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Marital Status and Gender Differences in Managing a Chronic Illness: The Function of Health-Related Social Control

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Abstract

The attempts of social network members to regulate individuals' health behaviors, or health-related social control, is one mechanism by which social relationships influence health. Little is known, however, about whether this process varies in married versus unmarried individuals managing a chronic illness in which health behaviors are a key component. Researchers have proposed that social control attempts may have dual effects on recipients' well-being, such that improved health behaviors may occur at the cost of increased emotional distress. The current study accordingly sought to examine marital status differences in the sources, frequency, and responses to health-related social control in an ethnically diverse sample of 1,477 patients with type 2 diabetes from southern California, USA. Results from two-way ANCOVAs revealed that married individuals reported their spouses most frequently as sources of social control, with unmarried women naming children and unmarried men naming friends/neighbors most frequently as sources of social control. Married men reported receiving social control most often, whereas unmarried men reported receiving social control least often. Regression analyses that examined behavioral and emotional responses to social control revealed that positive social control strategies were associated with better dietary behavior among married patients. Results also revealed a complex pattern of emotional responses, such that social control was associated with both appreciation and hostility, with the effect for appreciation most pronounced among women. Findings from this study highlight the importance of marital status and gender differences in social network members' involvement in the management of a chronic illness.

Keywords

social control; health behaviors; marital status; gender differences; illness management; type 2 diabetes, USA, social networks

It is widely accepted that social network involvement is associated with a reduced risk of mortality and better health outcomes (Cohen, 2004; Berkman, Glass, Brissette, & Seeman, 2000; House, Landis, & Umberson, 1988). Marriage, in particular, is one relationship that consistently has been found to have protective health effects, evidenced by many studies that have demonstrated that married individuals have longer survival times and lower incidence of health problems compared to unmarried individuals (see review by Burman & Margolin, 1992; Johnson, Backlund, Sorlie, & Loveless, 2000; Lillard & Panis, 1996).

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Research now has begun to shift toward examining the specific interpersonal mechanisms that link marriage to better health outcomes. A key pathway through which relationships can positively affect health is encouragement of a healthy lifestyle (Seeman, 2000). Social support and social control are two interpersonal mechanisms that have been identified as having implications for individuals' health behaviors (Berkman et al., 2000; Helgeson, Novak, Lepore, & Eton, 2004). A domain-specific type of support, or health-related social support, involves efforts by social network members to provide assistance and positive feedback directed toward promoting health-enhancing behaviors (Franks, Parris Stephens, Rook, Franklin, Keteyian, & Artinian, 2006; Gallant, 2003). Not all social interactions aimed at fostering healthy behaviors involve the provision of support, however. Thus, another mechanism by which social network members can contribute to healthy behaviors is by serving as sources of influence and regulation (Berkman et al., 2000; Cohen, 2004). *Health-related social control* refers to attempts made by social network members to monitor and influence an individual's health behaviors (Lewis & Rook, 1999). Given that support and control have been found to have distinctive effects on the health behaviors of recipients (Franks et al., 2006; Helgeson et al., 2004), it is important to examine the unique association between social control and health, a potentially relevant, yet understudied, area of research.

Many of the studies examining social control to date have been conducted using only married participants. While it is often assumed that spouses are in a unique position to influence their partners' health (e.g., Tucker, 2002), unmarried individuals also may have close network members who try to influence their health behaviors (Umberson, 1992). Thus, it is important to consider not only how married individuals influence their partners' health through the use of social control, but also whether a growing population of currently unmarried individuals (U.S. Census Bureau, 2001) can incur a comparable benefit from other sources of social control. Thus, the goal of the current study was to address this gap in knowledge by examining the extent to which the receipt of and response to health-related social control differs between married and unmarried individuals. Specifically, we sought to determine whether unmarried individuals have available to them this potentially important social resource, and if so, whether other individuals' attempts to provide these resources are equally effective in promoting positive health behaviors compared to married individuals.

Sources and Frequency of Health-Related Social Control

Within the social support literature, the spouse is often named as the most important source of support, especially for health-related issues (Revenson, 1994). Thus, for married individuals, spouses also may be in a unique position to influence their partners' health behaviors (e.g., Rokach, 1998). Furthermore, spouses commonly share many health behaviors (Homish & Leonard, 2008). Consequently, spouses generally are listed as the most frequent social control provider for married individuals (e.g., Tucker, 2002; Umberson, 1992). For example, in a nationally-representative sample of adults, Umberson (1992) found that among the married, more than 80% of men and 59% of women named their spouse as being an important source of influence and regulation.

For individuals who do not have a spouse to rely on, the question arises of whether other network members serve as sources of health-related social control. Although the evidence is not consistent, previous research sheds some light on this question. Some studies have found evidence that unmarried individuals typically identify unrelated persons (such as friends) as sources of health-related social control (Umberson, 1992). In a study of older adults, however, researchers found that family more frequently served as sources of health-related social control compared to friends (Rook & Ituarte, 1999). Although differences from these studies could be due to variation in the age groups under investigation, research is needed to elucidate whether

friends or other relatives are important sources of regulation of health behaviors for unmarried individuals.

In addition to differences in the sources of social control attempts, the frequency with which married versus unmarried individuals receive social control may differ. For married individuals, it may be a more normative – and expected – experience for couples to engage in efforts to influence each other's health behaviors (Berg & Upchurch, 2007). Furthermore, because spouses cohabitate with one another, there may be opportunities for married individuals to influence each other's behavior on a daily or more frequent basis. Sparse evidence exists, however, examining the sources and frequency of health-related social control receipt in married versus unmarried individuals.

Dual-Effects Hypothesis of Health-Related Social Control

The intent of health-related social control is to influence the recipient to change his or her behavior, thus promoting better health behaviors and improving overall health (Lewis & Butterfield, 2005). These efforts on the part of the social network to promote health behavior change in the recipient, however, may not be welcome (Rook, Thuras, & Lewis, 1990). Social control may lead to improved health behaviors, but recipients also may experience psychological distress due to the potentially unwelcome perceived criticism of their behavior (Hughes & Gove, 1981; Lewis & Rook, 1999). The idea that health-related social control may positively influence health behavior change but may come at a psychological cost to the recipient has been referred to as the dual-effects hypothesis (Hughes & Gove, 1981).

Evidence supporting the dual-effects hypothesis has been mixed. The association between social control and improved health behaviors has received some support in the literature when tested among married individuals (e.g., Tucker & Anders, 2001; Umberson, 1992). Less evidence is available, however, with regard to the effectiveness of social control among unmarried individuals, although the few studies that have specifically examined this group have found evidence of health behavior change (Lewis & Rook, 1999; Umberson, 1987). As to whether or not receipt of health-related social control comes with a cost remains unclear. Some studies have found that social control is associated with more distress (e.g., Lewis & Rook, 1999), while other studies report no relationship between social control and psychological distress (e.g., Rook et al., 1990), and, yet another study found that individuals may actually appreciate social control attempts (Rook & Ituarte, 1999).

Health-related Social Control in the Context of a Chronic Illness

The effect of social control, both in terms of impact of recipients' health behaviors and their psychological health, may operate differently in the context of a chronic illness where social network members, particularly spouses, commonly are involved in patients' illness management (Ell, 1996; Franks et al., 2006). Most studies, however, have focused on community samples, and have not examined social control specifically within the context of a chronic illness. In the few that have, the findings are mixed as to whether social control is associated with improved health behavior in chronically ill samples (e.g., Fekete, Geaghan, & Druley, 2009; Franks et al., 2006; Helgeson et al., 2004; Thorpe, Lewis, & Sterba, 2008). Some studies find evidence of improved adherence to a medical regimen (Fekete et al., 2009; Stephens, Fekete, Franks, Rook, Druley, & Greene, 2009), whereas other studies find evidence of worse health behaviors (Franks et al., 2006; Helgeson et al., 2004; Thorpe et al., 2008). In terms of the impact on recipients' psychological health, preliminary evidence suggests that patients do experience psychological distress, or negative emotions, in response to social control in the context of a chronic illness (Helgeson et al., 2004; Stephens et al., 2009; Thorpe, 2008). For example, in a study by Stephens and colleagues (2009) of older adults with

osteoarthritis who were recovering from knee replacement, more coercive forms of social control were related to negative emotions.

A majority of the studies that have examined social control in the context of a chronic illness have focused on the marital relationship and how social control is one way that spouses help manage their partners' illness. Little is known about how unmarried individuals manage chronic illnesses (see Fekete et al., 2009 for an exception), and no studies to date have investigated the effects of social control on health behavior in married versus unmarried individuals with type 2 diabetes. Type 2 diabetes requires strict adherence to a complex medical regimen on a daily basis, including taking oral medication and/or insulin, glucose monitoring, exercising, and following a specific diet (American Diabetes Association). Research has shown that social network members are involved in the management of the daily tasks (e.g., diet) associated with type 2 diabetes (e.g., Denham, Manoogian, & Schuster, 2007); thus, examining whether or not social network members' attempt to influences individuals' diabetes-related health behaviors is an important next step. Examining the effects of health-related social control within a specific chronic illness may help elucidate whether network members' involvement can promote adherence to a specific treatment regimen.

Role of Gender

Research suggests that compared to women, men obtain greater health benefits from social integration (Cohen, 2004; House et al., 1988). Thus, the sources, frequency, and effects of the regulatory aspect of social integration may operate differently for men and women. Compared to men, women possess more health-related knowledge, are more likely to monitor their own health status, and are less likely to engage in a number of risky health behaviors (e.g., Depner & Ingersoll-Dayton, 1985; Connell & Janevic, 2003). Consistent with this, the potential health benefits that marriage confers for men may be, in part, due to women's efforts to provide social control. Indeed, wives have been found to provide more health-related social control to their husbands than vice versa (e.g., Umberson, 1992). In addition, spousal control efforts have been found to be more effective for men compared to women (e.g., Westmaas, Wild, & Ferrence, 2002). Whether or not these differences hold outside of the context of marriage is a question that the current study sought to investigate.

The Current Study

The focus of the current study was to investigate the receipt of and response to health-related social control in married and unmarried individuals with type 2 diabetes. Accordingly, we hypothesized that for married individuals, spouses would be the most common source of social control; for unmarried individuals, other network members such as friends and other family members would be the most common sources of social control. We further hypothesized that married individuals would receive more health-related social control compared to unmarried individuals. Consistent with the dual-effects hypothesis, we predicted that for both married and unmarried individuals, health behaviors would improve as a result of social control attempts, and that psychological distress (in the form of hostility) would occur in response to the use of more coercive strategies, but not less coercive strategies, which patients may appreciate. We expected the association between social control and health behavior to be more pronounced among married compared to unmarried individuals. Finally, we hypothesized that for both married and unmarried individuals, social control attempts aimed at men would be more effective (i.e., better health behavior) than attempts towards women.

Method

Participants

The sample for the current study included 1,477 patients diagnosed with type 2 diabetes. To be eligible for this study, patients had to be 18 years of age, diagnosed with type 2 diabetes by a physician, and receiving care from one of seven university-based clinics in southern California. Participants ranged in age from 19–92 ($M = 58.80$, $SD = 11.52$). Approximately half of the participants were female (58.8%). Most (59.7%) of the participants were married or in a marital-like relationship; however, 40.3% of the sample was unmarried. About half (48.6%) of the participants had at least a high-school education. The sample was comprised of races/ethnicities representative of the surrounding geographic area: Mexican-American (50.1%), non-Hispanic white (23.8%), Vietnamese-American (17.5%), and other race/ethnicity (8.7%). Participants reported having diabetes for 9.15 years ($SD = 7.27$), on average.

Procedure

Patients were recruited from seven university-based primary care or endocrinology clinics where they received their primary diabetes care. A diabetes registry, which included ICD-9 codes, was used to identify eligible patients who were then mailed an introduction letter and brochure that described the study and informed them that they would be contacted by phone. Project staff subsequently called patients to determine their interest in participating in the study. At this time, patients were asked to arrive 15 minutes prior to their next scheduled office visit to discuss study details. Patients who agreed to participate in the study completed an informed consent as well as a Health Insurance Portability and Accountability Act (HIPAA) waiver to obtain patient consent to review their medical charts. At this time, patients were given a questionnaire to complete at home and send back in a return-addressed stamped envelope. Upon returning the questionnaire, patients were given a \$20 gift card for their participation. Enrollment occurred from May 2006 through February 2009. The research design and survey questions, as well as sampling, recruitment, and consent procedures, were approved by the University of California, Irvine's Institutional Review Board, which is subject to the US Code of Federal Regulations governing research with human subjects.

Measures

Network members involved in diabetes management—Patients were asked which social network members were involved in helping them take care of their diabetes on a regular basis (e.g., monitor blood sugar, follow diabetic diet, check feet): husband/wife, daughter (in-law)/son (in-law), brother/sister, other relative, friend neighbor, other network member. Yes/no response options were used to indicate whether a certain network member was involved. This question served as a proxy for patients' sources of health-related social control, or the network member(s) who were the most integral in influencing patients' diabetes management.

Health-related social control—To assess health-related social control, participants were asked to think about the important people in their life involved with their diabetic diet. They then were asked a total of seven items that assessed the frequency of specific attempts by social networks members to exercise control in the past month. Two types of social control were examined in this study: less coercive strategies, or persuasion (3 items), and more coercive strategies, or pressure (4 items). Items for these strategies were adapted from Stephens et al. (2009). A sample item for persuasion includes: "During the past month how often did (they) try to do something to get you to improve your food choices?" A sample item for pressure includes: "During the past month how often did (they) criticize your food choices?" For both types of strategies, participants responded how often these control attempts were made on a 6-point scale (1 = *everyday*, 6 = *not at all*). Responses were reverse coded (0 = *not at all*, 5 = *everyday*) and items were averaged to create a composite measure of health-related social

control. The internal reliabilities for the measures of health-related social control were very strong in this sample (persuasion $\alpha = .96$; pressure $\alpha = .93$).

Diet—To assess dietary behavior related to diabetes management, we used an adapted version of the Kristal Fat and Fiber Behavior Questionnaire (Kristal, Shattuck, & Henry, 1990; Shannon, Kristal, Curry, & Beresford, 1997). Patients were asked seven questions that assessed how often in the past week they selected low-fat, low-sugar diets (1 = *rarely or none of the time*, 4 = *most or all of the time*). A sample item included eating “foods high in sugar (such as candy, fruit juice, cookies, tea or coffee flavored with sugar).” Items were averaged to form a composite measure of dietary behaviors ($\alpha = .79$).

Emotional responses—Both positive (appreciation) and negative (hostility) emotional responses were assessed in response to receiving social control. Items that assessed these emotions were adapted from the Affect Balance Scale (Derogatis, 1975) and have been used in previous studies on social control (Lewis & Rook, 1999; Stephens et al., 2009). Patients rated on a 5-point scale the extent to which they experienced these emotions during the past month (1 = *not at all*, 5 = *extremely*). Items were averaged to create composite measures of appreciative and hostile emotional responses, respectively. Two items assessed appreciative emotional responses, or how loved/cared for or appreciative/pleased patients felt in response to their social network members’ involvement ($r = .82, p < .001$). In addition, two items assessed hostile emotional responses, or how resentful/bitter or irritated/angry patients felt in response to their social network members’ involvement ($r = .60, p < .001$).

Marital status—Marital status was assessed by asking participants to choose one of six options: married/living in marital-like relationship; divorced; widowed; separated; and single/never married. This variable was dichotomized to represent currently unmarried (0) and married (1) patients.

Covariates—Additional variables were assessed for possible inclusion as covariates in all analyses. These variables either demonstrated a significant association with one of the key study variables or have been used in previous literature on social control and health. These included standard demographic characteristics, such as age, education (0 = *less than a high school education*, 1 = *at least a high school education*), and race/ethnicity. The number and severity of other co-morbid health conditions an individual is dealing with may influence their frequency of health-related social control receipt and associated responses. Thus, a composite measure of co-morbid chronic health conditions using a modified version of the Total Illness Burden Index (TIBI) also was included as a covariate (Greenfield, Billimek & Kaplan, 2010). Finally, how long an individual has had diabetes may influence the level of involvement from network members and how the patient responds to this involvement. Duration of time since diagnosis with type 2 diabetes therefore was included as a covariate. Participants responded to the question, “How long have you had diabetes?” by reporting how many years they had diabetes.

Results

Descriptive Analyses

Most patients in the current study reported receiving some form of health-related social control, although social control using persuasion was reported more frequently than social control using pressure (73.9% and 69.4%, respectively). Table 1 presents the means, standard deviations, and intercorrelations for the key study variables. Both types of social control strategies – persuasion and pressure – were highly intercorrelated, suggesting that network members use both types of strategies to influence recipients’ dietary behaviors. In these correlational

analyses, receipt of both persuasion and pressure was significantly correlated with more appreciation and hostility, better dietary behavior, being male, and being married. On average, patients reported more appreciation than hostility in response to their network members' involvement. With regard to dietary behaviors, patients reported a high level of adherence to their dietary regimen, on average.

Sources and Frequency of Health-Related Social Control

We hypothesized that married patients would report their spouses most frequently as a source of social control, and unmarried patients would report their friends or other family members most frequently as sources of social control. Consistent with our hypothesis, married individuals named their spouses most frequently as a source of health-related social control (men: 78.1% women: 63.1%; see Table 2). Also consistent with predictions, friend or neighbor was listed as the most common source (25.5%) of health-related social control for unmarried men. Unmarried women, on the other hand, listed their children most frequently as a source of social control (46.5%).

To examine whether the sources of social control differed by marital status and gender, we conducted six 2-way univariate analysis of covariances (ANCOVAs). These analyses controlled for age, education, race/ethnicity, total illness burden, and duration of time with diabetes. As seen in Table 2, there was a significant gender difference for spouses as sources of social control, $F(1, 1,201) = 9.56, p < .01$. Specifically, more married men than married women received social control from their spouses. With regard to children as sources of social control, there was a significant gender difference, with more women than men receiving social control from their children, $F(1, 1,219) = 48.69, p < .001$. With regard to siblings as sources of social control, there was a significant marital status by gender interaction, $F(1, 1,141) = 7.75, p < .01$. Specifically, unmarried men received social control from their siblings the most, followed by married and unmarried women, with married men receiving the least control from their siblings. With regard to other relatives, there was a significant marital status difference, $F(1, 1,071) = 7.08, p < .01$. Specifically, unmarried men and women received social control from other relatives more than married men and women. With regard to friends or neighbors as sources of social control, there was a significant marital status by gender interaction, $F(1, 1,116) = 16.43, p < .001$. Specifically, unmarried men received social control from friends or neighbors more than married and unmarried women, who, in turn, received social control from friends or neighbors more than married men. Finally, with regard to other sources of control, there was a significant marital status difference, $F(1, 846) = 7.29, p < .01$. Specifically, unmarried men and women received social control from other sources more than married women and men. The most commonly named other network member included health care providers; other examples included boyfriend/girlfriend, caretakers/in-home aides, and co-workers.

Next, two, 2-way univariate analysis of covariances (ANCOVAs) were conducted to examine the frequency of health-related social control by marital status and gender. These analyses controlled for age, education, race/ethnicity, total illness burden, and duration of time with diabetes. As seen in Table 2, there was a significant interaction between marital status and gender in predicting receipt of persuasion, $F(1, 1,377) = 12.69, p < .001$. Specifically, married men reported the highest levels of persuasion, followed by married women, and then unmarried women and men. There also was a significant interaction between marital status and gender in predicting pressure, $F(1, 1,344) = 11.96, p < .001$. Similarly, married men reported the highest levels of pressure, followed by married women, and then unmarried women and men.

Behavioral and Emotional Responses to Health-Related Social Control

A total of six multiple regression analyses were conducted to examine the effects of social control on patients' behavioral and emotional responses. These analyses controlled for age, education, race/ethnicity, total illness burden, and duration of time with diabetes. We examined an important health behavior among patients with type 2 diabetes, specifically adherence to a healthy diet. We also examined both positive (appreciation) and negative (hostility) emotional responses to social control attempts. For each regression analysis, we first centered measures of social control before calculating interaction terms. We then entered variables in the following order: covariates (step 1); social control strategy, marital status, and gender (step 2); and two 2-way interactions: social control strategy $\times$ marital status and social control strategy $\times$ gender (step 3). (We also tested three-way interactions between social control strategy, marital status, and gender, but none of these effects were significant, so results were trimmed for illustrative purposes. These results are available upon request from the first author.) The nature of any significant interaction was examined following procedures recommended by Aiken and West (1991). Interactions were illustrated by inserting low and high values of social control (± 1 standard deviation around the mean) into the regression equation for each level of the moderator (i.e., marital status or gender) to determine predicted values of the behavioral or emotional response.

Dietary behaviors—As seen in Table 3, there was a significant interaction between persuasion and marital status in predicting dietary behavior ($\beta = .10, p < .05$). Specifically, for married patients, more frequent persuasion was associated with better dietary behavior. There was no association between persuasion and dietary behavior for unmarried patients, however. In addition, there were no significant main or interaction effects between pressure, marital status, and gender in predicting dietary behavior. Means and standard deviations for main and interactive effects for unmarried and married patients are shown in Table 4.

Appreciation—There was a significant interaction between marital status and gender in predicting appreciation (persuasion: $\beta = -.12, p < .05$; pressure: $\beta = -.16, p < .01$). This finding indicates that irrespective of the type or amount of social control received, married men were more likely to appreciate the efforts of their network members compared to the other three groups. There also was a significant interaction between both persuasion and gender ($\beta = .08, p < .05$) and pressure and gender ($\beta = .12, p < .01$) in predicting appreciation. Specifically, for both men and women, more frequent persuasion or pressure was associated with more appreciation. This effect was more pronounced, however, for women, such that women reported less appreciation to less frequent social control, but more appreciation in response to more frequent social control. Means and standard deviations for main and interactive effects for men and women are shown in Table 4.

Hostility—There were significant main effects for persuasion predicting hostility ($\beta = .06, p < .05$) and pressure predicting hostility ($\beta = .13, p < .001$). There were no significant interactions between social control strategy, marital status, and gender predicting hostility.

Discussion

One way in which patients' social networks help them manage their chronic illnesses is by attempting to influence their health behaviors, or by exerting health-related social control. The sources, frequency, and responses to these attempts vary by marital status and gender, however. The current study sought to examine these differences in a sample of married and unmarried patients with type 2 diabetes.

Marital Status and Gender Differences in Sources and Frequency of Health-Related Social Control

Consistent with predictions, the most frequently reported source of social control for married men and women was their spouse. This was not surprising, given previous research on the management of type 2 diabetes, which suggests that spouses frequently are involved in their partners' dietary practices through meal planning, food selection and purchase, food preparation, and shared diet plans (Miller & Brown, 2005; Trief, Sandberg, Greenberg, Graff, Castronova, Yoon, et al., 2003). For unmarried individuals, the most frequently reported sources of social control differed for women compared to men. For unmarried women, the most frequently reported sources of control were their children. For unmarried men, the most frequently reported sources of control were their friends or neighbors, although it is important to note that unmarried men reported all network members as sources of control with relatively equal frequency.

Next, we addressed the question of whether there were marital status and gender differences in the frequency with which patients reported receiving health-related social control. The results suggested that married men reported the highest levels of both types of social control strategies (persuasion and pressure), followed by married women, and then unmarried women and men. Looking to the sources of control for each of these groups sheds some light on these findings. Married men probably receive the most social control because their wives are the most common source of social control for this group of individuals, which is consistent with previous research demonstrating that for men, wives serve as their main source of social control (Umberson, 1992). This finding that married men received the highest levels of health-related social control suggests that attempts by members of the social network, particularly the spouse, to influence men's health behaviors may be one pathway that explains married men's greater health advantage. Although they did not report receiving as much social control as married men, married women received more frequent social control than unmarried individuals, further highlighting the central role that spouses play in their partners' disease management.

Unmarried women received social control less frequently than married men and women, but more frequently than unmarried men. Again, the source of social control may help explain these findings. Research has shown that children are more likely to live with (Kelly, 2007) and provide support (Kaufman & Uhlenberg, 1998) to their divorced or widowed mothers compared to their fathers. Thus, unmarried women may have more contact and opportunities for network members – particularly children – to attempt to influence their health behaviors, compared to unmarried men. Unmarried men, on the other hand, received social control from multiple sources, and furthermore, these attempts were not as frequent. Perhaps the sources who most commonly provide social control to unmarried men (i.e., friends or neighbors) may not feel comfortable attempting to influence men's health behaviors as often. Moreover, the opportunity may not be as available to influence these men's health behaviors.

Marital Status and Gender Differences in Responses to Health-Related Social Control

Network members' attempts to provide health-related social control were significantly associated with patients' dietary behaviors and emotional responses, although these associations varied by marital status and gender. Consistent with hypotheses and results from other studies (e.g., Stephens et al., 2009), persuasion appeared to be effective in promoting dietary behavior change, although for married patients only. This type of strategy, however, was ineffective for unmarried patients' behavior.

Two possible explanations can be offered as why social control attempts using persuasion may be more effective for married patients, but less effective for unmarried patients. First, the more frequent attempts directed at married patients, coupled with the greater likelihood that they

share meals together (Trief et al., 2003), increases the probability that social network members, particularly spouses, can effectively influence the patient's dietary behaviors. The less frequent attempts directed at unmarried patients simply may not be sufficient enough to change the health behavior of unmarried patients. In addition, perhaps the network members (friends, other relatives) of unmarried patients do not commonly share meals and other dietary behaviors with these unmarried patients. Second, despite evidence that hiding health behaviors occurs, even in marriage relationships (Tucker & Anders, 2001), it may be more difficult for patients to hide health behaviors around a spouse. This is particularly true for dietary behaviors, which are commonly shared between spouses (Miller & Brown, 2005; Trief et al., 2003). In contrast, unmarried patients may avoid exhibiting poor health behaviors around other people. In a related vein, it may be easier for unmarried patients to avoid social contacts that they perceive as being unpleasant or difficult. As a result, unmarried patients may find it easier to escape efforts by social network members to influence or regulate their behavior.

Contrary to predictions, there were no significant associations between health-related social control using pressure and dietary behavior, suggesting that this type of social control strategy may be ineffective in promoting dietary behavior change in both married and unmarried patients with type 2 diabetes. Patients may not appreciate the criticism, threats, and other negatively-valenced behaviors that their network members engage in when using these types of strategies. Consistent with results from the current study, other studies also have found that these more coercive strategies elicit negative emotional responses in recipients and are less likely to induce health behavior change (Lewis & Rook, 1999; Okun, Huff, August & Rook, 2007; Stephens et al., 2009; Tucker & Anders, 2001). Overall, the findings from this study suggest that although unmarried patients may not benefit in terms of dietary behavior from any type of social control attempts by network members, married patients respond better in terms of behavior change to less versus more coercive strategies of spousal social control attempts as a function of the receipt of more frequent attempts and greater opportunities for network members to influence their health behaviors. Married patients may be less likely to respond favorably to pressure, not only because use of this strategy has been shown to arouse psychological distress, but also because the intent behind these more coercive strategies may be perceived as less focused on the patient's health and well-being and more focused on controlling the patient's behavior (Tucker & Mueller, 2000).

In line with expectations, emotional responses to social control attempts were complex, with findings suggesting that pressure and persuasion elicited both appreciation and hostility in patients. Previous researchers have posited that positive social control strategies, or persuasion, may be likely to elicit both positive, as well as negative, emotions, particularly if these attempts are interpreted as expressions of love or concern (Tucker & Anders, 2001). In addition, many of the participants in our study were older adults, who have more chronic conditions compared to other age groups (Centers for Disease Control and Prevention, 2003). A previous study of older adults found that this age group, in particular, may appreciate network members' involvement in the form of social control (Rook & Ituarte, 1999). For persuasion and pressure, the effect of social control on appreciation was influenced by gender. Although for both men and women, more frequent social control (either strategy) was associated with more appreciation, the effect was more pronounced for women. In particular, women reported the most appreciation in response to more frequent social control. In the context of a chronic illness such as type 2 diabetes in which a complex medical regimen is involved, women (and men) may be grateful for their network members' efforts to help them manage their condition, regardless of the type of strategy used.

Although health-related social control may be more welcome in the context of a chronic illness, in which both sources and recipients of social control share the same goal of improving adherence to a medical regimen, patients still may resent social control attempts, especially if

these efforts are particularly coercive (Stephens et al., 2009). In addition, patients may not welcome others' involvement in their illness management because it could imply disappointment that patients are unable to self-regulate their own behaviors, as well as undermine patients' sense of autonomy (Franks et al., 2006; Tucker, 2002).

Overall, the findings from the current study suggest that in the context of a chronic illness, patients may have complicated reactions to social network members' involvement. Most findings were dependent on the type of social control strategy used, as well as the marital status and gender of the targets of social control attempts. Results were partially supportive of the dual-effects hypothesis, which posits that social control elicits health behavior change at the expense of recipients' psychological well-being. Specifically, social control attempts using persuasion were associated with improved health behavior for married patients, as well as hostility for all patients. Other results, however, were not supportive of the dual-effects hypothesis. Specifically, social control using pressure was not associated with improved health behavior. In addition, network members' attempts using either strategy of social control were associated with appreciation, especially for women.

Limitations

Several limitations of the current study should be noted. The current data are cross-sectional in nature; we therefore were unable to disentangle whether efforts by the social network to regulate patients' behavior actually influenced such behaviors and, ultimately, health outcomes, or whether the social network was responding to patients' already established behaviors. Longitudinal data would be useful to examine effects of social control over time, although it is important to consider that temporal shifts may occur in the provision of health-related social control over time according to such factors as patients' health status, how patients respond to these attempts, and how many other competing demands network members are experiencing. Moreover, although the dual-effects hypothesis was not entirely supported by findings that patients appreciated their social network's involvement, patients may be more likely to respond with hostility when control attempts are made, but upon reflection, may also appreciate such efforts. The current study, however, is the first to attempt to describe how social control operates differently for unmarried versus married individuals with a chronic illness. Future studies should consider focusing on how this process unfolds using momentary assessments over time.

Many participants in the current study reported that more than one network member was involved in managing their diabetes. Researchers have found that health behaviors differ as a function of the number of members in the household (Bae, Urrutia-Rojas, Patel, Migala, Rivers, Singh, et al., 2007). It is possible, then, that patients may react differently to unique sources of social control. Post-hoc analysis, which examined the most common source of social control revealed, however, that a majority of married patients indicated that their spouse was the most common source of control and a majority of unmarried women indicated that their children were the most common sources of control. This suggests that patients' health behaviors and emotional responses to social control are mainly in response to one network member's involvement for married individuals and unmarried women. More research is needed to determine the overall net effect of each specific network member, particularly for unmarried men.

Conclusion

Findings from the current study highlight the importance of social network involvement in the management of individuals with type 2 diabetes. Results also illuminate how marital status and gender are important factors to consider when examining how network members respond to chronically ill individuals, and how the social network can help or hinder patients' dietary

management. Marital status and gender differences should be considered in the delivery of health care services and design of programs to help patients with type 2 diabetes.

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Table 1

Means, standard deviations, and intercorrelations for study variables (N = 1, 477)

Variable	M	SD	Range	1	2	3	4	5	6	7
1. Persuasion	2.75	1.98	0-5	—	.81***	.48***	.06*	.13***	-.10***	.16***
2. Pressure	2.04	1.86	0-5	—	—	.38***	.14***	.05*	-.12***	.16***
3. Appreciation	3.37	1.46	1-5	—	—	—	-.02	.14***	-.11***	.16***
4. Hostility	1.54	.90	1-5	—	—	—	—	-.20***	.03	-.05
5. Good dietary behavior	3.34	.61	1-4	—	—	—	—	—	.03	.03
6. Gender ^a	58.6%	—	0-1	—	—	—	—	—	—	-.21***
7. Marital status ^b	59.7%	—	0-1	—	—	—	—	—	—	—

^aPercent female (Male = 0, Female = 1).^bPercent married (Unmarried = 0, Married = 1).*
 $p < .05$;**
 $p < .01$;***
 $p < .001$.

Table 2

Sources and frequency of health-related social control

<u>Source</u>	<u>Marital status and gender of respondent</u>			
	<u>Married</u>		<u>Unmarried</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
Spouse	78.1% ^a	63.1% ^b	N/A	N/A
Children	30.5% ^a	47.1% ^b	21.8% ^a	46.5% ^b
Sibling	8.5% ^a	16.1% ^b	20.3% ^c	15.3% ^b
Other relative	10.1% ^a	12.2% ^a	18.9% ^b	15.2% ^b
Friend or neighbor	5.1% ^a	12.1% ^b	25.5% ^c	15.1% ^b
Other	4.9% ^a	7.7% ^a	11.8% ^b	12.2% ^b
<u>Social control strategy</u>				
Persuasion	3.35 ^a	2.65 ^b	2.30 ^c	2.40 ^c
Pressure	2.64 ^a	1.92 ^b	1.69 ^c	1.70 ^c

Notes. Superscripts that differ in the same row are significantly different from each other. All analyses controlled for age, education, race/ethnicity, total illness burden index, and duration of time with type 2 diabetes. Adjusted values are reported.

Table 3

Standardized ordinary least square regression coefficients for behavioral and emotional responses to health-related social control

Behavioral and Emotional Responses to Social Control						
Variable	Dietary Behavior		Appreciation		Hostility	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
PERSUASION						
<u>Main effects</u>						
Persuasion	.11	4.10***	.47	19.09***	.06	2.08*
Marital status	-.01	-.06	.08	3.09**	-.04	-1.25
Gender	.05	1.79	-.02	-.91	.01	.16
<u>Interactions</u>						
Marital status $\times$ gender	.06	1.03	-.12	-2.51*	-.01	-.19
Persuasion $\times$ marital status	.10	2.28*	-.03	-.84	-.08	-1.79
Persuasion $\times$ gender	.05	1.07	.08	2.13*	-.04	-.83
Adjusted $R^2 = .07$		Adjusted $R^2 = .25$		Adjusted $R^2 = .05$		
PRESSURE						
<u>Main effects</u>						
Pressure	.05	1.68	.37	14.25***	.13	4.71***
Marital status	.01	.29	.10	3.69***	-.05	-1.62
Gender	.05	1.57	-.02	-.88	.02	.56
<u>Interactions</u>						
Marital status $\times$ gender	.04	.58	-.16	-3.12**	.01	.13
Pressure $\times$ marital status	.05	1.01	-.05	-1.28	-.06	-1.34
Pressure $\times$ gender	.04	.94	.12	2.88**	-.05	-1.09
Adjusted $R^2 = .06$		Adjusted $R^2 = .18$		Adjusted $R^2 = .06$		

* $p < .05$;

** $p < .01$;

 $p < .001$.

Notes: A total of six separate regression analyses are reported above. Each analysis controlled for age, education, race/ethnicity, total illness burden index, and duration of time with type 2 diabetes. Gender: *Males* = 0; *Females* = 1. Marital status: *Unmarried* = 0; *Married* = 1.

Table 4

Descriptive statistics for main effects and significant interaction effects

Variable	Behavioral and Emotional Responses to Social Control					
	Dietary Behavior ¹			Appreciation ²		
	Unmarried	Married	Overall sample	Males	Females	Overall sample
Social Control: Persuasion						
Less frequent persuasion	3.33 (.61)	3.15 (.66)	3.26 (.63)	2.29 (1.64)	2.10 (1.49)	2.17 (1.54)
More frequent persuasion	3.48 (.60)	3.50 (.56)	3.49 (.58)	4.19 (1.12)	4.27 (.97)	4.23 (1.04)
Social Control: Pressure						
Less frequent pressure	3.33 (.61)	3.25 (.64)	3.31 (.62)	2.68 (1.70)	2.24 (1.50)	2.39 (1.58)
More frequent pressure	3.57 (.50)	3.53 (.62)	3.55 (.58)	4.07 (1.23)	4.40 (.98)	4.20 (1.15)
All levels of social control	3.32 (.61)	3.36 (.61)	3.34 (.61)	3.55 (1.45)	3.24 (1.46)	3.37 (1.46)

Notes. Values presented are *M* (*SD*).

¹How often in the past week participants selected low-fat, low-sugar diets (1 = rarely or none of the time, 4 = most or all of the time).

²Extent to which participants experienced this emotion during the past month (1 = not at all, 5 = extremely).