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Features of Illness Versus Features of Romantic Relationships as Predictors of Cognitive and Behavioral Coping Among Individuals with Type 2 Diabetes

John Leustek [a] and Jennifer A. Theiss [b]

[a]Department of Communication Studies, The College of New Jersey; [b]Department of Communication, Rutgers University

ABSTRACT

For individuals with a chronic illness, such as type 2 diabetes, a multitude of factors may influence the ways people cope with their condition. This study compares characteristics of the illness and characteristics of a patient's romantic relationship as factors that predict coping behaviors for individuals with type 2 diabetes. Specifically, we identify illness uncertainty as a feature of chronic illness, as well as relational uncertainty and interference from partners as relationship characteristics that are associated with coping behaviors. Using Amazon Mechanical Turk, we recruited 500 participants who were diagnosed with type 2 diabetes and involved in a romantic relationship to complete an online survey about the ways they manage their illness in the context of their relationship. Structural equation model results showed that relational uncertainty and partner interference were both positively associated with the perceived threat of discussing the illness, whereas the effect for illness uncertainty was nonsignificant; thus, relationship characteristics were a more robust predictor of perceived threat than illness characteristics. In turn, the perceived threat of discussing the illness was negatively associated with treatment compliance and positively associated with topic avoidance about the illness. Treatment compliance was also negatively associated with topic avoidance. Implications for health and relationships are discussed.

Type 2 diabetes is a chronic health condition that has garnered increased attention due to its prevalence and impact. Having a supportive social network is one factor that can be helpful for promoting healthy behaviors and adhering to treatment for chronic illness (Strom & Egede, 2012), but several factors may undermine people's ability and willingness to involve relationship partners in their health behavior. Patients may have uncertainties about the seriousness of their diagnosis, which could increase the perceived risks in sharing information with a relationship partner (Middleton, LaVoie, & Brown, 2012). Type 2 diabetes is also characterized by negative stereotypes, which may decrease people's desire to discuss their diagnosis with people in their social network (Karlsen & Bru, 2014). Thus, the goals of this study are twofold. First, we aim to identify conditions associated with the perceived threat of illness conversations for patients. Second, we examine behavioral and communicative outcomes associated with the perceived threat of communicating about one's illness.

As a starting point, this study proposes two competing explanations for why people with type 2 diabetes are reluctant to discuss their chronic health condition with a relationship partner. First, we consider how the nature of the illness may predict people's willingness to talk to their partner about their diagnosis. Specifically, we highlight illness uncertainty (Mishel, 1990) as one factor that increases the perceived threat associated with discussing type 2 diabetes with a partner. Uncertainty limits people's ability to effectively plan their messages and anticipate conversational outcomes (e.g., Berger, 1997); thus, under conditions of illness uncertainty people lack sufficient knowledge or information about their illness to confidently discuss the implications and potential outcomes with a relationship partner (Miller & Dimatteo, 2013). Second, we consider characteristics of the relationship that may discourage conversations about one's type 2 diabetes with a partner. We draw on the relational turbulence model (Solomon & Knobloch, 2004) to nominate relational uncertainty and interference from partners as two relationship characteristics that may heighten the degree of perceived threat inherent in talking to a romantic partner about one's illness. Studies indicate that relationship talk (Knobloch & Theiss, 2011) and conversations about sexual intimacy (Theiss & Estlein, 2014) are perceived as more threatening when the mechanisms of relational turbulence are heightened. Similarly, the degree of threat in illness conversations is likely increased when individuals have doubts about their relationship and perceive disruptions to their goals. Our first goal in this study, then, is to examine whether features of the illness or features of the relationship are more strongly associated with the perceived threat of conversations with a partner about type 2 diabetes.

The second goal of this study is to examine the consequences that the perceived threat of discussing one's illness have for people's communication and health behavior.

CONTACT John Leustek leustekj@tcnj.edu Department of Communication Studies, The College of New Jersey, 2000 Pennington Road, Ewing, NJ 08628, USA.

Specifically, we expect that when health conversations are threatening, people avoid the topic with their partner and are less likely to comply with treatment advice. Research has shown that stigma surrounding type 2 diabetes arises due to physical symptoms, anticipated reactions from others, and disclosure (Della, Ashlock, & Basta, 2016), and that stigmatization is negatively associated with self-management behaviors and open communication with relational partners (Schabert, Browne, Mosely, & Speight, 2013). Thus, we anticipate that people undermine their treatment and avoid conversations about type 2 diabetes when conditions are threatening. In the sections that follow, we articulate the theoretical logic behind our predictions, describe a study that tested our hypotheses, and reflect on the implications of our findings for health and relationships.

Theoretical explanations for the perceived threat of discussing chronic illness

In the context of chronic illness, communicating about one's condition can be beneficial for encouraging coping and managing treatment (Goldsmith, Miller, & Caughlin, 2008), yet a lot of individuals are reluctant to discuss their health with significant others due to the stigma and embarrassment associated with their condition (Bevan, 2009). In this section, we point to characteristics of the illness and characteristics of the relationship that potentially account for the perceived threat of discussing one's illness with a relationship partner.

Characteristics of illness associated with perceived threat

Characteristics of the illness may be one explanation for the perceived threat of talking about a chronic health condition. Individuals with type 2 diabetes may experience uncertainties about their illness that make communication seem daunting. *Illness uncertainty* is defined as the degree of ambiguity and unpredictability stemming from illness-related events (Mishel, 1988). Illness uncertainty can arise through a combination of biological factors, psychological factors, and social factors that prevent individuals from being able to make informed decisions or increase the clarity of health-related outcomes (Reich, Olmsted, & Van Puymbroeck, 2006). For individuals with a chronic illness, uncertainties can stem from perceptions of the current state of their illness, the complexities of effective treatment, a lack of information regarding the severity of their illness, and the long-term prognosis of their illness (Johnson Wright, Afari, & Zautra, 2009). Individuals with chronic illness may be less capable of managing their uncertainty because the persistent nature of their condition makes coping and adapting a difficult process (Mishel, 1990). Thus, illness uncertainty is an important variable to consider in the context of chronic illness because it is likely to be persistent and unresolvable.

Illness uncertainty might be an influential factor in predicting the perceived threat of communicating about type 2 diabetes. High levels of illness uncertainty are associated with an increase in distress, anxiety, depression, and lack of hope (Hommel et al., 2003). Changes in illness uncertainty can also have implications for how patients perceive their close relationships as a supportive context for coping with their illness (Brashers, 2007). For example, high levels of illness uncertainty are associated with perceptions of decreased partner support and relationship satisfaction, particularly when the person suffering from a chronic illness has visible symptoms or the partner feels burdened by the illness (Reich et al., 2006). Individuals with type 2 diabetes may also question how certain aspects of their illness management, such as lifestyle changes and medical procedures, may negatively impact their romantic relationship (Johnson et al., 2009; Middleton et al., 2012), which can increase reluctance to discuss their illness with a partner. Thus, to the extent that individuals are uncertain about the severity of their illness, the complexities of their treatment, or the unintended impact on their relationship, they will perceive conversations with a romantic partner about their illness to be more threatening or embarrassing. In line with this reasoning, we propose the following hypothesis:

H1: Illness uncertainty is positively associated with the perceived threat of discussing type 2 diabetes with a relationship partner.

Characteristics of relationships associated with perceived threat

Characteristics of one's romantic relationship may also explain the perceived threat of discussing chronic illness with a partner. The relational turbulence model identifies features of relationships that are salient during important transitions and increase perceptions of turbulence between romantic partners (Solomon & Theiss, 2008). The model has been applied to various health-related transitions in close relationships (e.g., Solomon, Weber, & Steuber, 2010). Similarly, the diagnosis of a chronic illness can function as a transition in a relationship, as both partners must cope with the changes to behavioral routines (Thompson & O'Hair, 2008) and the new responsibilities involved in coping with chronic illness (Manne et al., 2004). Thus, given that the diagnosis and management of type 2 diabetes can constitute a significant transition in close relationships, the relational turbulence model offers insight about relationship conditions that might be especially relevant for predicting people's reactions to the illness. Specifically, the model identifies relational uncertainty and interference from a partner as two relationship characteristics that are heightened during transitions and contribute to turbulence.

The first mechanism in the relational turbulence model is *relational uncertainty*, which reflects the degree of confidence people have in their perceptions of a relationship and includes three interrelated sources of ambiguity (Knobloch, 2010; Knobloch & Solomon, 1999). *Self uncertainty* reflects questions about one's own involvement in a relationship. *Partner uncertainty* reflects questions about a partner's involvement in the relationship. *Relationship uncertainty* reflects questions about the state of the relationship as a whole. Individuals with type 2 diabetes are likely to experience increased relational uncertainty about how their health might impact their

own longevity in the relationship, whether or not their partner is still attracted to them in spite of the illness, and how the illness might affect the nature or quality of the relationship.

Heightened relational uncertainty is associated with biased cognitive reactions to interpersonal events. For example, under conditions of relational uncertainty irritating partner behavior is perceived as more severe and threatening to the relationship (e.g., Theiss & Knobloch, 2009). Individuals with heightened relational uncertainty also feel less confident communicating with their partner about sensitive subjects (Knobloch & Carpenter-Theune, 2004). Moreover, relational uncertainty is positively associated with the perceived threat of relational communication (Knobloch & Theiss, 2011; Theiss & Nagy, 2013) and sexual communication (Theiss & Estlein, 2014). For individuals with type 2 diabetes, heightened relational uncertainty may make it difficult to anticipate how sharing information about the illness will be received by a partner or shape the relationship. Consequently, relational uncertainty increases the potential threat associated with communicating about the illness. Based on this reasoning, we advance the following hypothesis:

H2: Relational uncertainty is positively associated with the perceived threat of discussing type 2 diabetes with a relationship partner.

The second mechanism in the relational turbulence model is *interference from partners*, which describes the extent to which individuals perceive their partner as hindering their everyday goals (Solomon & Knobloch, 2004). Individuals in romantic relationships exert a certain degree of influence over one another's behaviors, routines, and goals. Sometimes a partner's influence helps facilitate personal goals (e.g., "Thank you for picking up my medication at the pharmacy!"), whereas other times a partner's influence interferes in personal goals (e.g., "Why did you bake these cookies? You know I can't eat sugar."). Partner interference disrupts previously efficient routines and hinders the accomplishment of everyday goals (Solomon & Knobloch, 2001). The diagnosis of type 2 diabetes presents opportunities for increased partner interference as individuals adjust their behavioral routines to accomplish new goals and comply with lifestyle changes (Delamater, 2006). Thus, interference from partners is an important relationship characteristic to consider in this context because the diagnosis of type 2 diabetes introduces changes to relationship routines that can undermine efforts to coordinate actions.

In relationships where interference from partners is heightened, individuals may be especially reluctant to discuss the topic of their illness with a partner. Interference from partners is associated with perceptions of decreased partner responsiveness (Theiss & Knobloch, 2013) and increased turmoil (Knobloch & Theiss, 2012). When a partner is perceived as interfering with goals for effective management of a chronic illness, patients may feel unsupported by their partner, making it difficult to openly communicate with the partner about enacting needed changes (Cullum, Howland, & Instone, 2015). Indeed, interference from partners makes the prospect of relationship talk (Theiss & Nagy, 2013) and sexual communication (Theiss & Estlein, 2014) riskier and more threatening. Similarly, we expect that talking about type 2 diabetes with a romantic partner is perceived as riskier when the partner is perceived as interfering in goals. As such, we propose the following hypothesis:

H3: Interference from partners is positively associated with the perceived threat of discussing type 2 diabetes with a relationship partner.

Comparing illness characteristics and relationship characteristics

One unresolved issue is whether illness characteristics or relationship characteristics are more robust predictors of people's desire to talk with a partner about their illness. On one hand, illness uncertainty may make it difficult for individuals to talk about their condition with anyone to the extent that it contributes to feelings of stigma or helplessness (Schabert et al., 2013). On the other hand, conditions in one's romantic relationship can be especially vital for shaping how openly and intimately a patient can communicate with their partner in general, which may influence the extent to which they feel comfortable sharing information about their illness in particular (Smith, Ferrara, & Witte, 2007). Although both illness characteristics and relationship characteristics are likely to shape the experience of chronic illness, we wonder if one or the other is more important in predicting cognitive and communicative health outcomes. As such, we ask the following question:

RQ1: Are features of the illness or features of the relationship a more robust predictor of the perceived threat of discussing chronic illness?

Consequences of the perceived threat of discussing chronic illness

The next goal in this study is to examine how the perceived threat of discussing chronic illness predicts health maintenance behaviors and communicative engagement. Specifically, we highlight treatment compliance and topic avoidance as two primary outcomes of the perceived threat of discussing type 2 diabetes. These outcomes are important to consider because they are central factors in the successful management of chronic illness. Conditions that make it difficult for individuals to adhere to a treatment plan or to openly discuss their questions and concerns about their illness undermine efforts to maintain a healthy lifestyle. In this section, we consider how the perceived threat of communicating about type 2 diabetes predicts treatment compliance and communication behavior and we consider how these outcomes may be interrelated.

When individuals believe that it would be embarrassing or threatening to discuss their illness with a relationship partner, they may struggle to maintain their treatment regimen. Researchers have begun to explore relational facets of compliance, such as the amount of perceived support and the quality of the relationships patients have with their healthcare provider (Cullum et al., 2015). Research has also shown that relational

climates with high cohesion and low conflict are more likely to promote successful type 2 diabetes management behaviors (Delamater, 2006). In contrast, if conditions are not conducive to open communication about the illness, individuals may experience a deficit of support necessary to enact positive lifestyle changes (Barbour, Rintamaki, Ramsey, & Brashers, 2012). Consistent with this logic, we advance the following hypothesis:

H4: The perceived threat of discussing illness is negatively associated with type 2 diabetes treatment compliance.

The perceived threat of discussing one's type 2 diabetes may also be associated with topic avoidance about the illness. In chronic illness contexts, patients may feel as though communicating about illness-related topics is inappropriate, discouraged, or even pointless, and will actively avoid such topics with their partner (Donovan-Kicken & Caughlin, 2010). In addition, if chronic illness sufferers feel heavily stigmatized by their partner, they may be less likely to want to disclose information about their illness or their treatment compliance behaviors (Derlega, Winstead, Greene, Serovich, & Elwood, 2004). Conversely, individuals may be more willing to address the topic to the extent that they feel their partner will be receptive and supportive of communication about their illness (Knobloch & Delaney, 2012). As such, the following hypothesis is proposed:

H5: The perceived threat of discussing illness is positively associated with topic avoidance about type 2 diabetes.

Finally, we consider how failure to comply with type 2 diabetes treatment is associated with topic avoidance about one's illness. Individuals who are not adhering to their type 2 diabetes treatment may feel a sense of embarrassment or shame (Beverly, Miller, & Wray, 2008), which could make them reluctant to talk about their illness with a relationship partner. Communicating about the illness under these conditions might require individuals to admit that they are not doing everything they could be doing to cope with their illness, which may open them to criticism or judgment from a cherished partner (Stephens, Rook, Franks, Khan, & Iida, 2010). Thus, noncompliant behaviors may increase the amount of illness topic avoidance within a relationship. Based on this line of reasoning, we propose the following hypothesis:

H6: Compliance with treatment is negatively associated with topic avoidance about type 2 diabetes.

Our hypotheses are summarized in Figure 1. We anticipate that illness uncertainty (*H1*), relational uncertainty (*H2*), and interference from partners (*H3*) are all positively associated with the perceived threat of talking about one's type 2 diabetes with a relationship partner. In turn, the perceived threat of discussing one's health condition is negatively associated with treatment compliance (*H4*) and positively associated with topic avoidance about the illness (*H5*). Finally, we predict that noncompliance with type 2 diabetes treatment is negatively associated with topic avoidance about the illness (*H6*).

Method

Participants were recruited through Amazon Mechanical Turk, a crowdsourcing software platform that aggregates potential sample populations (see Shapiro, Chandler, & Mueller, 2013). Participants were first given a screening survey to verify their type 2 diabetes diagnosis and relationship status. The screening survey included a number of general questions about health behavior and asked participants to check off on a list of health conditions any illnesses with which they were diagnosed. Participants were also asked about their relationship status. Individuals who indicated they were diagnosed with type 2 diabetes and involved in a serious romantic relationship were invited to continue with the study. Screening surveys are an integral part of many crowdsourced sampling techniques as the screening process bolsters the integrity of the sample and the validity of the resulting data (Peer, Vosgerau, & Acquisti, 2014). Initially, 22,119 participants had completed the screening survey. Of

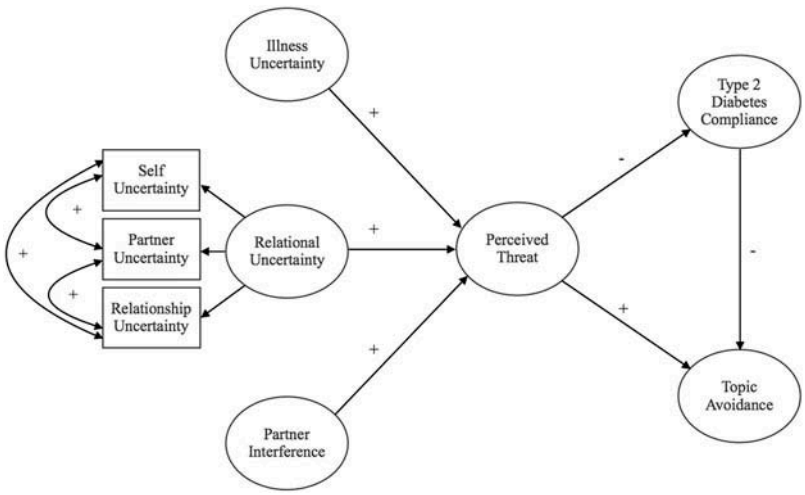

Figure 1. Predicted model including all hypothesized associations.

the 22,119 individuals, 500 participants met the eligibility requirements and completed the survey in its entirety.

Sample

Participants were 500 individuals (236 men, 264 women) who were diagnosed with type 2 diabetes and involved in a romantic relationship. The average length of time since being diagnosed with type 2 diabetes was 5.03 years (*SD* = 5.86 years). The majority of participants (98.4%) utilized some form of management for their type 2 diabetes, including daily blood glucose monitoring (58.2%), diet and exercise (78.2%), oral medication (71.8%), long-acting insulin treatment (21.2%), and rapid acting insulin treatment before meals (14.8%). A majority of participants (96.4%) also experienced some form of complications from their type 2 diabetes, with blood pressure changes (51%), high cholesterol (37.2%), and nerve disease (34.6%) being most frequently reported within the sample.

Participants ranged in age from 21 to 74 years (*M* = 42 years, *SD* = 11.82 years) and reported their ethnicity as White (67.8%), Asian (15.2%), African American (8.2%), Indian (7.8%), Native American (4.8%), and Other (0.6%). Participants' romantic relationships averaged 11.60 years (*SD* = 10.78 years). A majority of participants were married (64.6%) and others were monogamously dating (23%), engaged to be married or enter a civil union (9.8%), and in a civil union (2.6%). Most participants (74.4%) were diagnosed with type 2 diabetes after becoming romantically involved with their current partner.

Procedures

Qualified participants were asked to provide demographic information and then to answer closed-ended questions measuring the variables in this study. In order to prevent computer-assisted completion of the survey, attention checks were programmed into the survey. Participants who successfully completed the survey were compensated $2 through the Amazon Mechanical Turk payment system. Data was anonymized through the use of computer-generated identification numbers specific to the Mechanical Turk population that participated in the study.

Measures

Confirmatory factor analyses were conducted on all multi-item scales through SPSS Amos 22 to ensure that they were unidimensional. Criteria for a good-fitting factor structure were set at $\chi^2/df < 3.0$, Comparative Fit Index (CFI) > .95, Root Mean Square Error of Approximation (RMSEA) < .08 (Kline, 2010). All of the resulting scales met these fit criteria. All retained items of the measure were averaged to create a composite variable.

Illness uncertainty

The Uncertainty in Illness Scale (Mishel, 1988, 1990) was used to measure uncertainties specific to type 2 diabetes. After conducting the confirmatory factor analysis, 12 of the 23 items in the scale were retained. All items were lightly edited to refer to the condition of type 2 diabetes. Using a five-point Likert-type scale (1 = *very uncertain*, 5 = *very certain*), participants indicated their level of certainty about specific uncertainties that pertain to type 2 diabetes (e.g., whether or not my long-term health and quality of life are in jeopardy; whether or not the food I eat will affect my glucose management; *M* = 2.91, *SD* = 0.84, α = .83). All items were reverse coded so that higher values reflect greater *un*certainty.

Relational uncertainty

A shortened form of Knobloch and Solomon's (1999) relational uncertainty scale that was developed for use in online surveys was used to measure self, partner, and relationship uncertainty (e.g., Knobloch & Theiss, 2010). Individuals responded to items using a six-point Likert-type scale (1 = *very uncertain*, 6 = *very certain*). All items were reverse-coded so that higher values reflect increased *un*certainty. Six items measured self uncertainty (e.g., how committed you are to the relationship; *M* = 1.87, *SD* = 1.01, α = .97), six items measured partner uncertainty (e.g., how much your partner is romantically interested in you; *M* = 1.99, *SD* = 1.08, α = .94), and six items measured relationship uncertainty (e.g., the definition of the relationship; *M* = 1.98, *SD* = 1.07, α = .91).

Partner interference

Interference from partners was operationalized using a scale constructed by Solomon and Knobloch (2001) that was modified to refer to sources of interference in the management of type 2 diabetes. The measure consisted of five items using a six-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Participants were asked about specific ways in which a partner interfered with their type 2 diabetes goals (e.g., my partner interferes with my ability to cope with type 2 diabetes-related symptoms; my partner interferes with how much time I can spend managing my type 2 diabetes; *M* = 2.39, *SD* = 1.08, α = .89).

Perceived threat of discussing illness

The perceived threat of discussing one's illness with a relationship partner was measured using a version of the perceived threat of relationship talk scale (Knobloch & Theiss, 2011) that was modified to reflect the perceived threat of talking about illness. The measure consisted of 12 items that were answered using a six-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*). Participants responded to items about the degree of threat involved in discussing their health condition with a romantic partner (e.g., discussing my condition would threaten the relationship; discussing my condition would be embarrassing for me; discussing my condition would damage the relationship; *M* = 2.37, *SD* = 1.09, α = .78).

Treatment compliance

The degree to which participants successfully adhered to their type 2 diabetes treatment was measured using the Diabetes Self-Management Questionnaire (Schmitt et al., 2013). The scale measured four categories that encompass successful diabetes management: Glucose management, dietary control, physical activity, and health-care usage. The measure consisted of 14 items that were answered using a six-point Likert-type scale (1 = *does not apply to me*, 6 = *applies to me very much*). Participants were asked about the applicability of

various type 2 diabetes management activities (e.g., I tend to avoid diabetes-related doctor appointments; Sometimes I have real "food binges" not triggered by hypoglycemia; I do regular physical activity to achieve optimal blood sugar levels; M = 2.92, SD = 0.55, α = .79).

Topic avoidance

A topic avoidance scale developed by Guerrero and Afifi (1995) was used to measure the extent to which participants avoid discussing illness related topics with their partner. The measure consisted of 17 items that were answered using a seven-point Likert-type scale (1 = *never avoid*, 7 = *always avoid*). Items were modified to be more contextually specific to topics related to type 2 diabetes (e.g., I avoid discussing the progression of my illness with my partner; I avoid discussing my treatment regimen with my partner; M = 2.89, SD = 1.37, α = .92).

Results

Preliminary analyses

As a starting point, we conducted independent samples t-tests to examine potential sex differences. The t-tests revealed that there were significant differences between males and females in partner interference ($t_{(498)}$ = 4.95, p < .001), such that males (M = 2.64, SD = 1.08) reported higher levels of partner interference than females (M = 2.17, SD = 1.05). In addition, there were significant sex differences in the perceived threat of discussing illness with a partner ($t_{(498)}$ = 2.87, p < .01), such that males (M = 2.51, SD = 1.13) reported higher levels of perceived threat than females (M = 2.23, SD = 1.04). Finally, differences emerged between males and females on topic avoidance about illness ($t_{(498)}$ = 1.98, p < .05), such that males (M = 3.02, SD = 1.37) reported higher levels of topic avoidance than females (M = 2.78, SD = 1.36).

Next, we examined bivariate correlations among the variables in the study (see Table 1). Results indicated that illness uncertainty was positively associated with the three sources of relational uncertainty and with the perceived threat of discussing one's illness. In addition, self uncertainty, partner uncertainty, and relationship uncertainty were all intercorrelated, and were positively associated with partner interference, perceived threat, and topic avoidance, and negatively associated with treatment compliance. Interference from partners was positively associated with perceived threat and topic avoidance, and negatively associated with treatment compliance. In addition, perceived threat was negatively associated with treatment compliance and positively associated with topic avoidance. Finally, type 2 diabetes compliance was negatively associated with topic avoidance.

Test of hypotheses

Structural equation modeling with maximum likelihood estimation was used to test our hypotheses. All variables in the model were treated as parcels consisting of a latent variable, observed variable, measurement error, and random error. Measurement error was calculated as (1 – α)(σ) (Bollen, 1989). The observed variable in each parcel was the composite variable that was calculated as the mean of the individual scale items for that variable. For relational uncertainty, the parcel included self uncertainty, partner uncertainty, and relationship uncertainty as observed variables loading on a single latent variable. The threshold for a good-fitting model was set at χ^2/df < 3.0, CFI > .95, RMSEA < .08 (Kline, 2010).

Results indicated that our predicted model did not have an acceptable fit with the data (χ^2/df = 7.22, CFI = .95, RMSEA = .11). In order to achieve a good-fitting model, we added paths to the model one at a time, based on modification indices, until we achieved acceptable model fit. Two additional paths needed to be added to achieve acceptable model fit. First, we added a path allowing relational uncertainty and interference from partners to co-vary. Then, we added a path allowing relational uncertainty and illness uncertainty to co-vary. After adding these paths, the model achieved adequate fit (X^2/df = 2.18, CFI = .99, RMSEA = .05).

The final model is presented in Figure 2. Results indicated that, contrary to our predictions, illness uncertainty was not significantly associated with the perceived threat of discussing one's illness; thus, *H1* was not supported. Consistent with our hypotheses, relational uncertainty (*H2*) and partner interference (*H3*) were each positively associated with the perceived threat of discussing type 2 diabetes with a partner. In turn, the perceived threat of discussing one's illness was negatively associated with treatment compliance (*H4*) and positively associated with topic avoidance about the illness (*H5*), as predicted. Finally, type 2 diabetes compliance was negatively associated with topic avoidance about one's illness (*H6*). The paths that were added to the model to achieve model fit revealed that relational uncertainty was positively associated with illness uncertainty and interference from partners.

In order to test whether the effects of relationship characteristics and illness characteristics were significantly different from each other (*RQ1*), we calculated 95% confidence intervals that were estimated using bias corrected bootstrapping with 1,000

Table 1. Bivariate correlations.

	V1	V2	V3	V4	V5	V6	V7	V8
V1: Illness uncertainty								
V2: Self uncertainty	.21***							
V3: Partner uncertainty	.18***	.78***						
V4: Relationship uncertainty	.21***	.84***	.88***					
V5: Partner interference	.06	.39***	.33***	.31***				
V6: Perceived threat	.05	.47***	.46***	.42***	.51***			
V7: Compliance	.01	−.26***	−.27***	−.27***	−.24***	−.36***		
V8: Topic avoidance	.04	.45***	.42***	.42***	.41***	.61***	−.51***	

Notes. N = 500.
***p < .001.

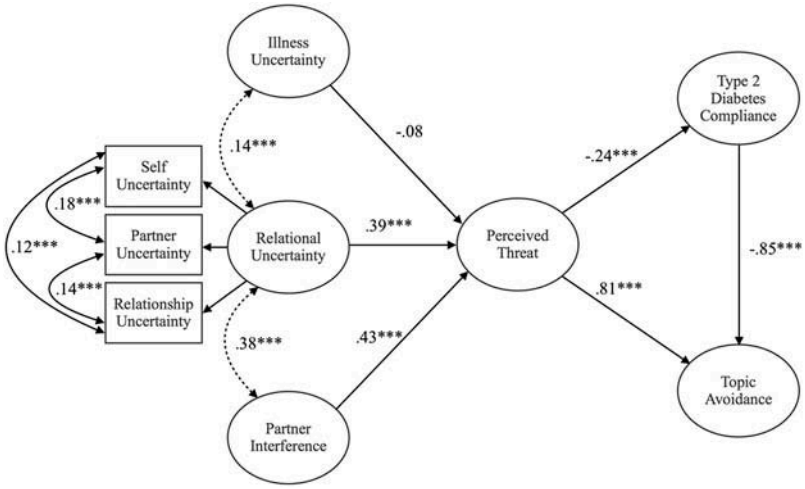

Figure 2. Fitted model.

permutations. Linear regressions were run to obtain the beta coefficients and confidence intervals for relational uncertainty ($\beta = .27$, $p = .01$, Lower Bound (LB) = .25, Upper Bound (UB) = .41), partner interference ($\beta = .43$, $p = .01$, LB = .37, UB = .53), and illness uncertainty ($\beta = -.05$, $p = .19$, LB = −.16, UB = .03) as regressed onto perceived threat. Cumming (2009) suggests that if confidence intervals overlap by less than 50%, the beta coefficients are significantly different ($p < .05$). To calculate the differences between confidence intervals, we calculated half of the average of the overlapping confidence intervals and added that value to the lower bound of the confidence intervals for the relationship variables, which resulted in lower bounds of .25 for relational uncertainty and .37 for interference from partners. The upper bound confidence interval for illness uncertainty (.03) was not greater than the lower bounds for either relational uncertainty or interference from partners; thus, the path coefficients for relational uncertainty and interference from partners are significantly different from the effect for illness uncertainty. These results suggest that relationship characteristics are a more robust predictor of perceptions of threat than illness characteristics.

Discussion

This study set out to determine how illness characteristics and relationship characteristics predict the ways in which individuals cope with type 2 diabetes. The results suggest that features of the relationship are more influential than features of the illness in predicting how willing people are to discuss their type 2 diabetes with a partner. Our results also highlight associations between the perceived threat of talking about type 2 diabetes and people's behavioral and communicative strategies for coping with illness. In this section, we discuss our results and highlight the implications of these findings for managing chronic health conditions.

Relationship and illness features that predict the perceived threat of communication

As a starting point, our model contrasted characteristics of illness with characteristics of the relationship as predictors of the perceived threat of discussing type 2 diabetes with a romantic partner. Results indicated that illness uncertainty was not significantly associated with perceived threat, whereas relational uncertainty and interference from partners were both positively associated with the perceived threat. We recognize two possible explanations for the non-significant association for illness uncertainty. First, it is possible that illness uncertainty is associated with the perceived threat of communicating about illness only indirectly through its association with relational uncertainty. Notably, both illness uncertainty and relational uncertainty were associated with perceived threat in the bivariate correlations, but when considered in combination in the structural equation model only relational uncertainty had a significant effect. Perhaps uncertainty about one's health contributes to questions about how a relationship might be impacted by chronic illness (Weber & Solomon, 2008), which exerts a more proximal effect on outcomes. Second, we suspect that the lack of an effect for illness uncertainty may also be related to the focus of our perceived threat variable. Our measure included items that indexed the potential for embarrassment to the self in discussing one's illness, but also the potential that talking to a partner about one's illness might damage the relationship. Although illness uncertainty may be associated with other aspects of the illness experience, such as information seeking (Brashers et al., 2003) or disclosure (Checton, Greene, Magsamen-Conrad, & Venetis, 2012), it may not be as reliable when predicting outcomes that are focused on the relationship.

Despite the wealth of research that has considered the various correlates of illness uncertainty (Brashers, Hsieh, Neidig, & Reynolds, 2006), the results of this study suggest that the characteristics of people's romantic relationships may be a particularly influential factor in how individuals cope with chronic illness. This is not to suggest that illness uncertainty is not an important factor in coping with chronic illness (McCormick, 2002). Individuals with type 2 diabetes may have uncertainties about the prognosis and management of their condition (Middleton et al., 2012), but the uncertainties and interference that stem from their relationship may have more immediacy for day-to-day health maintenance (Scott, Martin, Stone, &

Brashers, 2011). One reason for this may be the nature of type 2 diabetes management, which often involves changes to routine behaviors like diet and exercise that can have implications for one's romantic partner. Thus, experiencing turbulence within a relationship may make conversations about type 2 diabetes threatening because requesting changes to well-established routines and behaviors can change the dynamics of the relationship (e.g., "No more pizza date nights?"), create unwarranted expectations of a partner's support (e.g., "Why should I have to give up sweets when you're the one with diabetes?"), or invite unwanted scrutiny and influence from a concerned partner (e.g., "Should you really eat that piece of cake?").

Our results point to the important role of romantic relationship conditions in people's perceptions of their illness and management of their condition. A growing body of research has suggested that the heightened state of reactivity associated with relational turbulence is associated with context-specific perceptions of threat (Theiss & Estlein, 2014; Theiss & Knobloch, 2013). Our findings extend this body of literature by suggesting that chronic illness creates a context ripe for turbulence and risky conditions for communication. Relational uncertainty may discourage communication about illness because it makes it difficult to anticipate how a romantic partner will respond or how the illness may impact the relationship (Knobloch & Delaney, 2012). Interference from partners makes communication about illness undesirable because the romantic partner has already demonstrated an inability to support and encourage personal goals and routines, so it likely seems fruitless to involve the partner in one's health management goals. Thus, the experience of chronic illness may serve as a catalyst for relational turbulence, but the relationship conditions that characterize turbulent transitions are also associated with increased pessimism about individuals' ability to manage their illness.

The results of this study suggest that healthcare providers should explore ways to target patients' relational climate as a resource for encouraging treatment compliance, rather than just providing health information. This is in line with more recent calls to focus on the socio-relational components of successful chronic illness management (Schabert et al., 2013). Healthcare providers and relationship partners of individuals with type 2 diabetes should work to create a relationship climate in which conversations about illness are not considered taboo. Relational environments where one's illness can be discussed in a nonthreatening manner should be beneficial for the patient's relationship and facilitate successful management of the illness. Having a supportive environment may mitigate uncertainties about the state of the relationship in the context of the illness (Brashers, 2001), which may allow for more direct and focused communication about issues surrounding the illness. This is not to suggest that open communication is always desired or beneficial for people who are coping with chronic illness; certainly, there are situations in which individuals might prefer privacy or wish to cope with their condition independently from their partner. Yet, relationship conditions that increase perceptions that talking about illness is threatening, embarrassing, or taboo will stifle conversations that individuals coping with chronic illness might actually want to have. Thus, encouraging a relationship climate that is supportive and unthreatening makes it possible for individuals to choose whether they prefer to engage or avoid communicating with a partner about their illness.

Consequences of perceived threat

For individuals with chronic illness, we argued that the two primary outcomes of the perceived threat of communicating about the illness are changes in compliance behavior and avoiding health-related topics when communicating with a relational partner. Both *H4* and *H5* were confirmed in our analysis. Thus, the perceived threat of health communication has implications for both health-related outcomes and relational outcomes.

Our findings suggest that gaining treatment compliance from individuals with chronic illness may be multifaceted and benefit from focusing on a patient's close relationships. In relationships where communicating about one's illness is not perceived as particularly threatening, partner support may bolster maintenance behaviors. Rather than interfering with compliance, these partners may help to facilitate positive, compliant changes in a patient's daily routine. Research has shown that romantic partners have the potential to facilitate beneficial behaviors and routines in health contexts like weight loss (Theiss, Carpenter, & Leustek, 2016); thus, lifestyle changes for individuals with type 2 diabetes, such as healthier diets, increased exercise, and being proactive about glycemic control, may be easier to implement if a relational partner is willing to help facilitate those changes.

Our findings also indicate that the perceived threat of talking about one's illness is associated with increased topic avoidance about the issue, which could have lasting implications for the quality of the relationship. Avoiding communication about illness fosters a communication environment that is secretive, possibly deceptive, and guarded (e.g., Guerrero & Afifi, 1995). In turn, topic avoidance can decrease relationship satisfaction (Donovan-Kicken & Caughlin, 2010) and intimacy (Golish & Caughlin, 2002). In addition, the distance that topic avoidance creates between relationship partners can be detrimental to maintenance processes that require closeness and intimacy (Dailey & Palomares, 2004). Thus, damage to one's relationship is one unforeseen consequence of avoiding conversations about chronic illness.

Not only can topic avoidance be damaging for the relationship, it can also undermine the successful treatment of chronic illness. Our results suggest that there may be a cyclical relationship between the health and relational outcomes explicated in this study. Although the cross-sectional nature of our data makes it impossible to know what the long-term effects of noncompliance and topic avoidance might be, we speculate that failing to adhere to treatment and avoiding conversations about it are likely to further increase the perceived threat inherent to those conversations, which will continue the cycle of noncompliance and nondisclosure. Individuals who are not engaged in effective health maintenance are less likely to discuss their condition with a partner out of embarrassment, shame, or fear of being caught (Van Esch, Nijkamp, Cornel, & Snoek, 2012), which may lead to more uncertainties about how a partner might perceive their noncompliance. Patients may be caught in a pattern of

noncompliant behaviors because of the communication difficulties it creates within their interpersonal relationships. Thus, healthcare providers might consider ways to encourage more open communication about the illness between patients and their relationship partner as a means of bolstering treatment compliance. Although increased openness does not always lead to positive outcomes, in the case of chronic illness, avoidance of communication about the issue could have severe consequences.

Limitations and future directions

This study is not without some limitations. First, there are some critiques of utilizing a crowdsourced sampling technique like Amazon Mechanical Turk for specific populations (Buhrmester, Kwang, & Gosling, 2011). Given that this method of data collection is still relatively new, the debate about the consistency and validity of crowdsourced samples is ongoing (Casler, Bickel, & Hackett, 2013). To counteract some of these concerns, we implemented a number of strategies to ensure the integrity of our data, including a rigorous screening process and attention checks. Despite some of the limitations in this type of data collection, our study adds weight to a growing body of literature that utilizes similar methods of sampling (Goodman, Cryder, & Cheema, 2013). We look forward to future research that continues to utilize such methods to gain access to nationally representative samples of hard to reach populations.

Second, the cross-sectional nature of this study limits our ability to speak to the ways in which individuals manage chronic illness in the context of a romantic relationship over time. A longitudinal design would make it possible to document how experiences of chronic illness unfold over time, as well as the potential reciprocal influences that may exist between treatment compliance and topic avoidance and the experiences of intimacy and closeness in relationships. Future studies should collect multiple waves of data to better understand the reciprocal effects of topic avoidance and treatment noncompliance on features of the relationship and features of the illness. We also acknowledge that the cross-sectional nature of our study limits our ability to speak to the causal ordering of the effects observed in our model.

Third, we only examined the perceptions of individuals who were diagnosed with type 2 diabetes, but we did not consider how their romantic partner perceives these conditions in the context of the relationship. Although we were interested in how illness characteristics and relationship characteristics affect individuals' experience and management of type 2 diabetes, it is important to recognize that their romantic partner may also face unique struggles under these conditions. Future studies should take a dyadic approach to better understand how romantic partners of the chronically ill experience relational turbulence and health-related communication.

Finally, our study stops short of offering concrete recommendations for patients and healthcare providers in terms of implementing our results to improve health behavior. Our findings suggest that healthcare providers may be able to target partners to help provide the support and encouragement that individuals need to manage their illness. We see promise in future research that considers the unique role that romantic partners play in the facilitation of health behavior and the practical recommendations that may arise out of this approach.

Conclusion

Type 2 diabetes is a serious chronic illness that requires considerable self-management from diagnosed individuals. Given that self-management often involves lifestyle and day-to-day routine changes, relationships and social networks can play an important role in how individuals manage and cope with their condition. As such, this study sought to highlight how illness and relational characteristics predict type 2 diabetes coping behaviors. Our results suggest that characteristics of the relationship are an integral component of coping and managing a chronic health condition. Thus, future research should consider the importance of close relationships and interpersonal communication for individuals managing chronic illnesses.

ORCID

John Leustek http://orcid.org/0000-0002-7457-8740
Jennifer A. Theiss http://orcid.org/0000-0001-7991-7791

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