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Social Constraints and Fear of Recurrence in Couples Coping with Early-Stage Breast Cancer

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Abstract

Objective—Fear of cancer recurrence (FCR) is a top concern of breast cancer (BC) survivors and their spouses. FCR often occurs within an interpersonal context, yet there has been little research on relationship processes that may influence FCR in patients and spouses. It was hypothesized that the inhibition of disclosure of cancer-related concerns, thoughts, and feelings because of perceived partner disinterest or avoidance (termed *social constraints*) would predict greater FCR in BC patients and their spouses both globally and in the context of everyday life.

Method—Two studies, one cross-sectional ($N = 46$ couples) and one daily diary (21 days; $N = 72$ couples), were conducted to examine the between-person and within-person associations between social constraints and FCR in early-stage BC patients and their spouses. Assessments were conducted about six months after BC surgery.

Results—Global social constraints predicted greater global FCR in patients and spouses at the cross-sectional level, controlling for anxiety symptoms, relationship quality, and patient age, physical impairment, and BC stage. At the within-person level, results indicated that on days when more social constraints were reported, both partners were more likely to report greater FCR, controlling for momentary negative affect and relationship quality.

Conclusions—This study is the first to examine the within-person association between social constraints and FCR. These findings suggest relationship processes, particularly inhibition of disclosure, can uniquely influence the experience of FCR for both BC patients and their spouses, pointing to an important consideration for future research and possible intervention development.

Keywords

Social constraints; close relationships; fear of cancer recurrence; breast cancer; cancer survivorship

Fear of cancer recurrence (FCR) is one of the most frequently cited problems of breast cancer (BC) survivors (Simard, Thewes, & Humphris, 2013; Vickberg, 2003). FCR involves worry or concern that cancer will come back, progress, or spread sometime after treatment and/or remission (Lebel et al., 2016; Vickberg, 2003). Between 39% and 73% of cancer survivors report some degree of FCR, which tends to be stable, is separable from general distress, and often persists long after initial diagnosis (Simard et al., 2013). A variety of negative outcomes have been linked empirically to FCR, including psychological distress (e.g., Simard & Savard, 2009), poorer quality of life (e.g., Simard et al., 2013), poorer medical decision-making (e.g., Soran et al., 2013), and greater health care utilization (e.g., Lebel, Tomei, Feldstain, Beattie, & McCallum, 2013). Due to the high prevalence and impact of FCR, there is an urgent need to study its contributing factors to shed light on potential points of intervention.

BC patients often experience the aftermath of diagnosis and treatment together with their significant others, including spouses/intimate partners (hereafter termed *spouse*, regardless of marital status). Spouses of cancer survivors are typically found to have greater levels of FCR than patients themselves (for a review, see Simard et al., 2013) and patient and spouse FCR scores have been found to correlate within-dyad (Kim, Carver, Spillers, Love-Ghaffari, & Kaw, 2012), supporting the notion that couples coping with BC function as an interdependent system, rather than individuals with isolated emotional experiences (Hagedoorn et al., 2008). Despite the relevance of the interpersonal context to cancer survivorship (Manne & Badr, 2008), interpersonal processes have rarely been studied in relation to FCR, and few studies have examined predictors of spouse FCR. Rather, the majority of studied FCR predictors are demographic or disease characteristics of patients, such as younger age, gender, and cancer severity (Simard et al., 2013). While this research is important for understanding this relatively new construct, these contributors typically are not directly modifiable by FCR interventions. Conversely, defining and understanding the ways in which close relationship processes impact FCR may reveal yet untapped targets for intervention development.

Social Constraints and Fear of Cancer Recurrence

The nature and quality of communication between partners about FCR and other cancer-related concerns may be an important facet of the dyadic adjustment context (Manne & Badr, 2008). The social-cognitive framework (Lepore, 2001) emphasizes the central role of open disclosure of thoughts and feelings to significant others when coping with the diagnosis and treatment of cancer (Lepore & Revenson, 2007). *Social constraints* are defined

as objective or perceived interpersonal factors, such as withdrawing, criticizing, and silencing, that impede or inhibit self-disclosure of cancer-related thoughts and concerns. Social constraints are theorized to limit coping and impede adjustment to cancer by inhibiting cognitive processing in the form of exposure, habituation, or meaning-making (Lepore & Revenson, 2007).

Although social constraints can occur in the context of any relationship, given the pivotal influence of romantic relationships, social constraints from one's intimate partner are likely to be of prime importance (Soriano, Otto, Siegel, & Laurenceau, 2017). Because individuals often turn to close others for comfort and support during times of stress, a perceived lack of partner responsiveness to concerns may undermine the sense of the intimate relationship as a "safe haven" and contribute to poorer adaptation (Collins & Feeney, 2010). Indeed, social constraints have been linked to a number of negative psychosocial outcomes in both patients and spouses, including poorer psychosexual adjustment (Soriano et al., 2017), poorer relationship quality (Soriano et al., 2017), depression (Cordova et al., 2001), and lower emotional well-being (Pasipanodya et al., 2012). Taken together, social constraints likely impact couples' adjustment via interruptions to cognitive processing and impedances to relationship functioning.

In light of these findings, an important question is whether social constraints also contribute to FCR—social constraints prevent open discussion of patients' and spouses' cancer-related concerns, which typically include FCR (Simard et al., 2013; Vickberg, 2003). Social constraints may impede social cognitive processing of FCR and thus maintain or even intensify thoughts and fears of recurrence. Conversely, in the absence of social constraints, couples may process and reduce thoughts and fears about recurrence by discussing them together. The link between social constraints and FCR has only been examined in one prior study. Cohee and colleagues (2017) found that, indeed, social constraints were related to greater FCR in BC patients as well as their spouses. However, these promising cross-sectional results have not yet been followed with longitudinal examinations. This gap has theoretical relevance—the Social Cognitive Processing Model (Lepore, 2001; Lepore & Revenson, 2007) suggests that social constraints are not expected to have constant, stable effects on adjustment across time, but instead, are viewed as a malleable process that varies within-person over time. Thus, to test this model, longitudinal studies must examine whether an individual's changing levels of social constraints over time correspond to changing levels of FCR. As described in-depth elsewhere (see Bolger & Laurenceau, 2013; Hamaker, 2012), the results of comparisons of individuals at a single time point need not map onto comparisons within individuals over time.

Since social constraints and FCR occur within a dyadic context, there is likely interdependence between partners' perceptions of social constraints and FCR. Indeed, Cohee and colleagues (2017) noted significant interpartner correlations for both social constraints and FCR. However, mutual and reciprocal effects of one partner's social constraints on the other's FCR have not yet been examined. Examining the influence of patients' and spouses' social constraints on their own *and* each other's FCR would be consistent with the notion of relational interdependence, where one partner's cognitive-emotional characteristics often influence those of the other partner (Kashy & Kenny, 1999). One partner's disclosure likely

benefits the receiving partner by facilitating expression and cognitive processing of shared concerns, thus attenuating FCR. Conversely, high levels of social constraints lead to withholding of shared concerns, which may constitute a missed opportunity to manage FCR.

The Present Research

The goal of the present research was to examine the association between social constraints and FCR in early-stage BC patients and their spouses. Across two independent samples, cross-sectional and daily diary data were used to examine the link between social constraints and FCR both at the between-person and within-person level. The current report extends prior research in several ways. This association has been previously examined cross-sectionally (Cohee et al., 2017), but not yet longitudinally. Therefore, using daily diary data, Study 2 examined whether a person who perceives more constraints on one day also experiences more FCR on that same day. In order to bolster claims of directionality in this observational study, Study 2 also explored the question of whether social constraints predict FCR prospectively by examining their effects on *next-day* FCR. Finally, prior work has not yet examined the reciprocal and mutual effects of one partner's social constraints on the other's FCR. Thus, in Study 1 and Study 2, the effects of patients' and spouses' social constraints on their own *and* each other's FCR was examined.

There is little research or theory available to inform the specific time course of the relationship between social constraints and FCR. For example, it is unknown whether social constraints would be expected to result in greater FCR quickly (e.g., within a day) or whether global attributions of social constraints accumulate over a longer period of time to contribute to FCR. While not mutually exclusive, these questions involve different temporal specifications about the relationship between social constraints and FCR. Further, because existing research is predominantly cross-sectional in nature, the extent to which these constructs vary within individuals (e.g., day-to-day or month-to-month) is largely unknown. Therefore, there was no empirical or theoretical rationale to expect different links between social constraints and FCR at the within- versus between-person level.

The central hypothesis was that BC patients and their spouses who perceive more constraints on their disclosure of cancer-related thoughts and concerns would have higher levels of FCR. In addition, it was hypothesized that one partner's social constraints would be positively associated with the other partner's FCR. It was predicted that these links would persist above and beyond the effects of key covariates, including patient age, physical impairment as a result of the cancer, and BC stage (each shown in past work to be associated with FCR; Simard et al., 2013), each partner's anxiety symptoms and negative affect (feelings of fear or negativity could contribute to both social constraints and FCR), and each partner's relationship quality (to ensure that effects are not an artifact of poor relationship functioning).

Study 1

The aim of Study 1 was to examine the cross-sectional association between global assessments of social constraints and FCR, replicating and building on past work (Cohee et

al., 2017) by examining reciprocal and mutual effects of one partner's social constraints on the other's FCR. It was hypothesized that BC patients and spouses who reported greater global social constraints would report greater global FCR, controlling for patient age, physical impairment as a result of the cancer, and BC stage, as well as each partner's anxiety symptoms and self-reported relationship quality. In addition, it was hypothesized that one partner's (patient or spouse) social constraints would be positively associated with the other partner's FCR.

Method

Participants and procedure—Prospective participants were identified from medical records at a cancer center located in the Mid-Atlantic region. The Institutional Review Board of Christiana Care Health System (FWA00006557) approved the *Couples Coping with Cancer* study protocol (CCC# 26193). Data from this larger longitudinal study have been examined in Otto and colleagues (2015) and Soriano and colleagues (2017), but the current research question has not yet been examined in this data set. English-speaking women over age 18 were eligible to participate if they had a first diagnosis of early-stage BC (Stage 0 (lobular/ductal carcinoma in situ), I, II, IIIa), had undergone recent BC surgery, and were married/cohabiting with an English-speaking spouse who was over age 18. One hundred and twenty-two couples were initially contacted to participate. Of these, 65 declined (47 passive decliners, 8 not interested, and 10 spouses not willing to participate). Fifty-seven couples consented but 3 did not participate. Of the remaining 54 couples, 46 continued participation to the second assessment (examined in the current analyses). A logistic regression analysis modeled the probability of agreeing to participate based on BC stage and patient age. Stage did not differ between those who refused and agreed (all $p > .1$), but older patients were less likely to participate (unstandardized $b = -0.040$, $SE = .018$, $p = .031$). In addition, patient stage, age, physical impairment, and both partners' social constraints, anxiety, and relationship quality scores at the first assessment (measures described below) were tested as predictors of attrition ($n = 8$) before the second assessment; none were statistically significant (all $p > .3$).

Most patients (79.6%) and spouses (81.5%) were Caucasian, and 79.6% were married, with the remainder in committed, cohabiting relationships. The mean relationship length was 24.40 years ($SD = 13.8$ years). The mean patient age was 52.19 years ($SD = 10.98$) and spouse age was 54.57 years ($SD = 13.31$). Most patients and spouses worked at least part-time (65.2% and 76.2%, respectively). The modal family income was greater than \$100,000. Twenty-four percent of patients were diagnosed with Stage 0, 37% Stage I, 32% Stage II, and 7% Stage IIIa. Thirty-three percent of patients received chemotherapy and/or hormonal therapy, and none experienced a recurrence or new cancer diagnosis during the study duration.

Patients and spouses were emailed separate links to surveys, which they were asked to complete independently (M hours between partners' survey completion = 31). FCR was not measured until the second assessment, which was, on average, 7.70 months after surgery, when most patients have completed adjuvant treatment. Both empirical (King, Kenny, Schiel, Hall, & Boyages, 2000) and anecdotal (McKinley, 2000) evidence suggests that FCR

emerges soon after adjuvant therapy, when patients (accustomed to regular medical care) begin to have more sparing contact with their health-care providers and transition (with less medical support) to the uncertainty of survivorship. Ongoing treatment-related problems, diminished social support from family and friends after perceived recovery, and a sense of loss of control after the end of active treatment likely underlie the post-treatment emergence of FCR (Stanton et al., 2005). Thus, measurement of participants at this stage likely coincided with newly-emerging FCR.

Measures—Global FCR was assessed using the 4-item Overall Fear subscale of the **Concerns about Recurrence Scale** (Vickberg, 2003). Responses were on a scale ranging from 1 (*not at all*) to 6 (*all the time*). Global perceptions of social constraints “*during the past month*” were measured using the 15-item **Social Constraints Scale** (Lepore & Ituarte, 1999). Patients and spouses reported their perceptions of being constrained by their partner by responding from 1 (*never*) to 4 (*often*). Patient and spouse anxiety were assessed using the anxiety subscale of the **Hospital Anxiety and Depression Scale** (Zigmond & Snaith, 1983). Patients rated their experience of cancer-related physical symptoms using the 26-item **Cancer Rehabilitation Evaluation System-Short Form** (Schag, Geinz, & Heinrich, 1991) on a scale from 1 (*not at all*) to 4 (*very much*). Relationship quality was assessed using the 6-item **Quality of Marriage Index** (Norton, 1983). Patients and spouses responded on a scale ranging from 1 (*very strongly disagree*) to 7 (*very strongly agree*).

Data analytic strategy—Analyses were carried out in Mplus (Muthen & Muthen, 1998–2017) using robust maximum likelihood estimation producing valid inferences when data are missing at random. The actor-partner interdependence model (APIM) was used to assess actor and partner effects (Kenny, Kashy, & Cook, 2006). *Actor effects* refer to the influence of a person’s predictor variable on their own outcome. *Partner effects* refer to the influence of a person’s predictor variable on their partner’s outcome. For social constraints effects, the *patient partner effect* refers to the effect of spouse social constraints on patient FCR and the *spouse partner effect* refers to the effect of patient social constraints on spouse FCR. These dyadic path analyses involved simultaneous estimation of multiple outcomes (i.e., patient and spouse FCR) within the same model. The contemporaneous association between patient and spouse social constraints and FCR was jointly tested, controlling for each individual’s anxiety and relationship quality as well as patient age and patient physical symptoms. BC stage was examined as a covariate represented by 3 dummy variables, none of which were significant. Since their inclusion did not change the results reported below, they were excluded from the final model for parsimony.

Results and Discussion

Descriptive statistics and inter-correlations of study variables are presented in Table 1, and the results of focal analyses are presented in Table 2. As the social constraints actor effects were similar for patients and spouses, they were constrained to be equal. Results of a Satorra-Bentler χ^2 difference test (Satorra & Bentler, 2001) showed this constraint to be acceptable, as similar fit was obtained for the more parsimonious model with the effect of social constraints fixed to be equal across patients and spouses compared to a model with the effect freely estimated ($\chi^2(1, N = 46) = 0.021; p = .885$). Consistent with hypotheses and

the results of one prior study (Cohee et al., 2017), the actor effects of social constraints were statistically significant. This suggests that, above and beyond important covariates, individuals who perceived greater global constraints on their disclosure tended to report greater global FCR than individuals with fewer constraints.

Inconsistent with hypotheses, the partner effects were not significant for patients or spouses. These null partner effects suggest that the extent to which an individual (patient or spouse) perceives constraints from their partner does not necessarily inform the extent to which their partner experiences global FCR. Due to the relatively small sample size, this study may have been under-powered to detect the hypothesized partner effects of social constraints.

Relationship quality was significantly associated with greater FCR for spouses, but not for patients. This was an unexpected finding. Given these data were collected as couples first transitioned into survivorship, it would be interesting for future research to examine whether strong relationship quality becomes an asset as couples stabilize and adapt over time. Patient anxiety was significantly associated with greater patient FCR, but spouse anxiety was not associated with spouse FCR. While anxiety and FCR are conceptualized as distinct, they are typically found to be related—it is unclear why this was observed for patients but not spouses. Finally, there was evidence for a significant negative effect of patient age on both partners' FCR. The negative association between patient age and FCR is consistent with past work that has found younger BC patients to have more adjustment difficulties (Koch-Gallenkamp et al., 2016; Simard et al., 2013), and suggests that the same is true for spouses.

Study 2

Study 1 provided support for the hypothesized link between individual differences in global assessments of social constraints and FCR. However, this cross-sectional study did not determine whether an individual's changing levels of social constraints over time correspond to similar shifts in FCR over time. A robust test of the Social Cognitive Processing Model, which suggests that these processes indeed vary within-person over time (Lepore, 2001; Lepore & Revenson, 2007), requires longitudinal examination of the within-person link between social constraints and FCR. The goal of Study 2 was to examine the within-person actor and partner effects of social constraints on FCR in an independent sample of BC patients and their spouses using a 21-day daily diary design. It was hypothesized that on a day a patient or spouse perceives more social constraints, he/she *and* his/her partner would report greater FCR the same day. These effects were expected to persist after accounting for momentary negative affect and relationship quality. The covariates included in Study 1 captured individual (between-person) differences, which, by definition, cannot confound within-person associations (a strength of this approach). The effect of same-day social constraints on next-day FCR was also explored because establishing temporal precedence would bolster claims for the theorized direction of effects. A final goal was to examine the between-person effect of average social constraints and average FCR across the diary period.

Method

Participants and procedure—The recruitment strategy and inclusion criteria described in Study 1 were the same for Study 2 (although these were independent samples). The

Institutional Review Board of Christiana Care Health System (FWA00006557) approved the *Surviving Cancer Together* study protocol (CCC# 33026). Data from this larger longitudinal study have been examined in Soriano et al. (in press), but the current research question has not yet been examined in this data set. Four hundred sixty-three couples were invited to participate. Of these, 270 declined (116 passive decliners, 154 active decliners, the most frequent reasons were “not enough time” and “spouse does not wish to participate”) and 110 were ineligible. Eighty-three couples consented to participate; however, 4 did not participate. Of the remaining 79 couples, 72 participated in the daily diary period examined here. A logistic regression analysis indicated that participants and decliners did not differ with respect to BC stage (all $p > .1$), but older patients were less likely to participate (unstandardized $b = -0.045$, $SE = 0.010$, $p < .001$). Patient age and patient and spouse social constraints and FCR, which were measured in an baseline questionnaire (using the same instruments as Study 1), were also examined as predictors of attrition before the diary period. Stage could not be properly tested in this model as all patients in the attrition group ($n = 7$) had either stage I or II. None of these variables were significant predictors of participation in the diary period of interest (all $p > .1$).

Most patients (89%) and spouses (85%) were Caucasian, and 94% were married, with the remainder in committed, cohabiting relationships. Two of the 72 couples were same-sex. The average relationship length was 29 years ($SD = 14.43$). The mean patient age was 57.54 years ($SD = 9.48$) and spouse age was 59.49 years ($SD = 10.34$). Most patients (57%) and spouses (67%) worked at least part-time. The modal combined household income was greater than \$100,000. Fourteen percent of patients were diagnosed with Stage 0 BC, 47% Stage I, 37% Stage II, and 23% Stage IIIa. Thirty-three percent of patients received chemotherapy, 81% received hormonal therapy, and none had a recurrence or new cancer diagnosis during the study.

Based on the same rationale as Study 1, the daily diary period began, on average, 5.41 months after surgery and 5.77 weeks after the completion of adjuvant treatment. The diary period consisted of 21 consecutive days. Twenty-one days was chosen as a reasonable length of time to capture multiple instances of FCR; this length is in the range of most diary studies (Csikszentmihalyi, 2011). During this period, both partners independently completed online surveys from home each evening within about an hour of going to sleep (data were excluded if not completed between 6:00 p.m. and 3:00 a.m.). The average diary completion time was 13 minutes. The compliance rate was 81% (average completion of 17 of 21 daily surveys).

Measures—In the absence of validated daily measures of study variables, select items from validated scales were used to keep the diaries as brief as possible. Daily FCR was measured using six items culled from the severity, distress, and insight subscales of the **Fear of Cancer Recurrence Inventory** (Simard & Savard, 2009) and adapted for daily use (i.e., prefaced with “*Today...*”). The specific items were selected because they were among the highest-loading items in past factor analytic work (Simard & Savard, 2009). The four items from the distress subscale (assessed negative emotional reactions to the possibility of recurrence) and one item from the insight subscale (assessed extent to which a participant felt that he/she “*worried excessively*” about the possibility of recurrence) were measured using a Likert-type scale ranging from 0 (*not at all*) to 4 (*extremely*). The one item from the

severity subscale (“*How much time today did you spend thinking about the possibility of cancer recurrence?*”) was also measured on a 0 (*I didn’t think about it at all*) to 4 (*several hours*) scale. Items were summed to create a daily FCR composite. Perceived social constraints were assessed with four items adapted for daily use (i.e., prefaced with “*Today...*”) from the **Social Constraints Scale** (Lepore & Ituarte, 1999). An abridged version of the measure was utilized to limit participant burden, and these items were selected because they were among the highest-loading items from a unidimensional factor analysis of Study 1 items. The item stem “*How much did your spouse/partner...*” was followed by: (1) “*change the subject when you tried to discuss your concerns about your illness,*” (2) “*minimize your problems related to your cancer experience,*” (3) “*tell you to try not to think about the cancer,*” (4) “*make you feel as though you had to keep your feelings about your cancer to yourself, because they made him/her feel uncomfortable or upset?*” Items were rated on a 0 (*not at all*) to 4 (*extremely*) scale and averaged to create a daily composite. Momentary negative affect was measured using the seven standard items from the **Positive and Negative Affect Schedule** (Watson & Clark, 1999). Items, with responses ranging from 0 to 4, were averaged to create a composite. Momentary relationship quality was assessed using a single item from the **Quality of Marriage Index** (Norton, 1983): “*All things considered, what degree of happiness best describes your relationship with your spouse/partner at this moment?*” Response ranged from 0 (*unhappy*) to 9 (*perfectly happy*).

Data analytic strategy—These dyadic intensive longitudinal data were analyzed using multilevel path modeling, accounting for dependency between days within individuals and individuals within couples (Bolger & Laurenceau, 2013; Laurenceau & Bolger, 2012), in Mplus (see Study 1 for additional description of path modeling approach; Muthen & Muthen, 1998–2017). Because daily FCR had a positively skewed distribution with a large proportion of zero scores for patients (58.40%) and spouses (72.10%), zero-inflated Poisson regression was used to model FCR as a count outcome with overdispersion (Atkins, Baldwin, Zheng, Gallop, & Neighbors, 2013). Mirroring the analytic strategy of Study 1, actor and partner effects of social constraints were estimated (Kenny et al., 2006). Within-person covariates included time (to control for any linear trend over the diary period) and each partner’s momentary negative affect and relationship quality. The time-varying predictors were person-mean centered to allow for examination of pure within-person effects (Bolger & Laurenceau, 2013). A between-person model examined average FCR over the diary period as an outcome of average social constraints, momentary negative affect, relationship quality, BC stage, and patient age. A random intercept estimated variability in average FCR across participants. Random slopes, capturing person-to-person variability in the within-person fixed effects, were of interest for the actor and partner effects of social constraints; however, the model failed to converge when all random slopes were estimated. Therefore, random slopes were only estimated for actor effects.

Results and Discussion

Descriptive statistics are displayed in Table 1 (including measure reliability). First, daily versus person-level variability in FCR and social constraints was examined via their intraclass correlations (ICC), a ratio of between-person variability to total (between- and within-person) variability of a measure. The ICC of FCR was .43 for patients and .58 for

spouses. Thus, patient FCR contained more within-person variance (57%) relative to between-person variance (43%), and vice versa for spouses (42% within; 58% between). In other words, for patients, there was more day-to-day variability in FCR than there was person-to-person; for spouses, there was more person-to-person variability in FCR than there was day-to-day. For patients, variability in social constraints was about the same at the within- and between-person level ($ICC = .53$). For spouses, social constraints had more within-person variability than between-person variability ($ICC = .34$). Overall, these descriptive findings illustrate that, although these constructs are rarely measured repeatedly or in the context of daily life, both FCR and social constraints are characterized by substantial day-to-day fluctuations for both BC patients and spouses.

The focal results are displayed at the top of Table 3. Because the within-person fixed effects of social constraints, momentary relationship quality, and time were similar for patients and spouses, they were constrained to be equal. Results of a Satorra-Bentler χ^2 difference in fit test (Satorra & Bentler, 2001) showed this constraint to be acceptable ($\chi^2(3, N = 72) = 0.46; p = .93$). Consistent with hypotheses, the within-person actor effect of social constraints on FCR was statistically significant for both partners. These results indicated that on a day that a participant reported a one-unit increase in social constraints (compared to what was typical for her/him), she/he was predicted to have a 2.66 times greater FCR score. Notably, there was substantial person-to-person heterogeneity in these effects, indicating that the effect of social constraints on FCR ranged from negative to positive across patients and spouses. The hypothesis that an individual's daily social constraints would be related to the other partner's daily FCR was partially supported—the spouse, but not patient, partner effect was statistically significant. The spouse partner effect indicated that on a day that a patient reported a one-unit increase in social constraints, her spouse was predicted to have a 2.97 times greater FCR score. Momentary negative affect, but not relationship quality, predicted greater daily FCR for both partners.

In the exploratory model examining social constraints as a predictor of next-day FCR, fixed effects are reported, as estimation of random effects was not possible due to lack of model convergence. The results of this analysis are shown in the bottom of Table 3. The patient actor effect of social constraints was not a significant predictor of next-day FCR; therefore, while patient social constraints were significantly related to higher FCR on the same day, this effect did not carry over to the next day. The spouse actor effect was marginally significant, such that on a day a spouse perceived more constraints from their partner, she/he was more likely to have greater FCR the next day (controlling for same-day FCR). Neither the patient nor spouse partner effect were statistically significant for next-day FCR. In a parallel post-hoc analysis, the reverse direction of effects was tested: FCR predicting next-day social constraints. The same covariates were included in a zero-inflated Poisson model to account for social constraints' similarly skewed distribution. There was no evidence of actor (patient: $b = 0.008, p = .683$; spouse: $b = -0.023, p = .653$) or partner (patient: $b = 0.034, p = .620$; spouse: $b = -0.005, p = .748$) effects of FCR on next-day social constraints.

Finally, the between-person social constraints effects are shown in the top of Table 3. The between-person actor effect of social constraints on FCR was statistically significant for patients and spouses and these effects were independent of average negative affect,

relationship quality, patient age, and BC stage. At the between-person level, the spouse, but not patient, partner effect was statistically significant. Interestingly, the significant spouse partner effect was negative, indicating that the spouses of patients who report *more* social constraints over the diary period are predicted to have *lower* levels of FCR over the diary period. Thus, results indicate a positive association between patient social constraints and spouse FCR at the within-person level and negative association at the between-person level.

General Discussion

Across two independent samples of couples coping with early-stage BC, global cross-sectional (Study 1) and daily diary (Study 2) data were used to examine the link between social constraints and FCR at the between- and within-person level. While an association was found in one prior cross-sectional study (Cohee et al., 2017), this association had not yet been replicated or studied in the context of daily life or at the within-person level. Both studies examined the mutual, reciprocal effects of one partner's social constraints on the other's FCR, which have also not been reported elsewhere. The present findings support the hypothesis that, for BC patients and their spouses, social constraints contribute to greater global and daily FCR, a cancer-specific aspect of adjustment that is among the most frequently cited concerns of patients and spouses and is predictive of other negative outcomes (e.g., Simard & Savard, 2009; Simard et al., 2013; Vickberg, 2003). However, overall, limited support was found for the hypothesis that one partner's social constraints predict greater FCR in the other partner.

In Study 1, a significant cross-sectional association between global assessments of social constraints and FCR was found, such that patients and spouses who reported greater global social constraints had higher global FCR. By controlling for key covariates, including anxiety symptoms, relationship quality, patient age, patient physical impairment as a result of the cancer, and BC stage, these findings replicate and extend those of a previous report (Cohee et al., 2017). In Study 2, additional support for a between-person effect of social constraints on FCR was found. Note that the between-person results of Study 2 cannot be directly compared to the results of Study 1, as the former was based on the average of repeated daily reports and the latter on a one-time global assessment. The fact that a cross-sectional link between social constraints and FCR for BC patients and spouses was corroborated by the between-person findings of Study 2—based on 21 days of repeated measures that minimized retrospection and sampled daily life—provides strong evidence for the harmful effects of social constraints on cancer-related adjustment. These findings have important implications for the development of FCR interventions. For example, couple therapies for relationship distress often target problems with communicating about difficult topics, which is at the core of social constraints. Given the impact of social constraints on FCR, these communication intervention strategies may be well-suited for adaptation for the cancer context.

Study 2 documented significant within-person, day-to-day fluctuation in FCR among both patients and their partners, and this within-person variability was accounted for, in part, by the experience of daily social constraints. This demonstrated for the first time that when a patient or spouse perceives more constraints on disclosure of cancer-related concerns on one

day, he/she is also likely to experience greater FCR that same day, independent of momentary negative affect and relationship quality. In an effort to explore the time lag between the theorized cause and effect, the effect of social constraints on next-day FCR was also examined. For patients, there was no evidence that social constraints predicted FCR levels the following day; however, this effect was marginally significant for spouses. That is, on a day a spouse perceived their partner (a BC patient) to be less available or responsive to discussions of cancer-related concerns, she/he was more likely to report greater levels of FCR the following day, above and beyond the effects on same-day FCR.

An important and novel addition to the literature made by the current studies is the examination of partner effects—the effect of one partner’s social constraints on the other’s FCR. Across studies and analyses, contrary to hypotheses, there was little evidence to suggest that spouse social constraints are related to more patient FCR (at the between- or within-person level). However, an interesting pattern of findings emerged for the spouse partner effect. In Study 2, on a day a patient reported more social constraints, her spouse was predicted to report greater FCR. This supports the notion that the absence of constraints and ability to disclose concerns to a responsive and available partner not only benefits the discloser, but also the receiver. This effect, pending replication, implies that interventions that foster a patient’s perceptions of their spouse as open and responsive to disclosure of their cancer-related concerns may reduce FCR in *both* the patient *and* spouse. Although an empirically-supported intervention of this sort, to our knowledge, does not exist, assessing the extent of mutual disclosure of cancer-related concerns in patients and/or spouses with elevated FCR may improve triaging and treatment planning.

The findings from Study 2 also emphasize the theoretical and practical relevance of the temporal context of these effects—while patient social constraints were associated with more spouse FCR within the same day, examinations of average effects over the diary period painted a different picture. Patients who reported more constraints on average tended to be paired with spouses who reported *less* FCR over the diary period. These findings suggest that in the short-term (i.e., a day), more patient constraints results in a spike in spouse FCR. Over a longer period of time (i.e., 3 weeks), these daily associations do not simply aggregate; rather, they cumulatively characterize a distinct process—one that somehow attenuates spouse FCR overall, rather than exacerbating it. Alternatively, spouses with low average FCR may tend to exhibit behaviors that patients perceive as constraining. Yet, on days they exhibit more of these behaviors than usual, they may still experience a spike in FCR.

In Study 1, younger patient age was significantly associated with spouse FCR (and marginally so with patient FCR) while patient anxiety was associated with patient FCR. Consistent with prior work (Simard et al., 2013), this suggests that younger BC patients and their spouses are particularly vulnerable to FCR and points to an overlap between a patient’s generalized anxiety and FCR. These risk factors may have clinical utility in determining individuals and couples susceptible to the development of FCR and who may benefit most from interventional support. Additionally, because spouse relationship quality was positively associated with FCR, it may be that greater relationship functioning may, unfortunately, provide fertile ground for fears of a spouse’s cancer recurrence. However, this effect should

be interpreted with caution, as it was not hypothesized a priori and has not been reported elsewhere.

The Social Cognitive Processing Model (Lepore, 2001; Lepore & Revenson, 2007) states that social constraints represent malleable, dynamic processes that vary within-person over time and have varying influences on other psychological or interpersonal phenomena (e.g., FCR). The present report provides a robust test of this theory by utilizing cross-sectional and longitudinal data to model the between- and within-person associations between social constraints and FCR in BC patients and spouses. The within-person effects reported in Study 2 cannot be explained (confounded) by person-level characteristics of between-person factors, which is an important strength of within-person analytic approaches (Bolger & Laurenceau, 2013). The results of Study 1 and Study 2 provide strong evidence that social constraints not only impact broad aspects of psychological well-being in cancer survivors, but also a cancer-specific aspect of adjustment (FCR), that is itself linked to downstream negative outcomes.

Despite the robust findings reported, these studies also had several limitations. First, both studies utilized relatively small samples and may have lacked power to detect significant effects. Replication of these effects in an appropriately powered study is a critical next step. Until then, the evidence presented here should be interpreted as tentative. In addition, the focal analyses examined cross-sectional (Study 1) or concurrent (Study 2) relationships based on observational data. Thus, no clear direction of causality can be unambiguously inferred between variables. Although theory suggests that social constraints exert causal influence on FCR, the opposite direction (FCR causing social constraints) is also plausible. However, this was explored by examining the effect of social constraints on next-day FCR while controlling for same-day FCR. The optimal measurement interval to capture the temporal unfolding of this association (temporal precedence) is unknown, and, therefore, it is possible that the effect of social constraints on FCR occurs within a much shorter or longer timeframe than 24 hours. Future research can bolster inferences regarding directionality by measuring FCR soon after the experience of social constraints or by introducing meaningful lags to analyses. In addition, the analysis of next-day FCR should be interpreted with caution due to the inability to estimate random slope effects for social constraints, which can lead to biased standard errors and greater probability of detecting a Type I error (Matuschek, Kliegl, Vasishth, Baayen, & Bates, 2017). Relatedly, random slopes for the partner effects of social constraints were also unable to be estimated in Study 2; thus, these results should be interpreted with caution as well. Larger samples may be needed to obtain more accurate estimates of the lagged and partner effects of social constraints. The sample size likely contributed to difficulty with random effect estimation and may have also contributed to some of the null partner effects found.

The nature of the samples examined in this report also have implications for the generalizability of results. Overall, couples reported little variability in daily distress, generally low-to-moderate levels of global distress, and relatively high income. The response rate for both studies was quite low, which is likely reflective of the longitudinal and time-intensive nature of the parent studies. Younger patients were found to be more likely to participate, which raises concerns about generalizability to older patients. Also, to maintain

confidentiality during recruitment, patients had to either provide consent for their spouse to be contacted or relay information about the study to their spouse; this may result in an overrepresentation of couples in high-functioning relationships (Hagedoorn et al., 2014). Future research should continue to examine the influence of social constraints and other facets of the interpersonal context on FCR in other groups of cancer survivors, varying in terms of demographics, distress, relationship quality, and cancer type. Finally, it is important for future work to consider the time period studied relative to cancer events (e.g., diagnosis, treatment, follow-up screenings). Soon after the end of adjuvant treatment was targeted in the present research because the goal was intensive analysis of FCR, and empirical (King et al., 2000) and anecdotal (McKinley, 2000) evidence suggest that FCR emerges at this time. However, it is possible that the effect of social constraints on cancer-related quality of life (e.g., FCR) is not constant throughout survivorship. Future studies may examine the effects other difficult points in survivorship, such as the annual mammogram (McGinty, Small, Laronga, & Jacobsen, 2016).

Finally, this report focused exclusively on female BC patients. With the exception of two same-sex couples (Study 2), all couples examined in the reported studies were heterosexual. Therefore, gender effects could not be examined but are likely relevant to the constructs under study. Distress among couples coping with cancer is known to vary by gender, above and beyond the effects of role (patient versus spouse; e.g., Hagedoorn et al., 2008). However, a recent meta-analysis failed to find evidence that gender moderated the effects of social constraints on distress in cancer patients (although none of the reviewed studies examined FCR as an outcome; Adams, Winger, & Mosher, 2015). Nonetheless, to achieve an enhanced understanding of the effects of social constraints in broader populations of cancer survivors and their spouses, future studies must examine the link between social constraints and FCR in mixed-gender patient samples.

These findings linking FCR to social constraints extend the literature on predictors of FCR to include relationship processes—specifically, feeling as though one is unable to disclose one's cancer-related concerns to an intimate partner soon after diagnosis and treatment. Because prior research has focused largely on unchangeable medical and demographic factors as predictors of FCR, these findings highlight the importance of dynamic interpersonal contexts of FCR and also suggest possible ways that FCR may be ameliorated. For example, interventions may focus on expression and responsiveness to encourage open communication of cancer-related concerns held by partners to facilitate long-term adjustment to cancer diagnoses. More research is needed to delineate how couple interactions contribute to poorer adjustment and ultimately, how such knowledge can be applied to the development of psychosocial interventions.

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Table 1
Means, standard deviations, and inter-correlations of Study 1 and Study 2 variables

Variable	1	2	3	4	5	6	7	8	9	10
Study 1 (cross-sectional)										
1. FCR	.53***	.13	.31*	.11	.18	-.17				
2. Social constraints	.50**	.55***	.26 [†]	-.54***	.08	-.02				
3. Anxiety	.57***	.65***	.34***	-.09	-.01	-.03				
4. Relationship quality	-.30*	-.58***	-.51***	.60***	-.19	.07				
5. Patient physical symptoms	.25 [†]	.19	.25 [†]	-.21	-	-				
6. Patient age	-.26 [†]	-.15	-.03	-.09	-.16	-				
Study 2 (daily diary)										
7. FCR							.22***	.27**	.32**	-.02
8. Social constraints							.26*	.02	.23 [†]	-.13
9. Negative affect							.25**	.21**	.21**	-.28**
10. Relationship quality							-.06	-.13*	-.27***	.28***
Patient										
<i>M</i>	3.24 _a	1.64	1.82	41.07	40.47	52.19	2.09 _b	0.09	0.17	7.24
Between-person <i>SD</i>	0.20	0.62	0.57	6.50	13.23	10.98	2.20	0.26	0.23	1.37
Within-person <i>SD</i>	-	-	-	-	-	-	2.53	0.25	0.26	0.98
Reliability ^c	.93	.93	.87	.97	.93	-	.91	.84	.79	-
Spouse										
<i>M</i>	3.18 _a	1.72	1.91	40.05	-	-	1.51 _b	0.06	0.17	7.51
Between-person <i>SD</i>	0.17	0.49	0.44	6.47	-	-	2.43	0.14	0.32	1.37
Within-person <i>SD</i>	-	-	-	-	-	-	2.07	0.19	0.24	0.87
Reliability ^c	.85	.89	.77	.95	-	-	.92	.79	.89	-

Note. Study 1: *N* = 46 couples; Study 2: *N* = 72 couples. Correlations are based on between- and within-person variability for Study 1 and 2, respectively. Correlations between patient and spouse variables are italicized along the diagonal. Patient and spouse correlations are shown below and above the diagonal, respectively (with the exception of correlations between spouse variables, patient physical symptoms, and patient age).

Subscripts indicate that the mean difference between patient and spouse FCR does not significantly differ from zero (*p* > .05).

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^cReliability is shown in the form of Cronbach's alpha for Study 1 and coefficient omega (an appropriate reliability index of within-person change for daily composite measures; Bolger & Laurenceau, 2013; Cranford et al., 2006) for Study 2.

⁷ $p < .10$,

* $p < .05$,

** $p < .01$,

*** $p < .001$.

Table 2

Results of Study 1: Dyadic path modeling of global fear of cancer recurrence (FCR)

Effect	Estimate	Standard Error	95% CI	
			Lower	Upper
Outcome: Patient FCR				
Patient social constraints ^a	0.561 [*]	0.249	0.072	1.049
Spouse social constraints	-0.063	0.390	-0.827	0.700
Patient relationship quality	-0.002	0.022	-0.045	0.041
Patient anxiety	0.672 [*]	0.295	0.093	1.251
Patient physical symptoms	0.019	0.015	-0.010	0.047
Patient age	-0.025 [†]	0.013	-0.051	0.001
Outcome: Spouse FCR				
Spouse social constraints ^a	0.561 [*]	0.249	0.072	1.049
Patient social constraints	-0.258	0.402	-1.046	0.531
Spouse relationship quality	0.050 [*]	0.020	0.010	0.089
Spouse anxiety	0.373	0.283	-0.183	0.929
Patient physical symptoms	0.027 [†]	0.014	0.000	0.054
Patient age	-0.028 [*]	0.013	-0.052	-0.003

Note. $N = 46$ couples. All estimates are unstandardized. A patient-spouse residual covariance was estimated but not reported. BC stage was initially included as a covariate represented by 3 dummy variables, none of which were significant predictors of patient or spouse FCR or changed the pattern of results; therefore, they were excluded from the final model for parsimony.

^aCorresponding coefficients constrained to be equal across partners.

[†] $p < .10$.

^{*} $p < .05$.

Table 3
Results of Study 2: Dyadic multilevel path modeling of daily fear of cancer recurrence (FCR)

Effect	Estimate	Standard Error	95% CI		Rate Ratio ^b
			Lower	Upper	
Outcome: Patient same-day FCR					
Patient social constraints					
Fixed effect ^d	0.978 ***	0.242	0.504	1.453	2.659
Random effect (SD)	0.487 [†]	0.250	-0.004	0.978	-
Between-person effect ^c	1.292 ***	0.338	0.629	1.955	3.640
Spouse social constraints					
Fixed effect	-0.035	0.079	-0.189	0.120	0.966
Between-person effect ^c	-0.202	0.683	-1.540	1.136	0.817
Patient negative affect	0.234 ***	0.058	0.120	0.348	1.264
Patient relationship quality ^d	0.011	0.032	-0.052	0.073	1.011
Time ^d	-0.008	0.005	-0.018	0.002	0.992
Outcome: Spouse same-day FCR					
Spouse social constraints					
Fixed effect ^d	0.978 ***	0.242	0.504	1.453	2.659
Random effect (SD)	1.195 **	0.443	0.327	2.063	-
Between-person effect ^c	3.376 *	1.401	0.630	6.121	29.254
Patient social constraints					
Fixed effect	1.088 *	0.466	0.175	2.002	2.968
Between-person effect ^c	-1.357 *	0.649	-2.630	-0.085	0.257
Spouse negative affect	0.496 **	0.155	0.192	0.800	1.642
Spouse relationship quality ^d	0.011	0.032	-0.052	0.073	1.011
Time ^d	-0.008	0.005	-0.018	0.002	0.992
Outcome: Patient next-day FCR					
Patient social constraints					
	-0.066	0.110	-0.281	0.149	0.936

Effect	Estimate	Standard Error	95% CI		Rate Ratio ^b
			Lower	Upper	
Spouse social constraints	0.110	0.098	-0.083	0.303	1.116
Patient negative affect	0.038	0.093	-0.145	0.221	1.039
Patient relationship quality	-0.078*	0.031	-0.138	-0.018	0.925
Patient same-day FCR ^a	0.010	0.008	-0.006	0.026	1.010
Time ^a	0.004	0.006	-0.007	0.015	1.004
Outcome: Spouse next-day FCR					
Spouse social constraints	0.128 [†]	0.075	-0.019	0.275	1.137
Patient social constraints	0.584	0.423	-0.245	1.412	1.793
Spouse negative affect	0.255**	0.084	0.090	0.419	1.290
Spouse relationship quality	0.091*	0.038	0.017	0.165	1.095
Spouse same-day FCR ^a	0.010	0.008	-0.006	0.026	1.010
Time ^a	0.004	0.006	-0.007	0.015	1.004

Note. N = 72 couples. All estimates are unstandardized.

^a Corresponding coefficients constrained to be equal across partners.

^b Estimates are exponentiated for interpretation as rate ratios.

^c Between-person covariates were average momentary negative affect and relationship quality over the diary period, patient age, and cancer stage (data not shown).

[†] $p < .10$,

* $p < .05$,

** $p < .01$,

*** $p < .001$.