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## **BRIEF REPORT**

# Observed Dyadic Collaboration Among Couples Coping With Type 1 Diabetes

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Previous research linking collaboration to relationship and health outcomes has relied almost exclusively on individual self-report and failed to take into consideration the dyadic nature of collaboration. We enrolled couples (n=193) in which one person had Type 1 diabetes (52% female; 91% non-Hispanic white) into the study and asked them to discuss a diabetes-related issue of high concern for 8 min. These videotaped interactions were coded for dyadic collaboration. Mood was measured before and after the discussion. After the discussion, patients and partners reported support provided and received during the discussion. Results showed that observed dyadic collaboration was related to improvements in mood and greater support exchanges for both patients and partners when self-reported collaboration was statistically controlled. Gender moderated the effects on partners, such that benefits of dyadic collaboration were stronger for women than men. Future research may benefit from including collaborative elements into couple-focused interventions

Keywords: collaboration, coping, diabetes, marital interaction

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Increasingly, researchers have recognized that people do not cope with stressors in isolation from each other but within an interpersonal context. There are a variety of interpersonal coping theories, including the Systemic Transactional Model of Coping (Bodenmann, 1997), the Developmental Contextual Model of Coping (Berg & Upchurch, 2007), and communal coping (Afifi et al., 2020; Helgeson et al., 2018; Lyons et al., 1998). Each of these theories posits that the social environment is affected by and affects how one copes with a stressor.

Interpersonal coping is especially relevant to the context of chronic illness (Badr & Acitelli, 2017; Helgeson et al., 2018). Couples can manage chronic illness in a number of ways. Partners may be uninvolved, may provide support, may exhibit controlling behavior, or may collaborate with the patient (Badr & Acitelli, 2017;

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Berg & Upchurch, 2007). Collaboration reflects joint input, mutual effort, and a team approach to successfully managing a problem (Berg et al., 2011; Berg, Schindler, et al., 2008). Because chronic illness can benefit from joint coping efforts, collaboration has frequently been examined in the context of chronic illness.

Indeed, collaboration has been linked to good adjustment to chronic illness. Collaboration as assessed via daily diary has been associated with more positive emotions in the context of prostate cancer and Type 2 diabetes (Berg, Wiebe, et al., 2008; Zajdel et al., 2019) and to better self-care behavior among those with Type 2 diabetes (Zajdel et al., 2019). Using a multi-method approach, a latent collaboration variable (retrospective self-report, a pictorial measure, aggregate daily diary measure) was associated with better relationship quality, less psychological distress, and better self-care behaviors among persons with Type 2 diabetes (Zajdel & Helgeson, 2020).

One limitation of past research on collaboration is that measures typically have been based on individual members' self-reports of their behavior and have not included observations of collaboration as it naturally occurs during couple interactions. Observational studies of couple members' behavior exist, but these studies do not focus explicitly on collaboration, but rather support provision, support receipt, and support requests (Kuhn et al., 2017; Lau et al., 2019); global positive and negative behavior (Baucom et al., 2015; Hahlweg et al., 2000); and warmth and hostility (Lavner et al., 2016), often at the individual level. Two observational studies have examined communal coping, which consists of a shared illness appraisal (i.e., perception that illness is a shared problem rather than an individual problem) and collaboration (Rentscher, 2019; Van Vleet et al., 2018). However, these studies, like much of the other

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observational research, examined how *individual* couple members behave rather than how couple members behave together. Because collaboration is inherently a dyadic phenomenon (i.e., couple members working together), it is important that collaboration is examined at the dyadic level.

In addition, previous research has neglected to consider whether the effects of collaboration are moderated by gender. Because women are more interdependent (Cross & Madson, 1997) and socialized to be more relationship-focused than men (Helgeson, 2015), gender may be an important moderator of the effects of collaboration. We hypothesize that collaboration may be more beneficial to women than men, consistent with research that has shown women are more responsive to the quality of their relationships. Partner support is more strongly linked to marital satisfaction and well-being for women than men (Acitelli & Antonucci, 1994; Schulz & Schwarzer, 2004), and partner active engagement is more strongly linked to marital quality for women than men (Hagedoorn et al., 2000). Most relevant to this study, greater non-communal language has been linked with more marital distress for women but not men (Seider et al., 2009).

The effects of gender also may intersect with whether the person coping with diabetes is the patient or the spouse. Because women are more likely than men to be caregivers (Chappell et al., 2015; Danilovich et al., 2017) and in charge of the family's health (Umberson et al., 2018), families may cope better with health stressors, such as diabetes, when men are patients and women are spouses (i.e., caregivers). Male patients might benefit more from collaboration than female patients because men generally are more dependent than women on spouses for support (McLaughlin et al., 2010), including support for diet (Maclean, 1991). Alternatively, because spousal support might be more likely to occur in the context of a male patient/female spouse relationship, female patients might benefit more from collaboration than male patients because collaboration is less normative. Women might desire greater partner involvement than men, as women are more likely than men to cope with stress by seeking support (Tamres et al., 2002).

The primary goal of the present study is to examine the effects of observed dyadic collaboration on perceptions of support provision and receipt as well as changes in mood from before to after a couple-level discussion on how to address diabetes management concerns-independent of self-reports of collaboration. The secondary goal is to examine whether gender moderates these relations. Collaboration is examined in the context of Type 1 diabetes because it is a chronic illness that involves a demanding daily self-care regimen (i.e., insulin administration, monitoring of diet, exercise, and checking blood glucose levels multiple times throughout the day) that may benefit from joint input and assistance. In the present sample, adults with Type 1 diabetes have reported that they engage in collaborative and supportive strategies with their partner as they manage their diabetes (Helgeson et al., 2019). Here we focus on the extent of observed collaboration when resolving difficulties of diabetes management.

We focus on changes in mood and perceptions of support receipt and provision because collaboration is thought to lead to increased support provision and receipt as well as better mood. In the context of diabetes, collaboration should make it easier for patients to ask for support and partners to provide support (Berg & Upchurch, 2007; Bodenmann, 1997; Lyons et al., 1998). In the present sample,

survey and daily diary data indicate that patient perceptions of one's partner as collaborative and supportive are linked to perceptions that diabetes is more of a shared issue (Helgeson et al., 2019). Thus, collaboration in the context of a laboratory discussion about diabetes should reduce the stress experienced, measured by mood before and after the discussion.

#### Method

#### **Participants**

Participants were eligible to participate if patients were 25 years of age or older, had a diagnosis of Type 1 diabetes for at least 1 year, were taking insulin within 1 year of diagnosis, spoke English as their primary language (required for cognitive testing in the larger study), and were married or in a cohabitating relationship for at least 1 year with a partner who did not have diabetes. Of the 199 eligible couples enrolled (398 individuals), participants were mostly married (91.5%) and in heterosexual relationships (97%). Because gender was a study focus, we excluded the six same-sex couples from all analyses.

Of the remaining 193 couples, the average length of the romantic relationship was 19.73 years (SD=14.66). Patients were on average 46.94 (SD=14.31) years old, 52% were women, and were generally well educated (60% had a college degree or beyond). Spouses were on average 46.54 (SD=14.11), 47% women, and also well educated (53% with a college degree or beyond). Patients were largely Non-Hispanic White (91%), as were spouses (92%). Patients reported having lived with diabetes for an average of 27.24 (SD=13.73) years, 70% reported using a pump for insulin delivery, 44% reported using CGM, and the average HbA1c was above current ADA (2019) guidelines (<7.0%) (M=7.54, SD=1.04). Demographic and illness-related variables are shown in Table 1. Study procedures were approved by the Institutional Review Boards at the University of Utah, Carnegie Mellon University, and the University of Pittsburgh. All participants provided informed consent.

Participants were recruited from two university-affiliated endocrinology clinics. In Pittsburgh, patients were approached in the clinic by their provider who obtained permission to release their

**Table 1**Sample Demographic and Illness Related Variables

	Patient	Spouses		
	n = 19	n = 193		
	M	SD	M	SD
Age	46.94	14.31	46.54	14.11
Gender (female)	52%		48%	
Marital status (married)	92%			
Presence of children	65%			
Relationship length (years)	19.73	14.66		
Education (college degree)	60%		53%	
Race (nonHispanic white)	91%		92%	
Length of diabetes (years)	27.24	13.73		
Use of insulin pump	70%			
Use of CGM	44%			
Average HbA1c (%)	7.54	1.04		
Income (median range)	\$80-90,000			

name to the project director. If patients agreed, the project director contacted and explained the study to patients and spouses and enrolled those who agreed. Of the 206 patients approached, 4 declined to have their name forwarded, 47 were ineligible, 57 declined participation, and 6 could not be reached. Thus, 92 couples were scheduled and included in the study. At the University of Utah clinic, a research assistant explained the study to patients. If patients agreed, partner information was obtained. Of the 319 patients approached and screened for eligibility, 66 were deemed ineligible and 118 declined participation. Of the remaining 135 couples, 107 were scheduled and included in the study. The final sample included 199 couples across both sites, but 193 heterosexual couples form the basis of this article.

### **Procedure**

Once patients and spouses were recruited for the study, they were emailed online surveys (that included consent) to complete separately at home prior to the in-lab visit. Upon arrival to the lab, couple members completed an additional on-line survey separately (which included self-reports of collaboration for patients) and then were told that they would be discussing a diabetes-related problem. Each couple member completed a mood measure (described below) and a measure of common diabetes-related concerns to determine the videotaped discussion topic. Participants rated a set of 13 diabetesrelated concerns (e.g., diabetes-related complications, maintaining a healthy weight or losing weight, avoiding/managing hypoglycemia) on a seven-point scale ranging from 1 (not at all concerning) to 7 (very concerning). Answers were then reviewed by the experimenter to determine the highest rated shared diabetes concern. In the event that there were multiple equally highly rated topics, the top three topics were presented to the couple. Together, participants chose a topic of high concern that they agreed to discuss. Participants were instructed to discuss the topic for 8 min as if they were at home. The discussion was video-recorded. After 8 min, the experimenter returned and administered the post-discussion questionnaire separately to husbands and wives, which contained the same mood measure and reports of support receipt and provision (described below).

## **Self-Reported Collaboration**

Prior to the discussion, patients responded to seven items that reflected collaborative and supportive strategies (i.e., couples working together; partners providing advice and assistance) over the past month. The scale ( $\alpha = .94$ ) is elaborated elsewhere (Helgeson et al., 2019).

## Video Coding

A team of seven undergraduate or post-baccalaureate research assistants (RAs) rated communication during the video-recorded discussions under the supervision of a clinical psychologist who was a member of our team. This coding system is based on the Naïve Observational Rating System (NORS; Christensen, 2006), which has been shown to be a valid and reliable coding system (Baucom et al., 2012). (See Supplemental Materials for a copy of the Coding System, which includes the NORS as well as items developed specifically for this study, along with the correlations of dyadic

collaboration to all of the other codes.) Raters were informed of the topic selected for discussion and which partner had T1D. The seven raters watched the entire discussion and then made ratings of each aspect of communication based on the entire interaction. RAs completed pilot ratings from a small study of couples coping with Type 2 diabetes and the first discussions from the current study for the development and refinement of the coding manual. The idea behind the NORS coding system is that raters have the innate ability to know certain kinds of communication when they see it. Therefore, the codes are not further elaborated. The code that was central to this paper was dyadic collaboration, which was defined as "To what degree did the couple engage in joint problem solving in discussing the diabetes-related problem?" RAs assessed couples' degree of collaboration on a 10-point scale, ranging from 1 = not atall collaborative to 10 = very collaborative. The inter-rater reliability across the seven raters was .79. We note that our observational measure of dyadic collaboration was modestly related to patients' self-report of partner collaborative and supportive behavior, as described above (r = .13, p = .08). To discern collaboration from overall relationship quality, coders also rated couple relationship quality on a scale from 1 to 100, ranging from poor to excellent relationship (see Supplemental Materials).<sup>2</sup> Interrater reliability was high ( $\alpha = .87$ ).

#### **Post-Discussion Outcomes**

#### Mood

To assess mood before and after the discussion, patients rated the extent to which they currently felt 18 emotions on a 1 (not at all, very slightly) to 5 (extremely) scale. The nine negative mood items (e.g., sad, anxious, annoyed, angry) were taken from Cranford and colleagues (Cranford et al., 2006;  $\alpha$  = .79 patient pre;  $\alpha$  = .81 spouse pre;  $\alpha$  = .85 patient post;  $\alpha$  = .89 spouse post), and nine positive mood items (e.g., joyful, happy, amused) were devised for this study ( $\alpha$  = .95 patient pre;  $\alpha$  = .80 spouse pre;  $\alpha$  = .87 patient post;  $\alpha$  = .83 spouse post).

#### Support

Patients and spouses were each asked how much emotional and instrumental support they received and provided during the discussion. Emotional support consisted of "listened to what my partner had to say," "sympathized with my partner," and "was warm and friendly toward my partner." The internal consistencies for emotional support receipt and provision were good (receipt: patient  $\alpha=.86$ , spouse  $\alpha=.83$ ; provision: patient  $\alpha=.82$ , spouse  $\alpha=.72$ ). Instrumental support consisted of "tried to solve the problem" and "offered advice." The correlations for the two items were moderate for receipt (r=.66 for patients; r=.60 for spouses) and provision (r=.53 for patients; r=.46 for spouses, all

<sup>&</sup>lt;sup>1</sup> We created an agreement score by taking the absolute value of patient and partner ratings of concern for the topic that they discussed. Statistically controlling for this variable did not alter the results.

<sup>&</sup>lt;sup>2</sup> Coders also rated the overall relationship quality for the dyad as well as rated valence (positive and negative) and arousal for patients and partners separately. When these codes were entered into the analyses, the results remained unchanged with one exception: the main effect of observed dyadic collaboration on patient negative mood disappeared.

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p < .001). Because reports of emotional and instrumental support were moderately to highly correlated for patients (receipt = .56, p < .001; provision = .52, p < .001) and spouses (receipt = .57, p < .001; provision = .35, p < .001), we combined them into support provision and support receipt indices.

## **Overview of the Analysis**

First, we examined the extent to which demographic and background variables were related to gender and collaboration and might confound relations to outcomes. Then, we used multiple regression analysis to examine the relation of dyadic collaboration to postdiscussion outcomes. We entered covariates and self-reported collaboration on the first step, gender and dyadic collaboration on the second step, and the gender by dyadic collaboration interaction on the final step of the equation. For mood, we statistically controlled for pre-discussion mood so that we were examining changes in mood. When we statistically controlled for dyadic relationship quality, the results remained unchanged with one exception, which we note below.

#### Results

#### **Evaluation of Covariates**

Neither gender nor dyadic collaboration was related to any of the demographic or illness variables shown in Table 1. Collaboration was not related to use of an insulin pump or CGM, but gender was. Females were more likely than males (83% vs. 56%) to be using an insulin pump,  $\chi^2(1) = 16.87$ , p < .001, and using CGM (51% vs.  $37\%, \chi^{2}(1) = 3.35, p = .07$ . Thus, use of an insulin pump and CGM were statistically controlled in all analyses.

## Relation of Dyadic Collaboration to **Post-Discussion Mood**

As shown in Table 2, dyadic collaboration was related to a decrease in patient negative mood, although this main effect disappeared with controls for overall relationship quality. There was a nonsignificant trend toward an interaction of dyadic collaboration with sex to predict patient positive mood that suggested collaboration was related to an increase in positive mood for female but not male patients. Dyadic collaboration was related to a decrease in spouse negative mood and an increase in spouse positive mood. Both effects were qualified by interactions with sex. The relations of dyadic collaboration to decreased negative mood and increased positive mood were apparent for female spouses but not male spouses.

## Relation of Dyadic Collaboration to Post-Discussion **Support Provision and Receipt**

As shown in Table 2, dyadic collaboration was related to greater support receipt and greater support provision for patients. There were no interactions with patient sex. Dyadic collaboration also was related to greater support receipt and support provision for spouses. The effect on support receipt was qualified by an interaction with sex, such that the relation of dyadic collaboration to support receipt was stronger for female than male spouses.

#### Discussion

The primary goal of this study was to examine associations of an observational dyadic measure of collaboration on support receipt and provision as well as changes in mood from before to after a discussion on diabetes management. Results showed benefits of observational collaboration for both patients and partners in terms of mood and support exchanges, even when self-reported collaboration was statistically controlled.

Collaboration was related to a decrease in negative mood from before to after the discussion for patients and to a decrease in negative mood and an increase in positive mood for spouses. The findings for partners are of particular interest because past research has emphasized patients and paid less attention to partners. These data are consistent with a study of young adults with Type 1 diabetes showed that patients would like partners to be more involved in their diabetes but are concerned with burdening them (Helgeson, 2017). Collaboration may be one way to involve partners in diabetes management without increasing burden. The findings from this research show that discussing how to manage diabetes in a way that involves both persons working on the problem is mutually beneficial.

Collaboration not only has the potential to alleviate distress but also activates the support process. Couples who collaborated reported after the discussion that they provided more support to their partner and received more support from their partner. Again, these findings held for both patients and spouses, suggesting that working together to manage diabetes enables couple members to be mutually

Multiple Regression Coefficients (Standard Errors): Collaboration Predicting Mood, Support Receipt, Support Provision

	Patient negative mood	Patient positive mood	Spouse negative mood	Spouse positive mood	Patient support receipt	Patient support provision	Spouse support receipt	Spouse support provision
CGM	.06 (.06)	10 (.08)	.00 (.06)	04 (.07)	.02 (.21)	06 (.21)	20 (.20)	.07 (.17)
Insulin	04(.07)	00 (.10)	.04 (.07)	.08 (.09)	.07 (.25)	.28 (.24)	03 (.24)	15 (.19)
Pre mood	.42 (.08)***	.85 (.06)***	.48 (.08)***	.78 (.06)***	_	_	_	_
SR collaboration	03(.03)	.08 (.04)*	.03 (.03)	.05 (.03)	.43 (.10)***	.30 (.09)**	.09 (.09)	.16 (.08)*
Sex	01(.06)	06(.08)	13 (.06)*	$.14^{+}(.07)$	.15 (.21)	.45 (.21)*	.23 (.20)	20(.17)
DIADIC collaboration	06 (.02)**	02(.05)	12 (.04)***	.15 (.04)***	.36 (.08)***	.37 (.08)***	.81 (.12)***	.33 (.06)***
Sex × DIADIC collaboration		.12 (.06)+	.12 (.05)*	16 (.06)**		<u> </u>	50 (.16)**	<del>-</del> ^

*Note.* — not applicable; CGM = continuous glucose monitoring; neg = negative; pos = positive. p < .06. \* p < .05. \*\*\* p < .01. \*\*\* p < .001.

supportive to one another. Although collaboration is connected to support, it is important to distinguish the constructs conceptually. Whereas collaboration is a joint effort or a pooling of resources, support is typically understood as one person providing a resource to another person; that is, social support does not by definition involve people working together (Glass & Vander Platts, 2013). We have argued elsewhere that collaboration may be one way to shift the support process from a one-way street to a mutual interchange—that is, interactions in which one person is helping another person may come to be perceived as collaborative, which may be less likely to undermine self-efficacy (Helgeson et al., 2018).

It is also important to point out that collaboration is not a proxy for relationship quality, as the vast majority of findings held with statistical controls for relationship quality. Relationship quality in this study was defined as evidence of love, respect, and caring. Whereas a good relationship foundation may be necessary for collaboration to emerge, collaboration reflects a set of interactive behaviors that are especially useful in the context of one person's chronic illness.

A second study goal was to examine whether the gender of the patient or the partner affected the relation of collaboration to mood and support processes. Gender was a significant moderator of effects for partners. Female partners were the most likely to benefit from collaboration in terms of mood and in terms of support receipt. Collaboration is a relational process, and previous research has shown that women define themselves more in terms of connection than men (Cross & Madson, 1997). Women may have especially benefited from collaboration compared to men when they were spouses because women are more likely than men to be caregivers (Chappell et al., 2015; Danilovich et al., 2017).

Before concluding, we acknowledge several study strengths and limitations of our dyadic collaboration measure. The use of a behavioral measure of collaboration is a major contribution to the literature, as past research has largely focused on self-report. The use of a dyadic measure is also a study strength as collaboration is an inherently dyadic phenomenon but has often been assessed from the perspective of one individual. The question remains, however, whether this observed dyadic collaboration in the laboratory represents how couples interact with respect to diabetes in the home. Although both patients and partners rated the laboratory discussion as fairly typical to the discussions that they have at home (patients: M = 4.13, SD = 1.08; partners: M = 4.17, SD = 0.90 on a scale from 1 = not at all typical to 5 = very typical), we asked couples in the laboratory to discuss how to manage diabetes difficultiessomething that is not asked of them in the home. By presenting couples with this task, we are offering them the opportunity to collaborate. Our observed dyadic collaboration may not represent what occurs naturally in the home but may represent the possibility of conversations that could occur in the home. If that were true, these results would be particularly useful in the design of couple-level interventions.

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