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## Interpersonal Positive Reframing in the Daily Lives of Couples Coping with Breast Cancer

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### Abstract

**Objectives:** This study examined word use as an indicator of interpersonal positive reframing in daily conversations of couples coping with breast cancer and as a predictor of stress.

**Design:** The Electronically Activated Recorder (EAR) and Linguistic Inquiry and Word Count (LIWC) were used to examine naturally-occurring word use conceptually linked to positive reframing (positive emotion, negative emotion, and cognitive processing words).

**Sample:** Fifty-two couples coping with breast cancer.

**Methods:** Couples wore the EAR, a device participants wear, that audio-recorded over one weekend (>16,000 sound files), and completed self-reports of positive reframing (COPE) and stress (Perceived Stress Scale). LIWC, a software program, measured word use.

**Findings:** Both partners' word use (i.e., positive emotion and cognitive processing words) was associated with their own reported positive reframing, and spouses' word use was also indicative of patients' positive reframing. Results also revealed that, in general, words indicating positive reframing predicted lower levels of stress.

**Conclusion:** Findings supported the hypothesis that partners—and particularly spouses of breast cancer patients—may assist each other's coping by positively reframing the cancer experience and other negative experiences in conversation.

**Implications for Psychosocial Providers:** The EAR and LIWC provided a naturalistic account of positive reframing in daily life, revealing observable markers of this adaptive coping strategy that providers can identify and encourage.

### Keywords

Naturalistic observation; Electronically Activated Recorder (EAR); Linguistic Inquiry and Word Count (LIWC); word use; positive reframing

Breast cancer is generally a negative experience, but a surprising number of people report finding the “silver lining,” which tends to predict positive coping outcomes.<sup>1,2</sup> Finding the silver lining is positive reframing, defined as “construing a stressful transaction in positive terms”.<sup>3(p269)</sup> As a construal, positive reframing is largely a mental phenomenon, and therefore not readily visible in people’s behavior. However, hundreds of studies have now revealed that word use can be a window into people’s mental states and processes.<sup>4</sup> This study examined word use indicators of positive reframing among couples coping with breast cancer, using naturalistic observation, to find observable markers of everyday positive reframing.

## Positive Reframing

Women with breast cancer who engage in positive reframing tend to find some benefit in the breast cancer experience<sup>5</sup> and have lower distress.<sup>6</sup> However, how people come to adopt this coping style is unclear. One study investigated potential interpersonal antecedents to positive reframing. Among 231 breast cancer patients, greater social support predicted patients’ use of positive reframing, which in turn predicted better emotional well-being.<sup>7</sup> The authors interpreted this finding as evidence that social support may lead people to choose active coping strategies, like positive reframing, because they have the necessary psychosocial resources to actively cope with cancer. This is in-line with Thoits’ conceptualization of social support as “coping assistance.”<sup>8</sup> Thoits argued “that effective support is most likely to come from socially similar others who have faced or are facing the same stressors, and who have done so or are doing so more calmly than the distressed individual.”<sup>8(p420)</sup> Thus, spouses of breast cancer patients might be engaging in such coping assistance, as romantic partners tend to be similar<sup>9</sup> and also experience breast cancer as a stressor.<sup>10</sup> In the case of breast cancer, most patients are women and most spouses are male, which makes the coping assistance more likely, as male spouses of cancer patients tend to be less distressed than female spouses of cancer patients.<sup>11</sup>

Coping assistance may occur in interactions that are not necessarily considered social support. Literature on the social cognitive processing model has postulated that cancer patients may specifically benefit from discussing their experience with close others who can facilitate “cognitive processing by suggesting new and positive perspectives on the cancer experience”<sup>12</sup> (p. 319). In this case, this social cognitive processing would be facilitating positive reframing of cancer. Interpersonally processing one’s cancer experience entails verbal communication, which means that word use is a likely candidate for tapping into such processing.

Positive reframing has exclusively been studied using self-report measures, which inhibits the ability to examine interpersonal forms of coping. Questions remain regarding how social interactions may lead people to positively reframe the cancer experience. To answer these questions, research must examine the content of the social interactions in which spouses facilitate positive reframing. Traditionally, models of coping include social support and coping, but rarely examine the actual behavior that socially supporting and coping entails.  
11,13

## The EAR and LIWC

One way to measure social interactions and positive reframing in daily life is to use the Electronically Activated Recorder (EAR) to sample naturally-occurring word use<sup>14,15</sup> and Linguistic Inquiry and Word Count (LIWC) to analyze the types of words people use.<sup>16</sup> The EAR is programmed to sample ambient sound, and is worn comfortably by participants to observe the behaviors as they naturally unfold. LIWC is a software program that counts words and yields the percentage of words that are comprised in different psychological (e.g., positive emotion words) and linguistic (e.g., personal pronouns) categories. For example, using the EAR and LIWC, one study of women with breast cancer or rheumatoid arthritis revealed that those who swore most frequently in the presence of others tended to experience increases in depressive symptoms over a two-month period.<sup>17</sup> This association was mediated by their reported decreased emotional support, suggesting that for women in midlife who are coping with illness, swearing in the presence of others may repel social support at the expense of psychological adjustment. Another study found personal pronoun and emotion word use among non-cancer-related, everyday conversations of couples coping with breast cancer were indicative of dyadic adjustment.<sup>18</sup> These studies reveal the utility of using these tools to investigate the psychological and social correlates and consequences of word use while coping with breast cancer in everyday life.

## Present Study

This study examined word use as an indicator of interpersonal positive reframing in daily conversations of couples coping with breast cancer. We examined the degree to which word use (1) indicates intra- and inter-personal positive reframing, and (2) is associated with successful coping (lower stress) among couples coping with breast cancer.

1. Because positive reframing is conceptualized as “construing a stressful transaction in positive terms,”<sup>3(p269)</sup> we predicted it would be positively correlated with participants’ own positive emotion (e.g., happy, calm, fine) and cognitive processing words (e.g., because, think, know). The association between positive reframing and negative emotion words (e.g., angry, sad, worried) was exploratory, because reframing requires one to identify an experience as negative in the first place, yet the act of positive reframing is largely marked by positivity. We also predicted that both partners’ word use, particularly spouses’ rather than patients’, would be associated with each other’s positive reframing. This would lend support for the idea that social interactions can facilitate positive reframing,<sup>7</sup> as a form of coping assistance.<sup>8</sup> Lastly, we also hypothesized that positive reframing would be most associated with word use in cancer-related, versus non-cancer, conversations.
2. We predicted that greater positive emotion and cognitive processing word use, and less negative emotion word use, in-general would be associated with reduced perceived stress, based on past research finding that reframing a negative event in positive terms can reduce its stressfulness.<sup>18,19</sup> We also predicted that positive reframing would be associated with less stress for both partners, replicating past findings.<sup>1,2</sup>

## Method

### Participants

Participants were approached by a researcher during their regular visits to their oncologist at the Arizona Cancer Center, as described in a previous report.<sup>20</sup> Eligibility criteria for patients included women with Stage I, II, or III breast cancer, who had definitive surgery and were receiving chemotherapy or radiation. Eligibility criteria for couples included being at least 21 years of age, residence together in a marriage-like relationship, and speaking primarily English in their daily conversations. Six patients with stage 0 or IV cancer and who met all the other eligibility criteria were included to increase enrollment, due to difficulties with recruitment. Reasons for declining to participate included “too much going on,” the husband not wanting to participate, feeling uncomfortable with being recorded, feeling one is not sick or stressed enough to participate in a coping study, and having significant relationship problems.<sup>20</sup> The patients with stage 0 or IV cancer did not significantly differ from the rest of the sample on any psychological characteristics. Of the 56 consented couples, 52 patients, and 51 spouses had analyzable data. Medical and demographic information is provided in Table 1.

The data participants provided has been used to investigate the frequency and type of cancer<sup>20</sup> and non-cancer<sup>21</sup> conversations, the prevalence and interpersonal correlates of swearing<sup>17</sup>, and the degree to which emotion word and personal pronoun use in non-cancer conversations reflect dyadic adjustment.<sup>18</sup> None of the present analyses overlap with those reported in these manuscripts.

### Procedure

Participants completed a packet of questionnaires immediately before (Time 1, “T1”) and two months after wearing the EAR (Time 3, “T3”). For the EAR monitored weekend, participants were instructed to wear the EAR as much as possible 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, so they may conduct their lives as normally as possible. They were also informed the EAR would only capture about 10% of their waking day, and that it would be off for 6 hours at night. Finally, they were told they would be able to review and delete any of their sound files at the end of the study, before researchers listened to them. Participants were then given the EAR devices to wear. After the weekend, participants met with the researcher for a second session (Time 2, “T2”), where the researcher collected the EARs and administered another questionnaire packet to assess demographic and medical information. At the two-month follow-up, participants again completed baseline questionnaires, were debriefed, and then given a CD of their recordings to review them and erase any sound files they wished. One participant, a patient, deleted one sound file. Lastly, each couple received \$150 for their participation.

### Measures

**Demographic and medical information.**—All participants completed a 10-item demographics questionnaire, and the women with breast cancer also completed a 16-item questionnaire about relevant medical characteristics (Table 1).<sup>22</sup>

**EAR Device.**—The EAR hardware was an HP ipaq 100 handheld computer with software programmed to record 50 seconds every 9 minutes. Patients and spouses wore the EAR in a case clipped to their waistline, with an Olympus ME-15 external lapel microphone. The EAR recorded throughout participants' entire waking weekend, yielding an average of 176 (SD = 57) valid (i.e., participant wearing the device; no technical problems) and waking (i.e. not sleeping) sound files per participant. The EARs blacked out for 6 hours at night, starting at the time couples indicated they typically go to sleep. This procedure resulted in the collection of 18,453 waking and valid sound files.

**Word Use.**—Research assistants transcribed participants' utterances, transcripts were cleaned, and then cancer-related and non-cancer-related transcripts were input into LIWC—a software program—to yield the percentage of words that belonged to psychological and linguistic categories for each type of conversation.<sup>16</sup> Analyses for the present study focused on positive and negative emotion words and cognitive processing words. All are well-validated categories from the standard LIWC dictionary.<sup>23</sup> Output reflects the percentage of total words in cancer-related or non-cancer conversations that belong to each word category. See Table 2 for means, correlations between spouses, and examples of transcripts containing these words.

**EAR-Coded Measures.**—Each couples' sound files were coded by two independent research assistants. Sound files were coded for whether (“1”) or not (“0”) a conversation was cancer-related. “Cancer-related” included discussing anything surrounding cancer or the cancer experience, including treatment, psychological aspects, or practical matters.<sup>20</sup> Inter-coder agreement was calculated using one-way random effects intraclass correlations and was high, ICC[1;k] = .97.

Research assistants also coded a subset of sound files for positive reframing. Researchers selected transcripts that were coded as cancer conversations and contained at least one emotion word and cognitive processing word as scored by LIWC. Out of the 16,077 waking (not sleeping) and valid (no technical problems) sound files we sampled in total, participants talked in 46.43% of those sound files (7,465 sound files). Of the talking files, 4.37% (326 sound files) were about cancer, and of those sound files, we used all the sound files (n = 19) in which there was at least one emotion and one cognitive processing word. This is a small number of sound files, but it was the whole subsample of sound files that met these criteria. We used only cancer conversations for this coding to focus on the stressor most relevant for this project, and to have some consistency across the negativity of the experience. Positive reframing was defined as the process of, “perceiving something that was previously viewed as negative in a positive light, for example, as an opportunity, a chance to learn something new, a chance to gain a new skill, or to deepen a relationship” (p. 463).<sup>24</sup> Research assistants were given this definition and asked to identify whether the participant appeared to change a negative view into a positive one. The participant did not have to explicitly state what the negative experience was, as it could be inferred. Research assistants coded the subset for presence (“1”) or absence (“0”) of positive reframing. Four research assistants coded each file, and positive reframing was deemed present with a majority vote. There were 7 ties out

of the 19 identified sound files. Because this was a small subset of sound files, ties were resolved by the first author.

**Positive Reframing.**—Participants reported their use of positive reframing at T1 by completing the COPE, a commonly used measure for breast cancer coping studies.<sup>1,3,25</sup> The positive reframing subscale consists of 4 items (e.g., “I look for something good in what is happening;” “I learn something from the experience.”). Rated on a scale from 1 to 4, higher scores indicate greater use of positive reframing (means and test-retest reliability in Table 2).

**Perceived Stress.**—Patients and spouses completed the 14-item Perceived Stress Scale (PSS)<sup>26</sup> at T1 and T3 (e.g., “In the last month, how often have you felt nervous and “stressed”?). The PSS is extensively used in coping and cancer research,<sup>27</sup> and higher scores indicate more perceived stress (Table 2).

### Data Analytic Strategy

The first set of analyses correlated self-reported positive reframing, observed emotion and cognitive processing word use, and perceived stress. This was done to determine the degree of overlap between positive reframing and word use, and to examine bivariate associations with stress.

The second set of analyses employed Actor-Partner Interdependence Models<sup>28</sup> using multilevel modeling in SPSS to examine the degree to which word use and reported positive reframing are associated with participants’ own and their partners’ stress. Two separate APIMs were run per outcome to account for non-independence between partners: one for T1 stress and one for T3 stress.

Before running the APIMs, relevant medical and demographic variables were correlated with outcomes to determine which variables should be controlled, and models of T3 stress also controlled for T1 stress. Predictors and outcome variables were standardized across all participants, to yield standardized estimates in the regressions. Predictors were only included if they were at least marginally significantly related to stress in bivariate analyses at the  $p < .10$  level.

## Results

### Positive Reframing and Word Use

Sixteen out of the 19 (84.21%) selected transcripts were identified as potential positive reframing of cancer based on word use were coded as positive reframing. This validated word use as a behavioral indicator of positive reframing in daily life.

**Actor Correlations.**—Spouses’ positive emotion words in non-cancer, rather than cancer-related, conversations were associated with their own positive reframing (Table 3). Patients’ positive emotion words were not significantly associated with reported positive reframing. However, patients’ cognitive processing words in cancer conversations were significantly indicative of their reported positive reframing. Neither patients’ nor spouses’ negative emotion words were significantly associated with reported positive reframing.

**Partner Correlations.**—Spouses' non-cancer positive emotion words were marginally positively associated with patients' reported positive reframing ( $p = .06$ ). Likewise, their cancer-related positive emotion words were significantly positively associated with patients' reported positive reframing. In the same vein, spouses' cancer-related cognitive processing words were marginally associated with patients' greater positive reframing ( $p = .09$ ). However, spouses' non-cancer cognitive processing words were unexpectedly marginally associated with patients' lower reported positive reframing ( $p = .09$ ). Patients' word use was not significantly associated with spouses' positive reframing.

### Predicting Perceived Stress

**Bivariate Associations.**—Table 3 reveals that spouses' non-cancer positive emotion words were associated with both partners' lower stress levels at T1 and T3 (all four actor and partner effects). Spouses' cancer-related positive emotion words were associated only with patients', and not their own, lower stress at T1 and T3 (partner effects). Patients' cancer-related positive emotion words were marginally associated with lower stress for actors and partners at T3-only ( $p$ 's  $.10$ ). Patients' positive emotion words were not associated with stress at T1. Further, patients' non-cancer positive emotion words were not associated with stress at the bivariate level.

Negative emotion and cognitive processing words were not consistently related to perceived stress. There was a significant partner effect for spouses such that non-cancer negative emotion words were associated with spouses' greater stress at T3. Patients' cancer-related cognitive processing words were marginally associated with spouses' lower stress levels at T1 (partner effect;  $p = .09$ ). Unexpectedly, spouses' non-cancer cognitive processing words were associated with patients' greater stress at T1 (partner effect).

**APIMs.**—APIMs of perceived stress included only predictors that were at least marginally associated with stress in correlational analyses (Table 3). We ran two APIMs—one for each outcome timepoint. Both models controlled for depression medication use, and the model predicting T3 stress controlled for T1 stress. Depression medication use was the only relevant medical or demographic factor significantly associated with perceived stress at T1 ( $r_{patient} = .45, p = .001; r_{spouse} = .33, p = .02$ ) or T3 ( $r_{patient} = .39, p = .004; r_{spouse} = .32, p = .02$ ). Age, stage of cancer, and time since diagnosis were not significantly associated with stress ( $|r^2$ 's =  $.03 - .22, p$ 's =  $.14 - .73$ ).

Spouses' non-cancer positive emotion words were associated with lower T1, but not T3, stress (actor effect; Table 4). See Figure 1 for an example APIM modeling T1 stress. Two opposite partner effects emerged for spouses: patients' non-cancer positive emotion words were associated with spouses' increased stress at T3, whereas their cancer-related positive emotion words were associated with spouses' decreased stress at T3. Spouses' non-cancer cognitive processing words were associated with patients' higher T1 stress (partner effect). Further, patients' cancer-related cognitive processing words were marginally associated with their own lower T1 stress (actor effect). Negative emotion words were not significantly associated with stress. Finally, an actor effect emerged such that both partners' reported positive reframing was marginally associated with lower T1 stress.



## Discussion

This study examined word use as an indicator of interpersonal positive reframing in daily conversations of couples coping with breast cancer and as a predictor of stress. Findings supported the hypothesis that partners—and particularly spouses, rather than breast cancer patients—may assist each other's coping by positively reframing the cancer experience and other negative experiences in conversation.<sup>7,8</sup> Both partners' word use (i.e., positive emotion and cognitive processing words) was associated with their own reported positive reframing, and spouses' word use was also indicative of patients' positive reframing. Results also revealed that, in general, words indicating positive reframing were associated with lower levels of stress.

This study's results suggest that positive emotion and cognitive processing word use can indicate positive reframing among couples coping with breast cancer. First, coding revealed that positive reframing of cancer can sometimes be identified by attending to emotion and cognitive processing words in cancer conversations. More evidence for word use indicators of positive reframing was derived from correlational analyses. Spouses' positive emotion words in non-cancer conversations were associated with both partners' positive reframing, suggesting that spouses who report more positive reframing as a coping strategy tend to be more positive in general—they tended to use more positive emotion words overall, rather than only in the specific context of cancer conversations. This is consistent with emerging work revealing the importance of non-cancer interactions while couples cope with cancer.<sup>21</sup>

In cancer conversations, spouses' positive emotion and patients' cognitive processing words were associated with patients' reported positive reframing, suggesting that patients were cognitively processing the cancer experience in an interpersonal manner.<sup>12,20,29</sup> It is possible that spouses' positive emotion and cognitive processing words indicated that they were helping patients see a new, more positive perspective on having cancer, consistent with the social cognitive processing model.<sup>12</sup> This is also consistent with past studies finding that women with breast cancer, more than their partners, rely on interpersonal processing of the experience.<sup>30</sup> This supported our hypothesis that participants' own word use would reflect their own positive reframing, and that spouses would engage in more coping assistance—positively reframing—for patients than vice versa.

Despite this evidence, the relationship between positive emotion and cognitive processing word use and self-reported positive reframing was not consistent across the board. This might mean that word use is sometimes, but not always an indicator of positive reframing, but it might also mean that self-report and observational measures capture different aspects of positive reframing. The first explanation is likely because word use meaning is not the same in every context. The second is likely true because no single measure can perfectly capture positive reframing. People are able to self-report some aspects of positive reframing, but they may not remember and perfectly estimate how often they do it, relative to other people. This requires excellent attention and memory, and a knowledge of how often other people positively reframe, for reference. Because these are difficult tasks, it is likely that this observational measure of positive reframing is sometimes tapping into the variance that participants have difficulty self-reporting.

Negative emotion words were not significantly associated with reports of positive reframing. We did not make strong predictions for negative emotion words because negativity can be implied in reframing a stressful experience and may not always be verbalized. This was illustrated in the examples of positive reframing in Table 2. Some participants verbalized the negative experience (as in the cognitive processing word, cancer example), whereas others implied it without explicitly mentioning anything negative (as in the positive emotion word, cancer example).

Word use associated with positive reframing was associated with patients' and spouses' lower stress levels. The bivariate associations largely supported our hypotheses that positive emotion and cognitive processing words would predict lower stress, and the APIMs partially reinforced this. Spouses' word use indicated both partners', but mostly patients', stress and was more predictive of stress at both timepoints than patients' word use. At the bivariate level, spouses' positive emotion words were predictive of patients' stress at both timepoints, whereas in the APIMs, they were only indicative of patients' T1 lower stress. These findings are consistent with previous studies. Robbins and colleagues found that spouses' engagement in substantive discussions of cancer<sup>20</sup> and non-cancer topics<sup>21</sup> were related to patients' improved psychological adjustment among this same sample of participants. In another sample, Manne and colleagues<sup>30</sup> work revealed that spouses', more than patients', positive reappraisal and emotional expressiveness benefits the couple. Taken together, the more spouses engage patients in positive or substantive conversations—regardless of whether cancer is the topic—the less cancer tends to be a psychological burden for patients.

Patients' cancer word use, but not non-cancer word use, was marginally associated with stress at T3. This suggests that their general positivity is predictive of lower stress two months later, and may be a fruitful avenue to explore for potential interventions that target positivity in-general, rather than specifically cancer-related conversation.

Counter to prediction, self-reports of positive reframing were not significantly related to perceived stress in the APIMs. They were associated with perceived stress at the bivariate level, but the lack of robustness of these associations is surprising in light of the shared method variance between self-reported positive reframing and stress. The data suggest that the expression of positivity in-general, rather than the intentional positive reframing of cancer specifically, indicated stress.

Two findings in particular were unpredicted and are difficult to interpret. Spouses' non-cancer cognitive processing words were consistently related to patients' higher T1 stress. The authors admit they do not have a framework with which to explain this finding, except that it is possible it is a gender difference, where husbands are mansplaining<sup>31</sup>—explaining things to their wives unnecessarily. This finding could also reflect a mismatch in the type of support needed versus the type spouses are providing when discussing non-cancer-related problems, or it could be due to a third variable we have yet to uncover. This finding should be further investigated in future research. Another finding emerged in an APIM and is also difficult to explain: patients' non-cancer positive emotion words were associated with spouses' increased stress at T3. It is possible that patients' verbal emotional expression is distressing to spouses. This may reflect spouses' discomfort with the demand characteristics

of responding to patients' emotional expression, though this idea requires direct, empirical testing.

### Limitations and Future Directions

This study had several limitations. First, all associations found for patients versus spouses might also be phrased in terms of women and men, as all patients were women, and nearly all spouses were men. Future studies should recruit larger samples of same-sex couples to unpack the gender/role confound.

Another limitation is this study's small sample of couples who were predominantly white and middleclass. Because of the small sample size, all small effects were marginally significant. This is indicative of the challenges associated with employing naturalistic observation methods while people are coping with cancer. Such studies are more intensive for participants than traditional self-report studies, thus recruitment tends to be a little more difficult than other studies.

Additionally, all associations were cross-sectional, rather than longitudinal, so it is unclear, for example, how changes in one's positive emotion word use relates to changes in stress. The cross-sectional data also do not preclude the possibility that lower stress levels lead to a particular pattern of word use. Future research should study these associations more longitudinally.

Finally, the automated approaches used in this study yield rich, naturalistic data, and come with some limitations. When sampling sound from natural environments, researchers get pieces of conversations and often do not glean the whole context of each conversation. Thus, an aggregated approach is appropriate for utilizing the full body of data to predict self-reported measures of positive reframing and stress, but it also excludes some context which may be responsible for some unexpected findings. LIWC yielded the percentage of each word category across all sound files per participant, rather than within each sound file. This is an automated approach to processing this large volume of data (over 16,000 usable sound files from daily life). While this facilitates efficiency in characterizing a large dataset, it does not disentangle instances in which positive emotion and cognitive processing words co-occurred in conversation from instances when they were used separately, and it does not identify instances in which words are used with a different meaning (e.g., sarcasm).

Despite these limitations, most of the associations are consistent with past research, and add natural extensions to the literature. The associations between word use, positive reframing, and stress are particularly promising in light of the fact that the self-report and naturalistic observation measures share no method variance. Further, the rich, contextual information gained from such an intensive, observational study contributes a unique perspective that complements higher-powered studies. Such data complements other methods used in the field, contributing to the diverse perspectives on how couples cope together in their daily lives as they face breast cancer.

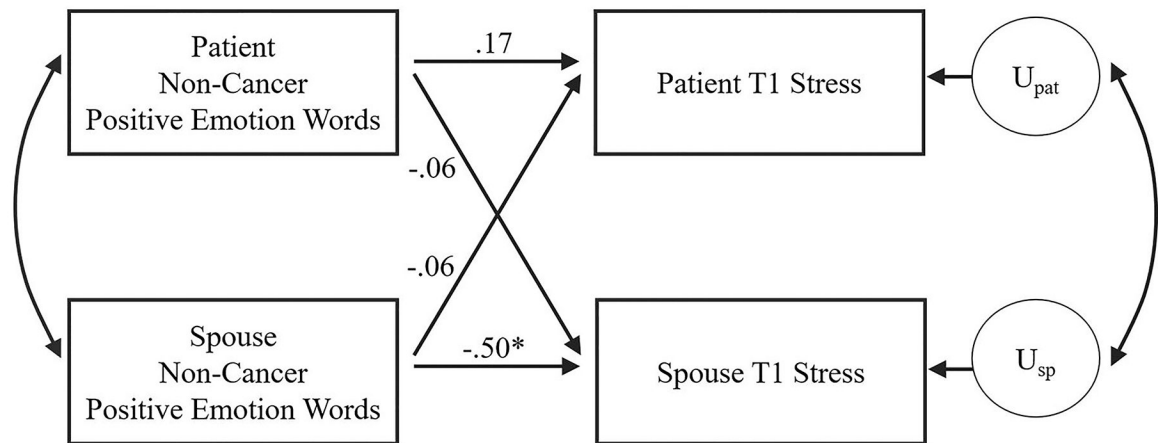
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### Implications for Psychosocial Oncology Practice

- The EAR and LIWC provided a naturalistic account of positive reframing in daily life, revealing observable markers of this adaptive coping strategy that providers can identify and encourage.
- Providers can use the knowledge that partners can help each other interpersonally reframe the cancer experience, which might help manage stress.
- Interventions should focus on patients and spouses, as coping can be a social activity. They should stress the importance of active and appropriate coping strategies to both the patient and their potentially less distressed partner or close other.



**Figure 1. Example APIM**

This example depicts one predictor (with actor and partner effects) for simplicity, though there were 4–5 predictors in each of the 2 APIMs (one model for T1 and one for T3 stress; Table 4). The paths in this APIM are a sample of the paths tested in the models in Table 4. The “U” paths represent the non-independence between partners’ unexplained variance in dependent variables.

**Table 1.**

## Demographic and Medical Descriptives.

	Mean	SD	Range
<b>Patient Age</b>	56	14	24 – 82
<b>Spouse Age</b>	59	14	26 – 94
<b>Years Married/Partnered</b>	23	16	0.4 – 62
<b>Months Since Diagnosis</b>	11	14	1 – 56
	<b>n</b>	<b>%</b>	
<b>Spouse Sex:</b>			
Male	44	86.3	
Female	7	13.7	
<b>Patient Ethnicity:</b>			
White/Caucasian	42	80.8	
Latina	6	11.5	
Black/African American	2	3.8	
Other/Unknown	2	3.8	
<b>Spouse Ethnicity:</b>			
White/Caucasian	42	82.4	
Latino	8	15.7	
Asian	1	2.0	
<b>Patient Education:</b>			
Some College/Vocational	18	34.6	
Bachelor's Degree	18	34.6	
Post-graduate Degree	16	30.8	
<b>Spouse Education:</b>			
Some College/Vocational	21	40.5	
Bachelor's Degree	10	19.6	
Post-graduate Degree	20	39.2	
<b>Cancer Stage:</b>			
0	2	3.8	
I	16	30.8	
II	14	26.9	
III	12	23.1	
IV	4	7.7	
Unknown	4	7.7	

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



Table 2.

Descriptives for EAR and self-report measures

Measure	Reliability	T1 Mean (SD)		T1 Pt. & Sp. (r)	Example
		Patients	Spouses		
<b>EAR Behavior</b>					
<b>Word Use (% of words)</b>					
Pos. Emotion Words Non-Cancer		3.65 (1.18)	3.22 (1.05)	.08	Tell yourself <b>thank</b> god it's Friday, <b>yay!</b> Take a deep breath, let's go. I'm in the mood for coffee, yeah. (Spouse)
Pos. Emotion Words Cancer		3.11 (2.03)	3.15 (2.92)	.15	Yes, that's the truth, you know, because the only way to get through this is to be <b>positive</b> and realize that it's, you know, it's all going to be <b>ok</b> . It's just a long haul. (Patient)
Neg. Emotion Words Non-Cancer		0.87 (0.39)	0.98 (0.50)	.46***	She's got <b>depression</b> and <b>anxiety</b> . And she has been mistreated by the state of Arizona. (Patient)
Neg. Emotion Words Cancer		1.12 (1.01)	0.36 (0.53)	.04	Anyway, so that's not so <b>bad</b> . I can live with that. Yeah, I mean, there's definitely some <b>crappy</b> side effects but you know what it's fine... if it means I will be done with this and hopefully it won't come back again, um, fine. (Patient)
Cognitive Proc. Words Non-Cancer		14.17 (1.91)	13.69 (2.54)	.05	<b>Because apparently</b> Xxxx is not very nurturing. He <b>thinks</b> every time kid cries it's <b>because</b> he's hungry. (Spouse)
Cognitive Proc. Words Cancer		15.74 (2.88)	13.59 (7.05)	.14	<b>Maybe</b> I'm <b>just</b> whack, but I even <b>think</b> having cancer has been... ok so it sucks, but you <b>know</b> what? It's <b>not all</b> bad. There's a <b>lot</b> to be said for it. (Patient)
<b>Self-Reports</b>	<b>Test-Retest (T1 &amp; T3 Internal (T1 a))</b>	<b>Internal (T3 a)</b>			<b>T3 Pt. &amp; Sp. (r)</b>
	(r)	<b>Patients</b>	<b>Spouses</b>		
Perceived Stress	.72*** .86	1.42 (0.70)	1.27 (0.54)	.41**	1.32 (0.66) 1.26 (0.62) .45***
Positive Reframing	.63*** .68	3.36 (0.60)	3.06 (0.62)	.21	

Note. Pt. = patient, Sp. = spouse. N = 52 patients and 51 spouses, except for word use in cancer conversations, where N = 43 patients and 36 spouses, due to some participants not talking about cancer at all in their sampled conversations (% is of cancer conversations). For self-report measures, reliability is test-retest at T1 and T3. Examples are sample transcripts from EAR sound files. Bolded words in the examples are sample words identified by LIWC that correspond to each word category listed on the left.

\*\* p .01;  
\*\*\* p .001

**Table 3.**

Positive Reframing, Word Use, and Perceived Stress Correlations

	T1 Positive Reframing			T1 Stress			T3 Stress		
	Patient	Spouse		Patient	Spouse		Patient	Spouse	
Pos. Emotion Words Non-Cancer	Patient	.15	-.03	-.11	-.09		-.06	.18	
	Spouse	.27 <sup>†</sup>	.42**	-.30*	-.24 <sup>†</sup>		-.35**	-.28*	
Pos. Emotion Words Cancer	Patient	-.16	-.03	-.17	-.23		-.26 <sup>†</sup>	-.29 <sup>†</sup>	
	Spouse	.33*	.14	-.32*	-.14		-.33*	-.04	
Neg. Emotion Words Non-Cancer	Patient	.05	-.13	.17	.13		.18	.34**	
	Spouse	-.04	-.18	.17	.22		.17	.23	
Neg. Emotion Words Cancer	Patient	.23	.15	-.04	-.02		-.01	.11	
	Spouse	-.10	-.02	-.06	.03		-.18	-.25	
Cognitive Proc. Words Non-Cancer	Patient	.05	.16	-.06	-.08		.07	-.13	
	Spouse	-.24 <sup>†</sup>	.09	.28*	-.01		.15	-.01	
Cognitive Proc. Words Cancer	Patient	.36*	.20	-.13	-.26 <sup>†</sup>		-.04	.04	
	Spouse	.29 <sup>†</sup>	.22	-.17	-.23		-.25	-.20	
Positive Reframing	Patient	-	-	-.28*	-.03		-.29*	.11	
	Spouse	-	-	-.28*	-.36**		-.25 <sup>†</sup>	-.26 <sup>†</sup>	

Note. Non-cancer word use is the percentage of words from all non-cancer conversations. Cancer word use is the percentage of all words in cancer-related conversations. Non-cancer conversations: N<sub>patient</sub> = 52, N<sub>spouse</sub> = 51; Cancer conversations: N<sub>patient</sub> = 43; N<sub>spouse</sub> = 36; due to missing data and 21 participants not talking about cancer.

<sup>†</sup> *p* .10;

\* *p* .05;

\*\* *p* .01

**Table 4.**

## Actor-Partner Interdependence Models (APIMs)

		T1 Perceived Stress		T3 Perceived Stress	
		Estimate		Estimate	
		Patient	Spouse	Patient	Spouse
Pos. Emotion Words Non-Cancer	Patient	.17 [-.21, .54]	-.06 [-.40, .29]	-.21 [-.62, .20]	.32* [.06, .57]
	Spouse	-.06 [-.40, .29]	-.50* [.04, .97]	-.26 [-.68, .16]	-.21 [-.62, .20]
Pos. Emotion Words Cancer	Patient	.02 [-.30, .33]	-.29 [-.83, .25]	.002 [-.26, .27]	-.53* [-.97, -.09]
	Spouse	-.29 [-.83, .25]	.02 [-.30, .33]	-.01 [-.28, .27]	.002 [-.26, .27]
Neg. Emotion Words Non-Cancer	Patient	-	-	.10 [-.19, .38]	.10 [-.28, .48]
	Spouse	-	-	.10 [-.28, .48]	.10 [-.19, .38]
Cognitive Proc. Words Non-Cancer	Patient	-.07 [-.49, .35]	-.09 [-.51, .33]	-	-
	Spouse	.56* [.10, 1.01]	-.07 [-.49, .35]	-	-
Cognitive Proc. Words Cancer	Patient	-.79 <sup>†</sup> [-1.63, .20]	-.35 [-1.19, .50]	-	-
	Spouse	-.35 [-1.19, .50]	-.10 [-.34, .15]	-	-
Positive Reframing	Patient	-.31 <sup>†</sup> [-.68, .05]	.31 [-.14, .76]	.03 [-.29, .35]	.14 [-.20, .49]
	Spouse	.31 [-.14, .76]	-.31 <sup>†</sup> [-.68, .05]	.14 [-.20, .49]	.03 [-.29, .35]

Models are two separate APIMs (one per outcome). Both models control for depression medication and the T3 model controls for T1 perceived stress. Words are percentage of words from all non-cancer or cancer conversations. Positive reframing is from self-reports. Estimates are the standardized main effect estimate, except where the interaction with role met the threshold of  $p < .20$ , and simple slopes were reported (yielding unequal estimates for patients and spouses). 95% confidence intervals are displayed under each estimate. Pos. = positive; Neg. = negative; Proc. = processing.

<sup>†</sup>  
 $p < .10$ ;

\*  
 $p < .05$