Does sharing good news buffer fear of bad news? A daily diary study of fear of cancer recurrence in couples approaching the first mammogram post-diagnosis

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Abstract

Objective: The core of fear of cancer recurrence (FCR)—a top concern of couples after successful breast cancer (BC) treatment—is fear of death. Daily relationship processes may be instrumental in regulating FCR as triggers of existential distress are encountered. We tested the hypothesis that daily capitalization, the process of sharing good news (capitalization attempts) to a partner perceived as responsive (responsiveness), buffers patient and spouse FCR as they confront the first mammogram post-diagnosis.

Methods: Fifty-seven early-stage BC survivors and their spouses reported daily FCR, capitalization, and positivity of the disclosed event during a 3-week diary period beginning 2 weeks before the first annual mammogram post-diagnosis. Dyadic multilevel path models estimated within-person effects of patient and spouse capitalization on same-day FCR, controlling for event positivity.

Results: Before the mammogram, capitalization attempts were unrelated to FCR, but for patients, responsiveness was predictive of greater same-day FCR. After the mammogram, for both partners, attempts were predictive of greater same-day FCR, yet responsiveness was predictive of lower FCR.

Conclusions: Findings were largely inconsistent with the hypothesis that capitalization buffers existential distress. However, results revealed novel insights about daily dyadic processes that may characterize within-person adaptation to existential threat. Potential explanations for the differential links between capitalization and FCR based on timing (before versus after threat) and capitalization component (attempts versus responsiveness) are discussed.

KEYWORDS
breast cancer, cancer, capitalization, close relationships, daily diaries, fear of cancer recurrence, oncology, responsiveness, survivorship

1 | BACKGROUND

With increasingly precise breast cancer (BC) screening and treatment methods, mortality rates have dropped by over a third in the last three decades,1 resulting in a tremendous and growing number of BC survivors. After adjuvant treatment, the transition to life as a survivor brings with it a new set of existential challenges—such as fear of cancer recurrence (FCR). FCR describes "fear, worry, or concern
relating to the possibility that cancer will come back or progress.\textsuperscript{2} FCR is a top ongoing concern of not only BC survivors, but also their intimate partners\textsuperscript{2,4} (hereafter termed spouse), consistent with the view that the impact of BC occurs within the interdependent context of close relationships.\textsuperscript{5,6} Evidence suggests that across the full spectrum of FCR severity, survivors share the same worst fear presumed to underlie the possibility of recurrence—fear of death.\textsuperscript{7}

FCR has been linked to a number of negative outcomes, including psychological distress\textsuperscript{8,9} and worse quality of life\textsuperscript{4,10}. Yet, cancer survivors cite FCR as a top unaddressed concern.\textsuperscript{4} To answer this call, more research is needed on mechanisms of natural adaptation to existential distress after successful treatment, as this could inform our knowledge of mechanisms that go awry in the case of pathological FCR—a fundamental step toward intervention development. Adaptation is defined and shaped by the nature of responses to and recovery from FCR triggers (eg, follow-up mammograms) as they ebb and flow over time. To understand mechanisms of adaptation, we must investigate the within-person processes that unfold as triggers occur. Most relevant research is cross-sectional (ie, between-person comparisons of groups, typically devoid of real-world context), and scant research has examined adaptation to FCR at this level (ie, within-person comparisons of individuals to themselves in daily life; see Soriano et al\textsuperscript{11} for an exception).

Research suggests that the process of forming and maintaining close relationships is one mechanism used to buffer death anxiety, or ward off thoughts of one’s death.\textsuperscript{12–14} It follows that close relationships may be instrumental in regulating FCR as triggers are experienced in everyday life. One interpersonal process that may buffer FCR is capitalization, which describes the process of disclosing positive events to a close other (attempt), whose response is perceived as genuine and enthusiastic (perceived partner responsiveness, hereafter termed responsiveness).\textsuperscript{15,16} Prior research has revealed benefits of capitalization on individual and relationship well-being, including less negative affect,\textsuperscript{15,17,18} less relationship conflict,\textsuperscript{19} and greater intimacy.\textsuperscript{15,17,19} Capitalizing on positive events may be one mechanism through which couples adapt to FCR in daily life, but this has not been studied.

The present study aimed to determine whether capitalization buffers FCR as couples face a naturally-occurring existential threat—the first annual mammogram after BC diagnosis. A 3-week daily diary design was used to obtain daily reports of FCR and capitalization from female patients and their spouses from 2 weeks before until 1 week after the mammogram. This design allowed us to examine the function of capitalization as couples react to this increasingly salient threat and recover when the uncertainty is replaced with relief of negative mammography results. Based on evidence that mammograms trigger increased FCR in BC survivors,\textsuperscript{20} we expected FCR to follow a nonlinear trajectory over the diary period (increasing as the mammogram approached and decreasing thereafter). Given prior evidence that close relationships buffer death anxiety\textsuperscript{12–14} and capitalization increases daily intimacy for BC patients and spouses,\textsuperscript{17} we predicted that capitalization would buffer FCR throughout the mammogram period. Specifically, we hypothesized that capitalization attempts and responsiveness would predict lower levels of same-day FCR for patients and spouses across the diary period, independent of how positive they rated the event. Keeping with the view of couples' adaptation as reciprocal and interdependent, the effects of one participant's capitalization on their partner’s FCR were also explored.

2 | METHOD

2.1 | Participants and procedure

The data for this report were drawn from a longitudinal study\textsuperscript{11} with IRB approval. Female patients were recruited from a US cancer center if they met the following inclusion criteria: (1) diagnosed with early-stage BC (Stage 0 through IIIA), (2) had recent BC surgery, (3) were in a committed romantic relationship with a partner who also agreed to participate, (4) were English-speaking, and (5) lived within an hour of the cancer center. Patients with prior cancer diagnoses were excluded. Patients who had a recent positive breast biopsy (n = 1161) and appeared eligible based on electronic medical records (n = 463) were contacted. Of these, 192 declined, 110 were ineligible, 82 were unable to be reached, and 79 provided informed consent and participated. However, 22 did not participate in the daily diary period of current focus (16 withdrew/declined and 6 had scheduling conflicts), resulting in a sample of 57 couples. Participants who did and did not complete the diary period did not significantly differ with respect to BC stage, age, race, income, or baseline FCR (see Soriano et al\textsuperscript{11} for description of baseline assessment). Sample characteristics are shown in Table S1.

The daily diary period was scheduled around each patient's first “anniversary” mammogram. It is standard for BC patients treated at this cancer center to get follow-up mammograms at the same site and receive results that same day. All patients received negative results, with the exception of one patient (excluding this couple's data did not alter the results reported here). The follow-up mammogram was on average 12.2 months (SD = 1.9) after diagnosis and 10.7 months (SD = 1.5) after surgery. The diary period began approximately 14 days before (M = 11.9, SD = 5.4) and ended 7 days after (M = 8.4, SD = 4.3) the mammogram. During this period, patients and spouses independently completed a brief online survey each evening (compliance rate: patients = 91%; spouses = 86%) within an hour of going to sleep.

2.2 | Measures

Daily FCR was measured using six items adapted from the Distress, Insight, and Severity subscales of the FCRI.\textsuperscript{9,11} In the absence of a validated daily FCR measure, these items were selected because they were among the highest-loading items in past factor analytic work.\textsuperscript{9,11} The four items from the Distress subscale assessed anxiety, sadness, anger, and helplessness related to FCR. The Insight subscale item assessed whether one “worried excessively” about recurrence. The Severity subscale item asked, “How much time today did you spend thinking about the possibility of cancer recurrence?” Each item was measured on a Likert-type scale from zero to four (higher scores indicating greater FCR). Items were summed to create a composite (possible range = 0-24). Coefficient omega, a reliability index of within-person change for multi-item daily composite measures,\textsuperscript{21,22}
indicated strong within-person reliability of patient and spouse FCR (both \( \omega = .91 \)). The full FCRI was administered approximately 1 week before the diary period, indicating that the typical patient (\( M = 7, SD = 4 \)) and spouse (\( M = 5, SD = 4 \)) had relatively low levels of global FCR severity.

After participants reported their best event of the day, they were asked, "How enjoyable was this event compared to what you experience on a typical day?" This item served as a measure of event positivity, with responses ranging from zero (much less enjoyable) to four (much more enjoyable). Next, participants reported on capitalization attempts, "Did you talk to or tell your spouse/partner about this event?", which was coded zero (no) or one (yes). When participants endorsed an attempt, they were asked about perceived partner responsiveness, "Did your spouse/partner respond with interest or enthusiasm?" Responses ranged from zero (not at all) to four (extremely). These daily capitalization measures were adapted from prior research.\(^19\)

### 2.3 Data analytic plan

Multilevel (days nested within participants) modeling was conducted in Mplus\(^{23}\) using robust maximum likelihood estimation, which provides valid inferences assuming data are missing at random. Predictors were person-mean centered to allow coefficients to reflect within-person effects.\(^22\) Due to the conditional relationship between capitalization attempts and responsiveness (ie, the latter was only assessed when the former was endorsed), separate models estimated their respective effects. In each model, attempts and responsiveness were specified as within-person predictors of same-day FCR. Between-person effects were also estimated. Actor-partner interdependence modeling\(^24\) was used to account for dependency between partners and explore both actor effects (ie, effect of one participant’s capitalization on his/her own FCR) and partner effects (ie, effect of one participant’s capitalization on his/her partner’s FCR). Using this approach, exploratory lagged analyses were also conducted to explore directionality (see Table S3).

Piecewise growth curve modeling was used to examine nonlinear FCR trajectories over the diary period. Growth curves and within-person capitalization effects were estimated separately for Week 1 (began 2 weeks before the mammogram), Week 2 (began 1 week before the mammogram), and Week 3 (began the day after the mammogram). Time was centered on the mammogram date, such that intercepts represented model-implied levels of patient and spouse FCR on that day. The distributions of patient and spouse FCR were positively skewed, with a high frequency of zero scores (patients: 62.4%; spouses: 77.1%). Negative binomial hurdle models were used to appropriately handle overdispersion and model (non-zero) counts of FCR.\(^25\) In all models, time (to control for linear trends each week) and event positivity (to discern unique effects of capitalization) were covariates. Random intercepts were estimated to allow between-person variability in FCR levels. The addition of random slopes for each capitalization effect (12 per model) resulted in model non-convergence and therefore they were not included in primary models. Because omission of random slopes can increase Type I error rates,\(^26\) we examined whether each significant capitalization effect changed after allowing it to vary in additional follow-up models.

### 3 RESULTS

Descriptive statistics and linear slopes for each variable are shown in Table S2. Examination of patient and spouse FCR trajectories revealed that, as expected, FCR increased before and decreased after the mammogram. With one exception, the linear change in FCR each week significantly differed from that of the adjacent week, supporting the piecewise analytic approach (the exception being Weeks 1 and 2 for patients, \( P = .10 \); data not shown). All effects reported below are independent of FCR trajectories and daily event positivity. Results of the exploratory lagged analyses are shown in Table S3.*

#### 3.1 Capitalization attempts and fear of recurrence

Results are displayed in the top of Table 1. The model-implied level of FCR on the mammogram date was 4.41 and 2.68 for patients and spouses, respectively. The random intercept variances (patients = 0.34; spouses = 0.49) indicated that on the day of the mammogram, approximately 95% of patients had FCR scores between 1.38 and 14.06 and approximately 95% of spouses had scores between 0.66 and 10.77.

Before the mammogram (Weeks 1 and 2), contrary to our hypothesis, there was no evidence of an association between patient or spouse attempts and same-day FCR. Following the mammogram (Week 3), the actor effects were similar for patients and spouses and thus were constrained to be equal; a Satorra-Bentler \( \chi^2 \) difference test\(^27\) indicated this constraint was acceptable \( (\chi^2 (1, N = 56) = 0.18; P = .67) \). In Week 3, contrary to hypothesis, there was a significant and positive association between each partner’s attempts and own FCR. This effect indicated that on a day a participant told his/her partner about a positive event, he/she was predicted to have a 63% greater FCR score that same day. When a random slope for this effect was estimated, it remained statistically significant \( (P = .03) \).

The only significant partner effect was found for spouses in Week 3, indicating that on a day a patient told her spouse about a positive event, the spouse was predicted to have a 48% lower FCR score compared with a day that the patient did not share. However, after allowing this effect to vary from person-to-person in a follow-up analysis, the effect was no longer statistically significant \( (P = .23) \).

Between-person effects reflect associations between average levels of capitalization attempts and FCR across the diary period. Neither the patient \( (y = -.015, z = -.040, P = .69) \) nor spouse \( (y = .31, z = .42, P = .68) \) actor effect was significant at the between-person level. The between-person partner effects for patients \( (y = .03, z = .08, P = .94) \) and spouses \( (y = .61, z = .73, P = .47) \) were also not significant.

#### 3.2 Perceived partner responsiveness and fear of recurrence

Results are displayed in the bottom of Table 1. Partner effects were initially included, but none were statistically significant and were thus removed for parsimony, resulting in similar model fit \( (\chi^2 (6, N = 53) = 2.43; P = .88) \) and the same pattern of results. The fixed and random intercepts were similar to results for attempts (intercept variance: patients = 0.30; spouses = 0.36).
TABLE 1  Dyadic multilevel path modeling results

<table>
<thead>
<tr>
<th>Effect</th>
<th>Estimate</th>
<th>SE</th>
<th>Rate Ratio</th>
<th>P</th>
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<td><strong>Outcome: Patient fear of recurrence</strong></td>
<td></td>
<td></td>
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<tr>
<td>Patient capitalization attempt</td>
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<tr>
<td>Week 1</td>
<td>0.057</td>
<td>0.172</td>
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<td>Week 2</td>
<td>0.138</td>
<td>0.138</td>
<td>1.148</td>
<td>.318</td>
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<tr>
<td>Week 3</td>
<td>0.488**</td>
<td>0.180</td>
<td>1.629</td>
<td>.007</td>
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<tr>
<td>Spouse capitalization attempt</td>
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<tr>
<td>Week 1</td>
<td>0.067</td>
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<td>.583</td>
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<tr>
<td>Week 2</td>
<td>−0.070</td>
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<td>0.057</td>
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<td>.792</td>
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<td>0.980</td>
<td>.692</td>
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<tr>
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<td></td>
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<tr>
<td>Spouse capitalization attempt</td>
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<tr>
<td>Week 1</td>
<td>−0.191</td>
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<tr>
<td>Week 3</td>
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<td>0.180</td>
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<td>.007</td>
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<td>Patient capitalization attempt</td>
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<td>0.546</td>
<td>0.408</td>
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<td>Week 2</td>
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<td>Event positivity</td>
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<td>0.093</td>
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<td><strong>Outcome: Patient fear of recurrence</strong></td>
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<td></td>
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<tr>
<td>Patient perceived partner responsiveness</td>
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<td>Week 1</td>
<td>0.253†</td>
<td>0.129</td>
<td>1.288</td>
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<tr>
<td>Week 2</td>
<td>0.456**</td>
<td>0.158</td>
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<tr>
<td>Week 3</td>
<td>−0.421**</td>
<td>0.127</td>
<td>0.656</td>
<td>.001</td>
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<tr>
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<td>−0.033</td>
<td>0.050</td>
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<td>.514</td>
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<tr>
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<td><strong>Outcome: Spouse fear of recurrence</strong></td>
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<td></td>
</tr>
<tr>
<td>Spouse perceived partner responsiveness</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Week 1</td>
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<td>0.822</td>
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<tr>
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<td>1.021</td>
<td>.914</td>
</tr>
<tr>
<td>Week 3</td>
<td>−0.421**</td>
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<td>0.656</td>
<td>.001</td>
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<tr>
<td>Event positivity</td>
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<tr>
<td>Intercept</td>
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<td>0.149</td>
<td>3.435</td>
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</table>

Note. Time (represented by three linear slopes for each week; not shown) was a covariate in all models. Between-person effects were also estimated (reported in text). N = 56 and 53 couples for the top and bottom panel, respectively.

†P < .10.
*P < .05.
**P < .01.
***P < .001.

*Coefficient estimates are exponentiated for interpretation as rate ratios and intercepts as model-implied FCR counts on the mammogram date.

In Week 1, contrary to our hypothesis, there was a marginally significant and positive association between responsiveness and FCR for patients. This effect remained marginal (P = .06) after estimating its random effect. In Week 2, this positive effect for patients was larger and statistically significant. On a day a partner rated her partner as one unit more responsive to capitalization, she was predicted to have a 58% greater FCR score that day. This effect remained statistically significant (P = .04) after estimating its random effect. In Weeks 1 and 2, for spouses, responsiveness was unrelated to FCR.

In Week 3, consistent with our hypothesis, a significant negative association between responsiveness and FCR was found for both patients and spouses. This effect was constrained to be equal across patients and spouses, as they were similar, and this resulted in similar model fit (χ²(1, N = 53) = 0.14; P = .71). On a day a participant rated his/her partner as one unit more responsive, he/she was expected to have a 34% lower FCR score that day. This effect remained statistically significant (P = .01) after estimating its person-to-person variability.

Neither patient (γ = −0.19, z = −0.93, P = .36) nor spouse (γ = −0.10, z = −0.40, P = .69) actor effect of responsiveness was significant at the between-person level. The between-person partner effect for patients (γ = 0.12, z = 0.81, P = .42) and spouses (γ = 0.41, z = 1.19, P = .24) was also not significant.

4 | CONCLUSIONS

This was the first study to examine daily within-person adaptation as BC patients and spouses interact, respond to, and recover from a significant existential threat—the first annual mammogram after diagnosis. Given theory and evidence suggesting intimate connections buffer existential distress,12-14 this daily diary study investigated the hypothesis that capitalization (attempts and perceived partner responsiveness) would attenuate FCR as couples confront the mammogram. The expected benefits of capitalization were only observed for responsiveness after the mammogram—when couples begin to stabilize and FCR returns to “normal” after receiving negative results. Here, on days partners were perceived as more responsive, patients and spouses reported lower FCR, consistent with past work showing the benefits of capitalization on well-being.15,19,28 The remaining findings were largely inconsistent with our hypothesis, yet reveal novel insights about daily dyadic processes that characterize within-person adaptation to existential threat.

Our findings differed unexpectedly with respect to timing (before versus after the mammogram) and capitalization component (attempts versus responsiveness). Before the mammogram, attempts were unrelated to FCR and for patients, responsiveness was linked to greater FCR. Following the mammogram, attempts and responsiveness were both related to patient and spouse FCR, but in opposing directions. During this time, for both partners, responsiveness predicted lower FCR (as hypothesized) and attempts predicted greater FCR.

To our knowledge, this is the first documentation of undesirable outcomes of capitalization.15,28 The first “anniversary” mammogram is a unique post-diagnosis experience—the existential distress that it arouses may be accompanied by unique vulnerabilities and needs distinct from typical daily life. If, indeed, capitalization causally influences FCR, as hypothesized (but not directly tested in this observational study), then the unexpected positive association between these variables may be explained by a mismatch between capitalization and the mechanisms by which heightened existential
distress is naturally soothed. Couples may be especially vulnerable at this time to seemingly small triggers—for example, capitalization may exacerbate fear by highlighting all one treasures and could lose. Future-oriented discussions of positive events (eg, planning a vacation) may be especially likely to trigger thoughts of recurrence (eg, “What if something happens to me before then?”). The existential needs of couples around the mammogram may be viewed through the lens of Terror Management Theory (TMT). TMT posits several mechanisms to manage death anxiety, including enhancing self-esteem and maintaining long-term relationships. These mechanisms theoretically work in tandem, such that when one is threatened or supported, the other activates or deactivates, respectively. Relationship processes are theorized to buffer existential distress to the extent that they facilitate maintenance of emotionally meaningful and long-term bonds. Death anxiety can lead to pursuit of this goal, and threats to this goal can lead to death anxiety. From this perspective, interactions about minor daily events may actually be at odds with the existential drive for deep, meaningful connection. This potential mismatch between capitalization content and need for meaningful connection may contribute to greater FCR. It is also plausible that a patient may interpret increased responsiveness as an inauthentic attempt to support her—the TMT and social support literatures suggest that greater responsiveness would increase FCR to the extent that it undermines patient autonomy, self-esteem, or perceived regard.

Finally, also unexpected were the differential effects found before versus after the mammogram and for attempts versus responsiveness. TMT suggests distinct effects of death awareness within versus outside of conscious awareness, and the latter are often investigated by inserting a time lag between the death salience task and outcome measurement. Perhaps after the mammogram, explicit existential distress shifts out of conscious awareness, but lingers on an implicit level. Further, the two capitalization components may serve different existential functions—sharing positive events may more likely meet existentially driven needs for self-esteem, while perceiving one’s partner as responsive and interested may more likely meet needs for connectedness and relationship commitment. Note that these interpretations are purely speculative and in line with our original view of capitalization influencing FCR, but the reverse (FCR influencing capitalization) remains a viable alternative interpretation.

### 4.1 Study limitations

Several study limitations are noteworthy and offer plausible methodological explanations for our findings. First, while capitalization was linked to greater same-day FCR, it remains possible that it is adaptive in the long term. Current models shed little light on these subtle temporal details, but future research should supplement daily snapshots with additional longitudinal data to explore delayed or cumulative effects of these adaptation mechanisms. Second, the positive association between FCR and capitalization could stem from a tendency toward capitalization on particularly high-FCR days. FCR and capitalization were assessed concurrently, and the direction of influence cannot be determined, as noted previously. Third, the sample was relatively homogenous with respect to race, ethnicity, income, and FCR severity. Future studies should make special efforts to recruit more diverse and distressed couples to improve generalizability. Fourth, future studies must examine these effects in mixed-gender patients in order to disentangle the effects of role and gender. Finally, TMT emphasizes differential effects of self-report and implicit measures of death fears. In this view, the daily FCR measure used here only accesses concerns within conscious awareness. Future studies should explore implicit measurement of FCR in daily life.

### 4.2 Clinical implications

This study adds to a growing literature supporting the view that close relationships are central to treating cancer survivorship concerns. Our findings highlight the complex role of daily dyadic interactions in the natural adaptation to existential distress in survivorship. Adaptation mechanisms involve spouse responses to not only negative events, but also positive events. Our findings highlight the importance of attending to context (high versus low threat) when drawing clinical implications from empirical research. Drawbacks of capitalization have not been reported elsewhere, and there is little prior work examining within-person adaptation to existential threats encountered in survivorship; yet our findings would have been missed if cross-sectional global assessments were used. Psychosocial interventions are intended to alter maladaptive within-person processes and thus are likely to be successful to the extent that they are supported by similarly within-person and ecologically valid data.

### ACKNOWLEDGEMENTS

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### CONFLICT OF INTEREST

The authors have declared no conflicts of interest.

### ENDNOTE

First, we conducted identical analyses to those reported, but with next-day FCR as the outcome (controlling for same-day FCR). For capitalization attempt, none of the actor effects were statistically significant, but there was a significant spouse partner effect in Week 3 in a direction consistent with the primary concurrent results (ie, after the mammogram, on a day a patient made a capitalization attempt, her spouse was predicted to have lower FCR the next day). For responsiveness, the only significant effect that emerged was the patient actor effect in Week 1, which also was consistent with the primary concurrent results (ie, on a day a patient perceived more partner responsiveness, she was predicted to have greater FCR the next day). Next, we examined the effects of FCR on next-day capitalization to explore the alternative hypothesis that FCR leads to changes in capitalization. The only significant effect that emerged for capitalization attempt was the spouse partner effect in Week 2 (this positive effect was not significant in concurrent results). No significant effects of FCR on next-day responsiveness were found. Taken together, several of the concurrent effects seemed to carry over to next-day FCR, but most did not, and even less evidence was found for effects of FCR on next-day capitalization. Therefore, these results failed to unambiguously support either hypothesis of directionality (capitalization preceding FCR or vice versa).

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REFERENCES


SUPPORTING INFORMATION

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