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Communal coping: A multi-method approach with links to relationships and health

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Melissa Zajdel
Vicki S. Helgeson
Carnegie Mellon University, USA

Abstract

Communal coping is defined as the appraisal of a problem as shared and collaboration to address the problem. The goals of the present study were to apply a multi-method approach to (1) disentangle appraisal and collaboration, (2) establish links to relationships and health outcomes, and (3) demonstrate that collaboration mediates the relations of shared appraisal to outcomes. Self-report measures, an observational measure, and we-language were assessed in patients with type 2 diabetes and their spouses ($n = 207$). A confirmatory factor analysis distinguished the two components of communal coping; each component was linked to greater relationship quality and less psychological distress for patients and spouses as well as better diabetes self-care behaviors for patients. Mediation analyses suggested that the links of shared appraisal to these outcomes were largely accounted for by collaboration.

Keywords

Chronic illness, communal coping, health, interpersonal coping, relationships

Researchers have increasingly recognized that there is an interpersonal context to coping. Not only does the social environment influence how one copes with a stressor, but the stressor influences those in one's social environment. The literature on interpersonal

Corresponding author:
Melissa Zajdel, Department of Psychology, Carnegie Mellon University 5000 Forbes Avenue Pittsburgh, PA Pennsylvania 15206 USA.
Email: mzajdel@andrew.cmu.edu

coping began with the seminal work of James Coyne and colleagues who studied patients with chronic illness and identified ways in which patients' coping involved the partner and partners' coping involved the patient (e.g., active engagement, protective buffering; Coyne & Smith, 1991). Subsequent researchers have outlined a range of interpersonal coping models, including the systemic transactional model of coping (Bodenmann, 1997), coping congruence (Revenson, 1994), and the developmental contextual model of coping (Berg & Upchurch, 2007).

One theory that has gained more recent attention is communal coping (Helgeson et al., 2018; Lyons et al., 1998). Communal coping is defined as the appraisal of a problem as shared and collaborative behavior to manage the problem. Shared appraisal refers to the perception of a stressor as a shared rather than an individual problem (e.g., "our problem" instead of "my problem" or "their problem"). Collaboration refers to joint input, mutual effort, and a team approach undertaken to address the stressor. Whereas shared appraisal refers to a cognition, collaboration refers to a behavior, but is nearly always measured by *perceptions* of a behavior. Note that communal coping is distinct from a communal orientation, which refers to an individual tendency to care for others without expectation of care (Clark & Mills, 1979). According to communal coping theory, communal coping is related to enhanced relationship quality and better psychological and physical adjustment to disease (Helgeson et al., 2018). The theory also specifies that the two components of communal coping are linked in a particular way—specifically that shared appraisal leads to collaboration, and collaboration mediates the link of shared appraisal to relationship and health outcomes.

However, there is currently no consensus as to the best way to measure these two components of communal coping. Thus, the primary goal of the present study was to apply a multi-method framework to the study of communal coping using a latent variable approach and to determine whether the shared appraisal and collaboration components of communal coping could be empirically distinguished. A secondary goal was to demonstrate that appraisal and collaboration are linked to relationship and health outcomes and to test the theoretical claim that collaboration mediates the links of appraisal to outcomes. No research has tested this latter possibility.

Thus far, communal coping and its components have been measured in a variety of ways with no clear consensus across studies. Some researchers have measured communal coping holistically without distinguishing between the two components, whereas other researchers have only examined the shared appraisal or the collaboration components of communal coping. Below, we briefly review each of these bodies of research in terms of their operationalization of constructs and connections to relationship and health outcomes.

Several studies have measured communal coping as a unitary construct and drawn links to relationships and health. For example, in a study of individuals with heart failure and their spouses, a 2-item self-report measure of communal coping was related to higher relationship quality (Rohrbaugh et al., 2008). In a daily diary study of couples in which one person had type 2 diabetes, daily self-reports of communal coping were linked to better self-care behavior and better mood at the end of each day and to improvements in mood on the next day (Zajdel et al., 2018). The self-report measure in both of these studies reflected shared appraisal and the perception of collaborative behavior. Additionally, a visual measure of communal coping was created by adapting the Inclusion of

Other in Self Scale (IOS; pairs of circles that vary in their degree of overlap; Aron et al., 1992) to represent how patients perceived that they and their partners cope with diabetes. This measure was linked to greater relationship quality and greater support receipt among couples in which one person had type 2 diabetes (Helgeson et al., 2017). An examination of couple members' understanding of this measure revealed that it largely reflected perceptions of collaborative behavior and support (Helgeson & Van Vleet, 2019). Finally, an observational measure of communal coping obtained from a videotaped couple conversation aimed to reflect both shared appraisal and past and present collaboration in handling diabetes difficulties was linked to more progress resolving diabetes problems, a reduction in diabetes distress, and an improvement in self-care behavior over the next 6 months (Van Vleet et al., 2019). In sum, across both self-report and observational measures of communal coping, researchers have shown links to positive relationship quality, more supportive interactions, reduced general and diabetes distress, and good diabetes self-care behaviors.

Some researchers have examined the use of first person plural pronouns relative to first person singular pronouns, suggesting that such "we-language" captures the appraisal component of communal coping. We-language has been hypothesized to indicate a communal rather than an individual self-construal particularly in the context of a significant life event or stressor (Karan et al., 2019; Rohrbaugh et al., 2008). We-language is thought to reflect the interdependence between the self and partner (Karan et al., 2019). Further, individuals who use we-language when discussing a stressor are thought to be applying this conceptual interdependence to the stressor as well. Intervention research with smokers with heart or lung disease has shown that patient and spouse increases in we-language over the course of an intervention were linked to greater smoking cessation (Rohrbaugh et al., 2012). Similarly, spouse we-language was related to greater cessation after a couple-focused intervention for alcohol use (Rentscher et al., 2017) and positive changes in health symptoms over 6 months among patients with heart failure (Rohrbaugh et al., 2008). In sum, the literature on appraisal is based on measures of we-language and shows links of we-language to positive relationship and health outcomes.

Other researchers have focused on the collaboration element of communal coping. The common dyadic coping scale developed by Bodenmann (1997) largely reflects perceptions of collaboration and has been linked to greater relationship quality (Falconier et al., 2015) and indirectly related to better diet and exercise adherence in couples in which one person had type 2 diabetes (Johnson et al., 2013). A daily diary study of men with prostate cancer and their wives showed that daily reports of collaboration were associated with more positive emotions for both husbands and wives over a 14-day period (Berg et al., 2008). Thus, there is consistent evidence that collaboration is adaptive for both relationships and health.

While the majority of studies examine communal coping as a unitary construct or focus only on appraisal or collaboration, there are a few studies that have examined both appraisal and collaboration in the same study. Daily diary data from the current sample of couples in which one person has type 2 diabetes showed that daily appraisal and daily collaboration can be empirically distinguished in predicting daily support interactions and mood (Zajdel et al., 2019). Two studies, one of couples in which one person had type 1 diabetes (Helgeson, Berg, et al., 2019) and one of adolescents with type 1 diabetes

(Berg et al., 2009), showed that collaboration with a partner in the former case and collaboration with a parent in the latter case were more beneficial when diabetes was viewed as shared. Thus, there is some evidence that the two components might be able to be empirically distinguished.

In sum, communal coping has been measured in a variety of ways, some of which distinguish the two components and some of which do not. Recent research highlights the importance and need to further explore whether the appraisal and collaboration components can be distinguished (Rentscher, 2019). We used a latent variable approach to capitalize on our multiple measures of appraisal and collaboration and to determine if we could empirically distinguish between the two components of communal coping. A latent variable approach has the advantage of reducing measurement error (Kline, 2016). We hypothesized that shared illness appraisal would be best captured by self-report measures of appraisal and the linguistic marker of appraisal (i.e., we-language), and we hypothesized that collaboration would best be captured by self-report measures of perceived collaboration and the adapted measure of the Inclusion of Other in Self Scale (IOS-CC). As mentioned previously, an examination of patient and partner conceptualization of the IOS-CC showed that the measure primarily reflected the perception of teamwork and partner involvement in helping patients manage diabetes (Helgeson & Van Vleet, 2019). Thus, we hypothesized that the IOS-CC would be more closely linked to the construct of collaboration than shared appraisal. Finally, we anticipated that the observational measure of communal coping would capture both shared illness appraisal and collaboration because raters are asked to consider both aspects of communal coping when making their ratings; that is, raters take into consideration expressions of we-language during couples' conversation as well as the content of the conversation to indicate past, present, and future collaborative behaviors (e.g., we should start walking more together; Hypothesis 1).

Our second goal was to examine links of shared illness appraisal and collaboration to relationship and health outcomes. Consistent with previous research, we hypothesized that shared illness appraisal and collaboration would be related to greater relationship quality, reduced psychological distress, and better self-care behavior (Hypothesis 2). Communal coping should be linked to positive relationship outcomes because communal coping indicates investment in the relationship and increases responsiveness during interactions with a spouse. Communal coping should also be linked to good health outcomes because it enhances self-regulatory resources, increases a patient's self-efficacy, and decreases how stressful the patient perceives the illness to be (Helgeson et al., 2018). Although other research has shown links of communal coping (and its components) to relationships and health, no prior research has investigated this hypothesis using a latent variable approach and a multi-method framework. Here we aimed to replicate previous research using latent variables that extract the commonality across measures and distinguish between the appraisal and collaboration elements of communal coping.

Our third and final goal was to test whether collaboration mediates the relation of shared illness appraisal to outcomes (Hypothesis 3). In the recent communal coping theoretical paper, the authors proposed that shared illness appraisal, the cognitive component of communal coping, leads to collaboration, the behavioral component of communal coping (Helgeson et al., 2018). When couples are learning to cope with a

chronic illness such as type 2 diabetes, it is likely that individuals first begin by perceiving the problem as shared and then begin to collaborate to manage the problem. Upon diagnosis, individuals may respond by trying to make sense of their new reality and by developing cognitions about how best to address the situation. One specific cognition is illness appraisal—that is, whether the illness is construed as an individual problem or shared with the spouse. Patients who perceive the illness to be a shared problem are then likely to behave in ways that reflect this perception—that is, by collaborating to manage the problem with the spouse. This is the first study to test whether collaboration mediates the relation of shared illness appraisal to positive relationship and health outcomes.

We addressed each of these aims in a diverse community sample of persons who had recently been diagnosed with type 2 diabetes (average 1.5 years) and were married to or living with a romantic partner. We tested our hypotheses with both patients and spouses. Health outcomes included general psychological distress for patients and spouses and diabetes self-care behaviors for patients. This is an ideal population to investigate this mechanistic model because it affords the opportunity to gain insight into both couple members' responses to chronic disease in the earlier phase of adjustment. People cope with type 2 diabetes for years, if not decades, and there is virtually no research on the first years following diagnosis. The sample was diverse in terms of race, sex, education, and age, which is noteworthy as the vast majority of relationship research has focused on White, college-educated, middle to upper-middle class couples (Karney, 2018). Although we have examined single measures of communal coping in a subsample of the present sample (Helgeson et al., 2017; Van Vleet et al., 2019; Zajdel et al., 2018), this is first report that takes into consideration the multiple measures of communal coping in the full sample. Because the data are cross-sectional, we cannot definitively determine the causal sequence between shared illness appraisal and collaboration or between appraisal and collaboration to relationships and health. Instead, we test whether a model that shows collaboration mediates the relation of shared illness appraisal to relationship and health outcomes is consistent with the data.

Method

Participants

Participants were 207 couples in which one person was diagnosed with type 2 diabetes within the past 5 years and was married or living together with a romantic partner. We use the term spouse throughout the article, although 28% of couples were not married and cohabitating with partners. Just over half of participants were White (53% patients; 55% spouses). Age ranged from 25 to 82 for patients and 24 to 83 for spouses. Only 26% of patients and 34% of spouses had a 4-year college degree. Demographics for both patients and spouses are shown in Table 1.

Recruitment

Couples were recruited from the community via local health fairs; hospital registries; and advertisements in churches, mass media, public transportation, and

Table 1. Demographics.

	Patients	Spouses
Gender:		
Male	55%	45%
Female	45%	55%
Race:		
White	53%	55%
Black	47%	45%
Education:		
Less than high school	4%	4%
High school grad	28%	30%
Some college	17%	17%
2 year college grad	25%	15%
4 year college grad	13%	22%
Postgraduate	13%	12%
Age (years); mean (*SD*): range	53 (11.11; 25–82)	53 (12.00; 24–83)
Years since diagnosis, mean (*SD*)	1.88 (1.68)	—
Average relationship length (years) (*SD*)	18.52 (14.70)	—
Average HbA1c, mean (*SD*)	7.19 (1.80)	—
Medication regimen:		
Oral medication	66.2%	—
Insulin	10.1%	
Combined regimen	15.5%	
No medication	8.2%	

HbA1c = Hemoglobin a1c.

physician offices. The study was advertised as involving people who had been diagnosed with type 2 diabetes in the past 5 years who were living with or married to a romantic partner. Interested persons contacted us and were screened for eligibility. Of the 658 people who contacted us, 419 were determined to be ineligible, largely because they reported being diagnosed more than 5 years ago. Of the remaining 239, 4 refused without us being able to determine eligibility, 22 refused after screening, and 3 were found to be ineligible after signing the consent form and, thus, did not complete the protocol. The remaining 210 agreed and completed the study protocol. Of the 210 couples who completed the study, three couples were dropped from analyses: one couple was intoxicated during the study, one couple was determined not to be romantic partners, and one person was learned to have type 1 diabetes upon verification of medical records.

Procedure

An in-person interview was conducted with couples either in their homes (72%) or at Carnegie Mellon University (28%). Patients and spouses were interviewed separately. Interviews consisted of questionnaires that measured appraisal, collaboration, and relationship and health outcomes. Patients and spouses were separately asked to describe

how they were coping with diabetes, and responses were audiotaped for later calculation of "we-language." In addition, patients and spouses were asked to discuss diabetes-related difficulties for 8 min. This discussion was videotaped and later rated by independent observers for patient and spouse communal coping. Each couple member completed a daily diary protocol that included daily communal coping measures on a study-provided iPad every evening for 14 consecutive days. Patients and spouses completed an average of 12.5 of the 14 daily diaries.

After patients completed the protocol and signed consent forms, we contacted physicians to verify diagnosis date. Of the 207, 11 were found to have been diagnosed more than 5 years ago. Of these 11, 6 were diagnosed 5–6 years ago and 5 were diagnosed 6–8.5 years ago. Results remained the same with or without these couples, so we opted to retain them.

Descriptive statistics for all variables are shown in Supplementary Table 1 for patients and in Supplementary Table 2 for spouses.

Measures of shared illness appraisal

Self-report. We assessed shared illness appraisal by asking patients three questions. First we asked, "When you think about diabetes, do 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 our problem," "mostly my problem," and "completely my problem." Second, we asked "When issues arise about diabetes, whose responsibility is it to try to deal with the issues?" and third, we asked, "When thinking about diabetes, how do you consider it?" Responses options to both questions were as follows: "Completely my responsibility," "Mostly my responsibility," "Both of our responsibility," "Mostly my spouse's responsibility," and "Completely my spouse's responsibility." Because the last two options were rarely endorsed (less than 1% of respondents) and did not make theoretical sense, responses to all three questions were recoded on a 3-point scale, such that higher numbers indicated greater shared appraisal: 1 = *completely individual appraisal* ("completely my spouse's problem/responsibility" or "completely my problem/responsibility"), 2 = *partly communal appraisal* ("mostly my spouse's problem/responsibility" or "mostly my problem/responsibility"), and 3 = *communal appraisal* ("both our problem"). The three items were standardized, and the average was computed.

We asked spouses a set of parallel items. Responses were recoded on the same 3-point scale, such that higher numbers indicated greater shared appraisal: 1 = *completely individual appraisal* ("completely my spouse's problem/responsibility" or "completely my problem/responsibility"), 2 = *partly communal appraisal* ("mostly my spouse's problem/responsibility" or "mostly my problem/responsibility"), and 3 = *communal appraisal* ("both our problem"). The three items were standardized, and the average was computed.

Daily diary. A second self-report measure of shared illness appraisal was constructed from daily diary assessments. At the end of each day, participants were told to focus on the most troublesome diabetes problem of that day and asked "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." Again, responses were recoded on the same 3-point scale as described above for patient and spouses. We then aggregated this measure across the 14 days to create a second self-report measure of shared illness appraisal.

The intra-class coefficient (ICC) revealed that 65% of the variance in patient appraisal is between subjects and 35% of the variance is across days. For spouses, 57% of the variance is between subjects and 43% of variance is across days. To determine whether patient and spouse responses to these questions were affected by repeated assessment, we examined whether time predicted changes in patient and spouse appraisal. Neither patient nor spouse reports of appraisal changed over the 2 weeks (ps $< .60$ for both).

We-language. A brief audiotaped interview was conducted in which participants were asked to describe how they are coping with diabetes and identify how participants appraised the illness. Two follow-up questions included (1) "Is there anything specifically you or your spouse do in relation to diabetes?" (2) "Is there anything specifically you or your spouse avoid doing in relation to diabetes?" Responses were audiotaped, transcribed, and processed via the 2007 version of Linguistic Inquiry Word Count to calculate the proportion of first person plural pronouns ("we") relative to all personal pronouns used. The proportion of plural pronouns ranged from 0 to 100. Because both patient and spouse we-talk were positively skewed (patient = 1.67, $SE = .17$; spouse = 1.58, $SE = .17$), we used a square root transformation to create a more normal distribution (patient skew = .60, $SE = .17$; spouse skew = .02, $SE = .17$).

Measures of collaboration

Self-report. We asked 1 item for both patients and spouses: "How much do you work together to solve problems related to diabetes?" The 5-point response scale ranged from 1 (*not at all*) to 5 (*all of the time*).

Daily diary. Self-reports of collaboration were measured by asking patients and spouses at the end of each day: "How much did you and your spouse work together to take care of diabetes?" The 5-point response scale again ranged from 1 (*not at all*) to 5 (*all of the time*). Again, we aggregated responses to this question across the 14 days. The ICC revealed that 56% of the variance in patient collaboration is between subjects and 44% is across days, and that 54% of the variance in spouse collaboration is between subjects and 46% is across days. To examine whether responses changed over the 2-week period, we used time to predict collaboration. The effect of time was significant in both models, suggesting that patient and spouse collaboration decreased over the 2 weeks (estimate = $-.02$, $p < .001$ for patient and spouses).

Inclusion of other in self. The IOS (Aron et al., 1992) was adapted to measure communal coping (IOS-CC) by Helgeson et al., 2017. With the IOS-CC, patients and spouses were asked to choose the pair of circles that best represent the way they and their partner deal with diabetes from a set of seven pairs of circles that vary in the amount of overlap (1 =

completely separate circles to 7 = *almost completely overlapping circles*). This measure is not only distinct from the IOS but has been shown to reflect teamwork or collaboration from a content analysis of open-ended data (Helgeson & Van Vleet, 2019).

Observational measure. Patients and spouses were asked to think about the difficulties in managing diabetes and to discuss those with their partner with the goal of coming to a resolution. Specifically, couples were told: "I want you to think about the most difficult aspect of managing diabetes and to talk about it. Your goal is to try to find ways to resolve this problem. This is a conversation you are having with each other. Do your best to act as though the camera is not there." This discussion lasted 8 min and was videotaped for later coding. Two trained coders rated patient communal coping, and two other trained coders rated spouse communal coping. Patient communal coping was defined as "Extent to which the current situation appears to be a joint problem, from the patient's point of view," and spouse communal coping was defined as "Extent to which the current situation appears to be a joint problem, from the partner's point of view." Coders were told to attend to language that indicates the target person views diabetes as a joint problem, such as "we're in this together", as well as to the content of those statements. That is, statements such as "we are done talking about this" include we-language but do not reflect shared appraisal with respect to managing diabetes. Communal coping was rated on a 5-point scale that reflected both magnitude and frequency, ranging from 1 = *never* to 5 = *very often/high quality*. The ICC between the two coders' ratings, or interrater reliability, was .80 for both patient and spouse communal coping. Further detail on the definition and coding is provided by Van Vleet et al. (2019).

Outcome measures

All outcome measures were assessed during the in-person interview. Relationship quality and psychological distress were measured among patients and spouses, but diabetes self-care was only assessed for patients. Unless otherwise noted, higher scores on all measures reflect the scale name (i.e., higher scores on the Personal Assessment of Intimate Relationships [PAIR] means higher intimacy).

Relationship quality. We administered the 6-item emotional intimacy subscale from the PAIR (Schaefer & Olson, 1981; patient $\alpha = .86$; spouse $\alpha = .85$). We also used the 5-item Quality of Marriage Index (Norton, 1983) to assess relationship quality and adapted the wording for couples who were cohabiting (i.e., "We have a good marriage" was rewritten as "We have a good relationship"; $\alpha = .94$ for both patient and spouse). Each scale was created by summing the items and taking the average. These two variables were used as indicator variables for a latent relationship quality construct.

Psychological distress. Psychological distress was measured with three instruments. We measured depressive symptoms with the 20-item Center for Epidemiological Studies Depression Scale (Radloff, 1977). Each item is rated on a 0 (*rarely or none of the time*) to 3 (*all of the time*, 5–7 days) scale (patient $\alpha = .91$; spouse $\alpha = .89$). We administered the Satisfaction with Life Scale (Diener et al., 1985), which asks participants to

indicate how much they agree or disagree with five statements on a 1–7 scale (patient $\alpha = .86$; spouse $\alpha = .84$). Finally, we used the 4-item abbreviated version of the Perceived Stress Scale (Cohen et al., 1983), which asks participants how often they felt or behaved a certain way on a scale ranging from 0 (*never*) to 4 (*very often*; patient $\alpha = .79$; spouse $\alpha = .77$). We constructed a psychological distress latent variable with these three scales as indicator variables.

Diabetes self-care behavior. We measured self-care behavior among patients only with the Summary of Diabetes Self-Care Activities (Toobert & Glasgow, 1994), which assesses the primary domains of diabetes self-care: diet, exercise, blood glucose checking, and medication adherence. We created a latent self-care behavior variable from the three indicator variables of diet, exercise, and blood glucose checking. Higher numbers on each of these variables represent better self-care. We did not include the medication adherence subscale because 8% of patients did not take any medication for diabetes and others had varied medication regimens (see Table 1).

Overview of analyses

SEM was conducted with Mplus Version 7 (Muthen & Muthen, 1998–2012). Latent constructs were derived for appraisal and collaboration, and a confirmatory factor analysis (CFA) was conducted to examine whether the hypothesized indicator variables reflected the two appraisal and collaboration constructs for patients and spouses separately. We then created a full path analysis to determine whether appraisal and collaboration were related to three latent variable outcomes: relationship quality, psychological distress, and self-care behavior. Again, we conducted these analyses separately for patients and spouses. First, we created a model with patient appraisal only regressed on patient outcomes. Second we constructed a model with patient collaboration only regressed on patient outcomes. Finally, we developed a model to determine whether the links between patient appraisal and patient outcomes were mediated by collaboration. We regressed relationship quality, psychological distress, and self-care on both appraisal and collaboration and also regressed collaboration on appraisal. This model allowed us to estimate both the direct effects of patient appraisal on outcomes and the indirect effects of patient appraisal on outcomes through collaboration. We repeated these procedures for spouse communal coping and spouse outcomes.

For all measures, we used commonly accepted fit statistics to assess the adequacy of the models. Good model fit is determine by whether the χ^2 test is rejected, Steiger-Lind Root Mean Square Error of Approximation (RMSEA) $< .05$, Bentler Comparative Fit Index (CFI) $> .95$, Tucker-Lewis index (TLI) $> .95$, and Standardized Root Mean Square Residual (SRMR) $< .08$ (Kline, 2016). We report relations below that meet the conventional requirement of $p < .05$. We also note that while our sample size fits general median guidelines for SEM research (i.e., $n = 200$; Kline, 2016), only the CFA model has the power to both reject an ill-fitting model and detect significant path loadings. Therefore, because the models were rooted strongly in theory and the CFA fit the data well, we concluded it was appropriate to test the fit of these models and evaluate the path coefficients.

Results

Means, standard deviations, and correlations are shown in Supplementary Table 1 for patient variables and Supplementary Table 2 for spouse variables. Although we did not have the power to determine whether our models generalized across sex and race, we conducted a series of sex by race analyses of variance on all study variables. These results are presented in Supplementary Table 3 (some of which have been reported in a previous publication, Helgeson, Naqvi et al., 2019, as noted in this table). Briefly, there were race differences in several communal appraisal measures, all in the direction of higher shared appraisal among White individuals than Black individuals. There were differences in appraisal such that male patients and female spouses reported higher shared appraisal and in collaboration such that males reported greater collaboration than females. In terms of outcomes, there were consistent race differences in the direction of Black persons reporting higher levels of distress than White persons and Black patients reporting poorer self-care than White patients.

Confirmatory factor analysis

We hypothesized that the shared appraisal element of communal coping would be best reflected by the self-report of appraisal, daily diary report of appraisal, we-language, and the observational measure. We hypothesized that the collaboration component of communal coping would be best reflected by the self-report of collaboration, daily diary report of collaboration, the IOS-CC, and the observational measure (Hypothesis 1).

Patients. We conducted a CFA with the two latent variables as described above and allowed the correlation of two sets of residuals due to shared method variance: (1) self-report of appraisal and collaboration and (2) daily diary reports of appraisal and collaboration. The initial CFA indicated the variances of self-report appraisal and collaboration were not related so we removed this path. We also allowed appraisal and collaboration to correlate. The CFA showed that this model fits the data well, $\chi^2_{(11)} = 13.54$, $p = .26$; RMSEA = .03; CFI = .99; TLI = .99; SRMR = .03; AIC = 3365.53. However, there was no evidence that the observational measure loaded on the collaboration latent variable (standardized coefficient = .04, $p = .79$). Therefore, we removed the observational measure from the collaboration latent variable and allowed it to load only on the appraisal latent variable. The revised model revealed a better fit to the data, $\chi^2_{(12)} = 13.62$, $p = .33$; RMSEA = .03; CFI = 1.00; TLI = .99; SRMR = .03; AIC = 3363.60. The AIC decreased by about 2 when we made this change to the model, which is consistent with conventional norms on evaluation of model fit (Seltman, 2015). This revised model is shown in Figure 1.

We tested an alternative model in which all of the variables reflected a single measure of communal coping, but the model did not fit the data well, $\chi^2_{(14)} = 58.52$, $p < .001$; RMSEA = .12; CFI = .87; TLI = .81; SRMR = .06.

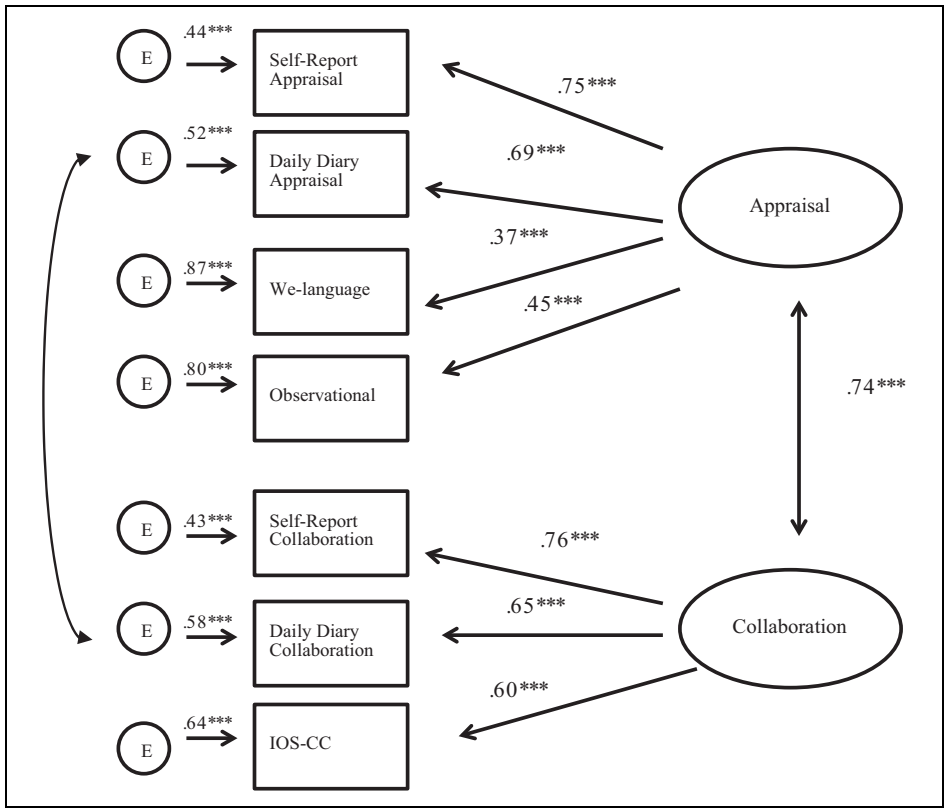

Figure 1. Final measurement model for the appraisal and collaboration latent variables. Note: All coefficients are standardized. *$p < .05$, **$p < .01$, ***$p < .001$.

Spouses. We used the final CFA model derived from the patient data to determine if it would be confirmed by the spouse data (Hypothesis 1). The model did not fit the data well, $\chi^2_{(12)} = 35.68$, $p < .001$; RMSEA = .10; CFI = .93; TLI = .87; SRMR = .07. Modification indices suggested a correlation between the residuals for we-language and the observational measure, perhaps indicating coders attend to we-language in making their rating. Adding this correlation improved model fit, $\chi^2_{(11)} = 22.30$, $p = .02$; RMSEA = .07; CFI = .96; TLI = .93; SRMR = .05. Thus, we retained this revised model (shown in Supplementary Figure 1) for testing hypothesized relations to relationship and health outcomes.

Structural model

Patients. Figure 2 shows the link of the patient latent appraisal variable to patient relationship quality, psychological distress, and self-care (Hypothesis 2). The model fit the data well, $\chi^2_{(48)} = 59.05$, $p = .13$; RMSEA = .03; CFI = .99; TLI = .98; SRMR = .05).

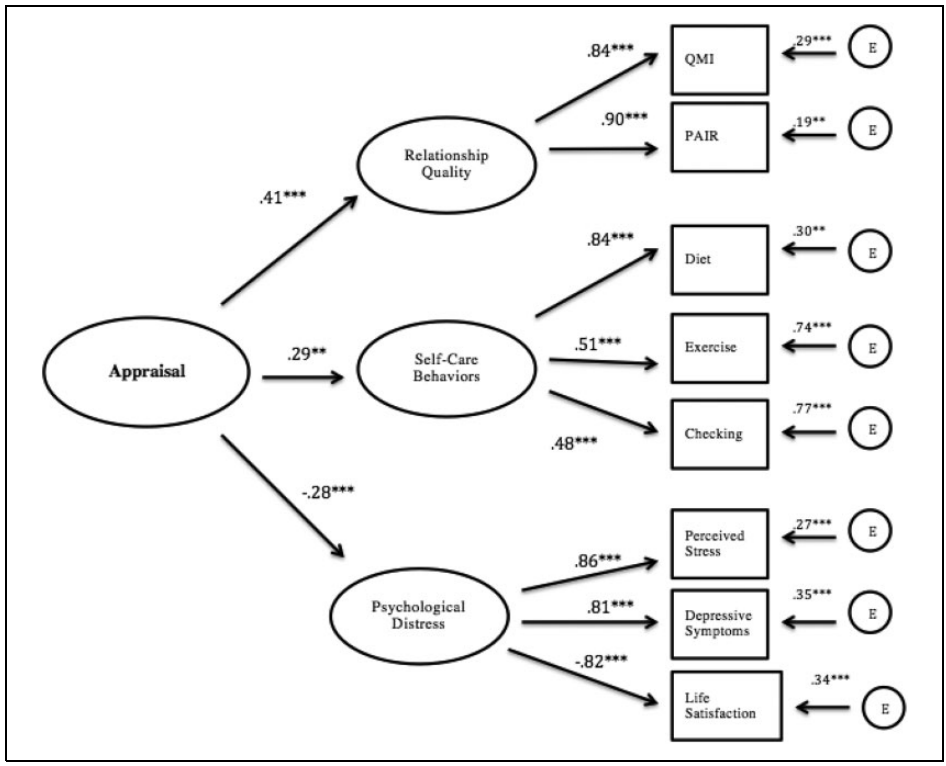

Figure 2. Relations of the latent variable appraisal to relationship quality, self-care behaviors, and psychological distress.
Note: All coefficients are standardized. The indicator variables for appraisal are not shown here, please refer to Figure 1.

Patient appraisal was linked to higher relationship quality ($\beta = .41$, $p < .001$), lower psychological distress ($\beta = -.28$, $p < .001$), and better self-care behaviors ($\beta = .29$, $p < .01$).

Figure 3 shows the link of the patient latent collaboration variable to relationship quality, psychological distress, and self-care (Hypothesis 2). The model fit the data well, $\chi^2_{(38)} = 39.55$, $p = .40$; RMSEA = .01; CFI = .99; TLI = .99; SRMR = .03. Collaboration was linked to significantly higher relationship quality ($\beta = .61$, $p < .001$), lower psychological distress ($\beta = -.33$, $p < .001$), and better self-care behaviors ($\beta = .40$, $p < .001$).

Spouses. Supplementary Figure 2 shows the links of the spouse latent appraisal variable to spouse relationship quality and psychological distress (Hypothesis 2). The model fit the data well, $\chi^2_{(23)} = 35.58$, $p = .05$; RMSEA = .05; CFI = .98; TLI = .97; SRMR = .04. Spouse appraisal was linked to higher relationship quality ($\beta = .25$, $p < .01$) and lower psychological distress ($\beta = -.17$, $p = .05$).

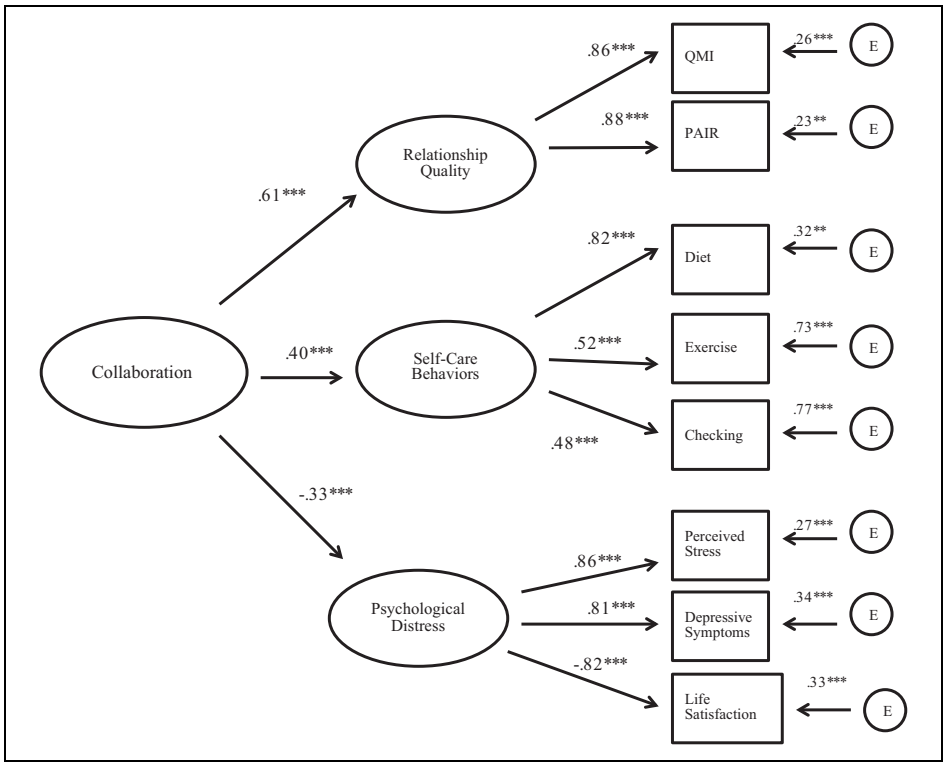

Figure 3. Relations of the latent variable collaboration to relationship quality, self-care behaviors, and psychological distress.
Note: All coefficients are standardized. The indicator variables for collaboration are not shown here, please refer to Figure 1.

The model testing the links of the spouse latent collaboration variable to relationship quality and psychological distress (Hypothesis 2) did not fit the data well, $\chi^2_{(17)} = 50.76$, $p < .001$; RMSEA = .10; CFI = .94; TLI = .91; SRMR = .05. Modification indices indicated a relation between the daily collaboration residual and the depressive symptoms residual that was not accounted for by the path between collaboration and psychological distress. This residual suggests a part of daily collaboration not captured by the latent variable is positively related to a part of depressive symptoms not captured by psychological distress ($\beta = .23$, $p < .001$). The aspect of depressive symptoms not captured by psychological distress could be somatic symptoms. Thus, this path may reflect a link between the repetition of daily collaboration to somatic symptoms for spouses. However, we do not want to overinterpret a finding that relies on links between residuals. Adding this path improved model fit, $\chi^2_{(16)} = 30.76$, $p = .01$; RMSEA = .07; CFI = .98; TLI = .96; SRMR = .03. As shown in Supplementary Figure 3, collaboration was linked to higher relationship quality ($\beta = .52$, $p < .001$) and lower psychological distress ($\beta = -.39$, $p < .001$).

Mediation

We created a model to test whether collaboration mediated the relations of shared appraisal to the three outcomes (Hypothesis 3).

Patients. First, we allowed both direct effects of appraisal and collaboration on outcomes and the indirect effect of appraisal via collaboration on outcomes. The model fit the data well, $\chi^2_{(79)} = 87.24$, $p = .25$; RMSEA = .02; CFI = .99; TLI = .99; SRMR = .04. Appraisal was significantly related to collaboration ($\beta = .74$, $p < .001$), and collaboration was significantly related to greater relationship quality ($\beta = .65$, $p < .001$), reduced psychological distress ($\beta = -.29$, $p = .05$), and better self-care behaviors ($\beta = .41$, $p = .01$). The direct effects of appraisal to the three outcomes were not significant. The tests of indirect effects showed that the links of appraisal to relationship quality and self-care behaviors were mediated by collaboration ($\beta = .49$, $p < .001$; $\beta = .30$, $p = .02$, respectively); however, the indirect effect of appraisal to psychological distress was not ($\beta = -.22$, $p = .06$).

Because there were no direct effects of appraisal on the three outcomes in this model, we removed those three direct pathways and tested whether this revised model provided an equally good fit for the data. The revised model shown in Figure 4 fit the data well, $\chi^2_{(82)} = 87.93$, $p = .31$; RMSEA = .02; CFI = .99; TLI = .99; SRMR = .04, and the $\Delta\chi^2$ difference test was not significant, $\chi^2_{(3)} = .69$, $p > .10$), indicating the revised model fit the data equally as well as the initial model. Figure 4 shows that appraisal was related to collaboration ($\beta = .73$, $p < .001$), and collaboration was related to each of the three outcomes: higher relationship quality ($\beta = .59$, $p < .001$), less psychological distress ($\beta = -.35$, $p < .001$), and better self-care behaviors ($\beta = .39$, $p < .001$), supporting our hypothesized mediational model.

Spouses. We used the same procedures to test mediation with spouse data. The model fit the data well, $\chi^2_{(45)} = 67.05$, $p = .02$; RMSEA = .05; CFI = .97; TLI = .96; SRMR = .05, but modification indices suggested a correlation between the residuals for life satisfaction and quality of marriage. The addition of this parameter improved model fit, $\chi^2_{(44)} = 55.97$, $p = .11$; RMSEA = .04; CFI = .99; TLI = .98; SRMR = .05. Again, we do not want to overinterpret a correlation between residuals. Importantly, appraisal was significantly related to collaboration ($\beta = .74$, $p < .001$), and collaboration was significantly related to greater relationship quality ($\beta = .76$, $p < .001$) and reduced psychological distress ($\beta = -.53$, $p < .01$). The direct effects of appraisal to psychological distress and relationship satisfaction were not significant. The tests of indirect effects showed that the links of appraisal to relationship quality and psychological distress were mediated by collaboration ($\beta = .57$, $p < .001$; $\beta = -.36$, $p < .01$, respectively).

Because there were not significant direct effects of appraisal on the outcomes in this model, we removed the direct pathways and tested whether this revised model provided an equally good fit for the data. The revised model fit the data well, $\chi^2_{(46)} = 60.69$, $p = .07$; RMSEA = .04; CFI = .98; TLI = .97; SRMR = .05, and the $\Delta\chi^2$ difference test was not significant, $\chi^2_{(2)} = 4.72$, $p = .09$, indicating the revised model fit the data equally as well as the initial model. This final model (Supplementary Figure 4) suggested that

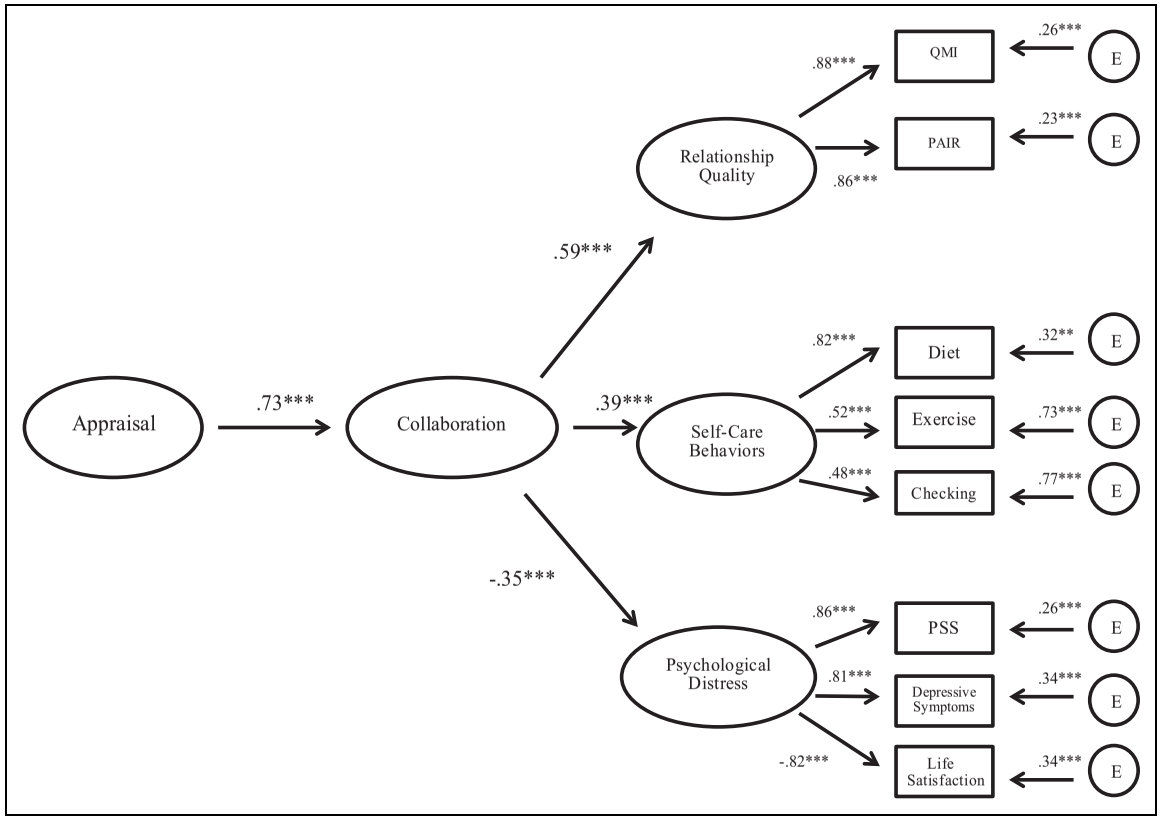

Figure 4. Model testing the relations of the appraisal to relationship quality, self-care behaviors, and psychological distress through collaboration.
Note: All coefficients are standardized. The indicator variables for appraisal and collaboration are not shown here. Please refer to Figure 1 to view the indicator variables.

appraisal was related to collaboration ($\beta = .72$, $p < .001$), and collaboration was related to higher relationship quality ($\beta = .46$, $p < .001$) and less psychological distress ($\beta = -.35$, $p < .001$).

Discussion

Our first goal was to apply a multi-method approach to the study of communal coping to determine if we could extract its commonality and distinguish the two components of appraisal and collaboration. Our CFA not only showed that there is empirical overlap among the different measures of communal coping but that we could distinguish the appraisal from the collaborative component of communal coping among both patients and spouses.

Shared illness appraisal can be considered to reflect the cognitive component of communal coping, as it represents the perception that the illness is a shared problem. As predicted, it was captured by self-report instruments that explicitly measured shared illness appraisal as well as from people's articulation of shared perceptions via a coping interview and a videotaped illness discussion. From the coping interview, we examined "we-language," which has been assumed by previous researchers to reflect the perspective of a shared approach to illness management (e.g., Rohrbaugh et al., 2008). The observational measure of communal coping, which was obtained from independent raters' examination of the couple's diabetes discussion, also appeared to reflect the appraisal component of communal coping. Although the observational measure of communal coping was developed to capture both shared illness appraisal and collaboration, raters attend to "we-language" in their ratings. Because the discussion is based on perceptions of illness management rather than actual engagement in illness management, it may more heavily reflect the cognitive rather than the behavioral aspect of communal coping. Future research should attempt to engage couples in actual problem-solving behavior to tap the collaboration component of communal coping.

Collaboration reflects the behavioral aspect of communal coping. It was best captured by explicit self-report measures of collaboration as well as the pictorial representation of communal coping, the IOS-CC. With the IOS-CC, patients are asked to choose which set of overlapping circles represents how they cope with diabetes. Thus, the instructions guide respondents to consider their behavior. When a subset of this sample was asked how they interpreted the IOS-CC, supportive and collaborative behaviors were the most likely responses (Helgeson & Van Vleet, 2019).

The second study goal was to examine links of communal coping to relationship and health outcomes. Results showed that communal coping, more broadly construed than it has been by previous research, is clearly connected to good relationship and health outcomes for both patients and spouses. Shared appraisal and collaboration were related to better relationship quality and less psychological distress for both patients and spouses and to better diabetes self-care behavior for patients. The findings are consistent with theory (Helgeson et al., 2018) and existing work on appraisal (e.g., Rohrbaugh et al., 2008; Karan et al., 2019) and collaboration (e.g., Berg et al., 2008; Johnson et al., 2013). As previous research has largely focused on patients, it is important to point out that we provided evidence that communal coping may be beneficial to spouses as well as

patients, with the exception of the one correlation between residuals. Most previous research on appraisal has focused on we-talk and has at times revealed inconsistent links to patient relationship and health outcomes (see Badr et al., 2016; Karan et al., 2019; Robbins et al., 2013). The latent variable approach may have allowed us to more fully capture the constructs of appraisal and collaboration, as each included multiple measures with varied methods.

Our third goal was to test recent theory (Helgeson et al., 2018) regarding the relation between appraisal and collaboration. It has been theorized that adopting a shared illness perspective drives couple members to work together to manage the illness, which then has benefits to relational, psychological, and behavioral health (Helgeson et al., 2018). If one couple member perceives diabetes to be a shared problem, this person will likely behave in ways consistent with this cognition. Thus, we hypothesized that collaboration would mediate the links of shared appraisal to relationship and health outcomes. Study results were consistent with this theoretical proposition, as results indicated that collaboration mediated the link of shared illness appraisal to relationship and health outcomes. However, we acknowledge that we are unable to make definitive causal claims regarding this relation because the data are cross sectional. Instead, we note that these results are consistent with previous research that suggests appraisal and collaboration can be distinguished from one another (Zajdel et al., 2019) and that appraisal can affect the role that collaboration has on the coping process (Helgeson, Berg et al., 2019).

These results suggest that intervention work with couples may be optimized if couple members hold a shared appraisal of the problem. Although interventions aimed at couples often include a collaborative component, researchers have rarely examined the implications of trying to alter couple members' appraisal of the problem. The vast majority of interventions focus on sharing the workload, collaborating and supporting one another (e.g., Trief et al., 2016; Wooldridge & Ranby, 2018). However, if appraisal leads to collaboration and maximizes the effects of collaboration on relationship and health outcomes, interventions that focus on a shared appraisal would shape the ways that couple members interact to manage the illness and impact relationship and health outcomes. Results from this study suggest that spouses would also benefit from communal coping interventions.

A primary limitation of this study is its cross-sectional nature. Because we did not examine changes over time, it is possible that positive relationships and health drive communal coping. That is, patients who are less distressed by their diabetes may be more likely to view it as shared and collaborate with their spouse. These data cannot rule out that possibility. However, there is longitudinal data to suggest that communal coping predicts beneficial health outcomes over time (Van Vleet et al., 2019). A second limitation is the high correlation between the appraisal and collaboration factors, making it less clear whether these two components of communal coping can be empirically distinguished. We suggest that future research further examine the causal sequence of communal coping and distinguish the two components with an experimental design in which the appraisal component of communal coping is manipulated to see if there are effects on collaboration. We have currently undertaken this research with promising results. A second way in which these questions could be addressed is via an intensive

repeated measures longitudinal design to determine whether appraisal leads to collaboration, collaboration leads to appraisal, or both occur.

Another limitation of using a latent variable approach to these data is that our sample size did not permit us to integrate patient and spouse communal coping into the same model to examine effects of one partner's communal coping on the other's outcomes. This is an important avenue for future research, as some data indicates partner communal coping is particularly impactful for patients (Karan et al., 2019). A final limitation is the sample size. While the sample size meets conventional guidelines for SEM (i.e., $n = 200$; Kline, 2016), we had lower than ideal power to detect poor model fit and statistically significant paths. This concern is somewhat alleviated by the fact that all of the hypothesized path coefficients met conventional levels of significance. However, replication with a larger sample will strengthen this work and allow us to examine the mutual effects of patient and spouse predictors on outcomes.

Despite these limitations, the study has a number of strengths. First, we examined communal coping with a variety of measures, as that was an explicit study goal. The vast majority of previous research relies on single measures. Second, we employed these measures in a diverse community sample with respect to age, race, and education. Nearly half of our sample was Black, and the vast majority of participants were not college educated. Future research should test whether these models are equally applicable to Black and White individuals and people of high and low socioeconomic status. Third, we distinguished the appraisal from the collaborative components of communal coping, which has been identified as a critical avenue for future research (Rentscher, 2019). With the exception of the "we-language" literature, previous research in this area has emphasized the collaborative component of communal coping or conflated the roles of appraisal and collaboration. We hope that these results inspire investigators to take into consideration whether the appraisal of a stressor is shared or not in their research.

We also hope that research on the collaboration component of communal coping is further strengthened by inclusion of more behavioral measures that include direct observation. Couples could be presented with a challenge related to their stressor and asked to manage that challenge to obtain a measure of actual behavior. Naturalistic collaboration could be captured by employment of innovative measures such as the EAR device (Mehl et al., 2001), which would assess collaborative behavior unfolding in the natural environment.

These results can be used to guide future researchers in their decisions of what communal coping measures to employ, depending on their research goals. The findings provide researchers with an enhanced understanding of what is captured by existing communal coping measures. Future research should carefully consider whether to measure communal coping as a unitary construct or to assess appraisal and collaboration as different dimensions of communal coping. These results provide researchers with a potential causal framework to employ regarding the communal coping process. This study indicated that appraisal may affect adjustment outcomes via collaboration. Future longitudinal work will help to explicate the process by which these two components of communal coping are related and how they benefit relationships and health.

Authors' note

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ORCID iD

Melissa Zajdel https://orcid.org/0000-0002-5097-3463
Vicki S. Helgeson https://orcid.org/0000-0002-2099-4714

Open research statement

As part of IARR's encouragement of open research practices, the authors have provided the following information: This research was not preregistered. The data used in the research are available. The data can be obtained by emailing Vicki Helgeson at vh2e@andrew.cmu.edu. The materials used in the research are available. The materials can be obtained by emailing: vh2e@andrew.cmu.edu.

Supplemental material

Supplemental material for this article is available online.

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