Cancer Conversations in Context: Naturalistic Observation of Couples Coping with Breast Cancer

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Abstract

This study explored the feasibility and potentials of a naturalistic observation approach to studying dyadic coping in everyday life. Specifically, it examined the natural context and content of the spontaneous cancer conversations of couples coping with cancer, and how they relate to patients' and spouses' psychological adjustment. Fifty-six women with breast cancer and their spouses wore the Electronically Activated Recorder (EAR), an unobtrusive observation method that periodically records snippets of ambient sounds, over one weekend to observe the couples' cancer conversations in their natural context. Both patients and spouses completed self-reported measures of psychological adjustment at baseline and at a two-month follow-up. Cancer was a topic of approximately 5% of couples' conversations. Cancer conversations occurred more often within the couple than with friends and family, and they were more often informational than emotional or supportive. Consistent with research on the Social Cognitive Processing model (Lepore & Revenson, 2007), spouses' engagement in emotional disclosure and informational conversation with patients predicted better patient adjustment. This first naturalistic observation study of dyadic coping revealed that the EAR method can be implemented with high compliance and relatively low obtrusiveness within the sensitive context of couples coping with cancer, and having a spouse who discussed cancer in an emotional or informational way predicted better patient adjustment. As a complement to in-lab and other momentary assessment methods, a naturalistic observation approach with a method such as the EAR can contribute to a more comprehensive understanding of the role that communication processes play in coping with cancer.

Keywords

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Breast cancer is a highly distressing experience, and rarely an isolated one. Following diagnosis, both women with breast cancer and their spouses are substantially more at risk for depression (Compas & Luecken, 2002; Segrin et al., 2006), and often experience avoidance or intrusive thoughts of cancer akin to those of post-traumatic stress disorder (Whitaker, Watson, & Brewin, 2009). Further, over time, patients and their spouses' adjustment trajectories tend to be closely linked (Northouse & Swain, 1987; Segrin & Badger, 2013); a realization that has prompted extensive research into the dyadic nature of coping with cancer.

A growing body of evidence suggests that partners can engage in supportive behaviors to help each other cope with breast cancer. For example, Hagedoorn and colleagues (2000) found that patients' reports of their spouses actively engaging them in the support process were associated with patients' higher satisfaction with their marriage and fewer negative feelings. Beyond perceptions of support, a diary study revealed that more daily support received predicted greater daily relationship intimacy in couples coping with breast cancer (Belcher et al., 2011). Greater intimacy was also found among patients and spouses whose partners were responsive to their emotional disclosures in an in-lab observational study (Manne et al., 2004). Further, the Social Cognitive Processing (SCP) model outlines how spouses' disclosure to cancer patients may facilitate patients' adjustment by reducing social constraints on disclosure (Lepore, 2001; Lepore & Revenson, 2007). These studies are a small sample highlighting the important ways in which couples coping with breast cancer can facilitate each other's psychological adjustment.

The existing methodological approaches to studying couples coping with breast cancer to-date have yielded important findings about subjective experiences within and outside the laboratory, and of more objective (i.e. direct, behavioral) aspects of cancer-related interactions within the laboratory. However, currently no research so far has tested the potentials that a naturalistic, behavioral observation approach might offer to studying couples' spontaneous cancer-related interactions as they cope with breast cancer in their daily lives (Mehl, Robbins, & Deters, 2012). Self-report methods are optimized for assessing participants' thoughts, feelings, and perceptions. Because of the well-established limitations of retrospective self-reports (e.g. reliance on memory), researchers have developed various ways of obtaining self-reports "in vivo" and "in situ" (Bolger & Laurenceau, 2013; Mehl & Conner, 2012; Stone, Shiffman, Atienza, & Nebeling, 2007). Still, participants are only able to report what they notice in the first place (Piasecki et al., 2007). Indeed, Coyne and Bolger (1990) pointed out that being in a supportive relationship often entails "being a regular recipient of unnoticed helpfulness. Much that is helpful occurs in a routine, habitual, and therefore unnoticed fashion" (p. 152). It is for this reason that in-lab observational studies have been used for studying more automatic aspects of couples' cancer-related interactions (e.g. Manne et al., 2004a; Manne et al., 2004b). The missing methodological piece for studying support processes among couples' coping with cancer is the behavioral observation of their interactions outside the lab. Whereas in-lab observation provides a focused examination of couples' cancer-related interactions, naturalistic observation provides information about how interactions unfold in couples' normal, daily lives.

The present study aimed to (a) evaluate the feasibility of naturalistically observing patients and spouses in the sensitive medical context of coping with cancer, (b) provide first descriptive information about with whom and how couples spontaneously talk about cancer in their normal, daily lives, and (c) explore how different types of cancer conversations predict patients' and spouses' psychological adjustment.

Studying cancer conversations within their natural context may help determine when it is most adaptive to engage in one. When couples talk about cancer, the content and context can range from intense and emotional (e.g. revealing fears about treatment or death) to mundane and informational (e.g. reminding of appointments and discussing oncologist credentials), and these different types of conversation may have different implications for adjustment. Hagedoorn and colleagues (2008) point out that it is unclear "how much cancer intrudes upon and organizes the lives of couples confronted with the disease," and that there is a need for "direct sampling of their interactions and daily experiences" (p. 24). By observing cancer-related interactions in couples' daily lives, researchers can better understand how cancer typically comes up in conversation, and how each type of conversation relates to adjustment.

Emotional disclosure, for example, has generally been found to be linked to better psychological and physical health for women with breast cancer (Manne et al., 2004b; Stanton et al., 2000). In one study, women with breast cancer who reported accepting their emotions and having a confiding marital relationship had lower risks of recurrence and mortality over an eight-year study period (Weihs et al., 2008). Likely pathways linking emotional disclosure and health include facilitation of meaning-making, and fostering intimacy in couples, and both have been linked to reduced distress in couples coping with cancer (Lepore, 2001; Manne & Badr, 2008).

While most disclosure research has focused on each participant's own adjustment, some recent studies have found that spouses' disclosure about cancer may facilitate patients' adjustment by reducing social constraints on disclosure (Badr & Carmack Taylor, 2006; Badr, Pasipanodya, & Laurenceau, 2012; Lepore, 2001; Lepore & Revenson, 2007; Pasipanodya et al., 2012). Social constraints are considered barriers, whether objective or perceived, to emotional disclosure. According to Lepore's SCP model (2001), reducing such constraints may alleviate patients' inhibition of talking to their spouses about cancer and thereby facilitate adjustment through reducing avoidance and intrusive thoughts of cancer. For example, Badr and colleagues (2012) found that daily reports of partner constraints, including avoidance of discussing cancer, predicted increases in breast cancer patients' negative affect the following day. Conversely, Manne and colleagues' (2004) study of couples' in-lab cancer discussions revealed that spouses' reciprocated disclosure was related to patients' lower distress levels.

Importantly, although most research so far has tested the SCP model in the context of emotional disclosure (e.g. Badr et al., 2012), there is no a priori reason to believe it applies exclusively to emotional conversations. Other types of substantive conversation about cancer may also facilitate cognitive processing, and thereby improve psychological adjustment. The SCP model posits that others' willingness to "socially process" cancer-

related information through conversation should facilitate adjustment (Lepore & Revenson, 2007). An important question, then, concerns the degree to which this processing may apply to less emotional, informational conversations. For example, discussing informational aspects of the cancer experience, such as course of treatment, are practically necessary and may facilitate cognitive processing by increasing exposure and habituating patients to such thoughts.

Informational cancer discussions are conceptually related to informational support. At the same time, they are distinct in that they do not necessarily occur in an explicitly supportive context. Informational support is the provision of information for the purpose of aiding management of and decisions surrounding a stressor, and is typically associated with positive coping outcomes (Helgeson & Cohen, 1996). For example, one study found that informational support provided by educational group interventions increased psychological and physical functioning in breast cancer patients (Helgeson, Cohen, Schulz, & Yasko, 1999). However, such informational exchanges may not necessitate an explicit support context to facilitate well-being. In a recent study, Mehl and colleagues (2010) found that conversations in which meaningful, unemotional, information was exchanged were related to higher levels of happiness in a healthy sample. It is possible, then, that partners' engagement in unemotional, informational cancer discussions may help patients adjust by facilitating the processing of informational aspects of the cancer experience. Such evidence would conceptually broaden the SCP model by extending the benefits of cognitive processing on adjustment beyond emotional topics, to include informational ones.

Whereas removing social constraints through engagement in emotional and informational conversations about cancer is a potential indirect route to being supportive, partners can also engage in more direct support behaviors to promote each other's adjustment. Several in-lab studies have documented the importance of social support for both breast cancer patients and their partners (e.g. Belcher et al., 2011; Gremore et al., 2011; Manne & Badr, 2008; Manne et al., 2004b; Manne, Ostroff, Fox, Grana, & Winkel, 2009). Specifically, receiving support from one's partner can exert a stress-buffering effect (Gremore et al., 2011), and may facilitate breast cancer patients' use of more effective coping strategies (Kim, Han, Shaw, McTavish, & Gustafson, 2010). Further, a survey of the partners of breast cancer patients revealed that receiving more support from patients was related to lower distress (Manne et al., 2009). Finally, surveyed patients who perceived their relationship as mutually supportive, one in which they were also contributing, were at lower risk for depression (Kayser, Sormanti, & Strainchamps, 1999). It is important, then, to consider both indirect and direct support processes within an examination of couples' daily, cancer-related interactions.

The Electronically Activated Recorder (EAR; Mehl et al., 2001) is a naturalistic observation method that unobtrusively samples ambient sounds from participants' daily lives. Past studies have established (a) that a broad spectrum of behaviors can be assessed reliably from the sampled ambient sounds with low levels of reactivity and obtrusiveness (Mehl & Holleran, 2007), (b) that these behaviors show large between-person variability and good temporal stability (Mehl & Pennebaker, 2003) and (c) that they have good convergent validity with theoretically-related psychological measures (e.g. Holtzman et al, 2010; Mehl,

Gosling, & Pennebaker, 2006). Past EAR studies have also identified ways in which naturalistic observation can help answer questions that are difficult to answer with other methods (for a review, including a discussion of ethical considerations around recording conversations, see Mehl et al., 2012).

Though past studies have established the EAR as a reliable and useful naturalistic observation tool, it is still unclear to what extent wearing an audio-recording device in the midst of a sensitive medical context, like the treatment of breast cancer, is perceived as intrusive and can undermine good compliance in wearing the device. Therefore, our first aim of the present study is to evaluate the feasibility of using the EAR in this sensitive medical context.

The second aim was to answer basic questions about how cancer comes up in couples' everyday conversations, to understand with whom and about what they talk while coping with breast cancer, and how these spontaneous cancer conversations relate to adjustment. Because this is the first study to directly observe cancer conversations in daily life, our analyses of their frequency, social context, and conversational type were exploratory.

The third aim of the present study focused on how different types of cancer conversations relate to patients' and spouses' adjustment. Based on past findings, we hypothesized that emotional disclosure would be linked to patients' and their spouses' own better psychological adjustment as measured by decreases in depression and avoidance/intrusive thoughts (Manne et al., 2004; Stanton et al., 2000). We further hypothesized that spouses' emotional disclosure would predict patients' better adjustment, based on the SCP model, which outlines that others' willingness to engage in cancer conversations will put patients at ease and facilitate their processing of the cancer experience (Badr et al., 2013; Lepore & Revenson, 2007). We predicted the same pattern of results for patients' and spouses' informational conversations about cancer, based on past findings on informational exchanges and greater well-being (Helgeson et al., 1999; Mehl et al., 2010), and the SCP model. We hypothesized that spouses' engagement in informational, in addition to emotional, conversations about cancer would be related to improvements in patients' psychological adjustment, presumably through removing social constraints on such discussions. Lastly, we predicted that higher frequency of patients' and spouses' explicitly supportive interactions would be related to each other's (Gremore et al., 2011; Manne & Badr, 2008), and their own (Kayser et al., 1999), better adjustment.

Method

Participants

Participants were recruited from the Arizona Cancer Center, during regular visits to an oncologist. Patients were approached by a researcher and given an overview of the study. Breast cancer patients were eligible if they had primary diagnosis of Stage I, II, or III breast cancer, had definitive surgery, and were receiving adjuvant treatment (chemotherapy or radiation). Couples were eligible if both partners were at least 21 years of age, living together in a marriage-like relationship, and spoke primarily English in their daily conversations. Of the 647 couples approached, 210 (32.5%) were eligible for this study, and

56 (26.7% of eligible couples) agreed to participate. This rate of accrual is slightly lower than, but broadly comparable to other studies of couples coping with breast cancer (e.g. Manne et al., 2004). Common reasons for non-participation included "too much going on" (20.1%), husband not wanting to participate (17.5%), feeling uncomfortable with being recorded (10.0%), feeling one is not sick or stressed enough to participate in a coping study (6.5%), and having significant relationship problems (2%). The remaining patients either provided no reason for declining, or stated a reason that comprised less than 2% of responses. After agreeing to participate, couples provided informed consent, and met with the researcher three times, typically in their homes or at the Arizona Cancer Center.

Of the 56 consented couples, 52 patients, and 51 spouses had data usable for the analyses. Two couples withdrew from the study, one just after having consented to participate because the external microphone wire was perceived as bothersome, and one before the follow-up session for an unknown reason, as the researchers were unable to contact them. Two patients and three spouses did not have a sufficient number of sound files (< 30) for the analyses due to technical problems. Couples tended to be well-adjusted, as indicated by the Dyadic Adjustment Scale (DAS; Spanier, 1976). Patients' ($M = 15.13$, $SD = 1.40$) and spouses' ($M = 14.82$, $SD = 1.44$) scores were well-above the midpoint (items were rated on a 5-point scale, averaged across each subscale, and the subscales summed; the maximum for this scoring of the DAS is 18.00). Medical information for patients and demographic information for couples are provided in Table 1. Two patients with Stage 0 and four with Stage 4 disease were allowed to participate despite not meeting the formal eligibility criteria. This decision was made toward the end of the study to maximize the sample size. These couples were not outliers in their levels of psychological adjustment or in their frequency and type of their cancer conversations; they were therefore retained in the final sample for analyses.

Procedure

During the first session, typically held on a Friday afternoon, participants completed a packet of questionnaires that contained several measures of psychological adjustment. Afterward, they were instructed to wear the EAR as much as possible over the weekend during their waking hours. They were told that the EAR would record 50 seconds of ambient sound at a time, and that they would not be aware of when the EAR was recording, in order to conduct their normal, daily lives as much as possible. They were also informed that the EAR would only capture approximately 10% of their waking day, with a blackout period at night. Finally, they were told that they would have the opportunity to review and delete any sound files at the end of the study, before anyone listened to them. After ensuring the participants understood this information, they were given the EAR devices to wear. After the weekend, typically on a Monday, participants met with the researcher for the second session, during which the researcher collected the EARs and administered a second questionnaire packet, assessing demographic and medical information, as well as the participants' experiences wearing the EAR. Participants also completed an event diary to indicate when they were and were not wearing the EAR. Two months later, participants met with the researcher for the final session, where they completed the session 1 questionnaires a second time, in order to assess any changes in psychological adjustment. Afterward, participants were debriefed and given a CD of their recordings to review them and erase any sound files

they preferred to remain private. Only one participant, a patient, deleted one sound file (out of over 18,000 total sound files collected). Finally, each couple was paid $150 for their participation.

Measures

EAR Device—The EAR device was an HP ipaq 100 handheld computer with the EAR software programmed to record 50 seconds every 9 minutes. In reliability analyses, this sampling rate has yielded highly stable estimates of daily social behaviors and highly robust estimates of effects with criterion variables (Mehl et al., 2012). Both patients and spouses wore their EAR device in a protective case clipped to their waistline, with an Olympus ME-15 external microphone clipped to their lapels. The EAR was programmed to record throughout participants' entire waking weekend from the time they received the device until they went to bed on Sunday night, which yielded an average of 176 (SD = 57) valid (i.e. the participant was wearing the device, and there were no technical problems), waking (i.e. the participant was not sleeping) sound files per participant. The EARs blacked out for 6 hours each night starting when the couple indicated they typically go to sleep.

EAR-Derived Measures—After participants had the opportunity to review their EAR recordings, research assistants extracted information about participants' daily lives by coding each sound file for aspects of their social environments (e.g. whether the participant was with his/her partner, or with friends or family). Talking with each other and talking to friends or family was neither mutually exclusive nor exhaustive. In other words, participants could, in a given sound file, engage in conversation with each other and with friends or family, and they could also engage in a conversation with someone other than their partner, a friend, or a family member (e.g. a stranger). All coding categories were dichotomous, indicating presence or absence of a behavior or aspect of the social environment.

Research assistants also coded whether or not a captured conversation was cancer-related, and whether or not it was emotionally disclosing, informational, or supportive. These conversation categories were mutually exclusive, except for the emotionally disclosing and supportive categories which were kept non-mutually exclusive because they often naturally co-occur. Emotional disclosure was coded if the participant shared his or her personal feelings or emotions about cancer (Manne et al., 2004). Informational conversations were coded if the participant exchanged thoughts, information, or ideas about anything surrounding the cancer experience in a non-emotional way. Specifically, these were conversations in which "meaningful information was exchanged," that did not contain an emotional element (e.g. describing the timeline of treatment, discussing a physician's credentials; Mehl et al., 2010). Although informational conversations could potentially be construed as informational support, the term "support" is reserved here for those interactions in which it was clear that the statement was overtly intended to be supportive or clearly perceived as supportive by the recipient (Schaefer, Coyne, & Lazarus, 1981). Supportive interactions comprised all such interactions, regardless of the specific type of support given. Specifically, interactions were coded as supportive if the participant was overtly providing emotional (e.g. expressing sympathy; actively listening to emotional disclosure), tangible (e.g. offering or providing practical help), or informational (e.g. offering advice) support to

another person (Helgeson & Cohen, 1996; Schaefer et al., 1981). An example of each type of conversation (from patients and spouses who are not from the same couples) is provided in Table 2.

All sound files were coded by two research assistants, which took on average about 5–6 hours per research assistant, per participant (i.e. one set of coding). The two sets of independent coding were then averaged. Inter-coder reliability was calculated using one-way random effects intraclass correlations. Intraclass correlations (ICC[1;2]) for all coding categories ranged from .76 to .92. After all sound files were coded by two research assistants they were aggregated across each participant to yield the mean frequency of cancer-related conversations.

Psychological Adjustment—Outcome measures were completed by patients and their spouses at Time 1 and 3. They completed the Center for Epidemiologic Studies Depression Scale (CES-D, Radloff, 1977), a 20-item self-report measure of depressive symptoms. The CES-D is highly reliable and extensively used in cancer research (Segrin et al., 2006). Higher scores indicate more depressive symptoms. Participants also completed the Impact of Events Scale (IES; Horowitz et al., 1979), a 15-item measure of avoidance/intrusive thoughts associated with a major stressor. The IES is extensively used in cancer research (e.g., Manne et al., 2009), and higher scores indicate more avoidance/intrusive thoughts. Follow-up scores, residualized for baseline scores, were used as the outcome measures' change scores. Means and internal consistency for both adjustment measures are reported in Table 3.

Patients and spouses did not significantly differ in their levels of depressive symptoms or avoidance/intrusive thoughts (p's > .50). Further, the correlations between patients' and spouses' outcome scores revealed substantial non-independence within couples. Patients' and spouses baseline scores for both the CES-D ($r = .32$, $p = .02$) and the IES ($r = .29$, $p = .04$) were significantly positively correlated. Their CES-D scores at follow-up were also significantly related ($r = .43$, $p = .001$), however, for the IES, they were only marginally related ($r = .25$, $p = .08$). Table 4 displays the intercorrelations for patients' and spouses' cancer conversations and changes in their adjustment measures (follow-up scores residualized for baseline scores).

Demographic and medical information—Patients and spouses completed a 10-item demographics questionnaire, and patients also completed a 16-item breast cancer questionnaire about medical characteristics (Table 1; Badger et al., 2005).

Data Analytic Strategy

The first set of analyses used descriptive statistics to answer the questions regarding with whom and about what couples talk in the context of coping with breast cancer. Next, repeated measures general linear models were used to examine whether patients and their spouses differed in frequency of cancer conversations in each context.

Before conducting Actor-Partner Interdependence Models within multi-level modeling in SPSS (APIM; Kenny, Kashy, & Cook, 2006) to determine how cancer conversations relate

to patients' and spouses' adjustment, correlations between the outcome variables and typically relevant medical and demographic variables were conducted to determine which variables should be controlled. Predictors and outcome variables were then standardized across the entire sample, to yield standardized estimates in the APIM output. APIMs addressed the questions about how different types of conversations were related to patients' and spouses' own and each other's psychological adjustment. Interactions between actor or partner effects and role (whether the participant was the patient or the spouse) were deconstructed using Case 1 from Preacher's online tool for HLM 2-way interactions (Preacher, Curran, & Bauer, 2006). A threshold of $p = .20$ was used to determine which interactions should be deconstructed to report unequal regression coefficients (simple slopes) for patients and spouses. Following recommendations by Kenny and Lederman (2010), this cautious approach was used to err on the side of allowing effects to differ between patients and spouses, rather than assuming equality where it may not have existed.

Results

EAR Compliance and Obtrusiveness

Of the waking sound files, 85.9% ($SD = 17.2$) of patients' and 85.7% ($SD = 16.7$) of spouses' sound files were coded as "valid," meaning that there were no problems with recording quality or participant compliance (i.e. participant was wearing the EAR). Research assistants coded 7.7% ($SD = 13.2$) of patients' and 9.1% ($SD = 14.7$) of spouses' waking sound files as the participant not wearing the EAR (non-compliance). Participants' reported compliance was slightly higher than the behavioral averages. Patients reported wearing the EAR an average of 89.1% ($SD= 14.5$) and their spouses reported wearing it 85.2% ($SD= 17.5$) of their waking hours over the weekend. However, self-reported and behavioral compliance were positively correlated for patients ($r = .52, p < .001$) and their spouses ($r = .59, p < .001$).

Participants also rated the obtrusiveness of wearing the EAR. Patients and spouses reported an average of ($M = 1.90, SD = 0.79$; $M = 1.89, SD = 0.58$, respectively) on a 5-point scale (1 = "not at all" through 5 = "a great deal") for the EAR's obtrusiveness into their lives and behavior (e.g. To what extent did the EAR impede your daily activities?), as well as bystanders' behavior ($M = 2.04, SD = 0.93$; $M = 2.10, SD = 0.98$, respectively; e.g. To what extent did the EAR influence the behavior of people around you?). Coded instances of talking about the EAR were used as a behavioral measure of the EAR's obtrusiveness. Patients mentioned the EAR in 1.4% ($SD= 3.0$) of their sound files and their spouses mentioned it in 0.8% ($SD= 0.7$). The behavioral and self-report measures of obtrusiveness were not significantly correlated for patients ($r = −.11, p = .45$) or their spouses ($r = −.02, p = .90$).

Description of Cancer Conversations

Patients and spouses talked, on average, 47.9% and 45.0% (respectively; $SD's = 15.0$) of their waking hours, and did not talk at significantly different rates, $F(1, 50) = 1.05, p = .31$. Interactions about cancer, however, only comprised 6.2% ($SD = 7.0$) of patients' and 2.5% ($SD = 2.9$) of spouses' conversations, which differed $F(1, 50) = 18.92, p < .001$. Further,

there was substantial range in percentage of cancer conversations among patients (0 – 35.3%) and spouses (0 – 12.6%). Figure 1 shows the mean percentage of all patients' and spouses' conversations that were about cancer, the percentage of cancer conversations with each other and friends/family, and the percentage of cancer conversations that were emotional, informational, and supportive.

Patients and their spouses also differed in with whom they talked about cancer-related topics. First, patients tended to talk about cancer equally as often with their spouses and friends/family (54.8% and 50.0% of their cancer conversations, respectively), whereas spouses tended to talk about cancer predominantly with patients (84.0% versus 24.0% with friends/family; $F(1, 50) = 17.09$, $p < .001$). These values are displayed in the second row of Figure 1. Because spouses so infrequently engaged in cancer conversations with friends and family (less than 1% of their conversations), no analyses of cancer conversations with friends and family, beyond descriptives, are reported.

Second, patients and their spouses differed in the types of conversations they had about cancer. The third row in Figure 1 shows the percentage of all conversations that were about cancer and emotionally disclosing, informational, and supportive, separated by whether the conversation occurred with each other or friends/family. The numbers in parentheses in this row reflect the percentage of all cancer conversations. Relative to their frequency of cancer conversations, patients emotionally disclosed about cancer more often than spouses ($F(1, 33) = 14.75$, $p = .001$), and spouses provided more cancer-related support ($F(1, 33) = 18.72$, $p < .001$). Partners did not differ significantly in their relative rates of informational conversations about cancer ($p = .43$).

Actor-Partner Interdependence Models

Covariates—Correlations between the outcome variables and typically relevant medical and demographic variables revealed that only patient age ($p's < .06$) and whether the patient was taking antidepressants ($p's < .01$) significantly related to patients' and spouses' outcomes. Patients' stage of cancer ($p's > .43$), time since last chemotherapy or radiation treatment ($p's > .15$), and spouses' gender ($p's > .42$) were not significantly related to psychological adjustment, and therefore were not included in the APIMs.

Total Cancer Conversations—We tested the relationship between the different types of cancer conversations and changes in psychological adjustment in a series of APIMs. Predictors were percentages of conversations that were about cancer and included all participants' data. Changes in psychological adjustment were two-month follow-up scores, residualized for baseline scores. Overall talking about cancer was not significantly related to changes in depressive symptoms ($p's > .20$). Further, the main effects of talking about cancer on changes in avoidance/intrusive thoughts were also not significant ($p's > .24$). However, the partner effect differed by role, following Kenny and Lederman's (2010) $p = .20$ threshold ($\beta = -0.46$; $p = .07$), such that patients whose spouses discussed cancer more often experienced marginally significant reductions in avoidance/intrusive thoughts about cancer ($\beta = -0.32$; $p = .07$). No pattern emerged for spouses' avoidance/intrusive thoughts ($\beta = 0.14$; $p = .46$).

Cancer-Related Emotional Disclosure—The standardized regression coefficients from APIMs of patients' and spouses' cancer conversations held with each other, and their relationship with psychological adjustment are in Table 5. Results revealed an interpersonal, rather than intrapersonal, relationship between emotional disclosure and psychological adjustment. This relationship differed between patients and spouses ($\beta = -1.40$, $p = .01$), such that spouses' emotional disclosure predicted reductions in patients' avoidance/intrusive thoughts of cancer ($\beta = -1.25$, $p = .01$), but not vice versa ($\beta = 0.14$, $p = .23$), lending support to the SCP model (Lepore & Revenson, 2007).

Cancer-Related Informational Conversations—A conceptually parallel pattern of results, but with a different outcome variable, emerged for informational conversations about cancer. There was an interaction between the partner effect of informational conversation and role on changes in depression ($\beta = -0.53$, $p = .05$), such that patients with spouses who engaged in more informational conversation experienced decreases in depressive symptoms ($\beta = -0.37$, $p = .02$), but not vice versa ($\beta = 0.17$, $p = .43$). This lends further support to the SCP model, and potentially expands it to include less emotional conversations (Lepore & Revenson, 2007).

Cancer-Related Provision of Support—Surprisingly, there were no significant positive associations between supportive interactions about cancer and psychological adjustment. There was, however, a significant interaction between the actor effect of support-giving and role on changes in depression ($\beta = 0.75$, $p = .02$), such that patients ($\beta = 0.61$, $p = .03$), but not spouses ($\beta = -0.13$, $p = .34$), who provided more cancer-related support reported increases in depression.

Discussion

This study explored the daily conversations of couples coping with breast cancer (1) to determine the feasibility of naturalistically observing couples within the sensitive context of coping with cancer, (2) to identify with whom and how they talk about cancer, and (3) to analyze how different types of cancer conversations relate to patients' and spouses' psychological adjustment. As the first study to directly observe cancer conversations in their everyday context, we found that participants were compliant with and minimally bothered by wearing the EAR. Our results further revealed that cancer was primarily discussed within the couple, rather than with members of their extended social networks, and that cancer conversations were most often informational, rather than emotional or directly supportive. Finally, for patients, having a spouse who engages in emotional or informational cancer conversations was related to improvements in psychological adjustment.

This study showed that using the EAR as a naturalistic observation tool within a sensitive coping context is feasible. Levels of participants' compliance and the obtrusiveness of the EAR were very similar to those reported in past EAR studies (Mehl & Holleran, 2007). In fact, coded non-compliance for patients (7.7%) was actually slightly lower than, and for spouses, equal to, that of two student samples (~9%; Mehl, Gosling, & Pennebaker, 2006; Mehl & Pennebaker, 2003). Overall, this indicates that despite the sensitive context of this study, breast cancer patients and their spouses were typically as willing as past healthy

samples to wear the EAR during most of their waking hours over the weekend, and were minimally bothered by it.

Descriptive findings in the present study revealed how patients and spouses typically discussed cancer in their daily lives. Patients tended to talk about cancer more frequently than their spouses, and split their cancer conversations between their spouses and other friends/family. In contrast, spouses almost exclusively talked about cancer with patients. Patients also emotionally disclosed within cancer conversations more than spouses, and spouses tended to engage in more overtly supportive interactions than patients.

Overall frequency of spouses' cancer conversations was associated with decreases in patients' avoidance/intrusive thoughts about cancer. This is consistent with the SCP model which posits that fewer social constraints on cancer discussions lead to reductions in patients' need to avoid them, thereby facilitating cognitive processing and promoting psychological adjustment (Lepore & Revenson, 2007). Considered in conjunction with the descriptive findings that patients tended to engage in more cancer-related conversations than spouses, this indicates that patients may see spouses' less involvement in cancer conversations as a social constraint to discussing cancer, and when such constraints are removed (by spouses engaging in conversation), patients no longer need to avoid the topic and experience fewer intrusive thoughts.

Interestingly, the infrequent discussion of cancer in this sample did not seem to be a marker of each partner's own avoidance of the topic. There was no significant association between frequency of talking about cancer and participants' own reports of avoidance or intrusive thoughts of cancer. Instead, we found evidence for an interpersonal association between cancer conversations and avoidance. While the frequency of cancer conversations may not be a marker of intentional avoidance of the topic, or lack thereof, spouses' engagement in cancer conversations with patients may have an interpersonal effect, such that patients feel more able to discuss cancer when they choose to do so. A closer examination of the links between cancer conversations and adjustment revealed that emotional disclosure was driving this effect, which more directly supports the SCP model (Badr et al., 2013; Lepore & Revenson, 2007).

The finding that spouses engaging patients in informational conversations about cancer was related to reductions in patients' depressive symptoms lends further support to the SCP model, and extends the model to include other substantive, but less emotional topics. Although past coping studies tended to focus on emotional cancer conversations (e.g. Badr et al., 2013; Manne et al., 2004; Pasipanodya et al., 2012), this suggests that couples' informational exchanges about cancer may also be impactful during the coping process, despite their apparent mundane quality. Just like emotional disclosure, informational conversations may also help patients make sense of and organize their cancer experience, thereby reducing its psychological impact (Helgeson et al., 1999; Lepore & Revenson, 2007). While informational conversations may contribute to patients' meaning-making surrounding cancer, they may also serve as practical support, perhaps aiding in the abundant decision-making required of cancer patients. Furthermore, the SCP model posits a cognitive pathway through which conversations can positively influence adjustment; however, an

affective pathway is likely operating in parallel. Though not tested in the present study, the process model of intimacy predicts that personal disclosure in a supportive context leads to feelings of closeness (Reis & Shaver, 1988), which in turn could facilitate psychological adjustment (Manne & Badr, 2008). Therefore, the benefits patients may receive from engagement in emotional and informational conversations about cancer are likely to stem from both cognitive and affective pathways.

An unexpected finding was that supportive interactions among couples emerged as largely unrelated to psychological adjustment. Though inconsistent with at least one study (Belcher et al., 2011), this might be best understood in light of evidence that the perception of support, more so than its mere provision, is important for successful adjustment (Helgeson & Cohen, 1996). Further, patients' provision of support to spouses in the cancer context was related to patients' own increases in depressive symptoms, indicating that they may not fare particularly well when they need to care for their spouse, rather than focusing on their own care. This should be interpreted cautiously, however, in light of the fact that this association was not predicted.

It was surprising that the data revealed no significant intrapersonal effects of emotional disclosure or informational conversation. This is particularly surprising for emotional disclosure, in light of the numerous studies that have shown its benefits for breast cancer patients (e.g. Manne et al., 2004; Stanton et al., 2000; Weihs et al., 2008). However, this null finding for emotional disclosure is consistent with at least one study among couples coping with colorectal cancer (Hagedoorn et al., 2011). It is possible that induced emotional disclosure, as in laboratory discussions (e.g. Manne et al., 2004) and the expressive writing paradigm (e.g. Pennebaker, 2004), facilitates better coping and health outcomes, but that naturally-occurring disclosure does not have the same effect (Zech and Rimé, 2005). Instead, our results suggest that for patients, having a spouse who discusses cancer in a substantive manner, whether emotionally or informationally, may be more integral to the coping process than their own levels of emotional disclosure or informational discussion.

As a first, in part, exploratory naturalistic observation study of couples coping with cancer, this study had several limitations. First, the sample size was fairly small. Therefore, replication within larger and more diverse samples of couples coping with cancer is an important future direction. Second, the participation accrual rate was slightly lower than past studies of coping with cancer. Through selective participation, then, this study might have oversampled well-adjusted patients and spouses. The ranges in both of our psychological adjustment measures suggest that a substantial number of couples in the sample were substantially distressed. However, future studies should also try to recruit couples earlier in the cancer coping process to understand how the initial impact of diagnosis affects their interactions. Third, we did not directly test the SCP model by assessing participants' perceptions of social constraints; therefore, future studies would ideally combine the EAR-assessed cancer conversations with momentary reports of perceived social constraints. Fourth, we were unable to conduct within-person analyses of engagement in cancer conversations and support processes due to the low base rates of these behaviors. It would be optimal to study, for example, whether a patient's emotional disclosure is followed by a supportive response from her spouse (Laurenceau & Bolger, 2005). Future EAR studies

should remedy this problem by extending the number of sampled days and recordings to maximize the opportunity to capture such infrequent, but important, interactions.

Finally, and perhaps most importantly, it is ultimately unclear what role gender may have played in explaining our pattern of results. The SCP model predicts that *patients* will benefit from spouses' engagement in cancer conversations; however, because all of our patients were female, and most of the spouses were male, our findings could reflect a gender, rather than a role, difference. The descriptive finding that patients emotionally disclosed more than spouses is consistent with established gender differences in disclosure (Dindia & Allen, 1992). In the same vein, the APIM results could be interpreted as women, rather than patients, tending to fare better with their (male) spouses' engagement in informational or emotional conversations about cancer. This study's inability to empirically test whether these differences were due to the gender or patient role is a limitation that should be remedied in future studies with a larger, ideally balanced, number of same sex couples and couples in which the patient is male.

Despite these limitations, this study has important implications for understanding the social ecology of cancer conversations and their links to adjustment. Using a naturalistic observation method, such as the EAR, coping researchers can study the relationship between psychosocial processes and health, bypassing potential limitations of self-reports (e.g. bias) and in-lab observational (e.g. ecological validity) studies. Though the EAR method clearly has its own set of limitations (e.g. audio-only information; focus exclusively on observable behavior at the expense of neglecting subjective experiences), it can complement more focused and controlled methods, yielding a more comprehensive understanding of the cancer experience.

This study also highlights the need for future studies to examine the role of non-cancer conversations in the coping process. Approximately 95% of patients' and spouses' conversations were not about cancer, and 9 patients and 14 spouses did not talk about cancer at all in their sampled conversations. This relative infrequency of cancer conversations may lend indirect support to Relational Regulation Theory, which posits that mundane, rather than coping-specific, interactions might be more important in the coping process than past research has implied (Lakey & Orehek, 2011). Because ordinary interactions comprise most of couples' daily life, perceptions of support may be largely derived from their quality (Algoe, Gable, & Maisel, 2010).

Future research should continue to study couples' communication processes in their natural context to further reveal how their daily interactions relate to their adjustment to cancer. As a complement to self-report and in-lab observational methods, naturalistic observation with the EAR can contribute to a more comprehensive understanding of how communication processes among couples coping with cancer are related to their psychological adjustment.

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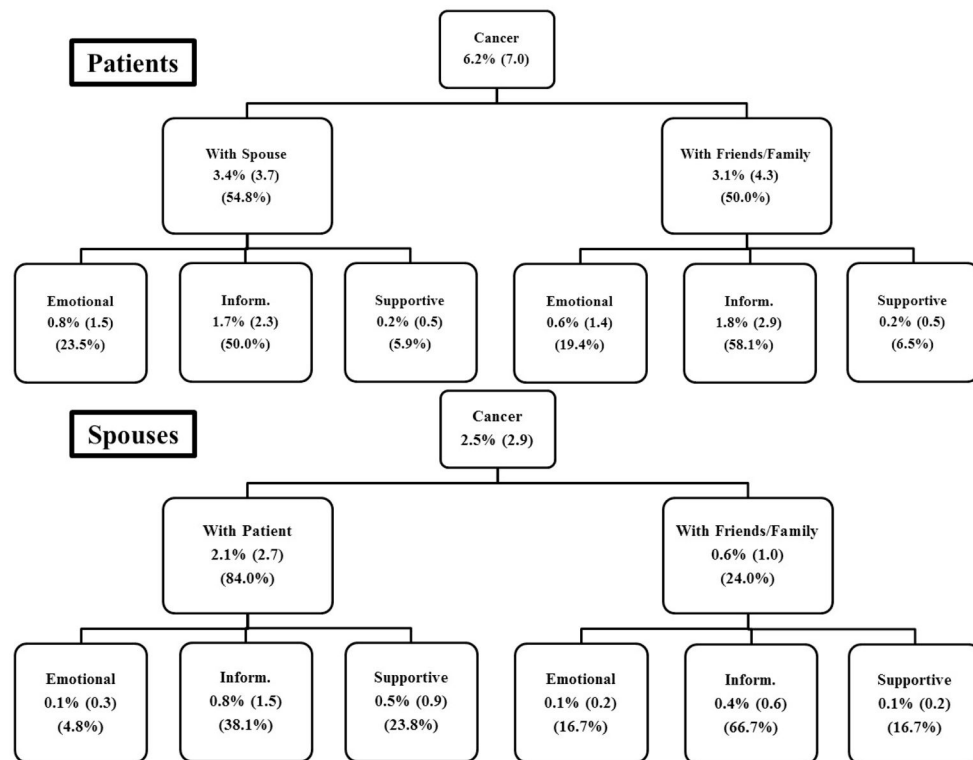
Figure 1.

Patients' and spouses' percentage of total conversations that were about cancer, and that comprised different conversation types.

Note. The first row is mean % of all conversations that were about cancer (and *SD*). The second row is % of conversations that were about cancer and with the spouse or friends/family, and numbers below in parentheses are % of cancer conversations in each social context. The last row is % of conversations that were categorized as each type of conversation, and numbers below in parentheses are % of cancer conversations with the spouse or friends/family. All means are from the entire sample.

Table 1

Demographics and Disease Characteristics.

	Mean	SD	Range
Patient Age	56	14	24 – 82
Spouse Age	59	14	26 – 94
Years Married/Partnered	23	16	0.4 – 62
Months Since Diagnosis	11	14	1 – 56

	n	%
Patient Sex:		
Female	52	100
Partner Sex:		
Male	44	86.3
Female	7	13.7
Legally Married Couples:		
	38	73.1
Patient Race:		
Caucasian	42	80.8
Latina	6	11.5
African American	2	3.8
Other/Unknown	2	3.8
Partner Race:		
Caucasian	42	82.4
Latino	8	15.7
Asian	1	2.0
Patient Education:		
Some College/Vocational	18	34.6
Bachelor's Degree	18	34.6
Post-graduate Degree	16	30.8
Partner Education:		
Some College/Vocational	21	40.5
Bachelor's Degree	10	19.6
Post-graduate Degree	20	39.2
Stage of Disease:		
0	2	3.8
I	16	30.8
II	14	26.9
III	12	23.1
IV	4	7.7
Unknown	4	7.7
Patients on Medication for Depression	16	30.8

Note. For patients, N = 52; for spouses, N = 51.

Table 2

Examples of different types of cancer-related conversations.

Type of Cancer Conversation	Example
Emotional Disclosure	**Patient:** Like I was gonna jump right out of my own skin if I had one more thing that was agitating me. And I just, I just needed to close my eyes and zone out. I had just had it. That is why I didn't call anybody yesterday. I didn't-- nothing even. And I just, I couldn't. I just knew I would either fall apart or be snappy or be whatever. **Spouse:** And then to complicate matters I had hand surgery and could hardly grip the steering wheel, but there was no one else, so it's those kinds of things, yes. Um, you can't ever foresee that, and so that would never have come up during your chemotherapy, you know, because you're so focused on 'ok it's chemo day, we've got to get there.'
Informational Conversation	**Patient:** Who? No... Xxx dies at eighty after a battle with breast cancer. That's not that old. **Spouse:** They said she was at the cancer center and uh University of Arizona Cancer Center. She'd gone online and checked her out so we knew that she'd had a fellowship at USF.
Supportive Interaction	**Patient:** You don't do, uh, hard manual work anymore. Not much. But oh yes you clean house. You clean house like a mad bandit. Especially since I've been sick. **Spouse:** I think your hair looks cute, dearest. I noticed that it's changed of course, but we'll go through and get past that, not worried about it. And if not we'll live with it the way it is, not a big deal.

Table 3

Descriptive Statistics for Adjustment Measures

	Cronbach's Alpha		T1 Mean (SD)		T3 Mean (SD)	
	T1	**T3**	**Patients**	**Spouses**	**Patients**	**Spouses**
Depressive Symptoms (CES-D)	.86	.92	11.82 (8.84)	10.93 (8.12)	10.10 (9.07)	9.36 (9.57)
Impact of Events Scale (IES)	.86	.86	2.05 (0.55)	1.97 (0.56)	1.97 (0.55)	1.88 (0.53)

Note. T1 and T3 represent the first session, before the EAR monitoring weekend, and the follow-up session two months later, respectively. A score of 16 or more on the CES-D is typically considered depressed, though this is not a diagnostic tool for clinical levels of depression. The IES is averaged on a scale from 1 to 4 (not at all to very often) for intrusive and avoidant thoughts.

Table 4

Correlations of Patients' and Spouses' Cancer Conversations and Adjustment

	1.	2.	3.	4.	5.	6.
1. Depressive symptoms change	**.19**	.07	−.16	−.19	−.16	−.10
2. Avoidance/intrusive thoughts change	.42**	**.04**	−.12	−.15	−.04	−.19
3. Conversations about cancer (% of all conversations)	.15	.04	**.47****	.56**	.81**	.64**
4. Emotional disclosure (% of all conversations)	.07	.15	.57**	**−.02**	.27	.75**
5. Informational conversations (% of all conversations)	.11	.05	.80**	.22	**.46****	.31*
6. Supportive Interactions (% of all conversations)	.11	.12	.39**	.17	.12	**.27***

Note. Numbers are Pearson correlations of participants' own scores. All conversation variables are percentages of all conversations, and are based only on conversations held within the couple. Patients' correlations are below the diagonal, Spouses' correlations are above the diagonal, and patients' and spouses' intercorrelations are on the diagonal in bold font.

*
p .05;

**
p .01

Table 5

Couples' cancer conversations with each other and their relationship to patients' and spouses' psychological adjustment.

	Depressive Symptoms Change		Avoidance/ Intrusions Change	
	Patient	**Spouse**	**Patient**	**Spouse**
Emotional Disclosure				
Patient	0.01	0.00	−0.61	0.14
Spouse	0.00	−0.86	−1.25**	−0.61
Informational Conversation				
Patient	0.16	0.17	−0.06	−0.05
Spouse	−0.37*	−0.38	−0.05	−0.06
Supportive Interaction				
Patient	0.61*	0.02	−0.21	0.52
Spouse	0.02	−0.13	−0.04	−0.21

Note. N = 52 couples. Numbers are standardized regression coefficients from Actor-Partner Inter-dependence Models, using multi-level modeling, and controlling for age and patients' use of antidepressant medication. A threshold of $p = .20$ was used to deconstruct interactions between role (patient or spouse) and main effects, and display unequal coefficients for patients and spouses. For each APIM, 4 coefficients are displayed: an actor effect for the patient (in the upper left cell for each outcome) and spouse (lower right cell), and a partner effect for the patient (lower left cell) and spouse (upper right cell). "Change" in outcome measures are two-month follow-up scores residualized for baseline scores. Because the distribution of the frequency of cancer conversations was positively skewed, we also reanalyzed the data after a $\log_{10}$ transformation. The transformed results revealed that the interpretation of our results is unchanged, therefore the untransformed results are reported here.

*
p .05;

**
p .01