Daily Communal Coping in Couples With Type 2 Diabetes: Links to Mood and Self-Care

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Abstract

Background Adjusting to the challenges of a chronic illness does not affect patients alone but also influences social network members—most notably spouses. One interpersonal framework of coping with a chronic illness is communal coping, described as when a problem is appraised as joint and the couple collaborates to manage the problem.

Purpose We sought to determine whether daily communal coping was linked to daily mood and self-care behavior and examined one potential mechanism that may explain these links: perceived emotional responsiveness.

Methods Patients who had been diagnosed with diabetes less than 5 years ago and their spouses (n = 123) completed a daily diary questionnaire that assessed communal coping and mood for 14 consecutive days. The patients also reported daily self-care behaviors. We used multilevel modeling to examine the links of communal coping to patient and spouse mood and patient self-care. Because both patients and spouses reported their mood, the actor-partner interdependence model (APIM) was employed to examine mood.

Results Multilevel APIM showed that actor communal coping was associated with lower depressed mood, higher happy mood, and lower angry mood and partner communal coping was linked to higher happy mood. Patient communal coping was related to better dietary and medication adherence, and spouse communal coping was linked to better medication adherence. Perceived emotional responsiveness partially mediated the relations of communal coping to mood but not to self-care behaviors.

Conclusions Communal coping on a daily basis may help both patients and spouses adjust psychologically to the illness as well as enhance patient self-care behaviors.

Keywords: Communal coping • Relationships • Mood • Self-care behavior

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A substantial number of adults in the USA are living with a chronic illness. For example, 85.6 million people are living with some form of cardiovascular disease or the after effects of a stroke (1), 14.5 million people have a history of cancer or are currently living with cancer (2), and 21.0 million people have been diagnosed with diabetes (3). The diagnosis of a chronic illness can be a major stressor, one with which both the patient and their social network must learn to cope with for a long period of time. Although individuals may experience periods of relapse and remission, as well as times of fewer and more difficulties, a chronic illness continues to impact patients in some way for the rest of their lives. Network members, such as spouses, family members, and close friends, also are impacted by chronic illness and its fluctuations. Not only are network members affected by the disease, but they also have the potential to influence disease adjustment. Research on chronic illnesses, such as heart disease, cancer, and diabetes, has

shown that both patients and spouses influence each other's health (4).

Traditionally, coping with stressors such as a chronic illness has been examined as an individual process, as researchers have sought to understand how individuals cope with this situation (5). However, as noted above, it has been increasingly recognized that coping with a chronic stressor occurs within a social context. One framework that recognizes this social context is communal coping. Communal coping was originally defined by Lyons et al. (6) as "when one or more individuals perceive a stressor as 'our problem' versus 'my' or 'your' problem and activates a process of shared or collaborative coping" and recently elaborated on by Helgeson et al. (7) in their "theory update." Both sets of authors agree that there are two facets to communal coping: (a) the appraisal of a problem as joint, which reflects perceiving the stressor as "our problem" instead of "his or her problem" or "my problem," and (b) collaboration, which reflects the extent to which patients and spouses work together to manage the problem (6, 7). Although communal coping may occur in any dyad in which an established relationship exists, the focus of the present research is on communal coping in the context of married or partnered couples in which one person has been diagnosed with type 2 diabetes.

Lyons et al. put forth their original theory of communal coping nearly 20 years ago. To date, little empirical research has examined this conceptual definition of communal coping. However, research has investigated constructs that reflect one of the two elements of communal coping among people with a variety of chronic illnesses including cancer, heart disease, and diabetes. For example, the collaboration component of communal coping was examined in a daily diary study of men with prostate cancer (8). Daily collaborative coping was related to same day higher positive affect for husbands and same day lower negative affect for wives. Other research has focused on the shared appraisal element of communal coping by examining links between first-person plural language, or "we-talk," and health outcomes. In a study of couples in which one person had heart failure, spouse "we-talk" predicted positive changes in patient symptoms over 6 months in couples where one person had heart failure (9). Spouse we-talk was also associated with reduced patient depression in a study of families of women with breast cancer (10). It is not clear from these studies, however, whether the we-talk was illness-related.

Another interpersonal coping framework that has been used to examine coping in the context of chronic disease is the theory put forth by Bodenmann (11). His dyadic coping framework consists of a series of both positive and negative dyadic coping strategies in which couples engage. One of the positive dyadic coping scales is referred to as common dyadic coping and reflects joint problem-solving, mutual commitment, sharing of feelings, and relaxing together (11). This scale is most similar to the collaboration component of communal coping but includes other positive behaviors such as relaxation and does not include the shared appraisal element of communal coping. Common dyadic coping has been linked to decreased depressive symptoms and increased relationship satisfaction among couples coping with breast cancer (12) and to higher diabetes self-efficacy among couples coping with type 2 diabetes (13).

We have investigated the full construct of communal coping—shared illness appraisal and collaboration—in two contexts. First, in brief phone interviews with partnered young adults with type 1 diabetes, self-reported communal coping was related to reports of greater emotional and instrumental support receipt from partners but was unrelated to psychological distress (14). Second, in a previous report on a subset of the participants in the present study (n = 70), self-report measures of communal coping were linked to greater support receipt, reduced psychological distress, and better patient self-care (15).

Taken collectively, previous researchers have examined constructs related to the collaboration and shared appraisal elements of communal coping, but there is little research that has examined the communal coping construct in its entirety. Communal coping might be an especially useful framework to understand how couples adjust to the diagnosis of type 2 diabetes in one couple member. Because disease management includes behaviors that may affect and be affected by the spouse (i.e., diet and exercise), couple members who appraise the illness as shared and work together to manage the illness might have the best health outcomes. Thus, we evaluated the implications of communal coping for psychological well-being and diabetes self-care behavior for couples in which one person was relatively recently diagnosed with type 2 diabetes. We focused on those who were diagnosed within the past 5 years because we expected that the challenges the couples face in managing diabetes would be most apparent during the initial adjustment period over these first few years. This is also the time in which one might expect to observe changes in self-care behaviors as patients come to terms with the disease diagnosis.

We extend our previous research in this area by studying communal coping in the context of a daily diary design where we can examine proximal links of daily communal coping to daily mood and self-care. Most of the previous research in this area has focused on retrospective recall reports of coping strategies. A daily diary design allowed us to learn whether communal coping efforts that are manifested on a daily basis are linked to daily self-care outcomes and mood. The patients completed daily diary measures of communal coping, mood, and self-care behaviors at the end of the day for 14 consecutive days, and spouses completed daily diary

measures of communal coping and their own mood at the end of the day for the same 14 consecutive days.

A daily diary design allowed us to expand on previous research in two ways. First, in contrast to single assessment studies that focus on interindividual processes by comparing outcomes among those who engage in more or less of a coping strategy, we focus on intraindividual processes—that is, comparing how changes within a person are related to changes in psychological and behavioral outcomes within that same person. If within-person changes in communal coping are linked to within-person changes in health outcomes, intervention efforts can be directed toward enhancing communal coping within a person. Second, the use of daily diary data reduces the recall bias inherent in survey data by allowing more proximal measurements of a phenomenon to be collected (16). Taken collectively, daily diary designs provide insight into both the within-person in addition to the between-person variation in communal coping.

We hypothesized that daily communal coping would be related to daily positive mood for both patients and spouses. Patients should experience an enhanced mood from communal coping because their spouse's disease involvement provides reassurance that they are not alone and that they have the benefit of working with a teammate to manage diabetes. Communal coping should be related to better mood for spouses because involvement in disease management may provide them with a sense of control over the situation, and perceived control has been linked to better mental health across a variety of contexts (17, 18). Research on mood benefits of prosocial behavior also supports the idea that communal coping should benefit spouses (19).

We also hypothesized that both patient and spouse communal coping would be related to better patient self-care behaviors. When patients perceive diabetes to be a shared problem, they may not view the task of managing diabetes as quite as daunting because the burden is shared. It also may be easier for patients to take care of themselves when they have a partner to help them or even participate in self-care with them (i.e., exercising with the patient). Spouse involvement in diabetes also may spur the patient to become more involved in taking care of him or herself.

We also examined whether one's own communal coping, one's spouse's communal coping, or both were related to the outcomes. We hypothesized that communal coping would benefit both patients and spouses but that one's own communal coping would be most likely to be linked to one's own outcomes. One's own perception of communal coping is more likely to influence one's own feelings and guide one's own behaviors compared with perceptions of the spouse.

A second study goal was to examine one explanation of why communal coping would be related to mood and self-care behavior. We focused on perceived emotional responsiveness, which is defined as the extent to which an individual perceives that one's spouse respects and understands the self and provides appropriate support (20). Perceived emotional responsiveness has been linked to a variety of positive outcomes, including marital intimacy, healthier cortisol patterns, and lower defensiveness (21–23).

We hypothesized that patient communal coping would be linked to perceiving spouses as emotionally responsive to their needs. We also hypothesized that the spouse communal coping would be associated with perceiving patients as more emotionally responsive to their needs. Communal coping should allow both patients and spouses to perceive the other as more responsive because individuals who view diabetes as a shared problem will be more likely to collaborate and address the situation in a way that the other person will appreciate. They will be more likely to interpret the other's behavior as responsive because they will have communicated about the problem and understood what the other person needs in this situation. Therefore, this study will examine whether the relations between daily communal coping to daily mood and daily self-care behavior are mediated by perceived emotional responsiveness.

Although perceived emotional responsiveness has not been tested as a mediator of the link between communal coping and self-care behaviors or mood, there is evidence that the perceived emotional responsiveness mediates the relation between social support and positive disease adjustment. For example, in a study of couples in which one partner had lupus and was experiencing a flare-up, spouse emotional support was linked to reduced depressive symptoms and perceived emotional responsiveness explained this relation (24). In this same study, more problematic support was related to poorer well-being, and this relation was mediated by a lack of perceived emotional responsiveness (24). These findings indicate that it is critical to understand how specific supportive and unsupportive behaviors are interpreted by patients. When spouse behaviors are viewed as responsive to patient needs, mood and well-being are enhanced.

Method

Participants

Participants were eligible for the study if they had type 2 diabetes that was diagnosed within the past 5 years and were married or living with a partner who did not have diabetes. Participants consisted of 123 couples who were either married ($n = 83$) or living together in a marital-like relationship ($n = 40$), with an average relationship length of 18.14 years *(SD = 13.91)*. To make findings easier to describe, we refer to all partners as spouses so that we can

refer to actor and partner effects when discussing those analyses. Demographics, presented in Table 1, show that there was a fairly even sex distribution, the average age was 54 years for both patient and spouse, there was a wide range of educational level, and the sample was racially diverse. The average patient HbA1C was 6.99% which meets the American Diabetes Association recommended target level of less then 7.0% (25). The average HbA1c of individuals without diabetes is below 5.7%.

Procedure

This community sample was recruited from hospital registries, advertisements, churches, and local health fairs. Interested individuals contacted us and were screened for eligibility. If eligible, an in-person visit was arranged. Of the 397 people who contacted us, 256 were deemed ineligible, largely because they had been diagnosed more than 5 years ago. Of the remaining 141, 4 refused without us being able to determine eligibility; 12 were eligible but refused after screening; and the remaining 125 were eligible, agreed, and completed the initial interview. Two

Table 1   Demographics of the Sample (n = 123)

	Patient	Spouse
Marital status		
Married	67%	
Living together	33%	
Average relationship length (years)	18.14 (13.91)	
Gender		
Male	55%	44%
Female	45%	56%
Age (years); mean (SD)	54 (9.90)	54 (10.59)
Race		
White	58%	55%
Black	36%	37%
Multiple races	6%	8%
Education		
Less than high school	4%	6%
High school graduate	31%	32%
Some college	15%	19%
2-year college graduate	27%	15%
4-year college graduate	12%	18%
Postgraduate	11%	11%
Years since diagnosis, mean (SD)	1.55 (1.41)	
Average HbA1C, mean (SD)	6.99 (1.71)	
Medication regimen		
Oral medication	68%	
Insulin	7%	
Combined regimen	15%	
No medication	11%	

couples who completed the initial interview were removed from the analyses, one because the patient was determined later to have type 1 diabetes, and one because the couple was under the influence of illicit drugs during the interview. After participants completed the protocol and signed consent forms, we contacted their physician to verify date of diagnosis. Four participants were outside of the 5-year diagnosis time frame (between 5 and 8.5 years). Because the findings were the same with and without these four persons, we retained them in the analyses.

The initial in-person interview was largely completed in participants' homes (80%), although 20% chose to drive to the University for the interview. At the end of this interview, we obtained a measure of HbA1c with the DCA Vantage Analyzer. Patients and spouses were each provided with their own iPad and shown how to complete the daily diary questionnaire separately from one another. Patient and spouse completed questionnaires at the end of each day for 14 consecutive days on the study iPads. The patient daily questionnaires measured communal coping, mood, and diabetes self-care behaviors. The spouse daily questionnaire measured communal coping and mood. Both patients and spouses completed an average of 12 of the 14 daily diaries.

Instruments

Communal coping

The communal coping measure was developed specifically for this study and grounded in theory first articulated by Lyons (6) and recently elaborated on by Helgeson et al. (7). Because communal coping has been conceptually defined as consisting of two critical components, shared appraisal of a problem and subsequent collaborative action to manage the probslem, we created two items to capture each of these two components. We utilized only two items because we were asking these questions on a daily basis for 14 consecutive days and wanted to minimize participant burden to enhance compliance. As noted above, our compliance was high.

The shared appraisal aspect of communal coping was measured by asking participants, "When you thought about diabetes today, did you view diabetes as "our problem" (shared equally by you and your partner) or mainly your own problem?" Responses were chosen from five options: "completely my spouse's problem," "mostly my spouse's problem," "both of our problem," "mostly my problem," and "completely my problem" for both patient and spouse. Responses were rescored on a 1–3 scale as either a 1=noncommunal appraisal ("completely my spouse's problem" or "completely my problem"), 2=partly communal appraisal ("mostly my spouse's problem" or "mostly my problem"), or 3=communal appraisal ("both of our problem"). Mean patient appraisal

was 1.86 (*SD* = 0.66), and mean spouse appraisal was 2.61 (*SD* = 0.45) on the 1–3 scale. The collaborative component of communal coping was measured by asking participants "How much did you and your spouse work together to take care of diabetes?" The five-point response scale ranged from 1 = "not at all" to 5 = "all of the time." Mean patient collaboration was 2.41 (*SD* = 0.96), and mean spouse collaboration was 2.48 (*SD* = 0.90) on the 1–5 scale. The two communal coping items were related to each other in multilevel modeling analyses for both patients and spouses (unstandardized coefficients were 0.13 and 0.09, respectively, both *p*s < .001). Thus, the communal score was created by standardizing the two items and taking the average. Patient and spouse communal coping were related to each other on a daily basis (coefficient = 0.16, *p* < .001).

Mood

Patients and spouses were asked to rate 12 items from 1 = "not at all" to 5 = "a lot of the time" regarding how they felt over the course of the day. Variance component analysis for daily diary data was conducted to determine the reliability of these scales (26). Three items measured depressed mood (sad, depressed, and unhappy; alphas = 0.74 for both patient and spouse), happy mood (happy, pleased, and cheerful; alphas 0.70 and 0.76 for patient and spouse, respectively), and angry mood (angry, annoyed, and mad; alphas = 0.72 and 0.75 for patient and spouse, respectively). The items for depressed and happy mood scales were taken from the Profile for Mood States (27); the three face valid angry mood items were developed for this study. Patient and spouse mood variables were related to each other: depressed mood (coefficient = 0.19, *p* < .001), happy mood (coefficient = 0.16, *p* < .001), and angry mood (coefficient = 0.11, *p* < .01).

Self-care behaviors

Patients were asked three face valid questions regarding specific self-care behaviors relevant to taking care of type 2 diabetes: (a) How much did you follow your diet today? (1=not at all to 5 = very much) (b) Did you exercise today? (Yes, No), and (c) Did you take your medication today? (Yes, No). Again, we used brief self-report measures of each aspect of self-care to reduce participant burden. These questions are critical daily self-care behaviors for those with type 2 diabetes. Because multilevel modeling showed that they were not related to one another, we analyzed them separately.

Perceived emotional responsiveness

Perceived emotional responsiveness reflects the extent to which one perceives that the partner has met one's needs. Patients were asked to think about how their

spouse responded to them with respect to their diabetes each day and then asked how much they felt understood, supported, judged, and ignored. Spouses were asked to think about how the patient responded to them with respect to diabetes and asked how much they felt appreciated, ignored, helpful, and frustrated. The items for patients and spouses differed, as their needs were different. Patients need to feel that their spouse is appropriately supporting them, whereas spouses need to feel that their support attempts are appreciated and valued. Each item was rated on a four-point scale: not at all, a little, somewhat, and a lot.

These items were selected from the perceived emotional responsiveness measure developed by Fekete et al. (24). We used abbreviated measures to reduce participant burden as they had to be completed on a daily basis. We selected the four items from their 16-item scale that were most representative of the construct we wanted to measure and made the most sense to administer on a daily basis. For the patient-perceived responsiveness index, "judged" and "ignored" were reverse coded and the average of the four items was taken. For the spouse-perceived responsiveness index, "ignored" and "frustrated" were reverse coded and the average of the four items was taken. Reliabilities for both patient and spouse perceived emotional responsiveness were acceptable (alphas: 0.64 and 0.65, respectively).

Overview of Analyses

Multilevel modeling was used in all analyses to account for the lack of independence between observations, as daily diary data are inherently hierarchical in nature. Days are nested within person in these analyses. The key variables included in these analyses are level 1 variables (day variables). This allows us to examine differences in mood and self-care behavior over the course of 14 days when an individual communally copes or not.

Although the focus of the study was on the variability within persons across days, there is also variability between persons in communal coping and outcomes. As suggested by Bolger and Laurenceau (26), we calculated within-person and between-person effects for communal coping so that the between-subject variance could be statistically controlled in all analyses. Within-person variables were created by subtracting an individual's average communal coping from the communal coping reported on a given day. Therefore, within-person communal coping reflects the amount that an individual deviates from his or her normal level of communal coping on a given day. Between-person variables were created to account for differences between individuals who report more communal coping than others. These variables were calculated by subtracting the grand mean of communal coping across all participants from the

individual's average level of communal coping. Thus, all models include effects for between-person communal coping and within-person communal coping, but the focus of this research—and daily diary research more generally—is on the effects for within-person communal coping.

Because both patients and spouses completed the same mood measures, we applied the actor-partner interdependence model (APIM) to mood outcomes. The APIM allows the isolation of actor effects (i.e., the effect of one's own communal coping on one's own mood) and partner effects (i.e., effect of partner's communal coping on one's own mood) across patients and spouses (28).

We determined the best covariance structure to use for each multilevel analysis based on the Bayesian Information Criterion (BIC). Autocorrelation of errors was chosen for the repeated measures, indicating that days closer together are more highly correlated. The unstructured covariance matrix was chosen for the random effects, which allows for correlated random effects. The initial models allowed for a random intercept for both patient and spouse communal coping. If the random effects were not significant, they were removed from the models.

In the first set of analyses, we examined the relation of communal coping to mood. Because both patients and spouses provided information on the independent variable (communal coping) and the dependent variable (mood), we used the APIM to isolate actor effects (i.e., one's own communal coping related to one's own mood) and partner effects (i.e., partner's communal coping related to one's own mood). We used the APIM for distinguishable dyads, as the two persons in the couple held distinct roles—one couple member was the patient with diabetes and the other couple member was the spouse without diabetes. We entered actor communal coping, partner communal coping, and the interactions of each with role (i.e., patient vs. spouse) to predict each of the three mood outcomes. The interaction tested whether communal coping was differentially related to outcomes for patients and spouses. Because none of the interactions were significant, they were not retained in the final models and will not be discussed further.

In the second set of analyses, we examined the relation of patient communal coping and spouse communal coping to patient self-care behavior. Only patients provided data on these outcomes. In these analyses, we entered patient communal coping and spouse communal coping to predict each of the three patient self-care outcomes.

For both mood and self-care behavior, we also examined whether communal coping predicted changes in outcomes over time with lagged analyses. We examined whether communal coping on day_n predicts mood or self-care behavior on day_n controlling for mood on day_{n-1}. This analysis tests whether communal coping is related to a change in mood from yesterday to today and is consistent with the analyses presented in other daily diary designs of couples who were newlyweds (29) and in which one couple member had type 2 diabetes (30).

Finally, the extent to which patient perceived emotional responsiveness mediated the links of patient communal coping to patient outcomes and the extent to which spouse perceived emotional responsiveness mediated the link of spouse communal coping to spouse outcomes was conducted in MPlus following the procedures outlined by Bolger and Laurenceau (26). Because perceived emotional responsiveness was measured with different items for patients and spouses as patients and spouse needs differed, we could not test mediation within an APIM framework for mood. Instead, we opted to examine whether patient-perceived emotional responsiveness explained significant patient communal coping links to patient outcomes and whether spouse-perceived emotional responsiveness explained significant links of spouse communal coping to spouse outcomes. We followed the guidelines for lower level mediation of daily diary data (26) because communal coping, the mediator, and dependent variables are all level 1 variables. This allowed us to explore the within-subject psychological processes in a manner consistent with the previous analyses. We used within-person-centered variables as described earlier in this section for all variables (independent, mediator, and dependent variables) following the recommendations of Bolger and Laurenceau (26).

Results

Potential Covariates

Before proceeding with hypothesis testing, we examined the relation of patient and partner demographic variables (age, sex, education, quality of marriage, marriage length, race, marital status, and patient HbA1c) to communal coping. None of these variables were related to communal coping, so they were not statistically controlled in the analyses reported below.

Descriptive statistics for all variables are shown in Table 2. The findings for actor and partner effects of communal coping on mood (APIM multimodeling) are shown in Table 3, and the findings for patient and spouse communal coping on patient self-care (multilevel modeling) are shown in Table 4. Although both between-subject and within-subject effects are shown in the tables, our interest is in the within-subject effects. The intraclass correlations (ICCs) for the null model for each dependent variable are shown in the bottom row of each table. Note that all outcomes had sufficient variability to warrant exploration of the models.

Table 2 Descriptive Statistics of Variables

	Mean	Standard deviation	Range
Communal coping[a]			
Patient	0.002	0.84	
Spouse	−0.001	0.81	
Depressed mood			
Patient	1.49	0.78	1–5
Spouse	1.40	0.75	1–5
Happy mood			
Patient	1.03	1.03	1–5
Spouse	3.76	0.99	1–5
Angry mood			
Patient	1.55	0.83	1–5
Spouse	3.30	1.12	1–5
Diet	0.49	0.50	1–5
Exercise	0.84	0.36	Yes/no
Medication adherence			Yes/no
Perceived emotional responsiveness			
Patient	3.41	0.66	1–4
Spouse	3.25	0.66	1–4

[a]This measure was created by standardizing two items and taking the average of them.

Table 3 Relations of Communal Coping to Mood

	Depressed mood	Happy mood	Angry mood
Intercept	1.58***	3.64***	1.61***
Role	−0.09*	0.07	0.01
Time	0.00	0.00	−0.01*
Actor WS communal coping	−0.11***	0.17***	−0.17***
Actor BS communal coping	−0.18***	0.39***	−0.21***
Partner WS communal coping	−0.01	0.08*	−0.02
Partner BS communal coping	0.04	−0.13*	−0.02
ICCs	0.44	0.53	0.36

Numbers reported are beta coefficients.

BS between-subjects; *WS* within-subjects.

* $p < .05$, *** $p < .001$

Multilevel Modeling of Dyadic Relations of Communal Coping to Mood

As shown in Table 3, actor communal coping on any given day was significantly related to decreased depressed mood, increased happy mood, and decreased angry mood on the same day. This indicates that one's own communal coping is related to better mood. Because the interactions with the role were not significant as noted previously, these findings generalized across patients and spouses. There was one significant partner effect for

Table 4 Relations of Communal Coping to Patient Self-Care

	Diet	Exercise	Medication adherence
Intercept	3.32***	−7.62	−5.94
Patient WS communal coping	0.29***	0.07	0.36*
Patient BS communal coping	0.63***	0.47	−0.24
Spouse WS communal coping	0.07+	0.16	0.45*
Spouse BS communal coping	−0.18	0.29	−0.08
ICCs	0.50	0.37	0.80

Numbers reported are beta coefficients.

BS between-subjects; *WS* within-subjects.

+ $p < .10$, * $p < .05$, *** $p < .001$.

mood, indicating that on days when partners reported more communal coping, one's own happy mood was higher.

Lagged multilevel dyadic models showed that actor communal coping was related to lower depressed mood (coefficient = −0.10, $p < .01$), higher happy mood (coefficient = 0.15, $p < .001$), and lower angry mood (coefficient = −0.14, $p < .001$) on that day compared with the previous day. Partner communal coping was marginally related to increases in happy mood from one day to the next (coefficient = 0.06, $p < .06$).

Multilevel Modeling of Communal Coping to Patient Self-Care

When both patient and spouse communal coping were entered into the equation to predict patient self-care, patient communal coping was related to better diet adherence and spouse communal coping was marginally related to better diet adherence (Table 4). Both patient and spouse communal coping were significantly related to higher medication adherence. Neither patient nor spouse communal coping was significantly related to exercise.

Lagged multilevel modeling showed that patient communal coping was related to an improved diet (coefficient = 0.29, $p < .001$) compared with the previous day, but spouse communal coping was not. Patient communal coping was related to improved medication adherence compared with the previous day (coefficient = 0.38, $p = .01$), as was spouse communal coping (coefficient = 0.70, $p < .05$). Neither patient nor spouse communal coping were related to changes in exercise.

Mediation by Patient Perceived Emotional Responsiveness

We examined whether patient-perceived emotional responsiveness mediated the significant relations of patient communal coping to patient outcomes. Before

testing mediation, we first examined whether patient communal coping was related to patient-perceived emotional responsiveness. Patient communal coping was related to patients' perceived emotional responsiveness of spouses (coefficient = 0.23, p < .001). Then we examined which patient outcomes were linked to patient-perceived emotional responsiveness. Patient-perceived emotional responsiveness was related to all patient outcomes except for medication adherence: less patient depressed mood (coefficient = −0.23, p < .001), higher patient happy mood (coefficient = 0.38, p < .001), less patient angry mood (coefficient = −0.33, p < .001), better patient diet (coefficient = 0.37, p < .001), and more patient exercise (coefficient = 0.27, p < .05).

The results of the mediational analyses are shown in Table 5. The first column of Table 5 displays the relation of communal coping to each outcome. The second column shows the amount of variance in each relation that is explained by patient-perceived emotional responsiveness. As shown in Table 5, perceived emotional responsiveness was a significant mediator of the relation between patient communal coping and patient angry mood and a marginally significant mediator of the relations between patient communal coping and patient depressed mood and patient happy mood. Patient perceived emotional responsiveness did not mediate the relations of patient communal coping to patient exercise or patient diet.

Table 5 Mediation of Communal Coping to Outcomes by Perceived Emotional Responsiveness

	Link between communal coping and outcomes (beta coefficients)	Amount of variance explained by perceived emotional responsiveness	Standard error of mediation estimate
Patient outcomes			
Depressed mood	−0.08*	0.70+	0.41
Happy mood	0.11*	0.50+	0.26
Angry mood	−0.17***	0.44**	0.16
Diet	0.27***	0.09	0.08
Exercise	0.08	0.65	1.57
Spouse outcomes:			
Depressed mood	−0.13***	0.20+	0.13
Happy mood	0.21***	0.32**	0.12
Angry mood	−0.15***	0.45**	0.17

Numbers reported in first column are beta coefficients, numbers reported in second column are percentages.

$^+$ p < .10, * p < .05, ** p < .01, *** p < .01.

Mediation by Spouse-Perceived Emotional Responsiveness

Before testing mediation, we first examined whether spouse communal coping was related to spouse-perceived emotional responsiveness. Spouse communal coping was related to spouse-perceived emotional responsiveness (coefficient = 0.21, p < .001). Spouse-perceived emotional responsiveness was related to all the three spouse mood outcomes: less spouse depressed mood (coefficient = −0.24, p < .001), higher spouse happy mood (coefficient = 0.48, p < .001), and less spouse angry mood (coefficient = −0.45, p < .001). As shown in Table 5, spouse perceived emotional responsiveness was a significant mediator of the relation between spouse communal coping and spouse happy mood and spouse angry mood and a marginally significant mediator of the relation between spouse communal coping and spouse depressed mood.

Discussion

Communal coping in the context of a romantic relationship is defined as the extent to which a person appraises the problem as shared and works with the partner to manage the problem. In the context of coping with type 2 diabetes, we hypothesized that daily communal coping would be related to daily positive mood for both patients and their spouses and daily self-care behavior for patients. Using a daily diary design, we found that on days when individuals, either patients or spouses, reported more communal coping, the same individual also reported better mood. With lagged analyses, we also found that communal coping on one day was related to an improvement in mood compared with the previous day. There was only modest evidence that suggested partner communal coping was related to mood. Overall, there was more evidence that one's own perception of communal coping rather than the partner's perception was linked to one's own mood.

These relations of communal coping to mood held for both patients and spouses. However, this does not mean that communal coping is experienced in the same way by patients and spouses. Communal coping may be associated with more positive moods for patients because it reduces the appraisal of stress, as another person's resources are available to help when they encounter a problem related to diabetes. That is, persons with diabetes may not be as threatened or stressed by a problem related to diabetes because they know they are part of a team that will support them. Communal coping may be associated with more positive mood for spouses because they feel good about being able to contribute to the well-being of their partner and obtain some relief from worrying about their partner when they are involved in

disease management. Taken collectively, these findings are consistent with previous research that has measured the appraisal component, the collaborative component, or the entire of the communal coping construct (8–10, 14–15).

There was also some evidence that patient communal coping was linked to better and improved self-care. Communal coping on a daily basis may be translated into better health behaviors because patients know they will have help in managing diabetes. These results are consistent with the previous research that has shown that people are more likely to exercise (31) and quit smoking (32) when there is evidence of communal or collaborative coping.

Although patient communal coping was related to better medication and dietary adherence, it was not related to exercise. It is possible that our daily diary measure of exercise was not precise enough to detect a link to communal coping, as exercise was measured with a self-reported dichotomous yes/no response. Other research has examined physical activity in the context of a daily diary design using accelerometers and found that spousal support of patient exercise was related to an increase in minutes of exercise among those with osteoarthritis (33). It also is possible that participants in this study defined exercise differently. For example, participants who walk on a regular basis may or may not have considered this to be exercise. Patients also may be prescribed different exercise regimens by their physician. Thus, future research in this area would benefit from greater clarity in the definition of exercise and more precise measures of exercise.

We also took the opportunity to examine one mechanism that could explain the link between communal coping to good self-care and mood outcomes—perceived emotional responsiveness. We theorized that communal coping would lead both patients and spouses to perceive that the other is involved in illness management in a way that is helpful and desired and that one's partner is responsive to needs. We suggested that perceiving partners as responsive to needs might explain why communal coping is connected to better mood and self-care outcomes. Indeed, we found that communal coping was related to perceived emotional responsiveness in both patients and spouses. We also found that perceived emotional responsiveness explained many of the links between communal coping and mood for both patients and spouses. Thus, one reason that patients and spouses experience a more positive mood in the context of communal coping is that they perceive that their partners are responsive to their needs.

Patient-perceived emotional responsiveness was related to patients reporting greater dietary adherence and exercise, suggesting that feeling supported and understood by the spouse can increase tangible health behaviors. However, perceived emotional responsiveness was not related to patient medication adherence. These findings suggest that perceiving spouses as responsive to one's needs may influence some self-care behaviors but not others. Of the three self-care behaviors, taking medication may be the one that is least affected by spouses because it is a fairly simple, concrete behavior that does not involve a lot of time. Having a supportive spouse may be more likely to influence the more complicated self-care behaviors, like diet and exercise, that take time to perform and may directly affect or involve spouses.

Despite the links of perceived emotional responsiveness to diet and exercise adherence, perceived emotional responsiveness did not explain the link between patient communal coping and these self-care behaviors. Thus, there may be other reasons that communal coping is related to better health behavior. Spouses could engage in some communal coping strategies, such as healthy meal preparation or shared walks, that facilitate self-care but do not necessarily require being responsive to patient needs. In this case, a potential mechanism is self-efficacy. We have suggested elsewhere (7) that communal coping may provide patients with additional resources that increase their likelihood of being able to manage their diabetes effectively, and it is this increased self-efficacy that is linked to better self-care behavior. Future work should be conducted to test this possibility.

In conclusion, we remind the reader of several study strengths. We tested a relatively novel interpersonal theory of coping in the context of couples in which one person was relatively recently diagnosed with type 2 diabetes. Few studies in the area of type 2 diabetes have examined this initial adjustment period when couples are in transition in terms of determining how to effectively manage the disease. There are studies on support and health among couples in which one person has type 2 diabetes, but they include people who have had the disease for decades (30, 34). The results of this study provide insight into how couples initially respond to a chronic illness when stress levels may be high and self-care regimens not yet established. In addition, the study was composed of a racially diverse community sample that encompassed a wide age-range and varying social status, all of which increase the generalizability of our findings. Finally, we used an ecological momentary assessment design where we could examine more proximal links of communal coping to mood and self-care. This enabled us to examine both concurrent relations between communal coping and outcomes and to examine how communal coping is related to changes in mood and self-care from one day to the next.

Study limitations include the brief nature of some measures, which may not have provided enough variability to capture the full range of the construct. Brief

versions of scales were used to accommodate the daily diary design and reduce participant burden. Although we had only a two-item measure of communal coping, we were able to capture both components of communal coping in this measure. We view this as an initial effort in the measurement of daily communal coping. There are many advantages of a daily diary design, such as exploration of within subject variation, but we cannot make confident causal claims that communal coping causes changes in outcomes. If the effects of communal coping are more transitory, it would be useful for future research to conduct more frequent assessments of communal coping and outcomes over the course of the day so that the temporal relation between communal coping and outcomes can be discerned.

In sum, this work provides evidence for links between communal coping on a daily basis and better mood and self-care behaviors among couples in which one person is relatively recently diagnosed with type 2 diabetes. Consistent with communal coping theory (6, 7), the findings suggest that the benefits are accrued by both patients and spouses. Thus, communal coping not only may help patients take better care of themselves but also may help to improve the lives of partners who face the burden of the disease. The results from this study could develop the foundation for intervention efforts that are aimed at couples by encouraging a shared appraisal of the disease as well as collaborative efforts to manage the disease.

Compliance with Ethical Standards

Authors' Statement of Conflict of Interest and Adherence to Ethical Standards The authors declare that they have no conflict of interest.

Primary Data Portions of these data were presented at the 2017 Society of Behavioral Medicine Meeting.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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