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Couples Communication and Cancer: Sequences and Trajectories of Behavioral Affective Processes in Relation to Intimacy

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Cancer poses a set of physical and emotional challenges to the patient, spouse, and their relationship. One challenge for couples is discussing cancer-related concerns in a manner that facilitates intimacy. Current couple-based interventions have been shown to have mixed efficacy, and little is known about how they bring about improvements. This study aims to expand our understanding of dyadic communication and intimacy to adapt and/or develop more effective interventions for couples coping with cancer. To accomplish this goal, the present study examined affective and behavioral processes associated with intimacy using the valence–affective–connection (VAC) framework and observational coding methods. Participants were 134 couples in which a patient was diagnosed with breast, colorectal, or lung cancer. Couples completed a battery of questionnaires, including a self-report measure of intimacy. Couples also completed a 15-min videotaped interaction about a cancer topic of their choosing, which was observationally coded for communication behavior and affective expression. Couples coping with cancer who reported higher versus lower intimacy engaged in qualitatively different levels, types, and patterns of communication behavior and affective expression. Specifically, couples who reported lower relationship intimacy used negative approach behavior and hard negative affect more frequently and for longer periods of time and were more likely to use avoidance-based communication. Higher intimacy couples were less likely to sustain the use of negative behavior and affect and displayed more reciprocity of positive joining affect. The study highlights important considerations for couple-based interventions and research in the context of cancer.

Keywords: couples, cancer, communication, observational coding, relationship intimacy

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A cancer diagnosis poses a set of physical and emotional challenges to the patient, including pain, side effects of treatment, and fear and uncertainty about the diagnosis itself (S. Manne & Badr, 2008; Milbury & Badr, 2013). A cancer diagnosis also affects the patient's significant other and the relationship. (We use the term "spouse" throughout to refer broadly to both spouses and nonspousal cohabiting partners, to avoid confusion with the term "partner" in the statistical sense.) For example, spouses must cope with worries about their loved ones and their ability to provide support for the patient (S. Manne & Badr, 2008). In addition, the couple may face challenges in navigating shifts in responsibilities (e.g., household and childcare), changes in their roles within the relationship, and possible changes to future plans (S. Manne & Badr, 2008). A cancer diagnosis can be destabilizing to the relationship, and couples are tasked to address the emotional and practical concerns of cancer as a team (Magsamen-Conrad et al., 2015; S. Manne & Badr, 2008).

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continued

The relationship intimacy model theorizes that intimacy—defined as feelings of being cared for and closeness between members of a couple—is a core interpersonal process linked with relational and health outcomes for couples coping with cancer (S. Manne & Badr, 2008). The model posits that dyadic communication patterns enhance or negate relationship intimacy, which subsequently affects couples' relational and psychosocial adjustment in response to cancer (S. Manne & Badr, 2008). For example, higher levels of disclosure about cancer-related concerns have been associated with higher levels of intimacy and adjustment in couples diagnosed with lung cancer and head and neck cancer (S. Manne & Badr, 2010). Conversely, higher levels of demand–withdraw interaction (an asymmetric cycle of behavior in which one spouse criticizes, demands, or nags to elicit change while the other spouse withdraws or avoids the conversation) have been associated with lower levels of intimacy and higher levels of psychological distress among couples coping with prostate cancer (S. Manne et al., 2010).

Based on the conceptual importance of maintaining intimacy through the use of constructive communication, couple-based interventions designed to improve dyadic communication have been tested in couples coping with cancer (D. H. Baucom et al., 2009; S. Manne & Badr, 2008; S. L. Manne et al., 2011). Specifically, these interventions have focused on facilitating disclosure of cancer-related thoughts and emotions, joint decision making, and validation and provision of support between patients and their spouses (D. H. Baucom et al., 2009; S. L. Manne et al., 2011). Studies have shown that these interventions can improve both relationship and psychological functioning (D. H. Baucom et al., 2009; S. Manne & Badr, 2008). However, there is also evidence that they may not be equally effective for patients and their spouses or for low- versus high-functioning couples (Badr & Krebs, 2013; S. L. Manne et al., 2011).

A more comprehensive and nuanced understanding of couples' communication patterns may be helpful in understanding why communication-focused interventions vary in their effectiveness. To date, most research on couple communication in cancer has been limited by reliance on self-report measures. Though self-report measures provide rich data regarding each individual's internal experience and perspective of their own communication, they are subject to selective attention and attribution bias (Heyman, 2001). Observational coding of communication provides an objective insight into couples' communication; however, its utilization has been limited within the context of couples coping with cancer. When assessment of observed communication has been employed, it has typically rated communication on a single dimension of positive to negative, combining affective expressions and communicative behaviors. This approach may be problematic, as collapsing the behavioral and affective dimensions of communication could obscure clinically relevant information needed in designing clinical interventions. Analyzing observed communication from a multidimensional perspective can potentially better capture specific communication patterns of affect and behavior associated with outcomes, which can then be used to identify areas of communication to target and improve in couples-based communication interventions.

The Valence–Affective–Connection Model

The valence–affective–connection model (VAC; Leo et al., 2019) proposes three dimensions of communication: positive versus negative interpersonal communication behavior, positive versus negative affective expression, and joining versus individual goals. The VAC theorizes that affective expression is distinct from communication behavior and that the combination of the two forms of communication is likely to be strongly related to relationship functioning (Leo et al., 2019). Affective expression refers to expressions related to feelings and emotions (e.g., the emotional tone of communication), while communication behavior strictly refers to the behavioral elements of communication. The distinction between affective expression and communication behavior is similar to the idea that "it's not what you said, it's how you said it." Differential combinations of affective expression and communication behavior may result in varying outcomes. For example, one spouse may request a change *(behavior)* from their significant other with warmth *(affect)*, which may lead to a better outcome compared to a spouse who is requesting a change from their significant other with anger.

The VAC further delineates communication behavior and affective expression into those that are joining versus individuating in nature, depending on the speaker's goals (Leo et al., 2019). Communication behavior and affective expression that are joining in nature tend to put the shared needs and goals of the couple or relationship above the individual's own goals and needs, which is hypothesized to facilitate relationship intimacy (Leo et al., 2019). On the other hand,

review boards) by emailing the corresponding author. Additionally, the analytic codes used to conduct the analyses presented in this study are not available in a public archive; however, they may be available by emailing the corresponding author. For study measures, the Miller Social Intimacy Scale (MSIS) is available online. Please email the corresponding author for the Asymmetric Behavior Coding System and Relational Affective Topography System.

The article resulted from Karena Leo's dissertation, which is available on ProQuest. The observational coding data set has been utilized in studies presented at the Society of Behavioral Medicine (e.g., identification of communication profiles; association between communication profiles and trajectories of psychosocial adjustment; affective expression in association with cancer stage and gender). Additionally, the observational coding data were presented in an article examining observed communication in the context of attachment and long-term health.

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individuating communication behavior and affective expression prioritize the individual's needs over the needs of the relationship or the needs of the other person, which is theorized to reduce intimacy and subsequent relationship functioning (Leo et al., 2019).

Subsequently, the multidimensionality of the VAC gives rise to differential categories of communication behavior and affective expression. Specifically, there are four categories of communication behavior: positive approach (positive valence/joining goals), negative approach (negative valence/joining goals), positive avoidance (positive valence/individuating goals), and negative avoidance (negative valence/individuating goals). For affective expression, there are five categories. Negative affective expressions can be one of two kinds: soft negative (negative valence/joining goals) and hard negative (negative valence/individuating goals). Positive affective expression can also be one of two kinds: positive joining (positive valence/joining goals) and positive individuating (positive valence/individuating goals). The fifth category is flat affect (neutral valence and goals; Leo et al., 2021). See Figure 1 for definitions and examples of codes for each category related to communication behavior and affective expression.

The Valence–Affective–Connection Model and Intimacy

The VAC theorizes that communication behaviors and affective expressions that are positive in valence and promote joining (i.e., positive approach behavior and positive joining affect) may be associated with higher relationship intimacy as they promote relationship functioning in a positive manner (Leo et al., 2019). For example, disclosure that is positive and constructive can promote increased understanding between patients and spouses, which facilitates relationship intimacy.

Communication behavior and affective expression that are positive in valence but individuating in nature (i.e., serve individual rather than relationship needs; positive avoidance behavior and positive individuating affect) may reduce immediate relationship distress but may not promote longer term intimacy as they prioritize one person's needs over the needs of the relationship. For example, when couples engage in accommodation, it is often intended to provide support or reduce immediate distress. However, it also reduces the chance of fostering understanding and resolution between patient and spouse, which may potentially hinder relationship intimacy (Leo et al., 2019).

Negative communication behavior and affective expression (i.e., negative approach behavior and soft negative affect) may also facilitate relationship intimacy in the short term if it is joining in nature, that is, if it engages the other person in a way that serves the relationship. For example, expressions of soft negative affect such as feelings of sadness may promote relationship intimacy as these expressions may elicit empathic responses from the other person, which can facilitate understanding and closeness (Fischer & Baucom, 2018). Additionally, negative approach behavior (e.g., pressures for change) may communicate distress or a need within the relationship, which can facilitate change and promote improved relationship functioning (Leo et al., 2019).

On the other hand, negative avoidance behavior as well as hard and flat affective expressions are classified as individuating (disengaging) or neutral in nature, which is theorized to be associated with low relationship intimacy. Such expressions are

Figure 1

Conceptual Description of the ABCS and RATS Categories Based on the VAC Model

Communication Behavior (ABCS)			
		Function/Communality	
Valence		Joining	Individuating
	Positive	**"Positive Approach"** Positive behaviors that promote engagement. Examples: • Disclosure • Collaboration • Validation	**"Positive Avoidance"** Positive behaviors that promote individuation. Examples: • Tough love • Accommodation • Minimization
	Negative	**"Negative Approach"** Negative behaviors that promote engagement. Examples: • Blame • Pressure for change • Emotional Protests	**"Negative Avoidance"** Negative behaviors that promote individuation. Examples: • Withdraw • Avoidance • Stonewalling

Affective Expression (RATS)				
		Function/Communality		
Valence		Joining	Individuating	Neutral
	Positive	**"Positive Joining"** Positive affective expressions that promote engagement. Examples: • Warmth • Appreciation • Kindness	**"Positive Individuating"** Positive affective expressions that promote individuation. Examples: • Happiness • Amusement • Satisfaction	**"Flat"** Neutral affective expressions. Examples: • Indifference • Boredom
	Negative	**"Soft Negative"** Negative affective expressions that pull for engagement. Examples: • Sadness • Guilt • Fearfulness	**"Hard Negative"** Negative affective expressions that promote individuation. Examples: • Anger • Frustration • Outrage	

Note. ABCS = Asymmetric Behavior Coding System; RATS = Relational Affective Topography System; VAC = valence–affective–connection.

thought to reflect reluctance to engage in the communication process, which may hinder relationship intimacy.

The Valence–Affective–Connection Model and Advances in Interaction Dynamics

Combining the conceptual innovations of the VAC and recent advances in interaction dynamics, the present study proposes using two methods of characterizing communication behavior and affective expression through observational coding by examining their *trajectories* and *sequences* over the course of a conversation. For trajectories of communication, we are examining how levels of communication behavior and affective expression change (e.g., escalate or decline) over the course of the conversation for both patients and spouses. Examining the trajectory of communication can provide unique information such as how couple-based interventions bring about change in relationship functioning (e.g., comparison of increase/decline of emotional arousal in couples completing different dyadic interventions; B. R. Baucom, Sheng, et al., 2015) as well as risk factors for low relationship satisfaction (e.g., inability for distressed couples to sustain low levels of emotional arousal throughout a conversation; Fischer et al., 2019). For sequences of communication, we are examining the back-and-forth of communication behavior and affective expression between patients and their spouses. Examining sequences of dyadic communication can increase understanding of how an individual's behavior or affect at one time point is related to their own and their spouse's behavior or affect at a future time point, which provides information regarding the antecedents and consequences of communication behavior or affective expression within- and between-partners.

Aims and Hypotheses

To our knowledge, the present study is the first to combine interaction dynamics with a multidimensional observational coding approach in the context of couples coping with cancer. The aim of this approach is to capture a more nuanced view of couples' communication patterns and their relationship to intimacy that may inform couple-based interventions. Specifically, the present study aims to evaluate associations between couples' intimacy and (a) trajectories of communication behaviors and affective expressions and (b) sequences of communication behaviors and affective expressions (both within and between patients and spouses) during couples' cancer-related conversations.

Hypothesis for Aim 1 (Trajectories of Communication)

In this aim, we examine trajectories of change in behavior and affect over the course of couple conversations and how these trajectories are related to couple intimacy. We predict that higher levels of intimacy will be associated with increases in the use of positive approach behavior, positive joining affect, or soft negative affect for both patients and spouses during the conversation. Additionally, lower levels of intimacy will be associated with increases in negative avoidance behavior, negative approach behavior, hard negative affect, or flat affect for both patients and spouses during conversation. We conduct exploratory analyses of how positive avoidance behavior and positive individuating affect change over the course of the conversation and relate to intimacy given limited research in these categories that could inform specific hypotheses.

Hypothesis for Aim 2 (Sequences of Communication)

In this aim, we examine the relationship of sequences of communication and affective expression to intimacy. Specifically, we predict that higher levels of intimacy will be associated with reciprocated patterns of positive approach behavior and positive joining affect and reciprocated patterns of positive approach behavior and soft negative affect between patients and spouses (i.e., between-partner effects). For example, we predict that in couples in which both patient and spouse report higher levels of intimacy, there will be reciprocal patterns in which positive approach behavior such as disclosure by a given dyad member (the actor) will be followed by positive joining affect (e.g., warmth) or positive approach behavior from their partner. We would also predict that in these couples, a similar pattern of reciprocity will be seen for positive approach behavior and soft negative affect.

In contrast, we anticipate that lower levels of intimacy will be associated with reciprocated patterns of hard negative affect and negative avoidance behavior; hard negative affect and negative approach behavior; flat affect and negative avoidance behavior; and flat affect and negative approach behavior between patients and spouses (i.e., between-partner effects). For example, in couples reporting lower intimacy, we predict that a given dyad member (the actor) will be more likely to engage in hard negative affect (e.g., anger, frustration) during the conversation and that subsequently their partner will be more likely to respond using negative avoidance behavior (e.g., withdrawing) or hard negative affect at the next time point and vice versa. This pattern of negative reciprocity is hypothesized to apply to the other behavior and affect combinations listed above. Examination of within-partner effects related to sequences of communication behavior and affective expression for the hypothesized combinations listed will be exploratory, given limited research to guide hypotheses.

Method

Participants

The present study utilized data from a subset of patients and their spouses ($N = 268$ individuals, 134 couples) participating in a larger longitudinal study of couple communication in cancer. This research was reviewed and approved by the Arizona State University Institutional Review Board and the Duke Health Institutional Review Board. For more details regarding participants' data, sample size and power, study procedures, and measures utilized in the larger study, please refer to the published protocol article (Langer et al., 2022). The larger study enrolled married or cohabiting couples in which one dyad member had been diagnosed with Stage II–IV breast, colorectal, or lung cancer within the past 2 years, had received or was currently receiving a form of systemic or hormone therapy, and had an oncologist-determined life expectancy of at least 6 months. Both patients and their spouses also needed to speak and comprehend English. Patients were excluded if they had cognitive impairments that limited their completion of study procedures, had logistical constraints, or were not approved for participation by their medical provider.

The average age of patients was 53.7 years old ($SD = 12.9$ years). There were 44 males, 89 females, and one individual who identified as transgender. Patients identified as 85.8% Caucasian, 3.0% African American, 4.5% Asian, and 6.6% other. 94.0% were non-Hispanic. In total, 46.3% of patients were diagnosed with breast cancer, 41.8% with colorectal cancer, and 11.9% with lung cancer; 30.6% of patients had Stage 2 cancer, 33.5% had Stage 3, and 35.8% had Stage 4. The average age of spouses was 54.0 years old (SD = 13.8 years). There were 86 male and 48 female spouses. Spouses identified as 86.6% Caucasian, 3.0% African American, 3.0% Asian, and 7.4% other. 97.0% were non-Hispanic. 93.3% of the couples were married, while 6.7% were in a committed, cohabiting relationship. The majority of couples identified being in a different-sex relationship (128 couples), while six couples identified being in a same-sex relationship.

Procedure

After providing informed consent, couples completed a baseline laboratory assessment, which included a battery of questionnaires and a 15-min videotaped cancer-related conversation. To determine the topic for the conversation, a research coordinator provided each dyad member with a list of common cancer-related issues or concerns (e.g., reaction to diagnosis, maintaining a sex life, future plans, financial concerns, fears about disease progression or death). Each dyad member was instructed to independently rank the three topics they were most interested in discussing. Couples were then asked to review their selected topics together and agree on a final topic for the conversation. Couples were instructed to discuss their chosen topic with each other as they normally would to encourage naturalistic conversation. After providing instructions and answering any questions, the research coordinator turned on the recording device and left the room for 15 min.

Measures

Intimacy

The Miller Social Intimacy Scale (MSIS; Miller & Lefcourt, 1982) was used to measure relationship intimacy. The MSIS is a 17-item self-report questionnaire that assesses for level of intimacy experienced by an individual. The measure has high reliability as well as high construct, convergent, and discriminant validity (Miller & Lefcourt, 1982). Reliability values of the MSIS in our sample were $\alpha = .876$ ($N = 127$) for patients and $\alpha = .899$ ($N = 132$) for spouses. Additionally, our sample is considered high in intimacy with a mean intimacy score of 8.04 ($SD = 1.08$), where we averaged the intimacy score across the 17 items of the MSIS. For the study, separate patient's and spouse's baseline intimacy scores were utilized for all study analyses.

Communication Behavior

The Asymmetric Behavior Coding System (ABCS; Leo et al., 2021) is based on the VAC model. The ABCS separates communication behaviors into categories of (a) positive approach (maintaining/deepening, disclosure, validation, collaboration, intimacy building, justification), (b) positive avoidance (accommodation, tough love, minimization, reassurance), (c) negative approach (blame, belligerence, contempt, dominance, emotional protests, defensiveness, pressures for change), and (d) negative avoidance (withdrawal, avoidance, stonewalling, submit, controlling the conversation). Six coders rated each behavioral code within the four specified categories on a scale from 1 (*absence of behavior*) to 7 (*extreme form of behavior*) for each of the 3-min segments of the 15-min conversations. Separate codes were generated for patients and spouses. Coders underwent at least 6 weeks of training and attended weekly meetings with the lead trainer to increase reliabilities and reduce discrepancies among coders. Interrater reliabilities were intraclass correlation coefficient, ICC = 0.94 for positive approach, ICC = 0.82 for positive avoidance, ICC = 0.99 for negative approach, and ICC = 0.94 for negative avoidance. Internal reliability of the scales was ICC = 0.84 for positive approach, ICC = 0.78 for positive avoidance, ICC = 0.93 for negative approach, and ICC = 0.92 for negative avoidance behaviors. Figure 1 displays definitions of each category of the ABCS.

Affective Expression

The Relational Affective Topography System (RATS; Leo et al., 2021) is an observational coding method developed to measure positive, negative, and flat affective expressions and is grounded in the VAC model. The affective expressions are further specified into categories of (a) positive joining (warmth, appreciation, kindness), (b) positive individuating (happiness, enthusiasm, amusement, satisfaction), (c) flat affective expression (boredom and indifference), (d) soft negative (sadness, fearfulness, loneliness, guilt, vulnerability), and (e) hard negative (anger, disgust, frustration, outrage). Ten coders rated five, 3-min segments for the 15-min conversation. For each segment, coders first indicated whether positive, negative, and/or flat affect was observed. Coders were then asked to rate the extent to which they observed each specific affective expression in each of the five categories on a scale from 0 (*no affective expression present*) to 7 (*high levels of affective expression present*). Separate codes were generated for patients and spouses. Coders went through 3 weeks of training and attended a coding meeting with the lead trainer weekly to reduce rating discrepancies and increase reliabilities. Interrater reliabilities were ICC = 0.90 for positive joining affective expression, ICC = 0.93 for positive individuating expression, ICC = 0.87 for soft negative affective expression, and ICC = 0.87 for hard negative affective expression. For the present study, analyses indicated minimal flat affective expressions displayed by both patients and spouses, such that coders were not able to reliably code for flat affect. When coders did code for flat affective expressions, there was little to no variance occurring. Therefore, flat affective expressions were excluded from all analyses. Please refer to Figure 1 for definitions of each category of the RATS.

Affective expression (RATS) and communication behavior (ABCS) were coded by two separate teams during the same time frame. At least 30% of the videos were coded by two or more coders for both affective expression and communication behavior. Additionally, the observational coding systems utilized in the present study build on and extend well-validated observational coding measures including the Specific Affect Coding System (SPAFF; Coan & Gottman, 2007) and the Couples Interaction Rating System–Revised (CIRS-2; Heavey et al., 2002). For more details regarding the conceptualization and discussion regarding

the coding systems (e.g., exploratory factor analysis), please refer to Leo et al. (2019) and Leo et al. (2021).

Transparency and Openness

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study. This study was not preregistered. Deidentified data from this study may be made available (as allowable according to the standards of the institutional review boards) by emailing the corresponding author. Additionally, the analytic codes used to conduct the analyses presented in this study are not available in a public archive; however, they may be available by emailing the corresponding author. For study measures, the Miller Social Intimacy Scale (MSIS) is available online. Please email the corresponding author for the ABCS and RATS coding systems.

Statistical Analyses

Study hypotheses were tested using multilevel modeling (MLM), as it appropriately adjusts standard errors for statistical dependency between measures that arise from the nested structure of the data. Three-level (time nested within partners nested within couples) linear mixed-effects models with random-effects parameters were estimated in Stata (StataCorp, 2019). Specifically, hypotheses for Aim 1 were tested using multivariate growth models, while hypotheses for Aim 2 were tested using repeated measures actor–partner interdependence models. More detailed information regarding each statistical method utilized is located in the results section under the appropriate headings for Aims 1 and 2.

Of note, the authors carefully considered whether to include gender when testing study hypotheses. The authors conducted distinguishability analyses to test whether male and female participants are statistically distinguishable, consistent with current methodological best practice standard (Olsen & Kenny, 2006), as an initial analytic step prior to adding gender to analyses. Distinguishability analyses are formal tests of whether a set of variables meaningfully differs across two or more groups (i.e., are the mean levels, variances, and covariances of a set of variables significantly different across gender, role, etc.). David Kenny's distinguishability test (Dingy Program; Kenny, 2015) revealed that the variables included in the present study are significantly distinguishable by role, but that male and female patients are not statistically distinguishable and that male and female spouses are not statistically distinguishable. These results suggest that there is no statistical support for analyzing male and female patients and male and female spouses separately in the present study.

Results

Zero-Order Correlations

Table 1 presents correlations and descriptive statistics for all study variables. Of note, separate correlations for patient and their spouse were generated and are presented in Supplemental Table 1.

Expected Correlation Outcomes

The majority of positive and negative affective expressions (3 of 4) were significantly and negatively associated with one

Table 1
Means, Standard Deviations, and Correlations for Affective Expression, Communication Behavior, and Intimacy

Variable category	Variable	Overall	Patient	Spouse	1	2	3	4	5	6	7	8	9
		M (*SD*)	*M* (*SD*)	*M* (*SD*)									
Affective expression	1. Positive joining	0.94 (0.61)	0.93 (0.62)	0.96 (0.59)	—								
	2. Positive individuating	1.06 (0.68)	1.11 (0.69)	1.01 (0.68)	**0.16****	—							
	3. Hard negative	0.31 (0.49)	0.33 (0.49)	0.30 (0.49)	**−0.38*****	**−0.12***	—						
	4. Soft negative	0.66 (0.59)	0.83 (0.64)	0.48 (0.48)	0.04	**−0.15***	**0.15***	—					
Communication behavior	5. Negative approach	1.36 (0.46)	1.35 (0.45)	1.38 (0.46)	**−0.23*****	−0.12	**0.44*****	0.12	—				
	6. Negative avoidance	2.00 (0.67)	1.91 (0.60)	2.10 (0.72)	**−0.17****	−0.08	**0.15***	−0.02	**0.30*****	—			
	7. Positive approach	3.03 (0.47)	3.06 (0.50)	2.99 (0.45)	0.07	−0.05	0.08	**0.13***	0.06	**−0.21*****	—		
	8. Positive avoidance	1.33 (0.40)	1.26 (0.33)	1.41 (0.44)	−0.08	0.09	**0.21*****	−0.08	**0.24*****	0.11	**0.13***	—	
	9. Intimacy	8.04 (1.08)	8.15 (1.04)	7.94 (1.11)	**0.13***	**0.23*****	**−0.29*****	−0.05	**−0.31*****	**−0.16****	0.11	−0.06	—

Note. 134 Couples (N = 268). Intimacy score was summed and averaged across the 17 items of the MSIS. MSIS = Miller Social Intimacy Scale. Significant findings with asterisks are also bolded for readability.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

another. In terms of associations between positive and negative communication behaviors, positive approach was significantly and negatively associated with negative avoidance. Half of the associations between negative affective expressions and negative behaviors (2 of 4) were significantly and positively associated with one another, while half of the correlations between positive affective expressions and negative communication behaviors (2 of 4) were significantly and negatively associated. Additionally, as expected, intimacy was significantly and positively associated with both positive affective expressions and was significantly and negatively associated with hard negative affect and both negative communication behaviors.

Unexpected Correlation Outcomes

There were no significant associations between positive affective expressions and positive communication behaviors. Further, results showed significant and positive associations between negative affective expressions and positive behaviors (2 of 4). Additionally, counter to expectation, intimacy was not significantly correlated with soft negative affect, positive approach, or positive avoidance behaviors.

Associations Between Trajectories of Communication Behaviors, Affective Expressions, and Intimacy

Hypotheses for Aim 1 were tested using a multivariate growth model where patients' and spouses' communication behavior and affective expression were regressed onto main effects for and interactions between time and intimacy. Separate models were estimated for each of the categories of communication behavior (e.g., positive approach) and affective expression (e.g., positive joining) as the dependent variable (total of eight models since flat affect was excluded). Significant interactions were decomposed by estimating simple slopes using recommended methods. α was set to .05 for all analyses. Additionally, to control for Type 1 error, the false discovery rate calculation was utilized to obtain adjusted *p* values by incorporating the number of tests run into the adjustment.

In assessing the association between intimacy and affective expression, an interaction between time and intimacy emerged for hard negative affective expression ($B = -0.03$, *p-adj* = .024). Decomposition of the interaction showed that couples who reported lower levels of intimacy were more likely to start with hard negative affective expression and maintain or increase the use of hard negative affect over the course of the conversation ($B = 0.05$, $p = .005$) compared to couples reporting higher intimacy. Time by intimacy interactions for other forms of affective expression were nonsignificant. Additionally, in assessing the association between intimacy and communication behavior, there were no significant interactions that emerged for positive approach, positive avoidance, negative approach, and negative avoidance. Please see Table 2 for complete results.

Sequences of Communication Behaviors, Affective Expressions, and Intimacy

Hypotheses for Aim 2 were tested using repeated measures actor–partner interdependence models (APIM; Cook & Kenny, 2005; Kenny & Kashy, 2014). Separate model analyses were conducted for each hypothesized combination of behavior and affect (four models: positive joining affect and positive approach behavior, soft negative affect and positive approach behavior, hard negative affect and negative avoidance behavior, hard negative affect and negative approach behavior). The outcomes for each model tested reflect a change in communication behavior or a change in affective expression, with the behavior variable (dummy coded as 0 and 1) to specify whether the outcome is an affect or behavior. Specifically, for each model, change in behavior/affect relative to the previous time point was regressed onto uncentered actor and partner behavior/affect at time = $t - 1$ (consistent with recommendation in Perry et al., 2017) as well as the main effect of and interactions with behavior, role, and intimacy. The intimacy variable was grand centered. After each APIM model was estimated, we decomposed significant interactions into their constituent simple slopes (four models estimated) to better understand the relationship of the coefficients in the models. Between-partner paths were analyzed for between-partner effects related to communication behavior, affective expression, and intimacy. Additionally, exploratory within-partner paths were analyzed and reported as they provide information about the temporal dynamics associated with intimacy.

Between-Partner Effects

Positive Joining Affect and Positive Approach Behavior. An interaction emerged between patient positive joining affect and intimacy in predicting spouses' positive joining affect. Specifically, spouses in higher intimacy relationships were more likely to reciprocate patients' positive joining affect ($B = 0.09$, $p = .052$) compared to spouses in lower intimacy relationships. Please refer to Table 3 and Supplemental Table 2 for complete results. Table 3 displays the decomposed significant interactions into their constituent simple slopes that were conducted after running the full APIM model, which is Supplemental Table 2. All other between-partner interactions involving intimacy were nonsignificant.

Soft Negative Affect and Positive Approach Behavior. An interaction between partner soft negative affect and intimacy emerged ($B = 0.05$, $p = .043$). Decomposition of the interaction revealed that spouses lower in intimacy were less likely to respond to patients' soft negative affect with their own soft negative affective expression at the next time point ($B = -0.08$, $p = .057$). See Table 4 and Supplemental Table 3.

Hard Negative Affect and Negative Avoidance Behavior. Results revealed an interaction between partner negative avoidance behavior and intimacy ($B = -0.06$, $p = .035$). Simple slope analyses indicate that participants lower in intimacy were more likely to follow their partners' negative avoidant behaviors with their own negative avoidant behaviors at the next time point ($B = 0.12$, $p = .016$) compared to participants higher in intimacy ($B = -0.02$, $p = .706$). See Table 5.

Within-Partner Effects

Hard Negative Affect and Negative Avoidance Behavior. Results showed a within-partner interaction between actor hard negative affect and intimacy ($B = -0.08$, $p = .022$). Specifically, patients and spouses who reported higher levels of intimacy were each less likely to express hard negative affect at the next time point if they previously showed hard negative affect

Table 2

Trajectories of Communication Behaviors, Affective Expressions, and Intimacy

Model variable	Positive joining			Positive individuating			Hard negative			Soft negative		
	B	*SE B*	95% CI	*B*	*SE B*	95% CI	*B*	*SE B*	95% CI	*B*	*SE B*	95% CI
Intercept	**0.93*****	0.06	[0.81, 1.05]	**1.04*****	0.07	[0.91, 1.18]	**0.31*****	0.05	[0.22, 0.40]	**0.97*****	0.06	[0.85, 1.08]
Time	−0.01	0.02	[−0.04, 0.02]	0.03	0.02	[−0.01, 0.06]	0.02	0.01	[−0.01, 0.04]	**−0.06*****	0.02	[−0.10, −0.03]
Intimacy	0.08	0.06	[−0.03, 0.19]	**0.11***	0.06	[0.00, 0.22]	**−0.15*****	0.04	[−0.24, 0.07]	−0.09	0.06	[−0.20, 0.02]
Time × Intimacy	0.01	0.02	[−0.02, 0.04]	0.01	0.02	[−0.03, 0.04]	**−0.03***	0.01	[−0.05, −0.01]	0.00	0.02	[−0.03, 0.04]
Role	0.08	0.08	[−0.08, 0.23]	−0.11	0.07	[−0.25, 0.03]	−0.08	0.06	[−0.21, 0.04]	**−0.43*****	0.08	[−0.58, −0.28]
Role × Time	−0.02	0.02	[−0.06, 0.03]	0.01	0.03	[−0.04, 0.06]	0.01	0.02	[−0.02, 0.04]	0.03	0.02	[−0.02, 0.08]
Role × Intimacy	−0.06	0.08	[−0.21, 0.08]	−0.07	0.07	[−0.21, 0.07]	0.15	0.06	[0.03, 0.26]	0.12	0.08	[−0.03, 0.27]
Role × Time × Intimacy	−0.01	0.02	[−0.05, 0.03]	0.02	0.02	[−0.03, 0.06]	0.01	0.02	[−0.02, 0.04]	−0.02	0.02	[−0.07, 0.02]
							Simple slopes (Time × Intimacy)					
						(−1 *SD*)	**0.05****	0.02	[0.02, 0.09]			
						(+1 *SD*)	−0.02	0.02	[−0.05, 0.02]			

	Positive approach			Positive avoidance			Negative approach			Negative avoidance		
	B	*SE B*	95% CI	*B*	*SE B*	95% CI	*B*	*SE B*	95% CI	*B*	*SE B*	95% CI
Intercept	**3.07*****	0.05	[2.98, 3.16]	**1.22*****	0.04	[1.14, 1.30]	**1.32*****	0.04	[1.23, 1.41]	**1.88*****	0.06	[1.76, 2.00]
Time	−0.01	0.01	[−0.03, 0.01]	0.02	0.01	[−0.00, 0.05]	0.02	0.01	[0.00, 0.05]	0.02	0.01	[−0.00, 0.05]
Intimacy	0.04	0.04	[−0.05, 0.12]	−0.03	0.04	[−0.11, 0.05]	**−0.10***	0.04	[−0.19, −0.02]	−0.10	0.06	[−0.22, 0.01]
Time × Intimacy	0.01	0.01	[−0.01, 0.03]	−0.01	0.01	[−0.04, 0.01]	−0.03	0.01	[−0.05, −0.00]	0.01	0.01	[−0.01, 0.04]
Role	−0.06	0.06	[−0.18, 0.06]	**0.17***	0.06	[0.05, 0.28]	0.04	0.06	[−0.07, 0.15]	0.14	0.08	[−0.02, 0.30]
Role × Time	0.00	0.02	[−0.03, 0.03]	−0.01	0.02	[−0.05, 0.02]	−0.02	0.02	[−0.06, 0.01]	0.01	0.02	[−0.02, 0.05]
Role × Intimacy	−0.01	0.06	[−0.12, 0.11]	0.02	0.06	[−0.09, 0.13]	0.09	0.06	[−0.02, 0.20]	0.02	0.08	[−0.14, 0.17]
Role × Time × Intimacy	−0.01	0.01	[−0.04, 0.02]	0.02	0.02	[−0.01, 0.06]	−0.01	0.02	[−0.04, 0.02]	−0.03	0.02	[−0.06, 0.01]

Note. Spouse coded as 1, patient coded as 0. Intimacy was grand centered. *SE* = standard error; CI = confidence interval. Significant findings with asterisks are also bolded for readability.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3
Simple Slopes of Within- and Between-Partners Associations: Positive Joining Affect and Positive Approach Behavior

Positive joining affect and positive approach behavior	*B*	*SE B*	95% CI
Spouse positive joining affect to spouse positive joining affect	**−0.47*****	0.04	[−0.54, −0.40]
Spouse positive joining affect to spouse positive approach behavior	0.01	0.04	[−0.06, 0.08]
Spouse positive approach behavior to spouse positive approach behavior	**−0.43*****	0.05	[−0.53, −0.33]
Spouse positive approach behavior to spouse positive joining affect	−0.04	0.05	[−0.14, 0.06]
Spouse positive joining affect to patient positive joining affect	−0.03	0.03	[−0.09, 0.04]
Spouse positive joining affect to patient positive approach behavior	−0.03	0.03	[−0.10, 0.04]
Spouse positive approach behavior to patient positive approach behavior	0.00	0.05	[−0.09, 0.10]
Spouse positive approach behavior to patient positive joining affect	0.06	0.05	[−0.04, 0.16]
Patient positive joining affect to patient positive joining affect	**−0.58*****	0.03	[−0.64, −0.51]
Patient positive joining affect to patient positive approach behavior	−0.04	0.03	[−0.11, 0.02]
Patient positive approach behavior to patient positive approach behavior	**−0.36*****	0.05	[−0.45, −0.27]
Patient positive approach behavior to patient positive joining affect	**−0.10***	0.05	[−0.19, −0.01]
Patient positive joining affect to spouse positive joining affect	**0.06***	0.03	[0.00, 0.12]
Patient positive joining affect to spouse positive approach behavior	0.00	0.03	[−0.06, 0.06]
Patient positive approach behavior to spouse positive approach behavior	0.00	0.05	[−0.09, 0.09]
Patient positive approach behavior to spouse positive joining affect	0.04	0.05	[−0.05, 0.13]
Simple slopes			
Patient Positive Joining Affect to Spouse Positive Joining Affect × Intimacy (−1 *SD*)	0.04	0.04	[−0.05, 0.12]
Patient Positive Joining Affect to Spouse Positive Joining Affect × Intimacy (+1 *SD*)	**0.09***	0.04	[−0.00, 0.17]

Note. Patient coded as 1, spouse coded as 0. Intimacy was grand centered. *SE* = standard error; CI = confidence interval. Significant findings with asterisks are also bolded for readability.
* $p < .05$. *** $p < .001$.

($B = -0.47$, $p = .000$) compared to patients and spouses who reported lower levels of intimacy ($B = -0.29$, $p = .000$). See Table 5.

Hard Negative Affective Expression and Negative Approach Behavior. For affective expression, a within-partner interaction between hard negative affect and intimacy emerged ($B = -0.09$, $p = .013$). Consistent with previous results, simple slopes revealed higher intimacy patients and spouses were less likely to sustain hard negative affect ($B = -0.68$, $p = .000$) compared to lower intimacy patients and spouses ($B = -0.48$, $p = .000$).

For communication behavior, a three-way interaction between behavior, one's own negative approach behavior, and intimacy emerged ($B = -0.16$, $p = .000$), as well as a four-way interaction of behavior by role by one's own negative approach behavior by intimacy ($B = 0.15$, $p = .009$). Simple slopes analyses revealed that patients and spouses in higher intimacy relationships were less likely to continue showing negative approach behaviors ($B = -0.90$, $p = .000$) compared to patients and spouses in lower intimacy relationships ($B = -0.84$, $p = .000$) and, consistently, that higher intimacy patients were less likely to continue displaying negative approach behaviors ($B = -0.63$, $p = .000$) compared to lower intimacy patients ($B = -0.56$, $p = .000$). All other within-partner associations involving intimacy were nonsignificant (see Table 6). In addition, please refer to Supplemental Table 2–5 for all results related to Aim 2.

Discussion

Communication Processes and Intimacy

The present study uses the VAC model as a framework for examining observed affective and behavioral processes in relation to self-reported intimacy in couples coping with cancer. This study is the first, to our knowledge, to assess communication behavior and affective expression as separate constructs during couple interactions within the context of cancer and to examine the trajectories of behavior and affect as they change over the course of a conversation and as sequences of expressions and responses between patients and their spouses.

The set of findings adds to the current literature by demonstrating that there are significant differences in the types and levels of communication behavior and affective expression used depending on the level of intimacy and roles within the relationship. Couples who reported higher levels of intimacy had a greater likelihood of reciprocating positive joining affect during a conversation than couples who reported lower levels of intimacy. Higher intimacy couples were also more likely to use lower levels of negative affective expression and negative approach behavior than lower intimacy couples, and they were less likely to sustain the use of hard negative affect and negative approach behavior if they did engage in these communication processes. These patterns were not present in lower intimacy couples.

In contrast, among both patients and spouses, those who reported lower intimacy were more likely to start a conversation with higher levels of hard negative affective expression compared to higher intimacy couples. Additionally, lower intimacy individuals were more likely to reciprocate their partners' negative avoidant behaviors, and lower intimacy spouses were less likely to reciprocate patient's soft negative affective expressions. These patterns did not occur in higher intimacy relationships.

These results demonstrate that high- and low-intimacy couples differ in the types, levels, and patterns of communication behavior and affective expression in which they engage. It may be particularly helpful to conceptualize the results in terms of the function of the communication processes within the context in which the conversations occur. A cancer diagnosis requires couples to manage

Table 4
Repeated Measures APIM: Sequences for Soft Negative Affect, Positive Approach Behavior, and Intimacy

Soft negative, positive approach	*B*	*SE B*	95% CI
Intercept	**0.47***	0.23	[0.03, 0 .91]
Behavior	**0.97*****	0.28	[0.43, 1.51]
Role	0.16	0.31	[−0.46, 0.78]
Behavior × Role	−0.22	0.40	[−1.00, 0.55]
Actor soft negative affect	**−0.73*****	0.04	[−0.82, −0.65]
Behavior × Actor Soft Negative Affect	**0.62*****	0.05	[0.51, 0.72]
Role × Actor Soft Negative Affect	0.07	0.05	[−0.03, 0.17]
Behavior × Role × Actor Soft Negative Affect	−0.04	0.07	[−0.17, 0.09]
Intimacy	0.02	0.21	[−0.39, 0.44]
Behavior × Intimacy	−0.08	0.26	[−0.59, 0.42]
Role × Intimacy	0.17	0.32	[−0.45, 0.79]
Behavior × Role × Intimacy	−0.21	0.39	[−0.98, 0.56]
Actor Soft Negative Affect × Intimacy	0.01	0.04	[−0.06, 0.08]
Behavior × Actor Soft Negative Affect × Intimacy	0.05	0.05	[−0.04, 0.14]
Role × Actor Soft Negative Affect × Intimacy	−0.05	0.05	[−0.14, 0.04]
Behavior × Role × Actor Soft Negative Affect × Intimacy	−0.01	0.06	[−0.13, 0.11]
Actor positive approach behavior	−0.09	0.05	[−0.20, 0.01]
Behavior × Actor Positive Approach Behavior	**−0.40*****	0.07	[−0.53, −0.26]
Role × Actor Positive Approach Behavior	0.00	0.08	[−0.15, 0.15]
Behavior × Role × Actor Positive Approach Behavior	0.04	0.10	[−0.15, 0.23]
Actor Positive Approach Behavior × Intimacy	0.06	0.05	[−0.04, 0.15]
Behavior × Actor Positive Approach Behavior × Intimacy	−0.03	0.06	[−0.16, 0.09]
Role × Actor Positive Approach Behavior × Intimacy	−0.11	0.08	[−0.26, 0.04]
Behavior × Role × Actor Positive Approach Behavior × Intimacy	0.10	0.10	[−0.08, 0.29]
Partner soft negative affect	−0.02	0.03	[−0.08, 0.04]
Behavior × Partner Soft Negative Affect	0.03	0.04	[−0.05, 0.11]
Role × Partner Soft Negative Affect	**0.13****	0.05	[0.03, 0.23]
Behavior × Role × Partner Soft Negative Affect	**−0.21****	0.07	[−0.34, −0.07]
Partner Soft Negative Affect × Intimacy	**0.05***	0.03	[0.00, 0.11]
Behavior × Partner Soft Negative Affect × Intimacy	−0.05	0.03	[−0.11, 0.02]
Role × Partner Soft Negative Affect × Intimacy	0.08	0.05	[−0.03, 0.18]
Behavior × Role × Partner Soft Negative Affect × Intimacy	−0.09	0.07	[−0.23, 0.04]
Partner positive approach behavior	0.06	0.05	[−0.04, 0.16]
Behavior × Partner Positive Approach Behavior	−0.03	0.06	[−0.15, 0.09]
Role × Partner Positive Approach Behavior	−0.01	0.08	[−0.16, 0.13]
Behavior × Role × Partner Positive Approach Behavior	0.02	0.09	[−0.17, 0.20]
Partner Positive Approach Behavior × Intimacy	−0.08	0.05	[−0.18, 0.01]
Behavior × Partner Positive Approach Behavior × Intimacy	0.08	0.06	[−0.04, 0.19]
Role × Partner Positive Approach Behavior × Intimacy	0.06	0.08	[−0.10, 0.21]
Behavior × Role × Partner Positive Approach Behavior × Intimacy	−0.02	0.10	[−0.22, 0.17]
Simple slopes			
Behavior × Actor Soft Negative Affect	**−0.12****	0.04	[−0.20, −0.04]
Behavior × Actor Positive Approach Behavior	**−0.49*****	0.05	[−0.60, −0.38]
Role × Partner Soft Negative Affect	**0.11****	0.04	[0.03, 0.19]
Behavior × Role × Partner Soft Negative Affect	−0.07	0.04	[−0.15, 0.01]
Partner Soft Negative Affect × intimacy (−1 *SD*)	−0.08	0.04	[−0.15, 0.00]
Partner Soft Negative Affect × intimacy (+1 *SD*)	0.04	0.04	[−0.05, 0.13]

Note. Patient coded as 1, spouse coded as 0. Intimacy was grand centered. The behavior variable is to specify whether the outcome is an affect or behavior. Behavior is coded as 0 = affect and 1 = behavior. Actor and partner behavior/affect variables are uncentered and measured at time = $t - 1$. *SE* = standard error; CI = confidence interval; APIM = actor–partner interdependence model. Significant findings with asterisks are also bolded for readability.
* $p < .05$. ** $p < .01$. *** $p < .001$.

the illness and the demands placed on their relationship by addressing emotional and practical concerns as a team (Magsamen-Conrad et al., 2015; Manne & Badr, 2008). Consequently, communication processes may change and shift as a form of adaptation. This study found that couples who reported higher levels of intimacy in their relationship were less likely to sustain the use of negative behavior and affect, and that there is more reciprocity of positive joining affect between patients and spouses. This is important because (a) high-intimacy couples engage in approach-based behaviors, regardless of whether they are negative or positive in nature, and (b) depending on the manner in which negative communication behavior and affective expression are used, they may not necessarily be detrimental but can potentially be adaptive and meaningful in eliciting change within the relationship. Essentially, being in a relationship characterized by high intimacy does not equal the absence of negative communication processes; rather, it may be the way couples use these processes that determines outcomes and functioning. Higher intimacy couples in our sample

Table 5
Repeated Measures APIM: Sequences for Hard Negative Affect, Negative Avoidance Behavior, and Intimacy

Hard negative, negative avoidance	*B*	*SE B*	95% CI
Intercept	−0.02	0.09	[−0.19, 0.15]
Behavior	**0.54*****	0.12	[0.30, 0.78]
Role	0.11	0.12	[−0.13, 0.35]
Behavior × Role	−0.15	0.17	[−0.49, 0.20]
Actor hard negative affect	**−0.38*****	0.04	[−0.46, −0.30]
Behavior × Actor Hard Negative Affect	**0.40*****	0.06	[0.29, 0.52]
Role × Actor Hard Negative Affect	**−0.14***	0.06	[−0.26, −0.02]
Behavior × Role × Actor Hard Negative Affect	0.13	0.09	[−0.04, 0.30]
Intimacy	0.09	0.08	[−0.06, 0.24]
Behavior × Intimacy	−0.01	0.11	[−0.23, 0.21]
Role × Intimacy	−0.13	0.12	[−0.36, 0.10]
Behavior × Role × Intimacy	0.15	0.16	[−0.18, 0.47]
Actor Hard Negative Affect × Intimacy	**−0.08***	0.04	[−0.16, −0.01]
Behavior × Actor Hard Negative Affect × Intimacy	0.09	0.05	[−0.01, 0.19]
Role × Actor Hard Negative Affect × Intimacy	0.02	0.05	[−0.08, 0.11]
Behavior × Role × Actor Hard Negative Affect × Intimacy	−0.06	0.07	[−0.19, 0.08]
Actor negative avoidance behavior	0.02	0.03	[−0.03, 0.08]
Behavior × Actor Negative Avoidance Behavior	**−0.29*****	0.04	[−0.37, −0.21]
Role × Actor Negative Avoidance Behavior	0.01	0.04	[−0.08, 0.10]
Behavior × Role × Actor Negative Avoidance Behavior	−0.01	0.06	[−0.13, 0.11]
Actor Negative Avoidance Behavior × Intimacy	0.01	0.03	[−0.04, 0.07]
Behavior × Actor Negative Avoidance Behavior × Intimacy	−0.04	0.04	[−0.12, 0.04]
Role × Actor Negative Avoidance Behavior × Intimacy	−0.01	0.04	[−0.09, 0.08]
Behavior × Role × Actor Negative Avoidance Behavior × Intimacy	0.04	0.06	[−0.08, 0.16]
Partner hard negative affect	0.02	0.04	[−0.06, 0.10]
Behavior × Partner Hard Negative Affect	−0.02	0.06	[−0.14, 0.09]
Role × Partner Hard Negative Affect	−0.02	0.06	[−0.14, 0.09]
Behavior × Role × Partner Hard Negative Affect	0.08	0.08	[−0.08, 0.24]
Partner Hard Negative Affect × Intimacy	−0.01	0.04	[−0.09, 0.07]
Behavior × Partner Hard Negative Affect × Intimacy	−0.08	0.06	[−0.19, 0.03]
Role × Partner Hard Negative Affect × Intimacy	−0.03	0.06	[−0.14, 0.09]
Behavior × Role × Partner Hard Negative Affect × Intimacy	0.14	0.08	[−0.02, 0.30]
Partner negative avoidance behavior	0.05	0.03	[−0.01, 0.12]
Behavior × Partner Negative Avoidance Behavior	−0.02	0.05	[−0.11, 0.07]
Role × Partner Negative Avoidance Behavior	−0.04	0.04	[−0.13, 0.05]
Behavior × Role × Partner Negative Avoidance Behavior	0.02	0.06	[−0.10, 0.14]
Partner Negative Avoidance Behavior × Intimacy	**−0.06***	0.03	[−0.12, −0.00]
Behavior × Partner Negative Avoidance Behavior × Intimacy	0.05	0.04	[−0.03, 0.13]
Role × Partner Negative Avoidance Behavior × Intimacy	0.04	0.04	[−0.05, 0.12]
Behavior × Role × Partner Negative Avoidance Behavior × Intimacy	−0.06	0.06	[−0.18, 0.05]
Simple slopes			
Behavior × Actor Hard Negative Affect	0.02	0.04	[−0.06, 0.10]
Role × Actor Hard Negative Affect	**−0.52*****	0.05	[−0.61, −0.43]
Actor Hard Negative Affect × Intimacy (−1 *SD*)	**−0.29*****	0.05	[−0.39, −0.19]
Actor Hard Negative Affect × Intimacy (+1 *SD*)	**−0.47*****	0.06	[−0.60, −0.35]
Behavior × Actor Negative Avoidance Behavior	**−0.26*****	0.03	[−0.32, −0.21]
Partner Negative Avoidance Behavior × Intimacy (−1 *SD*)	**0.12***	0.05	[0.02, 0.21]
Partner Negative Avoidance Behavior × Intimacy (+1 *SD*)	−0.02	0.04	[−0.10, 0.07]

Note. Patient coded as 1, spouse coded as 0. Intimacy was grand centered. The behavior variable is to specify whether the outcome is an affect or behavior. Behavior is coded as 0 = affect and 1 = behavior. Actor and partner behavior/affect variables are uncentered and measured at time = $t - 1$. *SE* = standard error; CI = confidence interval; APIM = actor–partner interdependence model. Significant findings with asterisks are also bolded for readability.
* $p < .05$. *** $p < .001$.

tended to use hard negative affect and negative approach behavior in a time-limited manner, likely to communicate and signal distress, elicit change, and convey the importance of the matters being discussed, which in turn may bring about change and adaptation in the context of cancer. They are also using approach-based communication, signaling the importance of engaging and addressing difficult topics and subjects related to cancer, which facilitates problem solving and understanding in the long term. This is consistent with the VAC framework and existing literature that the use of negative affect and communication behavior is not always detrimental but may provide short-term relief and benefits, as well as the idea that approach-based behaviors are characteristics of long-term relationship maintenance (Leo et al., 2019).

When comparing lower intimacy couples to higher intimacy couples, there are two key differences: (a) lower intimacy couples use negative approach behavior and hard negative affect more

Table 6
Repeated Measures APIM: Sequences for Hard Negative Affect, Negative Approach Behavior, and Intimacy

Hard negative, negative approach	*B*	*SE B*	95% CI
Intercept	0.13	0.08	[−0.02, 0.29]
Behavior	**0.78*****	0.09	[0.60, 0.97]
Role	**0.26***	0.11	[0.05, 0.46]
Behavior × Role	−0.12	0.13	[−0.38, 0.14]
Actor hard negative affect	**−0.58*****	0.04	[−0.67, −0.49]
Behavior × Actor Hard Negative Affect	**0.53*****	0.05	[0.43, 0.64]
Role × Actor Hard Negative Affect	−0.11	0.07	[−0.24, 0.02]
Behavior × Role × Actor Hard Negative Affect	0.07	0.08	[−0.09, 0.22]
Intimacy	0.02	0.06	[−0.10, 0.14]
Behavior × Intimacy	**0.14***	0.07	[0.00, 0.28]
Role × Intimacy	−0.12	0.09	[−0.29, 0.05]
Behavior × Role × Intimacy	−0.15	0.11	[−0.36, 0.06]
Actor Hard Negative Affect × Intimacy	**−0.09****	0.04	[−0.17, −0.02]
Behavior × Actor Hard Negative Affect × Intimacy	**0.11****	0.05	[0.02, 0.21]
Role × Actor Hard Negative Affect × Intimacy	0.01	0.05	[−0.09, 0.11]
Behavior × Role × Actor Hard Negative Affect × Intimacy	−0.07	0.06	[−0.20, 0.06]
Actor negative approach behavior	−0.06	0.04	[−0.14, 0.02]
Behavior × Actor Negative Approach Behavior	**−0.65*****	0.05	[−0.75, −0.55]
Role × Actor Negative Approach Behavior	−0.03	0.06	[−0.15, 0.09]
Behavior × Role × Actor Negative Approach Behavior	0.04	0.08	[−0.11, 0.19]
Actor Negative Approach Behavior × Intimacy	−0.03	0.03	[−0.09, 0.03]
Behavior × Actor Negative Approach Behavior × Intimacy	**−0.16*****	0.04	[−0.23, −0.08]
Role × Actor Negative Approach Behavior × Intimacy	0.06	0.05	[−0.03, 0.15]
Behavior × Role × Actor Negative Approach Behavior × Intimacy	**0.15****	0.06	[0.04, 0.26]
Partner hard negative affect	−0.07	0.04	[−0.15, 0.02]
Behavior × Partner Hard Negative Affect	−0.03	0.05	[−0.14, 0.07]
Role × Partner Hard Negative Affect	−0.00	0.06	[−0.13, 0.12]
Behavior × Role × Partner Hard Negative Affect	0.08	0.08	[−0.06, 0.23]
Partner Hard Negative Affect × Intimacy	0.02	0.04	[−0.06, 0.10]
Behavior × Partner Hard Negative Affect × Intimacy	−0.07	0.05	[−0.18, 0.03]
Role × Partner Hard Negative Affect × Intimacy	−0.08	0.06	[−0.20, 0.04]
Behavior × Role × Partner Hard Negative Affect × Intimacy	0.01	0.08	[−0.14, 0.17]
Partner negative approach behavior	**0.12****	0.05	[0.03, 0.21]
Behavior × Partner Negative Approach Behavior	−0.05	0.06	[−0.16, 0.06]
Role × Partner Negative Approach Behavior	**−0.13***	0.06	[−0.25, −0.01]
Behavior × Role × Partner Negative Approach Behavior	0.03	0.08	[−0.12, 0.18]
Partner Negative Approach Behavior × Intimacy	0.00	0.04	[−0.07, 0.08]
Behavior × Partner Negative Approach Behavior × Intimacy	0.03	0.05	[−0.07, 0.12]
Role × Partner Negative Approach Behavior × Intimacy	−0.04	0.05	[−0.15, 0.06]
Behavior × Role × Partner Negative Approach Behavior × Intimacy	0.00	0.07	[−0.13, 0.14]
Simple slopes			
Behavior × Actor Hard Negative Affect	−0.05	0.04	[−0.14, 0.04]
Behavior × Intimacy	**0.16****	0.06	[0.05, 0.28]
Actor Hard Negative Affect × Intimacy (−1 *SD*)	**−0.48*****	0.05	[−0.58, −0.38]
Actor Hard Negative Affect × Intimacy (+1 *SD*)	**−0.68*****	0.07	[−0.82, −0.55]
Behavior × Actor Hard Negative Affect × Intimacy (−1 *SD*)	−0.17	0.09	[−0.01, 0.35]
Behavior × Actor Hard Negative Affect × Intimacy (+1 *SD*)	−0.04	0.07	[−0.17, 0.09]
Behavior × Actor Negative Approach Behavior	**−0.71*****	0.04	[−0.79, −0.63]
Behavior × Actor Negative Approach Behavior × Intimacy (−1 *SD*)	**−0.84*****	0.08	[−0.99, −0.68]
Behavior × Actor Negative Approach Behavior × Intimacy (+1 *SD*)	**−0.90*****	0.06	[−1.01, −0.79]
Behavior × Role × Actor Negative Approach Behavior × Intimacy (+1 *SD*)	**−0.56*****	0.08	[−0.72, −0.40]
Behavior × Role × Actor Negative Approach Behavior × Intimacy (+1 *SD*)	**−0.63*****	0.09	[−0.81, −0.44]
Role × Partner Negative Approach Behavior	−0.01	0.04	[−0.09, 0.07]

Note. Patient coded as 1, spouse coded as 0. Intimacy was grand centered. The behavior variable is to specify whether the outcome is an affect or behavior. Behavior is coded as 0 = affect and 1 = behavior. Actor and partner behavior/affect variables are uncentered and measured at time = $t - 1$. *SE* = standard error; CI = confidence interval. APIM = actor–partner interdependence model. Significant findings with asterisks are also bolded for readibility.
* $p < .05$. ** $p < .01$. *** $p < .001$.

frequently and for longer periods of time than higher intimacy couples, and (b) lower intimacy couples are more likely to use avoidance-based communication rather than approach-based communication. Specifically, lower intimacy couples are more likely to persist or escalate in their use of hard negative affect and negative approach behavior, more likely to reciprocate negative avoidance behavior, and less likely to reciprocate soft negative affect. This interaction pattern in lower intimacy couples may suggest a maladaptive asymmetrical pattern of communication where one member of the dyad may use hard negative affect and negative

approach behavior to convey distress and to attempt to engage in a discussion of difficult thoughts and feelings about cancer, while their significant other may employ more avoidant behaviors in an attempt to lessen their own aversive emotional experience and downregulate the emotional intensity of the conversation. These patterns of responding are consistent with affective–behavioral patterns that are frequently observed in other types of couple conversations (e.g., general nonhealth distressed couples) and are thought to arise, in part, from competing emotional needs of the individuals within the relationship (B. R. W. Baucom & Baucom, 2021; B. R. Baucom, Dickenson, et al., 2015). Additionally, the results of the present study are consistent with and extend the literature regarding affect reciprocity in noncancer contexts. Previous research has found that both distressed and nondistressed couples engage in negative affect reciprocity; however, nondistressed couples display more positive affect reciprocity and are also better able to interrupt patterns of negative reciprocity (Gottman et al., 1998).

Clinical Implications

The results of the present study suggest that interventions that target affective expression in addition to communication behavior may be more effective in facilitating cancer-related adaptation compared to interventions that solely focus on communication behavior. For example, clinicians may help couples to become more aware of and modify their affective expressions as well as behavioral responses to each other to facilitate more productive conversations.

In addition, findings demonstrating differential patterns of communication in high- versus low-intimacy couples suggest that it would be valuable for clinicians to assess the level of intimacy to provide a context for communications and to tailor interventions to couples' needs (Halford et al., 2012). For example, clinicians may assist couples with lower relationship intimacy to reduce their use of negative affect and behavior to prevent escalation of maladaptive processes and help increase their use of approach-based affect and behavior to promote engagement. However, a similar approach would not likely be effective with high-intimacy couples if they are already engaging with one another using approach-based communication processes.

Current literature in this area has indicated the need to explore nuances of dyadic communication processes such as implicit communication strategies and patterns of reciprocity through the development of a more comprehensive coding system (Badr, 2017; Hasson-Ohayon et al., 2022). The present study provides support for the utility of a multidimensional observational coding system that incorporates the *content*, *valence*, *and function* of couple communication. Such an approach permits the identification of specific processes (e.g., inclusion of affect, differential patterns of communication as a function of relationship intimacy) that could be incorporated into existing interventions for couples coping with cancer.

Limitations and Future Directions

The findings of the study should be considered in light of several limitations. Though results showed associations between intimacy, affective expression, and communication behavior, we did not test directional relationships between intimacy and communication processes. As such, it is not possible to infer causality or directionality, and this may be a valuable avenue for future research. Additionally, the sample was primarily White, and findings may not generalize to minority couples as previous research has identified differences in communication processes across majority and minority couples (Rehman & Holtzworth-Munroe, 2006). Socioeconomic status has also been shown to influence communication processes and would be important to address in further research (Williamson et al., 2016). It would be beneficial for the present study to be replicated in more diverse populations to better understand specific communication processes unique to demographic factors, which will support the adaptation or development of more targeted and effective couple-based interventions.

Despite the limitations noted, the present study demonstrates the value of conceptualizing communication processes within a multidimensional framework in couples coping with cancer. The study offers support for taking affective processes into account when studying dyadic communication and provides nuanced insight into reciprocal patterns of behavior and affective expression between patients and spouses, trajectories of communication processes in a conversation, and differential communication patterns between high- and low-intimacy couples.

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