate levels of positive affect, role functioning, and relationship satisfaction and low levels of negative affect, pain, and fatigue. Correlations among all these variables are displayed in Appendix A. The pattern of correlations suggests moderate to strong relationships among the communication and RSP variables and moderate to strong relationships among the outcome variables.

In order to evaluate the hypotheses of the study, a path analysis was conducted utilizing male positive and negative communication, female positive and negative communication, and male RSP quality as predictors, partner support satisfaction as a mediator, and positive and negative mood, pain, fatigue, role functioning, and relationship satisfaction as outcome variables¹. The path diagram representing this model is presented in Figure 1. All predictors were allowed to correlate with each other, and residuals of the outcome variables were allowed to covary with each other. Because this model is a saturated model (i.e., all possible paths were estimated), fit indices did not provide any information that could be used to evaluate the fit of the model. Examining the individual path estimates, many paths were nonsignificant (see Appendix B for model results). However, given the

Table 1

Means and Standard Deviations of Predictor and Outcome Variables

Variable	Mean	SD
Positive Male Communication	22.93	7.22
Negative Male Communication	10.90	4.54
Positive Female Communication	21.95	6.84
Negative Female Communication	11.19	5.35
Couple Positive Communication	22.44	6.71
Couple Negative Communication	11.04	4.69
Male RSP Quality	2.82	1.09
Female RSP Quality	2.77	0.96
RSP Pull for Males	3.12	0.98
RSP Pull for Females	2.96	1.05
Age	51.47	10.92
Time Married/Living Together	22.60	14.04
Time Since Diagnosis	117.31	90.64
Partner Support Satisfaction	11.21	2.62
Positive Mood	14.49	3.57
Negative Mood	5.86	3.85
Pain	1.80	1.40
Fatigue	3.60	1.54
Role Functioning	8.06	1.78
Relationship Satisfaction	3.98	0.89

Note. SD=Standard Deviation; RSP=Relationship Schematic Processing.

Time since diagnosis was measured in days.

large overlap between male and female communication (i.e., r = .83, p < .001 for positive and r = .80, p < .001 for negative), neither communication variable would be expected to have a unique predictive ability over and above the other.

In order to evaluate the predictive utility of communication more clearly, two separate models were considered, a model with male variables only (i.e., male positive communication, male negative communication, and male RSP quality) and a model with female variables only (i.e., female positive communication, female negative communication, and female RSP quality). However, these separate models are not theoretically or ecologically valid. Communication is an interactive process that happens between two members of a couple, and the communication of one partner is expected to influence the communication of the other partner. Evaluating these communication variables in two separate models makes an assumption that the communication process for each member of the couple occurs independently from the partner. Thus, testing two separate models would not fit the overall hypotheses and assumptions of the study.

Instead of evaluating two separate models, one model containing couple-level positive and negative communication variables was examined. Given the high correlations between male and female communication scores, a couple-level variable of positive communication was created by averaging male and female positive communication, and a couple-level variable of negative communication was created by averaging male and female negative communication. A path analysis was then conducted utilizing these new couplelevel positive and negative communication variables and male and female RSP quality as predictors, partner support satisfaction as a mediator, and positive and negative mood, pain, fatigue, role functioning, and relationship satisfaction as outcome variables. This path model

is displayed in Appendix C. Female RSP quality was included in this model because theoretically, if females process events with a higher quality of RSP, they should notice support provided by their partner more often, and therefore, be more satisfied with partner support. In addition, the statistical model was now deemed to be small enough to include female RSP quality. Again, all possible paths were estimated. All predictors were allowed to correlate with each other, and residuals of the outcome variables were allowed to covary with each other. See Appendix D for model results.

Next, the above model was estimated with relevant demographic and medical covariates included in the model. Due to the low power of the study, potential covariates were assessed as significant predictors of outcome variables prior to including them in the path model. Only significant predictors of one or more outcomes would be included in the path model. A series of multiple linear regressions was conducted with one covariate as the predictor and one outcome variable as the outcome. Age, education, time married/living together, and joint income were assessed as demographic covariates, and time since diagnosis, surgery, radiation, and chemotherapy were assessed as medical covariates. Support satisfaction, positive mood, negative mood, pain, fatigue, role functioning, and relationship satisfaction were each included as outcome variables. Of these potential covariates, three were significantly related to one or more outcomes in these separate regression models. Age was significantly related to negative mood (B = -.149, p < .001) and pain (B = -.029, p = .049). Years married/living together was significantly related to negative mood (B = -.098, p =.001). Time since diagnosis was related to positive mood (B = .009, p = .052), fatigue (B = -.006, p = .003), and role functioning (B = .008, p < .001). Means and standard deviations for these significant covariates are displayed in Table 1. A path analysis was then conducted

utilizing the couple-level positive and negative communication variables, male and female RSP quality, and the significant covariates (i.e., age, time married/living together, and time since diagnosis) as predictors, partner support satisfaction as a mediator, and positive and negative mood, pain, fatigue, role functioning, and relationship satisfaction as outcome variables. This path model is displayed in Appendix E. All possible paths were estimated. All predictors were allowed to correlate with each other, and residuals of the outcome variables were allowed to covary with each other.

Then, a path analysis using the same predictors, outcomes, and covariates was conducted, estimating only paths from the communication and RSP predictors to the mediator and the mediator to the outcomes. Thus, no direct paths from these predictors to the outcomes were included. However, direct paths from the covariates (i.e., age time married/living together, and time since diagnosis) to the mediator and the outcomes were estimated. This path model is shown in Appendix F. All predictors were allowed to correlate with each other, and residuals of the outcome variables were allowed to covary with each other. This model was then compared to the saturated model to determine if it fit the data as well as the saturated model. The likelihood ratio test suggests that removing the direct paths between predictors and outcomes does not result in a significant decrement in model fit $(\chi^2_{\text{diff}}(24) = 15.69, p = .899)$. The model without these direct paths was considered more parsimonious and less complicated. In addition, only the indirect paths from predictors to mediator to outcomes were considered theoretically important; therefore, this last model was considered to be the final model. This final model provided an excellent fit to the data (χ^2 (24, *N* = 78) = 15.69, *p* = .899, CFI = 1.00, TLI = 1.08, SRMR = .03, RMSEA = .00).

Given that the model fit the data well, individual parameters for direct and indirect paths in the model were examined. Results of these individual parameter estimates and corresponding bias corrected bootstrap confidence intervals are displayed in Table 2. Figure 2 displays path model with estimates for the significant paths. As can be seen in Table 2 and Figure 2, a number of predictor-mediator and mediator-outcome paths are significant. Of the paths leading from the predictor to the mediator, one was significant: couple-level negative communication to partner support satisfaction was significant. As couples communicated more negatively, women were less satisfied with support from their partners. Couple-level positive communication, male RSP quality, and female RSP quality were not related to partner support satisfaction.

Of the paths leading from the mediator to the outcomes, four were significant: partner support satisfaction to positive mood, negative mood, role functioning, and relationship satisfaction. When women are more satisfied with partner support, they report greater positive mood, less negative mood, higher role functioning, and greater relationship satisfaction. Partner support satisfaction was not related to pain or fatigue, the two physical symptoms considered.

In addition to direct effects, the four corresponding indirect paths were significant: couple-level negative communication through partner support satisfaction to positive mood, couple-level negative communication through partner support satisfaction to negative mood, couple-level negative communication through partner support satisfaction to role functioning, and couple-level negative communication through partner support satisfaction to relationship satisfaction. As described with the direct paths, when couples communicate more negatively, women are less satisfied with partner support, and they experience less positive mood, more

Table 2

Direct and Indirect Effects from Path Analysis Modeling Associations between Couple-Level Communication, Relationship Schematic Processing, Support, and Outcomes with Covariates in Women with Breast Cancer Utilizing Bootstrap Method and Bias Corrected Confidence Intervals

Predictor Variable	Outcome Variable	В	SE	95% CI	
Direct Effects					
Couple Positive Communication	Partner Support Satisfaction	.09	.07	051,	.241
Couple Negative Communication	Partner Support Satisfaction	14*	.07	313,	017
Male RSP Quality	Partner Support Satisfaction	10	.39	940,	.619
Female RSP Quality	Partner Support Satisfaction	30	.41	-1.107,	.468
Partner Support Satisfaction	Positive Mood	.71*	.16	.427,	1.058
Partner Support Satisfaction	Negative Mood	50*	.15	803,	219
Partner Support Satisfaction	Pain	09	.06	197,	.024
Partner Support Satisfaction	Fatigue	07	.06	183,	.040
Partner Support Satisfaction	Role Functioning	.23*	.07	.109,	.382
Partner Support Satisfaction	Relationship Satisfaction	.29*	.03	.234,	.348
Indirect Effects: Partner Support Sa	tisfaction as Mediator				
Couple Positive Communication	Positive Mood	.06	.05	044,	.161
Couple Positive Communication	Negative Mood	04	.04	137,	.021
Couple Positive Communication	Pain	01	.01	031,	.003
Couple Positive Communication	Fatigue	01	.01	029,	.003
Couple Positive Communication	Role Functioning	.02	.02	011,	.058
Couple Positive Communication	Relationship Satisfaction	.03	.02	017,	.069
Couple Negative Communication	Positive Mood	10*	.06	225,	010
Couple Negative Communication	Negative Mood	.07*	.04	.013,	.189
Couple Negative Communication	Pain	.01	.01	003,	.044
Couple Negative Communication	Fatigue	.01	.01	003,	.036
Couple Negative Communication	Role Functioning	03*	.02	078,	003
Couple Negative Communication	Relationship Satisfaction	04*	.02	087,	005
Male RSP Quality	Positive Mood	07	.29	650,	.495
Male RSP Quality	Negative Mood	.05	.20	352,	.465
Male RSP Quality	Pain	.01	.04	057,	.111
Male RSP Quality	Fatigue	.01	.04	045,	.108

Table 2 (continued)

Direct and Indirect Effects from Path Analysis Modeling Associations between Couple-Level Communication, Relationship Schematic Processing, Support, and Outcomes with Covariates in Women with Breast Cancer Utilizing Bootstrap Method and Bias Corrected Confidence Intervals

Predictor Variable	Outcome Variable	B SE 95% (CI	
Male RSP Quality	Role Functioning	02	.10	223,	.159
Male RSP Quality	Relationship Satisfaction	03	.11	261,	.184
Female RSP Quality	Positive Mood	21	.30	833,	.495
Female RSP Quality	Negative Mood	.15	.22	235,	.644
Female RSP Quality	Pain	.03	.04	041,	.134
Female RSP Quality	Fatigue	.02	.04	026,	.135
Female RSP Quality	Role Functioning	07	.10	270,	.108
Female RSP Quality	Relationship Satisfaction	09	.12	345,	.131
Effects of Covariates					
Age	Partner Support Satisfaction	03	.04	093,	.056
Age	Positive Mood	.03	.04	061,	.105
Age	Negative Mood	11*	.05	207,	014
Age	Pain	03	.02	080,	.005
Age	Fatigue	04	.02	083,	.007
Age	Role Functioning	.05*	.02	.021,	.089
Age	Relationship Satisfaction	01	.01	020,	.008
Time Married/Living Together	Partner Support Satisfaction	.01	.03	060,	.073
Time Married/Living Together	Positive Mood	.03	.03	035,	.100
Time Married/Living Together	Negative Mood	03	.04	106,	.033
Time Married/Living Together	Pain	.00	.02	028,	.034
Time Married/Living Together	Fatigue	.02	.02	010,	.054
Time Married/Living Together	Role Functioning	03	.02	062,	.002
Time Married/Living Together	Relationship Satisfaction	.00	.01	006,	.015
Time Since Diagnosis	Partner Support Satisfaction	.00	.01	009,	.009
Time Since Diagnosis	Positive Mood	.01*	.00	.001,	.017
Time Since Diagnosis	Negative Mood	.00	.00	009,	.009
Time Since Diagnosis	Pain	.00	.00	005,	.000

Table 2 (continued)

Direct and Indirect Effects from Path Analysis Modeling Associations between Couple-Level Communication, Relationship Schematic Processing, Support, and Outcomes with Covariates in Women with Breast Cancer Utilizing Bootstrap Method and Bias Corrected Confidence Intervals

Predictor Variable	Outcome Variable	В	SE	95% CI	
Time Since Diagnosis	Fatigue	01*	.00	008,	002
Time Since Diagnosis	Role Functioning	.01*	.00	.005,	.010
Time Since Diagnosis	Relationship Satisfaction	.00	.00	.000,	.002

Note. B = Estimate for the Effect. SE = Standard Error. 95% CI = 95% Bias Corrected

Bootstrap Confidence Interval.

**p* < .05.

Figure 2. Results from the path analysis examining the relationship between couple-level communication and RSP, partner support satisfaction, and outcomes in women with breast cancer with covariates and no direct paths from the predictors to the outcomes estimated.



Note. Paths in bold are significant at p < .05, and estimates given are for significant paths only.

negative mood, lower role functioning, and decreased relationship satisfaction. No other indirect effects were significant.

Finally, a few paths from the covariates to the outcomes were significant. Age was significantly related to negative mood and role functioning. Older women experienced less negative mood and greater role functioning. Time since diagnosis was significantly related to positive mood, fatigue, and role functioning. The longer women were from diagnosis, the greater positive mood, less fatigue, and greater role functioning women reported. Time married/living together was not related to any of the outcomes, likely due to the large correlation between age and time married/living together (r = .70, p < .001).

In sum, the results suggest that there is an indirect relationship between couple-level negative communication and affective, functional, and relational outcomes through partner support satisfaction. As couples exhibited more negative communication, women reported less partner support, and they experienced less positive mood, greater negative mood, lower role functioning, and less relationship satisfaction. Thus, poorer communication predicts women perceiving less support, which then predicts poorer adjustment in many areas for women with breast cancer. Couple-level positive communication, male RSP quality, and female RSP quality, however, were not related to partner support satisfaction, and there was no indirect relationship between these variables and the outcomes through partner support satisfaction.

In order to explore the relationships between the RSP variables and support in more depth, a post hoc analysis was conducted. The lack of relationship between RSP quality and partner support is surprising, and potential testable explanations exist. First, there may be an interaction between male and female RSP quality, in which only couples in which both the

male and the female are relationship schematic is RSP related to support. In these couples, the male is relationship schematic and can more skillfully read cues from his partner regarding the support she needs, making it easier to provide satisfactory support. In addition, the female, being relationship schematic herself, may be more able to notice the support given, which makes it more likely for her to be satisfied with this support. Thus, the interaction between male and female RSP quality may predict support satisfaction. Second, only male and female RSP quality were included in the main analysis due to concerns about low power. However, pull, which refers to how much the context of the conversation induces an individual to be relationship schematic, seems potentially important in evaluating the effects of RSP. Processing events with a high quality of RSP may only be important when the conversation "pulls" an individual to be relationship schematic, it might not matter whether an individual processes in a relational manner or not.

To test these two hypotheses simultaneously, three interaction terms were calculated and included in a model: (a) the interaction between male and female RSP quality, (b) the interaction between male RSP quality and the pull for the male in the conversation, and (c) the interaction between female RSP quality and the pull for the female. A path analysis was conducted utilizing male and female RSP quality, their interaction, RSP pull for males and females, the interaction between male RSP quality and pull for males, and the interaction between female RSP quality and pull for females as predictors, partner support satisfaction as a mediator, and positive and negative mood, pain, fatigue, role functioning, and relationship satisfaction as outcome variables. This path model is displayed in Appendix G. All possible

paths were estimated. All predictors were allowed to correlate with each other, and residuals of the outcome variables were allowed to covary with each other.

Then, a path analysis using the same predictors and outcomes was conducted, estimating only paths from the RSP predictors to the mediator and the mediator to the outcomes. Thus, no direct paths from these predictors to the outcomes were included. This path model is shown in Appendix H. All predictors were allowed to correlate with each other, and residuals of the outcome variables were allowed to covary with each other. This model was then compared to the above saturated model to determine if it fit the data as well as the saturated model. The likelihood ratio test suggests that removing the direct paths between predictors and outcomes does not result in a significant decrement in model fit ($\chi^2_{diff}(42) = 43.63$, p = .402). The model without these direct paths was considered more parsimonious and less complicated; therefore, the results from this model were explored in order to investigate the relationship between RSP variables and support. This final model provided an excellent fit to the data ($\chi^2(42, N = 78) = 43.63$, p = .402, CFI = .99, TLI = .99, SRMR = .04, RMSEA = .02).

Given that the model fit the data well, individual parameters for direct and indirect paths in the model were examined. Results of these individual parameter estimates and corresponding bias corrected bootstrap confidence intervals are displayed in Table 3. Figure 3 displays the path model with estimates for the significant paths. As can be seen in Table 3 and Figure 3, a number of predictor-mediator and mediator-outcome paths are significant. Of the paths leading from the predictor to the mediator, three were significant: male RSP quality, RSP pull for males, and RSP pull for females to partner support satisfaction were

Table 3

Direct and Indirect Effects from Path Analysis Modeling Associations between Male and Female Relationship Schematic Processing Quality and Pull, Support, and Outcomes in Women with Breast Cancer Utilizing Bootstrap Method and Bias Corrected Confidence Intervals

Predictor Variable	Outcome Variable	В	SE	95%	CI
Direct Effects					
Male RSP Quality	Partner Support Satisfaction	1.20*	.45	.308,	2.106
Female RSP Quality	Partner Support Satisfaction	43	.48	-1.428,	.495
Male X Female RSP Quality	Partner Support Satisfaction	79	.52	-1.731,	.354
RSP Pull for Males	Partner Support Satisfaction	1.01*	.54	.043,	2.179
Male RSP Quality X Pull	Partner Support Satisfaction	.21	.37	437,	1.011
RSP Pull for Females	Partner Support Satisfaction	-1.47*	.54	-2.557,	493
Female RSP Quality X Pull	Partner Support Satisfaction	.59	.39	159,	1.383
Partner Support Satisfaction	Positive Mood	.74*	.15	.460,	1.057
Partner Support Satisfaction	Negative Mood	49*	.15	811,	220
Partner Support Satisfaction	Pain	10	.06	210,	.030
Partner Support Satisfaction	Fatigue	09	.06	195,	.045
Partner Support Satisfaction	Role Functioning	.25*	.07	.103,	.398
Partner Support Satisfaction	Relationship Satisfaction	.29*	.03	.235,	.353
Indirect Effects: Partner Support Sa	tisfaction as Mediator				
Male RSP Quality	Positive Mood	.88*	.36	.272,	1.728
Male RSP Quality	Negative Mood	58*	.29	-1.389,	162
Male RSP Quality	Pain	12	.08	296,	.009
Male RSP Quality	Fatigue	10	.08	301,	.020
Male RSP Quality	Role Functioning	.30*	.13	.101,	.677
Male RSP Quality	Relationship Satisfaction	.35*	.14	.079,	.668
Female RSP Quality	Positive Mood	31	.36	-1.053,	.362
Female RSP Quality	Negative Mood	.21	.25	226,	.800
Female RSP Quality	Pain	.04	.05	037,	.165
Female RSP Quality	Fatigue	.04	.05	027,	.194
Female RSP Quality	Role Functioning	11	.13	393,	.109
Female RSP Quality	Relationship Satisfaction	13	.14	445,	.146
Male X Female RSP Quality	Positive Mood	58	.38	-1.313,	.209

Table 3 (continued)

Direct and Indirect Effects from Path Analysis Modeling Associations between Male and Female Relationship Schematic Processing Quality and Pull, Support, and Outcomes in Women with Breast Cancer Utilizing Bootstrap Method and Bias Corrected Confidence Intervals

Predictor Variable	Outcome Variable	В	SE	95%	CI
Male X Female RSP Quality	Negative Mood	.39	.28	094,	1.028
Male X Female RSP Quality	Pain	.08	.07	021,	.252
Male X Female RSP Quality	Fatigue	.07	.06	021,	.242
Male X Female RSP Quality	Role Functioning	20	.14	466,	.055
Male X Female RSP Quality	Relationship Satisfaction	23	.16	549,	.086
RSP Pull for Males	Positive Mood	.74*	.38	.037,	1.533
RSP Pull for Males	Negative Mood	49*	.31	-1.263,	021
RSP Pull for Males	Pain	10	.08	335,	.011
RSP Pull for Males	Fatigue	09	.08	324,	.014
RSP Pull for Males	Role Functioning	.26*	.14	.014,	.582
RSP Pull for Males	Relationship Satisfaction	.30*	.16	.012,	.629
Male RSP Quality X Pull	Positive Mood	.16	.28	346,	.757
Male RSP Quality X Pull	Negative Mood	10	.19	594,	.193
Male RSP Quality X Pull	Pain	02	.04	154,	.034
Male RSP Quality X Pull	Fatigue	02	.04	135,	.031
Male RSP Quality X Pull	Role Functioning	.05	.10	119,	.280
Male RSP Quality X Pull	Relationship Satisfaction	.06	.11	127,	.318
RSP Pull for Females	Positive Mood	-1.08*	.40	-1.960,	418
RSP Pull for Females	Negative Mood	.72*	.34	.193,	1.560
RSP Pull for Females	Pain	.14	.10	011,	.393
RSP Pull for Females	Fatigue	.13	.10	031,	.377
RSP Pull for Females	Role Functioning	37*	.16	728,	134
RSP Pull for Females	Relationship Satisfaction	43*	.16	790,	152
Female RSP Quality X Pull	Positive Mood	.44	.30	130,	1.087
Female RSP Quality X Pull	Negative Mood	29	.20	790,	.052
Female RSP Quality X Pull	Pain	06	.05	219,	.010
Female RSP Quality X Pull	Fatigue	05	.05	213,	.013

Table 3 (continued)

Direct and Indirect Effects from Path Analysis Modeling Associations between Male and Female Relationship Schematic Processing Quality and Pull, Support, and Outcomes in Women with Breast Cancer Utilizing Bootstrap Method and Bias Corrected Confidence Intervals

Predictor Variable	Outcome Variable	В	SE	95% CI	
Female RSP Quality X Pull	Role Functioning	.15	.11	033,	.400
Female RSP Quality X Pull	Relationship Satisfaction	.17	.11	051,	.399

Note. B = Estimate for the Effect. SE = Standard Error. 95% CI = 95% Bias Corrected

Bootstrap Confidence Interval.

**p* < .05.

Figure 8. Results from the path analysis examining the relationship between male and female RSP quality, pull, and relevant interactions, partner support satisfaction, and outcomes in women with breast cancer with no direct paths from the predictors to the outcomes estimated.



Note. Paths in bold are significant at p < .05, and estimates given are for significant paths only.

significant. When men processed with higher quality RSP, women were more satisfied with support from them. When there was a higher pull for men to process with RSP, women were more satisfied with support. However, when there was a higher pull for women to process with RSP, women were less satisfied with support. Female RSP quality and the hypothesized interaction terms were not related to partner support satisfaction.

Of the paths leading from the mediator to the outcomes, the same four as in the main model were significant: partner support satisfaction to positive mood, negative mood, role functioning, and relationship satisfaction. When women are more satisfied with partner support, they report greater positive mood, less negative mood, higher role functioning, and greater relationship satisfaction. Partner support satisfaction was not related to pain or fatigue, the two physical symptoms considered.

In addition to direct effects, the twelve corresponding indirect paths were significant: male RSP quality through partner support satisfaction to positive mood, male quality through partner support satisfaction to negative mood, male quality through partner support satisfaction to role functioning, and male quality through partner support satisfaction to relationship satisfaction; RSP pull for males through partner support satisfaction to each of the four outcomes above (i.e., positive mood, negative mood, role functioning and relationship satisfaction); and RSP pull for females through partner support satisfaction to each of the four outcomes. As described with the direct paths, when men use higher quality RSP, women are more satisfied with partner support, and they experience greater positive mood, less negative mood, higher role functioning, and greater relationship satisfaction. When there is a greater pull for men to use RSP, women are more satisfied with partner support, and they experience greater positive mood, less negative mood, higher role

functioning, and greater relationship satisfaction. Finally, when there is a greater pull for women to use RSP, women are *less* satisfied with partner support, and they experience less positive mood, greater negative mood, lower role functioning, and less relationship satisfaction. No other indirect effects were significant.

In sum, although male and female RSP quality were not related to partner support in the main model, when RSP pull for males and females were included in a RSP model, male RSP quality, RSP pull for males, and RSP pull for females were all related to partner support, which was related to various outcomes in women with breast cancer.

Discussion

Partner support is vitally important to women with breast cancer. Many studies have demonstrated the effectiveness of social support in combating negative outcomes for women, such as depression, anxiety, and problematic physical symptoms associated with cancer treatment. However, researchers have not yet discovered an intervention that effectively heightens partner support. Thus, the purpose of this study was to explore interpersonal variables that might be altered to increase partner support, which would then be related to better outcomes in women with breast cancer.

In this sample of 78 couples in which the female had breast cancer, negative couple communication predicted satisfaction with partner support, which predicted mood, role functioning, and relationship satisfaction, above and beyond relevant covariates. When couples communicated in a more negative manner, women reported less satisfaction with support from their partners, and they experienced less positive mood, greater negative mood, lower role functioning, and lower relationship satisfaction. None of the remaining interpersonal variables (i.e., positive couple communication, male RSP quality, female RSP quality) predicted partner support in the original model. In addition, age and time since diagnosis were related to outcomes in women with breast cancer. Older women experienced less negative mood and greater role functioning, and higher role functioning. Time married or living together was not related to any of the outcomes, likely due to its high correlation with age.

Given these findings, the first hypothesis of the study, that both positive and negative communication would be related to partner support satisfaction, which would be related to outcomes, was partially supported. Negative communication, but not positive communication, predicted partner support satisfaction. This finding, in which negatives have more predictive power than positives, is consistent with results obtained in many areas of couple research and psychological research in general. For example, a great deal of couples' research demonstrates the salience of negative behaviors in a relationship context (Epstein & Baucom, 2002). For example, in terms of communication behaviors, a criticism directed at the partner often has a much larger impact than a compliment. If an individual includes both a criticism and a compliment in their statement, many partners will focus on the criticism, rather than hearing the compliment. The negative spoils the positive message. With noncommunication behaviors, negatives again usually carry more weight than positives. For example, an individual may engage in a nice deed for a partner, such as helping with chores; however, if the individual does not attend an important social event, the partner will focus on this negative behavior. Again, the negative spoils the positive behaviors. Supporting his theory of balance in relationships, Gottman (1993) reported that stable couples tend to achieve an approximate 5:1 ratio of positivity to negativity whereas unstable couples tend to experience a ratio approximately equal to 1:1 or below. The high number of positives needed to balance the negatives suggests that the negative behaviors perpetrated by couples hold much more weight than do the positive behaviors.

In the current investigation, when couples communicated more negatively, women reported lower support satisfaction. Negative communication may make the support process difficult for several reasons. Typically, when couples are engaged in negative communication

patterns, the partners are unable to effectively share their thoughts and feelings or problem solve with each other. Therefore, in these couples, women may not be clearly and effectively communicating what they need to their partners, and the partners may be unable to heed the women's concerns. The partners are not working together as a team, and so, cannot execute the support process successfully. In addition, because of the negative interaction patterns that the couples are experiencing, the partners may not be as willing or eager to provide the women with support at home. With this decrease in support provision, women may be less satisfied with support provided by their partners. This lack of satisfactory support may then lead to unsatisfactory outcomes, such as lower mood, role functioning, and relationship satisfaction. Furthermore, the presence of negatives demonstrated by the negative communication may make it difficult for women to perceive support, even when the male partners are providing it. When partners are engaged in negative interaction patterns with each other, they often attend to and perceive only negative behaviors their partners express, overlooking or ignoring the positives. In these couples, men may be attempting to provide support; however, the women may not recognize it, and so, are not satisfied with the support they perceive. Thus, negative communication can make the support process difficult and may lead to partners providing less satisfactory support and women perceiving less support.

In contrast to negative communication, positive communication was not related to support satisfaction. There are a few possible explanations for this lack of relationship. First, it was hypothesized that positive communication would lead to more satisfactory support because positive communication would allow couples to share their support needs and discuss how to meet those needs. However, positive communication is not necessarily related to elicitation and provision of support. A couple may be able to communicate in a positive

manner (e.g., demonstrate positive affect, problem solve in a constructive manner) without being facile with the support process. For example, a woman may be able to constructively problem solve around treatment for breast cancer, but she may not be able to directly and openly communicate her support needs to her partner. In this case, positive communication would not have led to an increased understanding of the partners' needs and ways to meet those needs, and so positive communication would not be related to satisfactory support receipt. Second, couples who communicate positively may interact with each other positively and make decisions well together, but they may not carry through with decisions at home. Thus, positive communication does not necessarily convey information about support behaviors at home. Third, communication was assessed during problem solving conversations rather than during a support task. Positive communication during problem solving may not be related to support provision or receipt. Giving advice or helping to solve a problem is one form of support; however, many other kinds of support exist, and the problem solving conversation does not capture these other types of support. Many women prefer emotional support to instrumental support, and so, they may not be satisfied with partner support, even when their partners give advice and problem solve well. If communication had been assessed within a support conversation in which the woman was discussing a situation in which she needed support, positive communication may have been related to support. Perhaps the task did not mirror the pertinent interactional process closely enough. Fourth, previous research has found that when women communicate in an extremely positive manner, relationship satisfaction in the future is lower (Schilling, Baucom, Burnett, Allen, & Ragland, 2003). Thus, some degree of negative communication may serve as a cue

to the partner that something is wrong in the relationship and that some sort of action needs to be taken. Positive communication may not cue the partner to provide support.

The second hypothesis of the study, that RSP quality would be related to support satisfaction, which would be related to outcomes, was not supported in the primary analysis. Neither male nor female RSP quality was related to partner support. Post hoc analyses were conducted to explore this null finding. Including the amount of RSP pull for individuals in a model of RSP quality clarified the relationship between RSP and support satisfaction. When RSP pull for males and females was accounted for, male RSP quality was positively related to support satisfaction. When males processed in a relational manner with a higher level of quality, women were more satisfied with the support they received, and they experienced greater positive mood, lower negative mood, higher role functioning, and greater relationship satisfaction. This finding supports the hypothesis that, when men process with higher quality RSP, they are more able to read women's cues and provide support that the women need. Another recent study conducted in this population also found that male RSP quality predicted female support satisfaction (Kelly, 2008). These findings are consistent with past research on RSP, suggesting that women are more satisfied in their relationships when men use higher quality RSP (Sullivan & Baucom, 2002). In fact, the results suggest that men who process events in a relational manner with a high quality are able to make their wives feel supported, which is related to increased relationship satisfaction (in addition to other positive outcomes).

RSP pull for males and females was also related to partner support satisfaction but in different ways. RSP pull for males was positively related to support satisfaction, suggesting that when men experience a greater "pull" to process things in a relational manner, women report more support satisfaction, greater positive mood, lower negative mood, higher role

functioning, and greater relationship satisfaction. The construct of "pull" per se is likely not important here; rather, "pull" probably acts as a proxy for another important construct or process that is occurring in the interactions between couples. Two factors underlie pull: how much relational processing the other person uses and the degree to which the problemsolving topic involves the relationship between the partners. Thus, the pull for the male partner may be due to a high degree of relational processing by the partner or to a highly relational topic. Within this context, the pull for a male partner may be a proxy for support elicitation. If the female is processing with a high degree of RSP, she may be attempting to involve her partner in the breast cancer experience and to approach the stressor as a team. In addition, if the problem-solving topic chosen was relational, the women may be asking for more partner involvement around the breast cancer. If the pull for a male is a proxy for support elicitation, then males would provide more support, and women would be more satisfied with that support. This process is consistent with the results obtained in the study.

In fact, when videos were individually examined qualitatively to explore explanations for the relationship between pull for males and support satisfaction, these interactions supported the hypothesis that pull for males is a proxy for support elicitation. For the majority of the conversations where there was a high pull for men to process relationally, the women chose the topic and clearly and directly asked for support they needed from their husbands. For example, during one interaction, the woman chose to discuss food and exercise. She told her husband that she did not want primary responsibility for food shopping and said, "I would like it if you would take more responsibility." She then suggested a shopping schedule, to which the husband agreed. During another interaction, a couple discussed whether the husband was going to visit their son who was away at college. The

woman stated that she thought it was still a good idea for him to go visit, and the husband agreed to go. Thus, in many of these conversations, women candidly discuss their needs and desires, and their partners respond by giving them needed support. Therefore, the pull for the men to process relationally is likely women's direct and clear bids for support, which then men answer by providing support the women asked for, leading the women to be satisfied with the support they receive.

In contrast, in interactions where there was low pull for men to process relationally, husbands tended to choose the topic and seemed to lead the conversation. Their female partners appeared more passive and less direct and were not asking for support they needed. For example, one male partner chose to discuss household chores. He suggested that the female hire a housekeeper and that they set up a schedule for their boys to help around the house. The female responded in an annoyed tone, but did not directly reject the suggestions, propose any ideas of her own, or ask for the husband's help around the house. In another conversation, the male partner chose to discuss nutrition and exercise. He complimented her, saying that he was proud of how she was handling her cancer. His phone rang during the conversation, and he answered it even though the couple was in the middle of their discussion. Once or twice, the female attempted to direct her partner to problem solving, but the efforts were weak and unsuccessful. Thus, a low pull for males to process relationally likely leads to lower support satisfaction because their female partners do not assert themselves or directly ask for what they need.

In addition to pull for males, pull for females was also related to partner support satisfaction. When there was a greater pull for women to be relationally schematic, they were *less* satisfied with support, and experienced lower positive mood, greater negative mood, less

role functioning, and less relationship satisfaction. Again, pull is likely a proxy for another construct. When there is a greater pull for women, their partners are more relationally schematic and/or the topic is relational. In this context of breast cancer, these women are likely experiencing a great deal of stress around their disease and may be feeling overwhelmed by details or events. They may need to focus more on themselves and their cancer in order to cope with this experience. When they are pulled to process in a relational manner, this may be an unwanted request that they do not have the resources to meet. They may experience the pull to be relationally schematic as a stressor or demand, which would lead them to experience less satisfaction with support from their partners.

In order to explore this hypothesis, individual interactions were viewed. In many of the conversations in which there was a high pull for the female to process relationally, the male partner was telling his wife he dislikes how she is coping with various aspects of breast cancer. For example, in one conversation, the male partner indicated that he wanted his wife to talk with him more about her experience, and the female replied with an irritated tone, "It isn't just me," suggesting that her partner is not very open either. The male also revealed that the cancer and its treatment had affected her level of sexual desire, which he termed "a side frustration." In another interaction, the woman wanted to discuss how she was going to pay for her medications because they could not currently afford them. The husband told her to go to social services, which would help them pay. He told her, "You need to do it soon because they don't ship overnight." The female responded saying that she would go as soon as she could, and the husband followed up, saying in an annoyed tone, "I would have had it paid already, but I'm waiting on someone else," clearly indicating his unhappiness with his wife's management of the situation. In a third conversation, a couple discussed their negative

interaction pattern around emotional issues. The women pointed out that her husband becomes angry when she is upset and asked him to stop doing so. He explained that he becomes angry because she attacks him, which makes it difficult for him to approach her. Thus, in all these conversations, the male partner explains that he dislikes how the female is handling her breast cancer experience and directly or indirectly asks her to change. Thus, the pull for the females appears to be the husbands' efforts to change their wives behaviors around breast cancer. The women in these conversations clearly did not experience the husbands' efforts as helpful, and these kinds of interactions likely lead to the women feeling less supported.

In addition to these specific findings, there are some notable aspects of the broader pattern of results. First, observational data predicted daily diary self-report measures. Relationships between data measured with different methods are more difficult to find because the more disparate two measures are, typically the lower the correlation between those measures will be. Holding all other factors constant, if the method of data collection is different between two measures, these two variables will be less related than if they measured more similarly (i.e., self-report and observational measures compared to two selfreport measures). Thus, the associations found between observational and self-report data are notable. Second, a couple-level predictor (i.e., negative couple communication) predicted an individual-level variable (i.e., support satisfaction). Relationships between predictors that have different targets (e.g., husband and wife, couple and individual) are also difficult to find because of the degree of separation between the two targets. Similar to multimethod findings, couple-level and individual-level data are less correlated with each other than with

themselves alone. Therefore, the findings in this study are remarkable in that they link observational data with self-report data and couple-level data with individual-level data.

Despite the intriguing findings, this study is not without limitations. First, these data are cross-sectional, and therefore, no causal relationships can be inferred from the results of the study. The observational data (i.e., communication and RSP) were collected before the support and outcome data; however, women completed the daily diary measures for 30 days directly after the observational data collection. Therefore, the data may be considered crosssectional in nature. While the pattern of results is consistent with a set of interpersonal variables that might causally influence support, which might affect women's outcomes, it is likely that these variables have reciprocal influences on each other or the direction of the relationships might be opposite of that predicted. Women who are not doing well (i.e., are experiencing low mood, lower role functioning, and less relationship satisfaction) may need and receive more support, which would explain the positive relationship between support satisfaction and these outcomes. In addition, women who are not receiving satisfactory support may be angry at their partners, and so, communicate more negatively. Thus, this explanation fits the opposite direction of causality from that hypothesized. A longitudinal or experimental study would have to be conducted to tease apart the direction of causality between these constructs. Furthermore, there may be additional variables that account for the observed associations that were not included in the study. Again, an experimental study would need to be conducted in order to rule out confounding variables.

Second, the measures included in the study did not tease apart the factors that women utilized to rate satisfaction. It is unclear whether women considered quality of support, effect of support, appreciation for support, match of support to what they wanted, or other factors

that have not yet been considered. Clearly, it would be beneficial to understand what aspects of support women consider in determining their level of satisfaction with support. Importantly, different women may desire different types or levels of support based on individual preferences. For example, some women may want to be doted upon while sick, while others may want their husbands to take the kids out so they can have time alone. The match of support received to women's preferences for support may be especially important in predicting mood and other outcomes (Cutrona, 1990; Jackson, 1992; Laireiter, Baumann, Perkonigg, & Himmelbauer, 1997; Reynolds & Perrin, 2004).

A third limitation of the investigation was that, in order to decrease burden on the women, daily diary constructs were only measured by a few items, and some measures (i.e., pain and fatigue) were only measured using one item. These few items could cause a multidimensional construct to be misleadingly represented as one-dimensional. Support satisfaction was measured by three specific questions that may not have captured all of the important types of support that might be utilized in caring for women with breast cancer. Also, the reliability of these few items could be lower than the reliability had more items been included. However, previous studies have suggested that one-item measures can be a good representation of measures compared to those that are greater in length (Hooley & Teasdale, 1989).

Fourth, this investigation helps to elucidate relationships between interpersonal variables, support, and outcomes in this specific population of women with breast cancer, but the generalizability of the findings is unclear. That is, it is uncertain whether the pattern of findings are unique to a situation in which there is a threat to the couple, such as breast cancer, or whether these results generalize to people with diseases that are not as "relational"

as breast cancer is. In addition, the women included in the study were mostly White, well educated, and wealthy. Results may not generalize to women of different demographic backgrounds (e.g., minorities, less well educated, or lower class). Furthermore, the sample was somewhat small (N = 78 couples), and power was low to detect significant relationships. Thus, different results may be found in a larger, more representative sample.

Although this study has its limitations, it raises interesting new questions that may be pursued by future research. The next step in this line of research would be to conduct a longitudinal study evaluating communication and RSP at one time point, support at an intermediate time point, and outcomes at a more distant time point. In this way, the directionality of the relationships may be better evaluated by establishing precedence in time. However, the most important stage of this line of investigation would be conducting an experimental study in which couples' communication, RSP, support, and individual outcomes were assessed at pretest. Then, couples could go through couple therapy focused on increasing positive communication, decreasing negative communication, and increasing both partners' RSP quality. After this intervention, communication, RSP, support, and outcomes could be assessed again to determine the effect of the intervention on these constructs. If an intervention focused on communication and RSP could, in fact, change support and outcomes, this therapy would be of great benefit to women with breast cancer and their partners. Moreover, the intervention could be tested and used in other populations of couples where increased social support would be beneficial, such as in couples facing other life stressors.

In addition to providing guidance for future directions for research, the findings of this study have potential clinical implications for couples facing breast cancer. Specifically,

clinicians should target negative communication through established techniques in couple therapy. Decreasing negative communication could potentially increase perceived support and positive outcomes and decrease negative outcomes. However, clinicians should understand that these results are preliminary and cross-sectional. Therefore, couples may need more assistance than simply decreasing negative communication. They may also need to be taught specific skills, such as problem solving, in order to endure the breast cancer experience.

Although the findings of this study are cross-sectional, the directions for future research and promising clinical interventions are clear. Negative communication emerged as the key interpersonal variable predicting support and outcomes in women with breast cancer. Future studies should continue to investigate changeable variables that impact social support so that researchers can build interventions to help women with breast cancer achieve a higher quality of life. Hopefully, the current investigation has helped paved the way for future studies to continue the investigation to better understand the myriad of concerns facing couples with breast cancer and better construct interventions that may both strengthen the couple and reduce the negative impact on survivors.

Endnotes

¹Because there were a number of outcome variables of interest, PA was utilized to estimate separate models containing subsets of these outcome variables. For example, one of these planned models includes only positive and negative mood as outcome, while all communication variables, RSP, and support satisfaction were retained in the model. However, the results from these separate models did not noticeably differ from the overall model including all outcome variables. Including all outcome variables in one model was preferable to conducting separate analyses; therefore, in all following models, all outcomes were included in one model.

Variable	1	2	3	4	5	6	7	8	9
1. Male Positive Communication	1.00								
2. Male Negative Communication	43**	1.00							
3. Female Positive Communication	.83**	34*	1.00						
4. Female Negative Communication	36**	.80**	42**	1.00					
5. Couple Positive Communication	.96**	40**	.95**	41**	1.00				
6. Couple Negative Communication	41**	.94**	40**	.96**	43**	1.00			
7. Male RSP Quality	.59**	36**	.41**	24*	.53**	31**	1.00		
8. Female RSP Quality	.39**	25*	.51**	29*	.47**	29*	.51**	1.00	
9. RSP Pull for Males	.30**	.13	.33**	.17	.33**	.16	.45**	.52**	1.00
10. RSP Pull for Females	.41**	09	.26*	.03	.35**	03	.79**	.45**	.69**
11. Partner Support Satisfaction	.24*	21	.19	31**	.23*	28*	.11	.04	.03
12. Positive Mood	.00	18	.08	21	.04	21	.07	02	04
13. Negative Mood	02	.25*	08	.33**	05	.31**	05	13	.03
14. Pain	11	.21	11	.17	12	.20	09	08	.05
15. Fatigue	04	.14	13	.20	09	.18	06	.10	.05
16. Role Functioning	.02	11	.10	17	.06	15	.08	05	04
17. Relationship Satisfaction	.24*	29*	.23*	33**	.24*	32**	.18	.04	.00
									_
Variable	10	11	12	13	14	15	16	17	
11. Partner Support Satisfaction	03	1.00							_
12. Positive Mood	04	.54**	1.00						
13. Negative Mood	.11	34**	60**	1.00					
14. Pain	.02	20	21	.44**	1.00				
15. Fatigue	.10	11	34**	.43**	.51**	1.00			
16. Role Functioning	.04	.35**	.72**	48**	40**	60**	1.00		
17. Relationship Satisfaction	.02	.84**	.58**	34**	17	15	.34**	1.00	

Correlations between Communication, Relationship Schematic Processing, Support, and Outcome Variables

Appendix A

Note. RSP=Relationship Schematic Processing.

p*<.05. *p*<.01.
Appendix B

Direct and Indirect Effects from Path Analysis Modeling Associations between Male and Female Communication, Relationship Schematic Processing, Support, and Outcomes in Women with Breast Cancer Utilizing Bootstrap Method and Bias Corrected Confidence Intervals

Predictor Variable	Outcome Variable	В	SE	95% CI	
Direct Effects					
Male Positive Communication	Partner Support Satisfaction	09	.08	037,	.308
Male Negative Communication	Partner Support Satisfaction	22	.12	099,	.423
Female Positive Communication	Partner Support Satisfaction	.14	.09	254,	.052
Female Negative Communication	Partner Support Satisfaction	.13*	.13	461,	018
Male RSP Quality	Partner Support Satisfaction	16	.39	970,	.541
Partner Support Satisfaction	Positive Mood	.80*	.15	.528,	1.126
Partner Support Satisfaction	Negative Mood	45*	.16	754,	111
Partner Support Satisfaction	Pain	10	.06	222,	.028
Partner Support Satisfaction	Fatigue	05	.07	191,	.083
Partner Support Satisfaction	Role Functioning	.25*	.08	.112,	.430
Partner Support Satisfaction	Relationship Satisfaction	.25*	.08	.227,	.345
Male Positive Communication	Positive Mood	28*	.10	486,	079
Male Positive Communication	Negative Mood	.18	.14	101,	.435
Male Positive Communication	Pain	.03	.06	098,	.135
Male Positive Communication	Fatigue	.07	.05	037,	.156
Male Positive Communication	Role Functioning	12	.06	229,	.004
Male Positive Communication	Relationship Satisfaction	03	.02	068,	.003
Male Negative Communication	Positive Mood	19	.15	547,	.077
Male Negative Communication	Negative Mood	.09	.16	211,	.402
Male Negative Communication	Pain	.08	.07	073,	.217
Male Negative Communication	Fatigue	.01	.07	122,	.137
Male Negative Communication	Role Functioning	03	.09	235,	.122
Male Negative Communication	Relationship Satisfaction	04	.02	081,	.003
Female Positive Communication	Positive Mood	.18*	.09	.009,	.343
Female Positive Communication	Negative Mood	10	.13	356,	.179
Female Positive Communication	Pain	03	.05	122	.081

Predictor Variable	Outcome Variable	В	SE	95% CI	
Female Positive Communication	Fatigue	06	.06	165,	.045
Female Positive Communication	Role Functioning	.09	.06	028,	.191
Female Positive Communication	Relationship Satisfaction	.03	.02	.000,	.058
Female Negative Communication	Positive Mood	.09	.11	120,	.346
Female Negative Communication	Negative Mood	.13	.14	210,	.416
Female Negative Communication	Pain	03	.07	154,	.106
Female Negative Communication	Fatigue	.04	.07	082,	.167
Female Negative Communication	Role Functioning	.01	.06	119,	.177
Female Negative Communication	Relationship Satisfaction	.02	.02	018,	.056
Male RSP Quality	Positive Mood	.48	.37	357,	1.155
Male RSP Quality	Negative Mood	24	.48	-1.201,	.657
Male RSP Quality	Pain	04	.20	459,	.326
Male RSP Quality	Fatigue	12	.20	530,	.268
Male RSP Quality	Role Functioning	.26	.24	176,	.801
Male RSP Quality	Relationship Satisfaction	.09	.07	055,	.226
Indirect Effects: Partner Support Sa					
Male Positive Communication	Positive Mood	.11	.07	021,	.260
Male Positive Communication	Negative Mood	07	.05	178,	.005
Male Positive Communication	Pain	01	.01	058,	.002
Male Positive Communication	Fatigue	01	.01	044,	.008
Male Positive Communication	Role Functioning	.04	.03	002,	.098
Male Positive Communication	Relationship Satisfaction	.04	.03	010,	.092
Male Negative Communication	Positive Mood	.10	.11	067,	.365
Male Negative Communication	Negative Mood	06	.07	274,	.032
Male Negative Communication	Pain	01	.01	077,	.004
Male Negative Communication	Fatigue	01	.01	071,	.006
Male Negative Communication	Role Functioning	.03	.04	014,	.138
Male Negative Communication	Relationship Satisfaction	.04	.04	031,	.124
Female Positive Communication	Positive Mood	07	.06	210,	.030
Female Positive Communication	Negative Mood	.04	.04	014,	.139
Female Positive Communication	Pain	.01	.01	003,	.042
Female Positive Communication	Fatigue	.00	.01	005,	.036
Female Positive Communication	Role Functioning	02	.02	075,	.007

Predictor Variable	Outcome Variable	В	SE	95% CI	
Female Positive Communication	Relationship Satisfaction	03	.02	075, .012	
Female Negative Communication	Positive Mood	18*	.10	402,022	
Female Negative Communication	Negative Mood	.10*	.06	.006, .267	
Female Negative Communication	Pain	.02	.02	002, .083	
Female Negative Communication	Fatigue	.01	.02	011, .073	
Female Negative Communication	Role Functioning	06*	.04	145,007	
Female Negative Communication	Relationship Satisfaction	06*	.03	131,006	
Male RSP Quality	Positive Mood	13	.32	834, .454	
Male RSP Quality	Negative Mood	.07	.19	242, .527	
Male RSP Quality	Pain	.02	.04	041, .161	
Male RSP Quality	Fatigue	.01	.03	035, .117	
Male RSP Quality	Role Functioning	04	.10	278, .128	
Male RSP Quality	Relationship Satisfaction	05	.11	306, .156	

Note. B = Estimate for the Effect. SE = Standard Error. 95% CI = 95% Bias Corrected

Bootstrap Confidence Interval.

*p < .05.

Appendix C

Path model showing the proposed relationship between couple-level communication and RSP, partner support satisfaction, and outcomes in women with breast cancer.



Appendix D

Direct and Indirect Effects from Path Analysis Modeling Associations between Couple-Level Communication, Relationship Schematic Processing, Support, and Outcomes in Women with Breast Cancer Utilizing Bootstrap Method and Bias Corrected Confidence Intervals

Predictor Variable	Outcome Variable	В	SE	95% CI	
Direct Effects					
Couple Positive Communication	Partner Support Satisfaction	.07	.07	068,	.197
Couple Negative Communication	Partner Support Satisfaction	13*	.07	325,	011
Male RSP Quality	Partner Support Satisfaction	03	.40	847,	.727
Female RSP Quality	Partner Support Satisfaction	29	.40	-1.025,	.541
Partner Support Satisfaction	Positive Mood	.73*	.16	.461,	1.085
Partner Support Satisfaction	Negative Mood	51*	.15	783,	223
Partner Support Satisfaction	Pain	11	.06	217,	.009
Partner Support Satisfaction	Fatigue	07	.06	186,	.068
Partner Support Satisfaction	Role Functioning	.24*	.08	.109,	.425
Partner Support Satisfaction	Relationship Satisfaction	.29*	.03	.228,	.343
Indirect Effects: Partner Support Sa	tisfaction as Mediator				
Couple Positive Communication	Positive Mood	.05	.05	056,	.144
Couple Positive Communication	Negative Mood	04	.04	110,	.034
Couple Positive Communication	Pain	01	.01	034,	.004
Couple Positive Communication	Fatigue	01	.01	030,	.004
Couple Positive Communication	Role Functioning	.02	.02	013,	.055
Couple Positive Communication	Relationship Satisfaction	.02	.02	022,	.055
Couple Negative Communication	Positive Mood	10*	.06	231,	005
Couple Negative Communication	Negative Mood	.07*	.04	.004,	.172
Couple Negative Communication	Pain	.01	.01	001,	.060
Couple Negative Communication	Fatigue	.01	.01	006,	.043
Couple Negative Communication	Role Functioning	03*	.02	087,	004
Couple Negative Communication	Relationship Satisfaction	04*	.02	091,	003
Male RSP Quality	Positive Mood	02	.31	614,	.593
Male RSP Quality	Negative Mood	.02	.22	401,	.461
Male RSP Quality	Pain	.00	.05	078,	.134
Male RSP Quality	Fatigue	.00	.04	079,	.093

Predictor Variable	Outcome Variable	В	SE	95% CI	
Male RSP Quality	Role Functioning	01	.10	220,	.193
Male RSP Quality	Relationship Satisfaction	01	.12	240,	.212
Female RSP Quality	Positive Mood	21	.31	785,	.372
Female RSP Quality	Negative Mood	.14	.22	314,	.590
Female RSP Quality	Pain	.03	.05	049,	.153
Female RSP Quality	Fatigue	.02	.04	033,	.149
Female RSP Quality	Role Functioning	07	.10	293,	.120
Female RSP Quality	Relationship Satisfaction	08	.12	309,	.153

Note. B = Estimate for the Effect. SE = Standard Error. 95% CI = 95% Bias Corrected

Bootstrap Confidence Interval.

*p < .05.

Appendix E

Path model showing the proposed relationship between couple-level communication and RSP, partner support satisfaction, and outcomes in women with breast cancer with age, time married/living together, and time since diagnosis as covariates.



Appendix F

Path model showing the proposed relationship between couple-level communication and RSP, partner support satisfaction, and outcomes in women with breast cancer with covariates and no direct paths from the predictors to the outcomes.



Appendix G

Path model showing the proposed relationship between male and female RSP quality, pull, and relevant interactions, partner support satisfaction, and outcomes in women with breast cancer.



Appendix H

Path model showing the proposed relationship between male and female RSP quality, pull, and relevant interactions, partner support satisfaction, and outcomes in women with breast cancer with no direct paths from the predictors to the outcomes estimated.



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