

RELATIONSHIP CORRELATES OF SPOUSAL INVOLVEMENT IN THEIR PARTNERS'

DIABETIC DIET

By

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THESIS ABSTRACT

Relationship Correlates of Spousal Involvement in their Partners' Diabetic Diet

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This study examined whether relationship factors were associated with spousal involvement in a partner's diabetic diet. Specifically, I examined whether marital quality and marital length were related to the frequency of spousal engagement in health-related social support and two types of health-related social control. Gender was examined as an exploratory moderator. Data from two different data sets, using the same measures, were examined. Data for study 1 were previously collected from self-report questionnaires of spouses whose partners had type 2 diabetes and were over the age of 55 receiving care from one of seven university-affiliated clinics in southern California. Data for study 2 were collected from an online survey of spouses whose partners also had type 2 diabetes and were over the age of 55. Regression analyses were conducted to determine whether marital length and marital quality were related to each type of spousal involvement, controlling for gender, race/ethnicity, and co-morbid health conditions. Data were analyzed separately for each sample. Study 1 found that marital quality was significantly and positively related to all three types of spousal involvement, but study 2 did not find this association. Neither study 1 nor study 2 found an

association between marital length and spousal involvement. No gender differences were found in any of these associations, although there were gender and racial/ethnic differences in spousal involvement. Given the inconsistent findings between these two studies, more research would need to be conducted to understand under what conditions marital quality, in particular, is related to spousal involvement in a partner's diabetes diet.

Keywords: diabetes, marriage, health-related social support, health-related social control

Relationship Correlates of Spousal Involvement in their Partners' Diabetic Diet

Introduction

The prevalence of diabetes has increased from 20.8 million in 2005 to 30.3 million in 2015 (CDC, 2005; CDC, 2017). According to the Centers for Disease Control and Prevention (2017) diabetes is prevalent in 12.2% of adults over the age of 18. Diabetes can lead to many complications (e.g. loss of eyesight, stroke, and kidney disease), and even death, when not well managed (American Diabetes Association, 2016). Older adults are not only more likely to have diabetes (CDC, 2017), but they also are at a higher risk of adverse diabetes outcomes (Kirkman et al., 2012). To successfully manage diabetes, patients must adhere to a number of prescribed health behaviors, including monitoring blood sugar, being physically active, eating a healthy diet, and taking medication and/or insulin if needed (CDC, 2014). Of the many required health behaviors patients must engage in, adhering to a prescribed diet is particularly important because it has a large impact on lowering blood glucose levels (CDC, 2011; August, Kelly, & Abbamonte, 2015).

Dietary nonadherence is common because dietary changes require that patients monitor their food choices daily for the rest of their lives (August et al., 2015; Beverly, Miller, & Wray, 2008). Among married patients, spouse's proximity to the patient puts them in a position to notice dietary nonadherence (Trief et al., 2003). Spouses are thus the most frequently social network member involved in a patient's dietary adherence in the context of managing diabetes (e.g. August & Sorkin, 2010; Beverly et al., 2008). Little is known, however, about potential factors related to spouses' attempts to promote their partners' dietary adherence. The

proposed study therefore examined relationship factors as possible correlates of spousal involvement in a partners' adherence to a diabetic diet.

Spousal Involvement

There are two key ways in which spouses can promote better adherence. The first is by providing social support, which is defined by Cohen (2004) as "a social network's provision of psychological and material resources intended to benefit an individual's ability to cope with stress," (p. 676). August, Rook, Franks, and Parris Stephens (2013) referred specifically to social support in the health-related context, defined as "attempts by social network members to provide encouragement and positive feedback to individuals perceived to be successfully self-regulating their own health behaviors" (p.712).

The second way that spouses can promote better adherence is by attempting to control, or regulate, their partners' dietary behaviors. Social control in the context of personal relationships is described as, "interactions that involve influence and regulation" (Lewis & Rook, 1999, p. 64). Health-related social control has been found to be conceptually and empirically distinct from health-related social support because, among other reasons, control involves restriction on behaviors, whereas support involves affirmation of behaviors (Rook et al., 2011). Two key types, or strategies, of social control have been examined in the literature. Positive social control refers to attempts to persuade individuals to engage in healthy behaviors (Craddock, vanDellen, Novak & Ranby, 2015; Stephens et al., 2009, 2013). Negative social control refers to attempts to pressure individuals to engage in healthy behaviors (Stephens et al., 2009, 2013). A distinction between positive and negative

social control (or persuasion and pressure, respectively) has been made because social control has been linked to both positive and negative associations, depending on which strategy is used (Stephens et al., 2013).

Correlates of Spousal Involvement

Most research has focused on the recipient of social support (e.g. Beverly et al., 2008; August et al., 2015). Studies have found that spousal social support is an important factor in coping and managing with chronic diseases, like diabetes (e.g. Beverly et al., 2008; Rook, August, & Sorokin, 2011; Iida et al., 2010). Stephens et al. (2013) found that the effect of health-related spousal support on dietary adherence was positive and significant; specifically, that spousal support towards a patient's diet was associated with an increase in patient's adherence. Little research has focused on the provider of health-related forms of social support. Although, August et al. (2013) found that when spouses provided support they reported less stress and more enjoyable marital interactions (August et al., 2011). Less is known about why social network members, such as spouses, engage in health-related social support.

Like social support, most research has focused on the recipient of social control (e.g. Rook et al., 2011; Craddock et al., 2015). Stephens et al. (2013) reported that on days when spouses exhibited more pressure than normal, patients reported a decrease in dietary adherence and an increase in diabetic distress. Additional researchers found that patients reported feeling resentful towards their spouses who engaged in social control of their diet (Beverly et al., 2008). Compared to negative social control, positive social control is often viewed as being motivated by

a partner's concern (Tucker & Mueller, 2000); therefore, it may have different effects than negative social control (August et al., 2013; Craddock et al., 2015; Stephens et al., 2009, 2013). For example, positive social control has been found to be beneficial to health behaviors and well-being (Fekete, Stephens, Druley, & Greene, 2006; Lewis & Rook, 1999). Some research has been conducted on how social control impacts the provider; for example, August et al. (2013) discovered that on days when spouses exerted control they reported more stress and more tense marital interactions. Similar to research on health-related social support, not much is known about the possible predictors of spouses' exertion of social control. August, Dowell, and Sorkin (2017) reported disease-specific factors that are related to spousal influence on their partners' diabetic diet, including spousal perception of their partners' dietary behaviors and diabetic worries, but no studies have examined how relationship factors may be related to spousal control.

Potential Relationship Factors Related to Spousal Involvement in a Partner's Diabetic Diet

Dunkel-Schetter and Skokan (1990) discuss four variables that influence the likelihood of social support attempts - stress factors, recipient factors, relationship factors, and provider factors. The focus of my study was on relationship factors as potential determinants of spousal support and control. Dunkel-Schetter and Skokan (1990) reported that marital adjustment was positively associated with spousal support. Iida et al. (2010) also hypothesized that relationship factors, such as relationship tension and enjoyment, were related to daily (emotional) support provision among patients with diabetes. They found that relationship tension was

not associated with spouses' social support; however, on days when spouses' reported higher levels of enjoyable interactions with patients, there was an increase in spousal support. Both studies suggest that relationship factors may be important to examine in understanding social support attempts. Although Dunkel-Schetter and Skokan (1990) discuss factors associated with social support, these same factors may be relevant to other types of social network involvement such as social control. Berg and Upchurch (2007) also discuss the importance of marital characteristics in couples' overall management of chronic disease, which may be important for specific spousal efforts.

Marital quality. One relationship factor that may be related to spousal involvement in a partner's diabetic diet is marital quality. Markey, Markey, and Gray (2007) found evidence that relationship quality is positively related to the number of positive health influence messages a partner sends. Specifically, this study found that men and women who felt that their partner had a positive influence on their health tended to be in more loving and understanding relationships than those who felt their partner had a negative impact. Additionally, couples who have high quality marriages are more likely to be invested in contributing to the well-being of their partner by promoting positive health behaviors (Schokker et al., 2010), and likely view disease management as a shared stressor (Berg & Upchurch, 2007; Iida et al., 2010). Furthermore, research has found that how spouses act toward their partners is related to whether they are satisfied with the overall quality of their marriage (Sagrestano, Christensen, & Heavey, 1998). Together, this evidence suggests that marital quality may be related to the type of

spousal involvement in their partners' diabetes management. As spousal support and positive strategies of social control may be considered positive spousal behaviors and negative strategies of social control may be considered negative spousal behaviors (Stephens et al., 2009), it is expected that spouses in higher quality marriages would engage in more frequent spousal support and positive strategies of social control and less frequent negative strategies of control than spouses in lower quality marriages.

Marital length. Another factor that may be related to spousal involvement in a partner's diabetic diet is marital length. There are inconsistent clues in the literature about whether marital length is related to more or less spousal support and control, however. For instance, long-term marriages are often characterized by shared goals and values (Lauer, Lauer, & Kerr, 1990); therefore, spouses in long-term marriages may share their partners' goal of adhering to their diabetic diet and thus become involved in promoting such adherence in multiple ways such as providing more frequent support and control, compared to spouses in short-term marriages. Another line of evidence suggests that in the later stages of marriage, couples are more likely to have established patterns of eating behaviors (Meyler, Stimpson, & Peek, 2007). As a result, spouses may be more likely to affirm patients' already established eating behaviors and be less likely to engage in efforts to change their behaviors (i.e., engage in more frequent support and less frequent control). Yet another line of evidence suggests that marriages in later life of shorter duration likely reflect remarriages (Livingston, 2014), and that remarriage appears to be related to worse health among older adults (Williams & Umberson, 2004). Patients'

worse health in short-term marriages may necessitate spouses to engage in more efforts to improve their partners' adherence to behaviors that promote better health (i.e., engage in more frequent control). Furthermore, spouses in newer marriages tend to have weaker marital commitment and this may result in them not being as involved in their partners' diabetic treatment regimen (Whitton, Stanley, Markman, & Johnson, 2013). Together, the evidence suggests it is possible that marital length could be related to spousal support and control in different ways, so the current study is exploratory in examining how marital length is related to the frequency of spousal support and control.

The Proposed Study

Little is known about what relationship factors are associated with the frequency in which spouses engage in social support and social control. Further, many previous studies have not differentiated between social support and social control, which are distinct constructs, despite co-occurring in close relationships such as marriage (August et al., 2013). Thus, efforts to understand factors related to both types of spousal involvement are worthy of consideration. This current study sought to examine what relationship characteristics were important for understanding spouses' involvement in their partners' diabetic regimen.

There are two specific aims that pertain to this study. The first aim was to examine if marital quality was related to the frequency of spouses' support or control of their partners' diabetic diet. I hypothesized that spouses who reported higher quality marriages would engage in more frequent spousal social support and

positive strategies of social control and less frequent negative strategies of social control than spouses who reported lower quality marriages.

The second aim was to examine if marital length was related to the frequency of spouses' support or control of their partners' diabetic diet. Given limited and inconsistent evidence in the literature, no hypothesis was posited about whether spouses who were married a shorter period of time would engage in more or less support and control than spouses who were married a longer period of time.

Gender also was examined as an exploratory moderator of these associations given gender differences in spousal involvement in chronic disease management more generally (Berg & Upchurch, 2007; Revenson et al., 2005) and diabetic diet more specifically (e.g. August and Sorkin, 2010; August et al., 2017; Revenson et al., 2005).

Methods

Data from two studies were used to address my hypotheses: "study 1" and "study 2". Both study 1 and study 2 have samples of older adults whose partners had type 2 diabetes. The same measures were used for both studies (with one exception, noted below).

Study 1

Participants

The participants in study 1 were 205 older adult spouses whose partners had type 2 diabetes (n = 93 female, n = 112 male). To be eligible, patients had to be diagnosed with type 2 diabetes, received their primary diabetes care at one of seven

university-affiliated clinics, and had at least one visit with a physician in the 2 years prior to the study. For comparison purposes to study 2, the analytic sample for this study was restricted to spouses of patients who were over the age of 55. Given the racial/ethnic background of patients at the clinics and surrounding geographic areas, participants were mainly comprised of three races/ethnicities. Specifically, 42% of spouses were non-Hispanic White, 28.8% were Asian/Pacific Islander, and 29.3% were Hispanic.

Procedure

The patients from study 1 were recruited from primary care and endocrinology clinics in southern California in 2006 through 2008. Married patients who provided written consent were asked to provide their spouses with a take home self-report questionnaire to complete. They sent it back in a pre-paid, stamped envelope. Spouses were compensated for participation with a \$10 gift card. Approval for the project was provided by the University-California, Irvine and Rutgers University Institutional Review Boards.

Study 2

Participants

Participants who were included in study 2 were 155 spouses (n = 78 females, n = 77 males) whose partners were diagnosed with type 2 diabetes. To be eligible, the patients had to be diagnosed with type 2 diabetes for at least a year prior to this study; be 55 or older; married/in a marital-like relationship; and the ability to understand English. Quota sampling was used to make sure there was a relatively

equal number of men and woman and that no more than 75 % of the participants would be non-Hispanic White. Specifically, 69.7% were non-Hispanic White, 18.1% were African American/Black, and 12.3% were of other races/ethnicities (Hispanic, Asian or Pacific Islander, and Native American or Alaskan Native).

Procedure

Patients were sampled through Qualtrics using one of their established panels with the eligibility criteria listed above. Patients were recruited directly through Qualtrics and were provided a survey link to share with their spouse. Participants provided electronic consent by clicking the “I agree” button. Participants who provided consent were asked to fill out a one-time self-report questionnaire that was completed online. Patients and their spouses were compensated by Qualtrics for their participation using the standard rate set by Qualtrics. This project received IRB approval from Rutgers, The State University of New Jersey.

Measures (Study 1 and Study 2)

For study 1, all questions were provided in English, Spanish, and Vietnamese. Items were forward and back translated, and focus groups with native speakers were used to determine cultural and linguistic equivalency (Gehlbach & Brinkworth, 2011). For study 2, all questions were provided only in English.

Marital Quality (independent variable). To assess marital quality, a total of five items were adapted from the Quality of Marriage Index (Norton, 1983; see Appendix A). Spouses responded on a 6-point scale the extent to which they agreed

with statements about their relationship with their spouse (*1 = strongly disagree, 6 = strongly agree*). Sample items are: “your marriage is strong” and “you really feel like part of a team with your spouse.” Items were averaged to create a composite measure of marital quality. Other studies have found this measure to have good reliability that ranged from $\alpha = .87 - .98$ (e.g., August et al., 2011; Henry, Rook, Parris Stephens, & Franks, 2013; Rook et al., 2011). The adapted version of this measure has been successfully used in multiple samples that have examined social support and control among couples managing type 2 diabetes (e.g. August et al., 2013; August et al., 2017; Franks et al. 2006; Rook, August, Stephens, & Franks, 2011). In studies 1 and 2, reliability was excellent for this measure ($\alpha = .93$ and $.98$, respectively).

Marital Length (independent variable). To assess marital length, spouses were asked, “How long have you and your spouse been married?” (see Appendix B).

Spousal Support (dependent variable). To assess health-related social support, three items were adapted from other studies of patients with diabetes and their spouses (e.g., Franks, Stephens, Rook, Franklin, Keteyian, & Artinian, 2006; August et al., 2013; see Appendix C). Spouses respond on a 6-point scale how often they engaged in support attempts directed toward their partner (*1 = not at all, 6 = every day*). Sample items are: “do something to help your spouse stick with his/her diabetic diet” and “show appreciation for your spouse’s efforts to stay on track with his/her diabetic diet.” Items were averaged to create a composite measure. In another study that used spouse reports of this measure, the reliability was good ($\alpha = .87$; August et al., 2013). Franks et al. (2006) reported that spouses’ support was

positively associated with patients' health behavior in the expected direction, providing evidence for the measures' validity. Stephens et al., (2013) reported that the effect of spousal support on dietary adherence was positive and significant, further providing evidence for the measures' validity. In studies 1 and 2 reliability was good for this measure ($\alpha = .90$ and $.88$, respectively).

Spousal Control (dependent variable). To assess the two types of health-related spousal control of dietary behaviors, seven items were adapted from Stephens et al. (2009). Spouses respond on a 6-point scale how often they engaged in control attempts directed toward their partner (*1 = not at all, 6 = every day*). Three items assessed positive social control, or persuasion; a sample item includes: "try to persuade your spouse to do more to follow his/her diabetic diet," (see Appendix D). Four items assessed negative social control, or pressure; a sample item includes: "do something to try to restrict your spouse from making poor food choices," (see Appendix E). Items were averaged to create a composite measure of persuasion and pressure, respectively. Reliability has been reported to be good for this measure in two different studies ($\alpha = .85$ to $.94$; August et al., 2013; August et al., 2017). These same studies found evidence between spouse reports of this measure and expected outcomes, including findings that suggest that exerting control towards a partner is related to worse spousal and relational well-being, providing evidence for the measures' validity. In studies 1 and 2, reliability was excellent for the persuasion measure ($\alpha = .92$ and $.91$, respectively) and was good for the pressure measure ($\alpha = .89$ and $.93$, respectively).

Covariates. The following covariates were considered in analyses due to their use in previous literature on support and control among couples managing type 2 diabetes: time since diagnosis, spouses' age, race/ethnicity, gender, and patients' co-morbid health conditions. To assess time since diagnosis in study 1, patients were asked, "How long have you had diabetes?" (see Appendix F). To assess time since diagnosis in study 2, patients were asked, "How long have you been diagnosed with type 2 diabetes?" (see Appendix G). To assess age, spouses were asked, "What is your birth date?", which was subtracted from the year of data collection (see Appendix H). To assess race/ethnicity in study 1, spouses were asked, "What is your racial background?" (see Appendix I). To assess race/ethnicity in study 2, spouses were asked, "What is your racial/ethnic background?" (Appendix J). Race/ethnicity was dummy coded (Indicator Variable) for analysis (study 1: Vietnamese American, Mexican American; study 2: African American, other race/ethnicity). To assess gender, spouses were asked if they were male or female (See Appendix K). To assess co-morbidity in study 1, patients responded "yes" or "no" to 27 different chronic conditions; a sample condition was: "Rheumatoid arthritis," (see Appendix L). To assess co-morbidity in study 2, patients responded "yes" or "no" to a list of 13 different chronic conditions; a sample condition was: "Arthritis or rheumatism," (see Appendix M). Co-morbidities were not assessed exactly the same across samples (e.g., study 1 sample did not include a question about whether participants had cancer and had unique questions for heart issues). However, efforts were made to standardize the variables across samples and a count was used to assess total number of co-morbidities. Only covariates that were

significantly associated with the dependent variables were included in regression models in order to have the most parsimonious model.

Analytic Plan

All analyses were conducted using SPSS version 25 software. Data were analyzed separately for study 1 and study 2. To measure reliability, the Cronbach's alpha for each measure was calculated. For both samples, I conducted descriptive analyses by examining the mean and standard deviation for all continuous variables and frequencies of nominal variables. I also examined bivariate correlations among key study variables. Finally, I compared the values on both participant characteristics and key study variables between the two samples using independent samples t-tests (continuous variables) and Chi-square analyses (nominal variables).

Linear multivariable regression analyses were performed to determine the significance and strength of the association between the independent and dependent variables. Specifically, to examine how marital quality and marital length were related to different types of spousal involvement among individuals with diabetes, a multivariable regression analysis was conducted for each outcome (social support, and two types of social control). The interaction between the independent variables (marital quality and marital length) and gender were calculated by using the product of the centered versions of these independent variables (i.e. the mean was subtracted from each variable) and gender. Variables were entered into the regression model in the following sequence: covariates and independent variables (marital quality and marital length; step 1) and interaction terms of the independent variable x moderator (step 2). Separate regressions were

conducted for each outcome, so three total regressions were examined for each data set.

Table 1.
Study 1 and study 2 participant characteristics.

Characteristics	Study #1 Values	Study #2 Values	t-test/Chi-square values
Age (years), <i>M(SD)</i>	65.91(7.23)	65.70(7.68)	$t(355)=.432, p=.666, d=0.05$
Gender (% male)	54.6%	49.7%	$X^2=(1, N=360)=.870, p=.351, \phi=.275$
Race/ethnicity Non-Hispanic White Vietnamese Hispanic African American Other (Hispanic, Asian or Pacific Islander, Native American or Alaskan Native)	42% 28.8% 29.3% - -	69.7% - - 18.1% 12.3%	Comparison between a dichotomous version of race (White vs. non-White) $X^2=(1, N=360)=27.31, p<.001, \phi=.049$
Education level Less than high school degree High school degree More than high school degree	37.9% 15.7% 46.4%	6.5% 29% 64.5%	Comparison on continuous education variable $t(279.269) = -11.28, p < .001, d=-1.35$
Patient time since diagnosis (in years), <i>M(SD)</i>	9.91(6.96)	11.88(7.14)	$t(333)=-2.54, p=.011, d=-0.28$
Chronic condition count, <i>M(SD)</i>	1.85(1.31)	1.38(0.96)	$t(356.843)=3.91, p <.001, d=0.41$

Results

Data were checked for completeness; the amount of missing data on all variables used in analyses for data from study 1 was $\leq 0.1\%$ and for data from study 2 was $\leq 0.03\%$. Listwise deletion was used for missing data. When examining bivariate associations between potential covariates and outcomes the following were significant: gender, race/ethnicity, and co-morbid disorders, and thus were included in regression models.

Table 1 presents participant characteristics by sample. Independent samples t-tests were conducted on continuous variables to compare the participants in samples 1 and 2. The results suggest that there were significant differences in length of marriage, highest education level, time since patient diagnosis, and number of chronic conditions, such that participants in study 1 were married significantly longer, had significantly less education, their partners had diabetes for significantly less time, and they had significantly more chronic conditions than those in study 2. There were no significant differences in age between the two samples. Chi-square tests were conducted on nominal variables to compare the sample from study 1 and 2 (given differences in the racial/ethnic composition between samples, race/ethnicity was first dichotomized to White vs. non-White). The results suggest that there was a significant difference in race/ethnicity across the two samples, such that spouses in study 2 were more likely to be White than spouses in study 1. There were no significant gender differences between the two samples.

Table 2 presents means, standard deviations, and intercorrelations among key variables for each sample, as well as independent samples t-tests for comparisons between the samples. There were significant differences in marital length, health-related social support, positive health-related social control, and negative health-related social control between study 1 and study 2. Participants in study 1 were married significantly longer than participants in study 2. Participants in study 1 also reported using more health-related social support, positive health-related social support, and negative health-related social control than participants in study 2.

Table 2

Means, Standard Deviations, and Intercorrelations among Key Study Variables, and Comparisons Between Samples

	1	2	3	4	5
1. Marital quality	_____	-.09	.15*	.17*	.12
2. Marital length	-.05	_____	.05	.05	-.04
3. Health-related social support	.14	-.10	_____	.76**	.48**
4. Positive health-related social control	-.04	-.05	.61**	_____	.64**
5. Negative health-related social control	-.09	.02	.43**	.80**	_____
Study 1 ($n = 205$): $M (SD)$	5.42(0.81)	37.46(13.16)	4.56(1.57)	4.18(1.75)	2.88(1.66)
Study 2 ($n = 155$): $M (SD)$	5.44(0.95)	33.37(14.84)	3.89(1.52)	3.07(1.64)	2.33(1.52)
$t (df)$	-0.15(355)	0.26(309.853)	4.07(352)	6.05(351)	3.19(353)
p	.884	.009	<.001	<.001	.002
d	-0.02	0.30	0.43	0.65	0.33

Note. Study 1 sample's correlations are above the diagonal; Study 2 sample's correlations are below the diagonal.

* $p < .05$. ** $p < .01$. *** $p < .001$

There were significant intercorrelations among some key variables. Marital quality was significantly and positively associated with health-related social support and positive health-related social control in study 1, but not in study 2. Health-related social support was significantly and positively associated with both positive health-related social control and negative health-related social control in study 1 and study 2. Lastly, positive health-related social control was significantly and positively associated with negative health-related social control in both study 1 and study 2.

Regression Results: Marital Quality and Marital Length as Relationship Correlates of Spousal Involvement

Health-related social support. Results for study 1 are shown in Table 3. The association between marital quality and health-related social support was significant in study 1 such that spouses who reported higher marital quality also reported providing more frequent social support. The interaction between marital quality and gender in predicting health-related social support was not significant in study 1. There was no significant association between marital length and health-related social support in study 1. Furthermore, there was no significant interaction between marital length and gender in predicting health-related social support in study 1.

There was a main effect for gender in study 1 such that female spouses provided more frequent health-related social support than male spouses. Finally, there was a main effect for race/ethnicity in study 1 such that Mexican American and Vietnamese American spouses reported more frequent support than non-Hispanic White spouses.

Results for study 2 are shown in Table 4. The association between marital quality and health-related social support was not significant in study 2, nor was the interaction between marital quality and gender in predicting health-related social support. The association between marital length and health-related social support was not significant in study 2, nor was the interaction between marital length and gender in predicting health-related social control using positive strategies.

There was a main effect for gender in study 2 such that female spouses provided more frequent health-related social support than male spouses. Finally, there was a main effect for race/ethnicity in study 2 such that African American spouses reported providing more frequent support than non-Hispanic White spouses.

Positive health-related social control. Results for study 1 are shown in Table 3. The association between marital quality and health-related positive social control was significant in study 1 such that spouses who reported higher marital quality also reported using more frequent health-related positive social control. The interaction between marital quality and gender in predicting health-related positive social control was not significant in study 1. There was no significant association between marital length and health-related positive social control in study 1. Further, there was no significant interaction between marital length and gender in predicting health-related positive social control in study 1.

There was a main effect for gender in study 1 such that female spouses provided more frequent health-related positive social control than male spouses. Finally, there was also a main effect for race/ethnicity in study 1 such that Mexican Americans and Vietnamese American spouses provided more frequent positive health-related social control than non-Hispanic White spouses.

Results for study 2 are shown in Table 4. The association between marital quality and health-related positive social control was not significant in study 2, nor

Table 3.

Study 1: Main and Interactive Effects Marital Quality and Length on Health-Related Social Support, Positive Social Control and Negative Social Control

Study 1 sample (n = 205)	Social Support				Positive Social Control				Negative Social Control			
	β	<i>t</i>	<i>p</i>	Model R^2	β	<i>t</i>	<i>p</i>	Model R^2	β	<i>t</i>	<i>p</i>	Model R^2
<i>Main effects</i>												
Marital quality	0.22	2.87	.005	Adjusted $R^2 = .08$	0.21	3.03	.003	Adjusted $R^2 = .23$	0.17	2.37	.019	Adjusted $R^2 = .17$
Marital length	-0.02	-0.27	.790		-0.05	-0.62	.535		-0.12	-1.58	.117	
Gender	0.17	2.21	.029		0.24	3.31	.001		0.13	1.69	.093	
Race/ethnicity					0.45	5.73	<.001		0.43	5.25	<.001	
Mexican	0.19	2.20	.028		0.47	5.64	<.001		0.29	3.31	.001	
American	0.26	2.90	.004									
Vietnamese												
American												
Co-morbid conditions	-0.02	-0.19	.201		0.11	1.48	.142		0.21	2.75	.007	
<i>Interaction effects</i>												
Marital quality x gender	0.11	1.03	.304	Adjusted $R^2 = .08$.011	1.13	.262	Adjusted $R^2 = .23$	-0.00	-0.04	.971	Adjusted $R^2 = .16$
Marital length x gender												

Note. A total of three separate regression analyses are reported above.

was the interaction between marital quality and gender in predicting health-related positive social control. The association between marital length and health-related positive social control was not significant in study 2. Furthermore, there was no significant interaction between marital length and gender in predicting health-related social control using positive strategies in study 2.

There was a main effect for gender in study 2 such that female spouses provided more frequent health-related social control using positive strategies than male spouses.

Negative health-related social control. Results for study 1 are shown in Table 3. The association between marital quality and health-related negative social control was significant in study 1 such that spouses who reported higher marital quality also reported using more frequent health-related negative social control. The interaction between marital quality and gender in predicting health-related negative social control was not significant in study 1. The association between marital length and health-related negative social control was not significant in study 1, nor was the interaction between marital length and gender in predicting health-related social control using negative strategies.

There was a main effect for race/ethnicity in study 1 such that Mexican American and Vietnamese American spouses used more frequent health-related social control using negative strategies than non-Hispanic White spouses. There was also a main effect for chronic conditions in study 1 such that the spouses of patients

Table 4.

Study 2 sample: Main and Interactive Effects Marital Quality and Length on Health-Related Social Support, Positive Social Control and Negative Social Control

Study 2 sample(n = 155)	Social Support				Positive Social Control				Negative Social Control			
	β	t	p	Model R^2	β	t	p	Model R^2	β	t	p	Model R^2
<i>Main Effects</i>												
Marital quality	0.13	1.63	.106	Adjusted $R^2 = .10$	-.03	-0.34	.734	Adjusted $R^2 = .05$	-0.09	-1.05	.294	Adjusted $R^2 = .02$
Marital length	-0.04	-0.51	.614		-0.03	-0.31	.757		0.04	0.49	.618	
Gender	0.26	3.02	.003		0.29	3.39	.001		0.22	2.49	.014	
Race/ethnicity					0.25	2.75	.007		0.18	1.96	.052	
African American	0.26	2.99	.003		0.07	0.88	.381		0.02	0.27	.787	
Other	0.14	1.76	.080									
Co-morbid conditions	-0.14	-1.82	.072		-0.45	-0.56	.580		-0.08	-1.01	.312	
<i>Interaction effects</i>												
Marital quality x gender	-0.15	-1.31	.193	Adjusted $R^2 = .09$	-0.07	-0.57	.573	Adjusted $R^2 = .04$	-0.01	-0.05	.958	Adjusted $R^2 = .01$
Marital length x gender	-0.30	-0.28	.781		0.02	0.21	.828		-0.01	-0.05	.958	

Note. A total of three separate regression analyses are reported above.

who had more chronic conditions reported using more frequent negative social control.

Results for study 2 are shown in Table 4. The association between marital quality and negative health-related social control was not significant in study 2, nor was the interaction between marital quality and gender in predicting health-related social control using negative strategies. The association between marital length and health-related negative social control was not significant in study 2, nor was the interaction between marital length and gender in predicting health-related social control using negative strategies.

There was a main effect for gender in study 2 such that female spouses provided more frequent health-related social control using negative strategies than male spouses. However, there was also a main effect for race/ethnicity such that spouses of Mexican American and Vietnamese American race used more frequent health-related negative social control than non-Hispanic White spouses.

Discussion

The current study sought to examine whether relationship factors helped explain some of the variability in spousal involvement in a partner's adherence to a diabetic diet. The aims for this study were to examine if marital quality and marital length were related to the frequency and type of spousal involvement in their partners' diabetic diet, after controlling for the other relationship factor, as well as gender, race/ethnicity, and co-morbid health conditions. Given established gender differences in spousal involvement in chronic disease management more generally (e.g., Berg & Upchurch, 2007) and diabetes diet more specifically (e.g., August &

Sorkin, 2010), this study further sought to examine whether gender was a moderator of all associations.

Marital quality as a correlate of spousal involvement

As hypothesized, spouses in study 1 who reported higher marital quality also reported more frequent health-related social support and positive health-related social control. These findings are consistent with past research that found providing health-related social support was related to better relational well-being (August et al., 2013). Like social support, positive health-related social control, which includes gentle reminders, persuasive appeals, and expressions of worry, is often viewed as a positive type of interaction that is used out of love or concern for the recipients' health (Lewis & Rook, 1999; Tucker & Anders, 2001). As positive types of interactions are related to better marital quality (Karney & Bradbury, 1995), it is thus not surprising that these types of spousal involvement are related to better marital quality. Given the cross-sectional nature of the data, it is not clear which direction this association is, although it is expected that it is bidirectional – i.e., better marital quality is related to more positive interactions, which in turn, are related to better marital quality.

Contrary to the hypotheses, spouses in study 1 who reported higher marital quality also engaged in more frequent negative health-related social control. As negative health-related social control, which includes criticisms, restrictions of behavior, and other attempts at influence that tend to elicit negative emotions, is conceptualized as a negative type of interaction (Lewis & Rook, 1999; Tucker & Anders, 2001), this finding is surprising. One possible explanation is that spouses in

better quality relationships are more likely to view their partners' diabetes as a shared stressor (Berg & Upchurch, 2007) and thus are willing to use any strategy necessary to promote their partners' adherence to their diet (even if this involves more "forceful" strategies that are considered negative forms of social control). It is also possible that spouses who use these types of (less frequent) strategies in the context of a high quality relationship engage in a greater number of positive social control strategies, thus preserving marital quality (Gottman, 1999).

Unlike participants in study 1, in study 2, marital quality was not related to health-related social support, positive social control, or negative social control. It is unclear why these associations differed for study 1 and study 2 but could reflect differences between the samples. In study 1, more than half of the participants were either Mexican American or Vietnamese American and these cultures tend to be more interdependent than non-Hispanic White culture that tends to be more individualistic (e.g. Berg & Upchurch, 2007). Interdependent cultures often view illness as being a shared obstacle (Berg & Upchurch, 2007) which means they may be more likely to expect involvement and thus marital quality depends on it versus in individualistic cultures, where autonomy, and individual goals are valued (Markus & Kitayama, 1991, 2003). In study 2, approximately 70% of the participants were non-Hispanic Whites, with 18% being African American. African American cultures are also more interdependent (Milburn & Bowman, 1991; Hatchett & Jackson, 1993), but the number of African American participant was much smaller than the number of White participants in study 2.

Additional differences between the samples could also account for these inconsistent findings, including the education level, number of comorbid chronic conditions, marital length, as well as the frequency of spousal involvement, which are significantly different in study 1 compared to study 2. Further, the samples were collected at two different time periods using different methods. The sample for study 1 was collected between 2006-2008 and the sample for study 2 was collected more than ten years later in 2019. Data for study 1 were collected using self-reported questionnaires that were completed in hard copy format in southern California and the data for study 2 were collected via an online survey using participants from across the United States. These differences by sample composition, as well as the cohort and methodological differences, could potentially account for the differences in findings. However, other findings (discussed below) are relatively consistent between the samples, suggesting that a more conceptual explanation for these inconsistent findings for marital quality is more likely (e.g., race/ethnicity is a potential moderator that is responsible for the differences between samples).

Marital length as a correlate of spousal involvement

Marital length also was examined as a possible (exploratory) correlate of spousal involvement, but was not related to any type of spousal involvement – health-related social support, positive social control, or negative social control – in either study. These findings suggest that spousal involvement may occur at similar frequencies for couples who have been married for a shorter versus longer length of

time. Other factors (e.g., marital quality) may be more important than the length of the marriage per se in understanding spousal involvement.

Associations by gender

Although gender was examined as a potential moderator of associations between marital length and quality and spousal involvement, the results of these analyses were not significant in either study. However, main effects for gender were found such that in study 1, gender was related to health-related social support and positive health-related social control, while study 2 found that gender was related to all three types of spousal involvement. Specifically, female spouses were more likely to engage in more frequent spousal involvement than male spouses. This finding is consistent with previous research that suggests that females are more likely to be involved in their spouses' health than male spouses (Umberson, 1992). In addition, the current study focused on dietary behaviors as the target of spousal involvement and the current cohort of women tend to be more responsible for meal planning, shopping, and preparation (Umberson, 1992), which could further explain gender differences in spousal involvement in the dietary aspect of their partners' diabetes management.

The only difference in this gender finding between the two samples is that gender was only related to negative health-related social control in study 2, but not in study 1. This type of involvement is the least frequent type of involvement in both samples (and for both genders). Potential reasons for this difference in findings by sample could be explained by the sample composition, as discussed previously.

Additional findings: Racial/ethnic differences in spousal involvement

More frequent social support and positive social control also were related to race/ethnicity in both samples. Specifically, in study 1, Mexican American and Vietnamese American spouses were more likely to engage in all types of spousal involvement compared to non-Hispanic Whites. This finding may be explained by the nature of Mexican and Vietnamese cultures, which tend to be interdependent cultures (Berg & Upchurch, 2007) and interdependent cultures emphasize interconnected goals more than individualist cultures (Markus & Kitayama, 1991, 2003). Likewise, for study 2, African American spouses engaged in more frequent health-related social support and positive health-related social control than White spouses. Some research has suggested that the African American culture is also interdependent (e.g. Milburn & Bowman, 1991; Hatchett & Jackson, 1993). As previously discussed, interdependent cultures tend to put emphasis on interconnected goals and thus individuals from these cultures may be more likely to be involved in their partners' disease management using multiple strategies.

Limitations, Future Directions, and Implications

In assessing the results of this current study, some limitations and future research directions should be discussed. First, the directions of the effects between spousal relationship factors and spousal involvement in a partner's diabetic diet cannot be determined by this study, as it was cross-sectional. It is likely that spousal involvement and marital quality, in particular, have a reciprocal relationship, such that marital quality may affect spousal involvement and spousal involvement may

affect marital quality. Second, sample size was relatively small in both samples, limiting statistical power to detect significant effects. Study 2 was not intended to be a replication of study 1, but sample size also may have been the reason that study 2 did not yield the same results as study 1. According to Simonsohn (2015) the sample size of an original study should be set to reach a reasonable level of statistical power, which is around 80%. Further, in order to replicate the results of an original study there would need to be 2.5 times the amount of participants in the subsequent study to achieve this 80%. Lastly, there could be other factors that could be related to spousal involvement in a partner's diet, or moderators of such effects, that were not taken into account. Some potential influential factors to consider in future research are which spouse is responsible for meal planning/preparation and personality factors. In addition, future research should also look at potential racial/ethnic differences in the associations examined, especially given the racial/ethnic differences between the samples.

The results of this study may have important implications for the research on spousal involvement in a partner's chronic disease management because research on the determinants of social support and social control is limited. Given conflicting findings in the two samples in the current study, more needs to be understood about why some spouses are involved in different ways in a partner's disease management. Identifying factors related to spouses' behavior is essential for the effective design of couple-focused interventions to promote better diabetes management (August, Dowell, & Sorkin, 2017).

Appendix A

Please indicate how much you agree or disagree with the following statements about your relationship with your spouse.

(circle one for each item)

	Strongly disagree	Disagree	Slightly disagree e	Slightly agree	Agree	Strongly agree
a. You have a good marriage.	1	2	3	4	5	6
b. Your relationship with your spouse is very stable.	1	2	3	4	5	6
c. Your marriage is strong.	1	2	3	4	5	6
d. Your relationship with your spouse makes you happy.	1	2	3	4	5	6
e. You really feel like part of a team with your spouse.	1	2	3	4	5	6

Appendix B

How long have you and your spouse been married?

(fill in number of years)

Appendix C

The following questions ask about the ways YOU might have been involved in YOUR SPOUSE'S diabetic diet. That is, his/her food choices. Food choices can include food and beverages consumed at meals and snacks, as well as food consumed in your home, in the homes of others, and at restaurants.

During the past month, how often did YOU...?

	<i>(circle one for each item)</i>					
	Every day	Several times per week	About once a week	3-4 times in the past month	1-2 times in the past month	Not at all
a. Do something to help your spouse stick with his/her diabetic diet.....	1	2	3	4	5	6
b. Show appreciation for your spouse's efforts to stay on track with his/her diabetic diet.....	1	2	3	4	5	6
c. Show an understanding of the importance of your spouse following a healthy meal plan.....	1	2	3	4	5	6

Appendix D

The following questions ask about the ways YOU might have been involved in YOUR SPOUSE'S diabetic diet. That is, his/her food choices. Food choices can include food and beverages consumed at meals and snacks, as well as food consumed in your home, in the homes of others, and at restaurants.

During the past month, how often did YOU...?

(circle one for each item)

	Every day	Several times per week	About once a week	3-4 times in the past month	1-2 times in the past month	Not at all
d. Try to do something to get your spouse to improve his/her food choices.....	1	2	3	4	5	6
e. Let your spouse know that his/her poor food choices worries you.....	1	2	3	4	5	6
f. Try to persuade your spouse to do more to follow his/her diabetic diet.....	1	2	3	4	5	6

Appendix E

The following questions ask about the ways YOU might have been involved in YOUR SPOUSE'S diabetic diet. That is, his/her food choices. Food choices can include food and beverages consumed at meals and snacks, as well as food consumed in your home, in the homes of others, and at restaurants.

During the past month, how often did YOU...?

(circle one for each item)

	Every day	Several times per week	About once a week	3-4 times in the past month	1-2 times in the past month	Not at all
g. Do something to try to restrict your spouse from making poor food choices.....	1	2	3	4	5	6
h. Express irritation with your spouse's poor food choices.....	1	2	3	4	5	6
i. Criticize your spouse's poor food choices.....	1	2	3	4	5	6
j. Question or express doubts about your spouse's poor food choices.....	1	2	3	4	5	6

Appendix F

[Patient] How long have you had your diabetes?

I have had my diabetes for years *(fill in number of years).*

Appendix G

[Patient] How long have you been diagnosed with type 2 diabetes? (Fill in number of years.)

Appendix H

What is YOUR birth date? / /

(month) (day) (year)

Appendix I

What is YOUR racial background?*(circle one)*

- | | |
|--|---|
| White..... | 1 |
| African American or Black..... | 2 |
| Hispanic..... | 3 |
| Asian or Pacific Islander..... | 4 |
| Native American or Alaskan Native..... | 5 |
| Other Race. PLEASE SPECIFY: _____ | 7 |

Appendix J

What is your racial/ethnic background?

- White
- African American or Black
- Hispanic
- Asian or Pacific Islander
- Native American or Alaskan Native
- Other (Please Specify)

Appendix K

Are you...?

Male (1)

Female (2)

Appendix L

Have you ever been told by a physician that you have any of the following problems with your breathing?

(check one for each item)

	NO	YES
Emphysema.....	<input type="radio"/> 1	<input type="radio"/> 2
Chronic bronchitis.....	<input type="radio"/> 1	<input type="radio"/> 2
Asthma.....	<input type="radio"/> 1	<input type="radio"/> 2

Have you ever been told by a physician that you have any of the following problems related to your heart or circulation?

(check one for each item)

	NO	YES
a. Previous heart attack	<input type="radio"/> 1	<input type="radio"/> 2
b. Congestive heart failure.....	<input type="radio"/> 1	<input type="radio"/> 2
c. High cholesterol.....	<input type="radio"/> 1	<input type="radio"/> 2
d. Angina.....	<input type="radio"/> 1	<input type="radio"/> 2

Have you ever been told by a physician that you have high blood pressure?

(check one)

No Yes

Have you ever been told by a physician that you have any of the following problems?

(check one for each item)

	NO	YES
Peptic or stomach ulcer.....	<input type="radio"/> 1	<input type="radio"/> 2
Liver disease.....	<input type="radio"/> 1	<input type="radio"/> 2
Ulcerative colitis (or Crohn's Disease).....	<input type="radio"/> 1	<input type="radio"/> 2
Irritable or functional bowel disease.....	<input type="radio"/> 1	<input type="radio"/> 2
Gallstones or gallbladder disease.....	<input type="radio"/> 1	<input type="radio"/> 2

Have you ever been told by a physician that you have any of the following bladder, kidney, or urinary problems?

(check one for each item)

	NO	YES
Kidney failure.....	<input type="radio"/> 1	<input type="radio"/> 2
Protein in your urine.....	<input type="radio"/> 1	<input type="radio"/> 2
MEN ONLY: Enlarged prostate.....	<input type="radio"/> 1	<input type="radio"/> 2
WOMEN ONLY: Recurring vaginitis.....	<input type="radio"/> 1	<input type="radio"/> 2

During the past 6 months, how many times have you had any of the following problems with your kidneys, bladder, or urination?

(circle one number on each line)

	More than Once a Week	Almost Every Week	About Once a Month	Once or Twice Only	Never
a. Trouble starting to urinate (had to push or strain).....	1	2	3	4	5
b. Trouble completely emptying your bladder.....	1	2	3	4	5
c. "Leaking" urine when you sneeze or cough.....	1	2	3	4	5
d. Feeling like you have to urinate suddenly or without warning.....	1	2	3	4	5

Have you ever been told by a physician that you have:

(check one for each item)

	NO	YES
Osteoarthritis or degenerative joint disease.....	<input type="radio"/> 1	<input type="radio"/> 2
Rheumatoid arthritis.....	<input type="radio"/> 1	<input type="radio"/> 2
Slipped or herniated disc in your back.....	<input type="radio"/> 1	<input type="radio"/> 2
Osteoporosis (or thinning bones).....	<input type="radio"/> 1	<input type="radio"/> 2

Appendix M

Have you been told by a doctor or other health professional that you have any of the following conditions?

(check one for each item)

	NO	YES
a. High blood pressure or hypertension.....	<input type="radio"/> 01	<input type="radio"/> 02
b. Asthma.....	<input type="radio"/> 01	<input type="radio"/> 02
c. Emphysema or chronic bronchitis.....	<input type="radio"/> 01	<input type="radio"/> 02
d. Arthritis or rheumatism.....	<input type="radio"/> 01	<input type="radio"/> 02
e. Diabetes.....	<input type="radio"/> 01	<input type="radio"/> 02
f. Stomach or intestinal ulcers.....	<input type="radio"/> 01	<input type="radio"/> 02
g. Liver disease.....	<input type="radio"/> 01	<input type="radio"/> 02
h. Kidney or bladder problems.....	<input type="radio"/> 01	<input type="radio"/> 02
i. Cancer or a malignancy of any kind.....	<input type="radio"/> 01	<input type="radio"/> 02
j. Heart attack or heart failure.....	<input type="radio"/> 01	<input type="radio"/> 02
k. Stroke (current disability or impairment due to a stroke).....	<input type="radio"/> 01	<input type="radio"/> 02
l. Hip fracture.....	<input type="radio"/> 01	<input type="radio"/> 02
m. Another health condition. PLEASE SPECIFY: _____	<input type="radio"/> 01	<input type="radio"/> 02

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