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Invisible versus Visible Social Support and Social Control in the Context of Chronic Illness

THESIS

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by

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ABSTRACT OF THE THESIS

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Background: Invisible social support (i.e., support not recognized by recipients) has been posited to avoid the costs of receiving support, which include distress and reduced feelings of self-efficacy. The effect of invisible support has primarily been studied in the context of acute stressors. Moreover, little research has examined invisible versus visible social control (i.e., others' efforts to improve a health behavior). **Purpose:** The current study examined the implications of invisible and visible social support and control for negative affect and self-efficacy in the context of a chronic stressor, namely the management of type 2 diabetes.

Methods: Daily diary data was collected from 129 older couples in which one spouse had type 2 diabetes. **Results:** Invisible support and invisible control were not associated with negative affect, and invisible control was associated with lower, rather than greater, patient self-efficacy.

Conclusion: The results suggest that the benefits of invisible social support and invisible social control may not extend to chronic illness.

INTRODUCTION

Research on the health-related effects of social support has yielded mixed findings. Benefits of social support have been reported quite consistently for perceived support, whereas null or even deleterious effects have often been reported for received support (see reviews by 1, 2, 3). Specifically, after controlling for demographic factors and initial health status, perceived support tends to be associated with improved physical and psychological health, whereas received support tends to be associated with poorer physical and psychological health (e.g., 4, 5).

A leading explanation for the differential effects of perceived and received social support is that receiving support entails costs. Receiving support may increase recipients' awareness of their need for support and may make them feel less able to handle stressful situations by themselves, thereby contributing to reduced feelings of self-efficacy, increased feelings of dependence on others, and increased psychological distress (e.g., 6, 7, 8). Berkman (8) asserted in this regard that social support benefits health and well-being only if it enhances recipients' feelings of competence and self-efficacy; otherwise potential health benefits are negated by the psychological costs sustained. Perceiving social support to be available, on the other hand, allows people to handle stressors more independently while still having the option of receiving support if necessary (6, 9).

Recently, Bolger and colleagues (6, 10) have extended this line of reasoning to suggest that subtly rendered support – specifically, support that is provided but not recognized by the recipient (i.e., “invisible support”) – may spare recipients the costs of receiving support. Evidence consistent with this idea has begun to emerge in studies that contrasted the effects of visible versus invisible support (3) but this work has focused largely on support for acute stressors (such as preparing for an upcoming exam). Whether the hypothesized benefits of invisible social support would extend to long-lasting stressors, such as managing a chronic

illness, has received little research attention to date. A key goal of the current study, accordingly, was to examine the effects of visible versus invisible support in the context of a chronic stressor (managing type 2 diabetes).

Visible versus Invisible Social Support

Both visible support (i.e., support that is recognized by recipients) and invisible support (i.e., support that is not recognized by recipients) have the potential to assist a recipient in dealing with a stressor. Visible support, however, calls attention to the recipient's need for support and limited ability to resolve a problem independently. Conversely, invisible support remains undetected by recipients and allows them to benefit from the support provided without actually being aware of receiving it, thus preventing a loss of self-efficacy or increase in distress (6). Support can be invisible either when it occurs without the recipient's awareness or when it is recognized by the recipient but is not interpreted as support (e.g., giving advice in an indirect manner; 10).

The idea that invisible social support is more advantageous than visible support has been examined in only a few studies to date. Bolger et al. (6) first examined this idea in a dyadic daily diary study of young adult couples in which one spouse was facing a pending stressor (an approaching bar exam required as a pre-condition for practicing law), for which the partner might provide support. The researchers conceptualized visible support as occurring when the partner reported providing support on a specific day and the spouse reported receiving support that same day. They conceptualized invisible support, in contrast, as occurring when the partner reported providing support on a specific day but the spouse did not report receiving support that day. The researchers found that support provided outside of the recipient's awareness (i.e.,

invisible support) was associated with less depression and anxiety; conversely, visible support was associated with greater anxiety.

Bolger and Amarel (10) sought to extend these findings by examining the effects of social support visibility experimentally, by manipulating it to be either visible or invisible. In this study, undergraduate students responded to a stressful task (giving a speech in front of a panel of judges) after they received either visible or invisible support. The visible support manipulation involved having confederates explicitly provide the participants with support and advice on the task. The invisible support manipulation, in contrast, involved a confederate asking a supervisor for clarification of the task in front of the participant in such a way that participants received support (i.e., helpful information about the task) indirectly, without having to request it or having it directed toward them explicitly. The researchers found a significant reduction in distress in the invisible support condition but no change in distress in the visible support condition.

More recently, Howland and Simpson (11) investigated the effects of visible versus invisible support in naturalistic social interactions. Members of young adult couples were asked to discuss with their partners something they would like to change about themselves. Trained observers classified any support provided by the listening partners as invisible (e.g., indirect; de-emphasized the roles of support provider versus recipient; diverted attention from the disclosing partner's limitations/distress) or visible (direct; emphasized the roles of support provider versus recipient; focused attention on the disclosing partner's limitations/distress). Invisible support, as compared with visible support, was found to be associated with lower negative affect and higher self-efficacy in the disclosing partners.

Visible versus Invisible Social Control

Social support is not the only interpersonal process associated with health and psychological well-being. Health-related social control has been identified as a mechanism by which others seek to influence a person's health behaviors, such as adherence to a prescribed treatment regimen (e.g., 12, 13). Social control differs from social support in that control is aimed at changing, rather than maintaining or reinforcing, a focal person's health behaviors, using strategies such as bargaining, persuading, or cajoling (14, 15, 16).

Mirroring research on social support, research on the association between social control, physical health, and psychological well-being has yielded mixed results. Social control has been found to be associated with better health behaviors in some studies (e.g., 17, 18, 19, 20) but has been found to be associated with worse health behaviors in others (e.g., 12, 14). Similarly, just as the receipt of social support has been found to have psychological costs, experiencing social control has been linked to poorer psychological health (e.g., greater emotional distress, lower self-efficacy; 21), even when it has appeared to foster better health behaviors (13, 22).

It is plausible that the effects of social control, much like the effects of social support, may depend on the visibility of social control. Relative to visible social control, invisible social control might have fewer adverse consequences for the recipient's psychological well-being and self-efficacy. Virtually no research, however, has examined the distinction between visible and invisible social control. In one exception, Luscher et al. (15) studied smokers who were about to initiate efforts to quit smoking and their nonsmoking spouses' provision of social control. Invisible social control was associated at a three-week follow-up assessment with a decrease in the smokers' negative affect and an increase in their positive affect (15). (The implications of invisible social control for self-efficacy were not examined in this study.) The researchers concluded that Bolger et al.'s (6) model of invisible support could be expanded to social control

in the context of smoking cessation. It is unclear, however, whether the apparent benefits of invisible social control would generalize to chronic illness.

Social Support and Control in the Context of Chronic Illness

Studies comparing the outcomes of invisible versus visible support and control are scarce, but existing work highlights the potential benefits of invisible support and control in situations of acute stress (e.g., preparing for an upcoming exam or stressful speaking task; discontinuing a problematic health behavior). In contrast, chronic stressors, such as managing a chronic illness, tend to present more severe and recurring demands, which might limit the viability and effectiveness of invisible social support and social control.

Researchers have posited that when long-term support is needed, merely perceiving support to be available might be insufficient to improve mood or health; instead, actual receipt of support may be more beneficial in such circumstances (6, 9). If chronic illness requires long-term provision of support, then the outcomes of long-term support provision could be two-fold. First, if support is provided *visibly*, then recipients may experience improved illness management and, in turn, better health (cf. 14, 23) even though they might simultaneously experience psychological costs, such as a decline in mood or self-efficacy (cf. 9). Second, if social support is provided *invisibly*, then recipients might be spared a psychological toll on mood or self-efficacy, while allowing them to derive aid that fosters better illness management and, in turn, better physical health. By extension, parallel effects of the visible versus invisible distinction could be posited for social control, with invisible control fostering better illness management without detracting from recipients' psychological health. In view of results from the literature on invisible social support, it is plausible that invisible social control would benefit disease management. Therefore, another goal of the current study was to examine the idea that invisible

health-related support and control are less likely than visible health-related support and control to be associated with lower self-efficacy and greater psychological distress among individuals coping with a chronic illness.

The Current Study

The current study had two specific aims: 1) to examine whether visible versus invisible social support have different associations with mood and self-efficacy in the context of chronic illness, similar to different associations found in studies of healthy individuals handling acute stressors (e.g., studying for a bar exam, preparing for a speech), and 2) to examine whether visible versus invisible social control have differential associations with mood and self-efficacy in the context of chronic illness. We focused on support and control directed toward the efforts of individuals with type 2 diabetes to adhere to dietary guidelines because of the high prevalence of type 2 diabetes (24) and the fact that dietary adherence is a particularly challenging aspect of the diabetes treatment regimen (25). We hypothesized that, relative to visible social support, invisible support for dietary adherence would be associated with lower negative affect and higher diet-related self-efficacy. Similarly, we hypothesized that, relative to visible social control, invisible control directed toward dietary adherence would be associated with lower negative affect and higher diet-related self-efficacy. Given some evidence of a gender difference in effects of invisible versus visible social control (Luscher et al., 2014), a secondary objective of this paper was to explore the possible gender differences in invisible versus visible social support and control.

METHODS

The data for the current study were derived from a larger, dyadic daily diary study that examined older couples in which one spouse was coping with type 2 diabetes mellitus (see 16, 26 for more details).

Sample

Participants were recruited using brochures in medical offices, diabetes education clinics, and senior citizen centers, as well as advertisements in commercial media. Interested participants called a toll-free number to be screened for eligibility. In order to be eligible, participants had to have a primary diagnosis of type 2 diabetes mellitus, be older than 54 years old, be married or in a marriage-like relationship, and have had a physician recently recommend specific diet improvements. To be eligible to participate, the patients' spouses needed to live with the patient and have no diagnosis of diabetes themselves.

Of the 235 couples screened, 58 were not eligible to participate (e.g., both patient and spouse were diagnosed with diabetes) and 48 couples declined to participate. Overall, of those who were eligible, 129 couples comprised the final sample, yielding a 72.9% participation rate.

Patients were around 66 years old ($M=66.15$, $SD=7.62$, range 55-85), and spouses were of similar ages ($M=66.01$, $SD=8.73$, range 46-89). Couples had been married for an average of 37.80 years (range= 0-61 years, $SD=13.80$). Roughly half (50.4%) of the patients were female and most were Caucasian (74.4%). The average time since diagnosis was 11.66 years (range 1-40 years, $SD=9.33$).

Procedure

Both the spouse and the patient completed electronic diaries daily across 24 days. Each day, patients reported negative affect, feelings of self-efficacy, and perceptions of their spouse's involvement in their disease management (i.e., support or control). Spouses completed parallel measures, including measures that assessed their perceptions of their involvement in the patient's disease management (i.e., support or control). Participants were given a laptop computer with software adapted for the study and a separate password for each partner to log in order to complete the diaries independently at the end of each day; the diary software was specifically

designed for easy use by older adult participants, including those with minimal computer experience (for more information, see 16). The daily diaries could only be completed within a 4-hour window (8:00-11:59 pm) each evening for 24 consecutive days, and each diary contained a time and date stamp. The software tracked participants' completion of the diaries, showing that 97.3% of possible diaries were completed and that all 129 participants finished at least 1 week of daily diaries (16).

Measures

Patients' and spouses' reports of daily diet-related spousal support and control.

Diet-related support and control were measured each day with questions concerning how much the spouse was involved in the patient's dietary management, using a 3-point Likert scale (1=*not at all*, 2=*somewhat*, 3=*very much*). The support scale had three items ("showed appreciation for [the patient] sticking with the diabetic diet," "showed that [the spouse] understands the importance of [the patient] following a healthy meal plan," and "did something to help [the patient] stick with diabetic diet). The items were averaged to create composite measures of daily spousal support ($\alpha = .80$ for patients' report of support received, $\alpha = .72$ for spouses' report of support provided; $M = 1.89$, $SD = .01$ for patients; $M = 1.95$, $SD = .01$ for spouses). Control was measured with three items ("expressed irritation with [the patient's] poor food choices," "questioned or expressed doubts about [the patient's] poor food choices," and "criticized [the patient's] poor food choices"). The items were averaged to create composite measures of daily spousal control ($\alpha = .86$ for patients' report of control received, $\alpha = .84$ for spouses' report of control provided; $M = 1.27$, $SD = .01$ for patients; $M = 1.22$, $SD = .01$ for spouses). The support and control items were adapted from other studies of health-related social support and social control (e.g., 13, 14, 19) and were validated in previous studies using confirmatory factor analyses (16). Patients and spouses completed parallel versions of these items, tapping either

patients' receipt or spouses' provision of support and control.

Patient negative affect. Patient negative affect was measured each day with an abbreviated version of the negative affect subscale of the Positive and Negative Affect Schedule (PANAS; 27). Patients rated on a 5-point Likert scale (1=*very slightly or not at all*, 5=*extremely*) how well six words (distressed, upset, scared, nervous, afraid, guilty) described how they were feeling ($\alpha = .94$, $M = 1.23$, $SD = .01$).

Patient self-efficacy for dietary adherence. Patients' self-efficacy for dietary adherence was measured with five questions that assessed their confidence that they would be able to engage the next day in five dietary behaviors that correspond to those in the diet subscale of the Summary of Diabetes Self-Care Activities Measure (28). A sample item asked "What number between 0 and 10 best describes your confidence that tomorrow you will be able to avoid making unhealthy food choices that would get you off-track with your diabetic diet; 0 = *not confident at all*, 10 = *extremely confident*). The questions inquired about the patient's confidence for tomorrow's choices because the diaries were completed at the end of each day ($\alpha = .91$, $M = 7.76$, $SD = .04$).

Covariates. Patients' perceptions of their marital quality was included as a covariate in our data analyses to control for the possibility that marital quality might account for associations between the visibility of spousal support and control and patients' outcomes (negative affect, self-efficacy). Patient marital satisfaction was assessed at the baseline interview with five items from the Quality of Marriage Index (QMI; 29). Sample items asked patients to rate on a 7-point scale (1=*strongly disagree*, 7=*strongly agree*) the extent to which they regarded their marriage as "good," "stable," and a "source of happiness" ($\alpha = .88$, $M = 6.52$, $SD = .59$).

Additionally, symptom severity was also included a covariate to control for the possibility that spouses might provide support and control differently on days when patients'

symptoms are more severe than on days when they are less severe. Symptom severity was measured with a single item asking participants “what number between 0 and 10 best describes the average severity of your diabetes symptoms TODAY? A zero (0) would mean “not severe at all” and a ten (10) would mean “as severe as they could possibly be” ($M = 1.50, SD = 2.33$).

Amount of time since diabetes diagnosis was also included as a covariate to control for the possibility that couples who are still adjusting to a new diagnosis provide support and control differently from those who have been handling the disease for several years. Amount of time with diabetes was measured with one item asking spouses to report how long (in years) it has been since the patient was diagnosed with type 2 diabetes ($M = 11.66, SD = 9.33$, range 1-40).

Finally, for each analysis we controlled for the previous day’s negative affect (in analysis when this was the dependent variable) and previous day’s self-efficacy (when this was the dependent variable).

Analytic Strategy

The visibility of spousal diet-related support and control was operationalized in two steps, following the analytic strategy developed by Bolger et al. (6). In the first step, the patient measure of diet-related daily support *received* was dichotomized to distinguish between days when patients reported receiving no support (i.e., answered “not at all” to all three support items; coded as 0) and days when they reported receiving at least some support (i.e., answered “somewhat” or “very much” to one or more of the three support items; coded as 1). Similarly, the spouse measure of daily support *provided* was dichotomized to distinguish between days when spouses reported providing no support (i.e., answered “not at all” to all three support items; coded as 0) and days when spouses reported providing at least some support (i.e., answered “somewhat” or “very much” to one or more of the three support items; coded as 1). The patient measure of daily diet-related social control *received* was dichotomized using the

same procedure to distinguish between days when patients reported receiving no control (i.e., answered “not at all” to all three control items; coded as 0) and days when they reported receiving at least some control (i.e., answered “somewhat” or “very much” to one or more of the three control items; coded as 1). The spouse measure of daily control *provided* was dichotomized, similarly, to distinguish between days when spouses reported providing no control (i.e., answered “not at all” to all three control items; coded as 0) and days when they reported providing at least some control (i.e., answered “somewhat” or “very much” to one or more of the three control items; coded as 1).

In the second step, these dichotomized patient and spouse support variables were used to define invisible versus visible social support and invisible versus visible social control. *Invisible social support*, following Bolger et al. (6), was defined as occurring on a given day when the patient had a score of 0 on the dichotomous measure of support *received* (i.e., the patient reported receiving no spousal support that day) and the spouse had a score of 1 on the dichotomous measure of support *provided* (i.e., the spouse reported providing some support that day). *Visible social support*, in contrast, was defined as occurring on a given day when the patient had a score of 1 on the dichotomous measure of support *received* (i.e., the patient reported receiving some spousal support that day) and the spouse also had a score of 1 on the dichotomous measure of support *provided* (i.e., the spouse reported providing some support that day). Similarly, *invisible social control* was defined as occurring on a day when the patient had a score of 0 on the dichotomous measure of control *received* (i.e., the patient reported receiving no spousal control that day) and the spouse had a score of 1 on the dichotomous measure of control *provided* (i.e., the spouse reported providing some spousal control that day). *Visible social control*, in contrast, was defined as occurring on a day when the patient had a score of 1 on the dichotomous measure of control *received* (i.e., the patient reported receiving some

spousal control that day) and the spouse had a score of 1 on the dichotomous measure of control *provided* (i.e., the spouse reported providing some control that day).

We operationalized invisible social control as occurring when spouses reported engaging in social control but patients did not detect it at all, whereas Luscher et al. (2014) operationalized it as occurring when the smokers reported receiving less social control than the spouses reported providing (i.e., a discrepancy score). Discrepancies between smokers' and spouses' reports could have occurred, therefore, on days when spousal control was visible to both smokers and their spouses, but the smokers simply perceived less control. This discrepancy measure, therefore, may have captured a dyadic phenomenon with a somewhat different meaning than the undetected meaning of invisible control emphasized in our study and in the study by Bolger et al. (2000) of invisible support. Therefore, in order to capture "true" invisible support and control, we chose to utilize the analytic strategy employed by Bolger et al. (2000), rather than the strategy employed by Luscher et al. (2014).

The study hypotheses were examined using these variables in multilevel analyses conducted using Hierarchical Linear Modeling (HLM 6.05). Two models were tested, one for each dependent variable (i.e., negative affect and self-efficacy). To examine change in the dependent variable from the prior day to the current day as a function of the current day's invisible versus visible support and invisible versus visible control, the analysis of negative affect included a control for the prior day's negative affect (cf. 6). Similarly, the analysis of self-efficacy included a control for the prior day's self-efficacy. Each model included both social support and social control in order to evaluate their unique associations with the dependent variable. Marital quality was included as level-2 covariate (not shown) in each of the models examined, symptom severity and years since diagnosis were added as level-1 covariates (not shown), all other predictor variables were included as level-1 variables.

The following equations illustrate how the models were tested, mirroring the models tested by Bolger et al. (6) in their study of invisible support:

$$NA_t = \beta_0 + \beta_1 P_{sst} + \beta_2 R_{sst} + \beta_3 P_{sct} + \beta_4 R_{sct} + \beta_5 NA_{t-1} + e$$

$$SE_t = \beta_0 + \beta_1 P_{sst} + \beta_2 R_{sst} + \beta_3 P_{sct} + \beta_4 R_{sct} + \beta_5 SE_{t-1} + e$$

In these equations, NA_t is the patient's negative affect for the current day (day t); SE_t is the patient's self-efficacy for the current day (day t); P_{sst} the *provision* of diet-related social support as reported by the spouse on day t; R_{sst} is the *receipt* of diet-related social support as reported by the patient on day t; P_{sct} is *provision* of diet-related social control as reported by the spouse on day t; R_{sct} is the *receipt* of diet-related social control as reported by the patient on day t; NA_{t-1} is the patient's negative affect for the previous day (day t-1); SE_{t-1} is patient's self-efficacy for the previous day (day t-1); e is the residual component of change in the dependent variable.

Italicized variables were group-mean centered. An effect of *invisible social support* would be evident in these models if β_1 is significant and β_2 is *not* significant, whereas an effect of *visible social support* would be evident if both β_1 and β_2 are significant. An effect of *invisible social control* would be evident if β_3 is significant and β_4 is not significant and, in contrast, an effect of *visible social control* would be evident if both β_3 and β_4 are significant (cf. Bolger et al., 2000).

RESULTS

Initial Analyses

Table 1 describes the degree of agreement between patients' dichotomized reports of social support and control receipt and spouses' dichotomized reports of social support and control provision on a specific day. Although spouses and patients generally tended to agree about whether support or control had been provided, some disagreement was still evident. Spouses reported providing support on 14.72% of the days that patients reported not receiving support (i.e., invisible support), and spouses reported providing control on 35.84% of days that patients reported not receiving control (i.e., invisible control).

Associations of Visible versus Invisible Social Support and Social Control with Patient Negative Affect

Our first multilevel analysis examined the associations of visible versus invisible social support and social control with patient negative affect (see Table 2, left panel). Contrary to expectation, we found no significant associations between patient negative affect and the visibility of either social support or social control.

Associations of Visible versus Invisible Social Support and Social Control with Patient Self-Efficacy

Our next multilevel analysis examined the associations of visible versus invisible social support and social control with patient self-efficacy (see Table 2, right panel). We found no effect of invisible support, but we did find a significant effect of support receipt. Greater support receipt was related to significantly greater patient self-efficacy, fixed effect = 0.13, $p = .024$ (see Table 2, right panel). We also found a significant effect of invisible social control (i.e., control reported as provided by the spouse but not received by the patient), although the direction of the effect was contrary to expectation. Invisible social control was related to lower, rather than greater, self-efficacy, fixed effect = -0.17, $p < .001$.

Supplemental Analyses

Given Luscher et al.'s (2014) finding that effects invisible social control differed between men and women, we examined whether the hypothesized associations might have varied between male and female patients. When gender was added to the model, there were still no significant associations with negative affect. Interestingly, both invisible support and control approximated significance, at $p=.064$ and $p=.089$ respectively. Similarly, controlling for gender did not change the significant association between invisible social control and lower self-efficacy; however, it did cause the effect of support receipt, during days when spouses do not

significantly report providing support, on self-efficacy to become nonsignificant ($p=.079$).

Because our findings were contrary to expectation, we conducted two sets of supplemental analyses to aid in their interpretation. Second, we sought to examine whether the quality of participants' marital interactions differed on days in which invisible versus visible support or control occurred. This would allow us to determine, for example, whether the counterintuitive finding that invisible, rather than visible, social control was associated with lower patient self-efficacy may have been due to greater marital tension or less marital enjoyment on days when invisible control occurred. Marital tension and enjoyment were assessed with two questions in the daily diary assessments that asked both spouses and patients to rate independently how tense and how enjoyable their marital interaction had been that day on a 1-10 scale (e.g., 0 = *not tense at all*, 10 = *as tense as possible*). We conducted one-way ANOVAs that contrasted patient's and spouses' reported marital tension and enjoyment on days when visible versus invisible support occurred and, similarly, on days when visible versus invisible social control occurred. These analyses revealed that on days when support was *invisible*, as compared with days when it was *visible*, patients reported greater marital tension [$M= 2.23$ versus $M = 1.87$, $F(1,2487) = 5.18$, $p = .023$] and lower marital enjoyment [$M = 7.84$ versus $M = 8.41$, $F(1,2484) = 22.83$, $p <.001$]. Marital quality did not differ on days in which invisible versus visible social control occurred.

Third, we also sought to understand whether the spouse's awareness of the patient's diet differed on days in which invisible support or control occurred. This would allow us to determine whether invisible social control might have reflected spousal disengagement from careful monitoring of the patient's diet, potentially resulting in offhand critical cues (e.g., a raised eyebrow) that affected patients outside of their awareness. Both patients and spouses reported each day how much they felt the spouse was aware of the extent to which the patient had

followed the diabetic diet that day (1 = *not at all*, 2 = *somewhat*, 3 = *very much*). One-way ANOVAs were conducted to examine spousal awareness of patient's diet on days when visible versus invisible support occurred and, similarly, on days when visible versus invisible social control occurred. On days when social support was *invisible*, as compared to *visible*, both patients [$M_s = 1.32$ vs. 1.93 , $F(1,2470) = 352.27$, $p < .001$] and their spouses [$M_s = 1.82$ vs. 1.98 , $F(1,2482) = 33.88$, $p < .001$] reported less spousal awareness of the patients' diet. On days when social control was *invisible*, as compared with days when it was *visible*, patients [$M_s = 1.74$ vs. 2.07 , $F(1,1186) = 89.33$, $p < .001$] and their spouses [$M_s = 2.00$ vs. 2.07 , $F(1,1194) = 4.68$, $p = .31$] reported less spousal awareness of the patient's diet.

Considered together, these results provide clues that invisible support and invisible control tended to occur on days when patients experienced less satisfying marital interaction and when patients and spouses alike perceived the spouses to be less aware of the patient's diet. It is possible that in the context of a chronic illness, invisible support and control may not reflect the spouse's attentive, well-attuned, and subtle involvement in the patient's disease management.

DISCUSSION

Research on the health-related effects of social support has yielded mixed findings. Notably, perceived support has frequently been found to be related to positive health outcomes, whereas received support often has been found to be unrelated to health outcomes or related to worse health outcomes (e.g., 7, 8). Recently, Bolger et al. (6) postulated that these differential outcomes may reflect a difference in the visibility of the two kinds of support. They hypothesized that invisible support is likely to be more beneficial than visible support because it allows the recipient to receive support without incurring psychological costs. Research testing this idea has focused largely on visible versus invisible support for acute stressors (e.g., studying for a major exam, giving a speech) rather than chronic stressors; thus, a key goal of the current

study was to examine whether potential benefits of invisible support would be detected in the context of a chronic stressor, such as seeking to manage a chronic illness. Moreover, little research has examined the visibility of another health-related interpersonal process, social control, particularly in the context of a chronic illness; therefore, another key goal of this study was to examine whether benefits of invisible social control, relative to visible social control, would emerge among individuals engaged in efforts to manage a chronic illness (type 2 diabetes).

The results of this study revealed, contrary to expectation, no association between invisible spousal diet-related social support and patients' negative affect or diet-related self-efficacy. These results diverge from previous studies that have found invisible support to be more strongly related than visible support to decreased negative affect (6, 11). Several explanations may exist for our unexpected findings. First, invisible support was not common in our study, occurring on 14.72% of diary days as compared with 35% of diary days in the study by Bolger et al. (6). Thus, it is possible that the more restricted range for our invisible support variable made it difficult to detect significant associations with patient outcomes. Assessing naturally occurring spousal support behaviors that typify visible versus invisible support in a range of contexts in future studies would aid efforts to determine whether the distinction is blurred in the context of chronic illness. Second, in long-term relationships, like those of the couples we studied (married on average for nearly 40 years), much support may be implicit or invisible because spouses tend to trust that their partners have their best interests in mind (11). To shed light on the viability of this interpretation, future research could assess patients' trust in their partners and views of the partners' intentions regarding their illness-management involvement.

Our finding that invisible, rather than visible, diet-related social control was associated

with lower diet-related self-efficacy was unexpected and also diverges from Luscher et al. (15), who found that invisible social control was associated with greater positive affect and less negative affect among smokers. Thus, their results suggested that invisible social control was associated with a psychological benefit (increased well-being), whereas our results suggested that it was associated with a psychological cost (lower self-efficacy). It is possible that spouses' actions reflecting invisible social control in our study might have been more subtly critical than those of the spouses in the study by Luscher et al. (15). Spouses in the Luscher et al. (15) study were non-smokers, which would have spared them from experiencing potentially invidious comparisons or perceived links between their own smoking behavior and that of their partner. Spouses in our study, in contrast, frequently shared meals with the patient, which may have invited critical scrutiny of the patient's dietary behavior or may have amplified frustration with their patient's poor dietary choices. As a result, some spouses may have engaged in subtly reproachful forms of social control that were not consciously encoded as social control by their ill partners but, nonetheless, were experienced unconsciously in ways that detracted from their sense of self-efficacy. For example, a raised eyebrow or look of disapproval by the spouse, even if not accompanied by a verbal comment, might have lessened from the patient's feelings of self-efficacy. The apparent cost associated with invisible social control in our study might also have been due to actions by the spouse that removed some of the challenges of handling a chronic illness (e.g., removing tempting foods from the house). Such actions, even if well-intentioned, might keep patients from developing confidence in their ability to manage their illness successfully.

Another puzzle raised by our findings is why patient-reported, social support was associated with greater, rather than less, patient self-efficacy. Patients' perception of spousal support might have helped to buoy their feelings of self-efficacy because they regarded their

partners as supportive allies facing a chronic illness together (e.g., 1, 2, 5). When long-term support is required, as in the context of a chronic illness, patients' perception that others care about and wish to support their illness management efforts may function to improve, rather than to erode, self-efficacy (cf. 6, 9).

Examining characteristics on days when invisible or visible support (or control) occurred yielded some clues about our unexpected findings. Support tended to occur invisibly on days when patients experienced more marital tension and less marital enjoyment. Similarly, on those days, spouses also reported being less aware of the patient's diet. Thus, invisible support might reflect some marital discord and/or spousal disengagement from the patient's disease management. A generally similar pattern emerged for days when social control was provided invisibly. These results hint at the possibility that, in the context of a chronic illness, invisible support (and, similarly, invisible control) may not reflect spouses' skillful provision of subtle support (or control), as suggested by previous research (e.g., 11); rather, it might reflect marital friction or spousal detachment from involvement in the patient's illness management.

Limitations and Future Directions

Some limitations should be considered in evaluating the findings of this study. Participants in the study were in long-term marriages that were generally characterized by relatively high marital quality, which might have affected the nature and perceptions of health-related support and control in the relationship. In such relationships, subtle behaviors (such as invisible social control) may be more likely to produce significant changes in patient outcomes than would be the case in other kinds of relationships. Our findings, therefore, might not generalize to couples with shorter or less satisfying marriages. The current study also lacked information about the specific kinds of spouse behaviors that were classified as visible versus invisible support and control, making it unclear why some spouse actions were not detected by

the patients or, conversely, why some patients reported spouse actions that the spouses themselves did not report. Future research that supplements closed-ended questions about support and control with observational methods and open-ended questions would help to shed light on when and why patients' and spouses' perceptions of spousal support and control differ. Because the current study examined spouses' involvement in their partners' management of type 2 diabetes, the findings may not generalize to other illness contexts.

Future studies should also measure the impact of gender or personality factors on the prevalence and outcomes of invisible support or control. Also, since to date studies on invisible support and control have only been conducted on younger or middle-aged adults, future studies should draw upon a lifespan perspective (e.g., 31) to examine the potential age differences in support and control invisibility. Lastly, future research should consider whether support and control visibility might shift overtime, either as marital relationships develop or as a chronic illness progresses.

Despite these limitations, this study contributes to the existing literature by extending the investigation of invisible social support to chronic illness and by examining a little-studied parallel construct, invisible social control. The findings suggested that the visibility of social support and social control in the context of chronic illness may be consequential for patients' feelings of self-efficacy. Self-efficacy plays an important role in successful health behavior change (31, 32) and in the management of chronic illness (22). Developing a better understanding of how visible and invisible social support and social control may affect patients' self-efficacy would help to inform interventions to improve the day-to-day management of chronic illness. This goal is important in view of burgeoning rates of chronic illness in the United States and worldwide (33, 34).

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Table 1

Spouse- and Patient-Reports of Provided and Received Social Support and Social Control

		Spouse-reported provision						
		Support			Control			
		No	Yes	Total	No	Yes	Total	
Patient-reported receipt	No	<i>N</i>	246	367	613	1,283	433	1,716
		%	56.03	14.72	20.91	75.21	35.84	58.89
	Yes	<i>N</i>	193	2,126	2,319	423	775	1,198
		%	43.96	85.28	79.09	24.79	64.16	41.11
	Total	<i>N</i>	439	2,493	2,932	1,706	1,208	2,914
		%	100	100	100	100	100	100

Note: *N*=# of days, from a 24-day daily diary assessment, characterized by specific combinations of spouse- and patient-reported social support and social control. Visible support/control is represented by the intersection of patient “yes” row and spouse “yes” column. Invisible support/control is represented by the intersection of patient “no” row and spouse “yes” column.

Table 2

Patient Negative Affect and Self-Efficacy Predicted by Receipt and Provision Social Support and Social Control

	Negative affect			Self-efficacy		
	Fixed effects	SE	<i>p</i>	Fixed effects	SE	<i>p</i>
Social support						
Social support receipt	0.00	0.02	0.882	0.06	0.07	0.383
Social support provision	0.04	0.02	0.066	0.05	0.06	0.378
Social control						
Social control receipt	0.01	0.02	0.439	-0.01	0.05	0.862
Social control provision	-0.03	0.02	0.046	-0.17	0.05	<0.001

Note: SE = Standard error. Symptom severity, diet adherence, and the score for the previous day's dependent variable (not shown) were included as covariates in each analysis.