Perceived Spousal Criticism, Self-Efficacy, and Adherence to Diet and Exercise Self-Care Behaviors in Adults with Type 2 Diabetes

A thesis presented to

the faculty of

the College of Arts and Sciences of Ohio University

In partial fulfillment

of the requirements for the degree

Master of Science

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August 2008
This thesis titled
Perceived Spousal Criticism, Self-Efficacy, and Adherence to Diet and Exercise Self-Care Behaviors in Adults with Type 2 Diabetes

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Abstract

MERRILL, JENNIFER C., M.S., August 2008, Clinical Psychology

Perceived Spousal Criticism, Self-Efficacy, and Adherence to Diet and Exercise Self-Care Behaviors in Adults with Type 2 Diabetes (110 pp.)

Director of Thesis: Mary de Groot

Objective: The primary aim of the current study was to assess the relationships between perceived spousal criticism and dietary and exercise self-care adherence in adults with type 2 diabetes and to determine if self-efficacy mediated this relationship.

Research Design and Methods: This study used a cross-sectional survey design. Potential participants were mailed self-report questionnaire packets that included measures of perceived spousal criticism, adherence to diet and exercise, self-efficacy, depressive symptoms and positive and negative affect.

Results: The total sample (N=90) was predominantly White (90.0%) and female (53.3%). The mean age was 59.8 years (S.D. 10.6) and 44.4% of participants reported completing a high school degree or less. The majority of participants reported using oral hypoglycemic agents to treat their diabetes (50.0%). Within the sample, low levels of perceived spousal criticism were observed across four different measures. Each measure of perceived spousal criticism was negatively related to patient self-efficacy ($r = -.30$ to $r = -.45$), but most were not associated with patient self-care adherence. One measure of perceived spousal criticism was negatively correlated with dietary adherence ($r = -.22$), but the mediational model could not be tested because this relationship was no longer significant once age was accounted for in the analyses.
Conclusion: Although low levels of perceived spousal criticism were found within this sample, there was a relationship between higher levels of perceived criticism and lower levels of patient self-efficacy. Knowledge about the relationship between perceived spousal criticism and patient self-efficacy could be useful in designing education and intervention programs for patients and spouses of patients with type 2 diabetes.

Approved: _____________________________________________________________

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Introduction

Type 2 diabetes is a serious and costly health condition for adults in the United States. It has been estimated that as of 2005, there were 20.6 million adults over the age of 20 with diabetes, with 1.5 million new cases diagnosed in the prior year alone (Centers for Disease Control [CDC], 2005). Nearly 10% of the current adult population has diabetes, with type 2 diabetes accounting for 90-95% of these cases (CDC, 2005). Complications of diabetes include cardiovascular disease, nephropathy, neuropathy, and retinopathy (American Diabetes Association [ADA], 2007). In 2002, the costs associated with diabetes and its complications were over $130 billion in the United States. Studies have shown that the detrimental effects of type 2 diabetes and its complications can be reduced by controlling blood glucose levels, blood pressure, and blood lipid levels through a carefully monitored medication, diet, and exercise plan (United Kingdom Prospective Diabetes Study [UKPDS], 1998). Current ADA recommendations include maintaining a glycosolated hemoglobin (HbA1c) level below 7% (ADA, 2007). Despite this knowledge, poor glucose control continues to be a major issue for adults with type 2 diabetes.

A study of 1,480 individuals with type 2 diabetes using data from the Third National Health and Nutrition Examination Survey indicated that less than 50% of individuals had an HbA1c level below 7% as recommended by the ADA (Harris, Eastman, Cowie, Flegal, & Eberhardt, 1999). Lack of adherence may contribute to poor glycemic control in many individuals with type 2 diabetes. There are several factors that contribute to poor adherence such as the complexity of treatment regimens, personal factors, psychological factors, and social factors (Lin, Katon, von Korff, Rutter, Simon,
One personal factor that has been identified in prior adherence research with type 2 diabetes patients is self-efficacy, or one’s confidence in his or her ability to carry out certain tasks (Bandura, 1986; Whittemore, Melkus, & Grey, 2004).

Adherence in Type 2 Diabetes

Treatment for type 2 diabetes is variable across individuals and is often a very complex regimen. Generally, treatment consists of a combination of medication, diet, exercise, and self-monitoring of blood glucose levels (SMBG; Cox & Gonder-Frederick, 1992). A typical regimen will involve several different tasks and behaviors that require both time and effort from the patient on a daily basis. Due to the complexity of treatment regimens, it is not surprising that estimates of adherence rates in individuals with type 2 diabetes are often low (Norris, Engelgau, & Narayan, 2001).

Although adherence can be difficult to define and measure methodologically, prior studies have demonstrated that individuals with diabetes have difficulty adhering to recommendations related to all areas of self-care (Haynes, McDonald, & Garg, 2002; McNabb, 1997; Norris et al., 2001). One study that considered individual aspects of adherence simultaneously found that approximately 57-70% of individuals adhere to blood glucose monitoring routines, 65% adhere to dietary routines, 19-30% adhere to exercise routines, and 20-80% adhere to insulin routines depending on the complexity of the regimen (McNabb, 1997).

There are clear benefits from lowering HbA1c levels and further research to identify factors that influence adherence is crucial (Karter et al., 2001; Schectman, Nadkarni, & Voss, 2002; UKPDS, 1998). Researchers have considered several psychological and social factors that may contribute to this lack of adherence to diabetes
self-care including poor cognitive abilities, lack of motivation, negative health beliefs, and social support (Boehm, Schlenk, Funnell, Powers, & Ronis, 1997; Jones, Remley, Engberg, 1996; Lin et al., 2004; Travis, 1997). Family support and family involvement in routines and rituals related to adherence have also been suggested as an important factor that may impact adherence (Denham, 2002). Social cognitive theory incorporates a number of these concepts in an attempt to further explain health behaviors, such as those involved in self-care activities of people with 2 diabetes.

Social Cognitive Theory and Self-Efficacy

Bandura’s social cognitive theory has been used to describe the reciprocal interaction between behavioral, personal, and environmental factors that contribute to health behaviors (1977; See Figure 1; for a more detailed discussion see Appendix A). The environment represents factors that are external to an individual, including both the physical and social characteristics of an individual’s situation (Bandura, 1977). The theory explains how individuals acquire and maintain certain behavioral patterns, while also providing guidelines for interventions that might successfully modify these behaviors by addressing personal and environmental factors.

One important personal factor that Bandura added to the social cognitive model is self-efficacy. Self-efficacy is defined as one’s confidence in their ability to successfully carry out a certain behavior (Bandura, 1994; Rosenstock, Strecher, & Becker, 1988). Individuals with higher self-efficacy expect positive results, while those with less confidence in their abilities imagine less favorable outcomes (Bandura & Schunk, 1981). Self-efficacy can be influenced by personal and environmental factors in the social cognitive model such as observational learning, social influences, situational factors, and
reinforcements (Bandura, 1977). Self-efficacy has been studied extensively within the context of health behavior and has been shown to be predictive of health behaviors and outcomes in many chronic illnesses such as asthma, arthritis, chronic obstructive pulmonary disease, and diabetes (Allen, Becker, & Swank, 1991; Bandura, 1977; Baranowski, Perry, & Parcel, 2002).

Self-efficacy has been used in research involving a variety of health behaviors including obesity treatment and weight loss, smoking cessation, and research predicting postoperative behaviors of patients undergoing cholecystectomies (Clark, Abrams, Niaura, Eaton, & Rossi, 1991; DiClemente, Prochaska, and Gibertini, 1985; Godding & Glasgow, 1985; Oetker-Black, Hart, Hoffman, & Geary, 1992). A review of 21 behavior studies involving smoking behavior, weight loss, contraception, alcohol abuse, and exercise behaviors found that self-efficacy was an important predictor of both behavior change and maintenance (Strecher, DeVellis, Becker, & Rosenstock, 1986). Higher self-efficacy in patients has been shown to predict better health outcomes than lower self-efficacy levels in patients with similar health status (Holman & Lorig, 1992). Research has also shown that self-efficacy predicts adherence in diabetes more consistently than other components of social cognitive theory (Charron-Prochownik, Becker, Brown, Liang, & Bennett, 1993; Skelly, Marshall, Haughey, Davis, & Dunford, 1995; Williams & Bond, 2002).

Self-Efficacy and Diabetes Self-Care Adherence

Numerous studies have demonstrated the importance of self-efficacy in diabetes self-care adherence in terms of patients’ beliefs in their ability to carry out self-care tasks (Glasgow & Osteen, 1992; Jenkins, 1995). Higher rates of self-efficacy have been
consistently shown to be associated with higher rates of self-care adherence (McCaul, Glasgow, & Schafer, 1987; Padgett, 1991; Skelly et al., 1995; Whittemore et al., 2004). The association between self-efficacy and self-care adherence has been found to exist even when controlling for metabolic control, history of adherence, and demographic variables (Kavanagh, Gooley, & Wilson, 1993). Hurley and Shea (1992) completed a longitudinal study with 142 adults with type 1 or type 2 diabetes who used insulin as part of their daily self-care routines. Self-efficacy was positively related with overall self-care (r = .40, p < .001), diet (r = .37, p < .001), and insulin adherence (r = .67, p < .001).

In samples of individuals with type 2 diabetes, similar results have been found indicating a positive relationship between self-efficacy and self-care adherence. Aljasem and colleagues (2001) demonstrated this association in a sample of 309 individuals with type 2 diabetes in a questionnaire-based study. Results indicated that greater self-efficacy in planning diabetes self-care predicted regular blood glucose monitoring (r = .26, p <.001), medication adherence (r = .16, p <.05), closer adherence to an ideal diet (r = .27, p <.001), and less frequent binge eating (r = -.22, p <.001). Williams and Bond (2002) measured adherence in 94 adults with type 2 diabetes who completed questionnaires about self-efficacy. Self-efficacy was positively associated with adherence to diet (r = .47, p <.001), exercise (r = .61, p <.001), and SMBG (r = .39, p <.01). Some studies have shown that self-efficacy is a strong predictor for exercise, but can be less predictive of diet and blood glucose testing (Kingery & Glasgow, 1989; Ludlow & Gein, 1995; McCaul et al., 1987; Padgett, 1991). Skelly and colleagues (1995) found that self-efficacy accounted for 53% of the variance in adherence to exercise routines, but only 24% of the
variance in adherence to dietary routines in a sample of 118 African-American women with type 2 diabetes receiving care at an outpatient clinic.

For individuals with diabetes, the complex tasks involved in self-care regimens can be extremely demanding and higher levels of self-efficacy appear to increase the likelihood of adequately performing these tasks. Social cognitive theory takes into account sources of self-efficacy including personal, cognitive, and environmental factors that may influence an individual’s confidence in their self-care behaviors (Bandura, 1986).

Influencing Self-Efficacy through Social Persuasion

According to social cognitive theory, there are four main sources of self-efficacy beliefs including mastery experiences, vicarious experiences, emotional states, and social persuasion (Bandura, 1986; See Figure 2; for a complete description see Appendix A). Social persuasion or verbal feedback from others about behaviors can influence an individual’s confidence in their ability to successfully complete a certain behavior. Social persuasion can include positive and negative types of verbal feedback (See Figure 3). Examples of positive social persuasion include praise and encouragement, while examples of negative social persuasion include criticism or skepticism about one’s abilities. Although positive social persuasion can be effective in increasing self-efficacy, it is also possible to decrease self-efficacy through negative social persuasion (Bandura, 1986).

There has been limited research that has considered the concept of social persuasion within health behaviors or chronic illness research. The majority of research involving social persuasion has been related to public health campaigns targeting health
behaviors such as vaccinations and condom use (Albarracin, Kumkale, & Johnson, 2004; de Wit, Vet, Schutten, & van Steenbergen, 2005; Stroebe, 2000). Some intervention studies have targeted several sources of self-efficacy, without examining individual effects of sources such as social persuasion (Lorig et al., 2001). For example, McAuley and colleagues (1994) found that an intervention providing efficacy-based information on mastery experiences, vicarious experiences, social persuasion, and interpretation of physiological states improved exercise adherence in middle-aged adults. However, the relationships between the individual components of the intervention and exercise were not explored. Furthermore, there have been few studies that have investigated the role of social persuasion in type 2 diabetes. Some intervention studies in type 2 diabetes research have attempted to improve self-efficacy and health outcomes through mastery experiences or vicarious experiences in order to increase the likelihood of positive outcomes such as increased adherence to self-care regimens (Funnell & Anderson, 2003; Sturt, Whitlock, & Hearnshaw, 2006). However, further research is needed to evaluate social persuasion in type 2 diabetes, due to the role that family members play in their daily self-care adherence routines (Denham, 2002; see Appendix A for more a more detailed discussion). According to Bandura, negative social persuasion from family members may be detrimental to self-efficacy (1986). Criticism is one common example of negative social persuasion that has been measured in research related to medical illnesses. Although there are no known studies that have examined negative social persuasion in the form of criticism within the context of type 2 diabetes, there are studies related to other medical illnesses that have demonstrated the relationship between criticism and poor health outcomes in several types of illnesses including asthma,
inflammatory bowel disease, and rheumatoid arthritis (Fiscella & Campbell, 1999; Hermanns et al., 1989; Manne & Zautra, 1989; Schobinger et al., 1992; Vaughn, Leff, & Sarner, 1999; Wamboldt et al., 1995). Some examples of spousal social persuasion, specifically criticism, can be found within the context of expressed emotion research. Expressed emotion (EE) is a set of constructs related to family conflict that was originally developed to explain relapse rates in patients with schizophrenia (Vaughn & Leff, 1976). The EE construct includes criticism, hostility, warmth, positive comments, and emotional overinvolvement which are typically measured during an interview with the patient and family member. EE has been studied in the context of psychological and medical illnesses with results indicating that of the 5 components, criticism appears to be one of the strongest predictors of poor psychological and physiological outcomes (Wearden et al., 2000a). For a more detailed discussion of the EE literature, please see Appendix A.

Criticism and Medical Illnesses

Criticism can be defined as a type of feedback that can be given in a constructive or destructive way. Constructive criticism is specific and given in a considerate way while destructive criticism is non-specific, attributes behaviors to internal causes, and is delivered in a negative, sometimes threatening way (Baron, 1988; Liden & Mitchell, 1985). Most research has examined destructive criticism, which has been associated with lower self-efficacy when individuals receive feedback on task performance (Baron, 1988). Destructive criticism can also be described as comments of dislike, annoyance, or resentment (Leff & Vaughn, 1985). Although criticism has not been directly related to self-efficacy in chronic illness, it has been associated with poor outcomes in psychological and medical illnesses. High levels of criticism in family members have
been associated with higher relapse rates and poor outcomes in schizophrenia, depression, bipolar disorder, eating disorders, anxiety disorders, and more recently type 1 diabetes (Brown, 1985; Hooley, 1986; Hooley & Richters, 1995; Hooley & Teasdale, 1989; Leff & Vaughn, 1985; Miklowitz et al., 2005; Parker & Hadzi-Pavlovic, 1990; Vaughn, Leff, & Sarner, 1999; Wearden et al., 2000a).

Klausner and colleagues measured familial criticism and glucose control in patients with type 1 diabetes who were enrolled in the Diabetes Control and Complications Trial (DCCT; 1995). Patients were recruited from both the intensive and conventional treatment groups in the DCCT. A total of 86 patients and individuals they identified as key relatives (i.e., spouses, parents, etc.) completed measures of criticism (both ratings of perceived criticism by the patient and ratings by family members) in addition to a family interview to assess number of critical comments. A significant relationship was found between family member ratings of criticism of the patient and HbA1c \( r = .46, p < .05 \) but only in patients involved in the intensive treatment program. These findings suggest that the impact of perceived criticism may be particularly salient in individuals attempting to adhere to more strict care regimens, such as the intensive routine in the DCCT. However, perceived criticism and number of critical comments during the interview were not significantly related to HbA1c. The mixed results may be due to the heterogeneous sample of family members that included 25% parents. Although the key relatives in this study included many spouses, no analyses were conducted to consider the impact of spouses when compared with other key relatives in the study. Another possible explanation for the mixed results may be the physiological factors involved in HbA1c levels which may be influencing levels of glucose control.
Koenigsberg and colleagues examined the association between perceived criticism levels of relatives and glycemic control in three different studies of adolescents and adults with type 1 diabetes (1993; 1995). In one study, patients whose relatives made more critical comments during a family interview had poorer glucose control ($r = .44, p< .01$). In the other two studies, no association was found between relatives’ criticism and glucose control. However, patients with psychiatric comorbidities, including depression, were excluded from these analyses. This may have influenced the results, due to the apparent vulnerability to critical comments that is seen in patients with depression (Hooley & Teasdale, 1989; Wearden et al., 2000a). It is also important to note that considering glycemic control alone may not be an appropriate dependent variable to understand psychosocial variables in diabetes. There are numerous factors that influence glycemic control, including physiological characteristics that have a great deal of variability across individuals (Koenigsberg, 1995). Most researchers agree that perceived criticism does not directly impact glycemic control, but instead influences the patients’ management of their illness (Koenigsberg, 1995; Wearden et al. 2000a). Accordingly, self-care adherence may be a better marker of the impact of perceived criticism due to the benefits that can be obtained from consistent adherence and disease management, and the clear association between adherence and lower incidence of complications (DCCT, 1995; Wearden et al., 2000a).

Wearden and colleagues examined the relationship between observed criticism from partners and HbA1c, diabetes management, diabetes appraisal, depression, and anxiety in a sample of 60 adults with type 1 diabetes (2000b). Diabetes management was rated for insulin adherence, SMBG, diet adherence, and precautions against
hypoglycemia by interviewers on a scale from 0 (inadequate in more than one area) to 4 (good in all areas). Only 13% of the participants had partners with “high” criticism ratings (more than 6 critical comments during the interview) and criticism was not related to HbA1c. However, results indicated that participants with “high” criticism spouses had lower diabetes management ratings ($U = 151, p < .05$), more negative appraisals of their diabetes ($U = 123, p < .01$), and higher levels of depressive symptoms ($U = 132, p < .05$). Although these findings are limited due to the small subsample of participants with highly critical partners, the results suggest that there may be a relationship between spousal criticism and self-management behaviors in type 1 diabetes. This suggests that for individuals with type 2 diabetes, spousal criticism may also be related to self-care adherence. Most previous studies have examined multiple familial sources of criticism, although for married adults with type 2 diabetes, spouses may be a key source of social persuasion (see Appendix A for a more detailed discussion of marital relationships and chronic illness).

Spousal Social Persuasion and Chronic Illness

There are many different sources of social persuasion that an individual may be exposed to, including family members, friends, and co-workers. The majority of research that includes types of social persuasion such as perceived criticism has focused on family members as a source of feedback. In individuals with type 2 diabetes, spouses are particularly important due to the daily routine and rituals that are involved with the diet, exercise, and medical management components of diabetes self-care (Denham, 2003). Therefore, positive spousal social persuasion can have a positive impact on health outcomes, while negative social persuasion, such as criticism, from spouses could have
the opposite effect. However, no studies within the criticism literature have explained why this negative feedback from spouses about patient’s abilities may influence patient outcomes. Social cognitive theory and the influence of social persuasion on self-efficacy may provide further information about this relationship (Bandura, 1986).

Reviewing past research involving spouses is helpful to understand the potential relationship between spousal social persuasion and adherence outcomes. Spousal persuasion, both positive and negative, can influence health outcomes and psychological well-being in individuals with chronic illness because of their involvement with the daily activities involved with disease management (de Ridder, Schreurs, & Kuijer, 2005). This has been documented in many types of disease including cardiovascular disease, arthritis, multiple sclerosis, and diabetes (Fisher & Weihs, 2000). Those studies that have considered the role of negative social persuasion have found that negative health consequences can result from these behaviors that include criticism, hostile remarks, and other unsupportive verbal feedback. In one study of women with rheumatoid arthritis, researchers showed that greater levels of spousal criticism predicted increases in disease activity during periods of interpersonal stress (Zautra et al., 1998). The increased disease activity was not observed in women who reported lower levels of spousal criticism or higher levels of positive support. Furthermore, Ewart and colleagues (1991) found that in patients with hypertension, self-reported spousal hostility accounted for up to 50% of the variance in systolic blood pressure changes in women during a stressful activity.

Although there is growing evidence to support the relationship between spousal criticism and chronic illness outcomes, very little research has identified potential mediators for this relationship. Many social support models consider the influence of marriage on
illness positively, either through direct or indirect effects of stress buffering (Cohen, Sherrod, & Clark, 1986; Cohen & Willis, 1985). However, these models do not often take into account the negative impact that spousal persuasion, such as perceived criticism, may have on a patient’s self-efficacy (Martire, 2004). In fact, most studies involving types of negative spousal persuasion such as criticism have not provided a theoretical explanation for the negative impact on health outcomes. Social cognitive theory provides a theoretical framework to link negative spousal social persuasion to decreased patient self-efficacy, which can lead to poor adherence and health outcomes.

Overall, these studies suggest that criticism has been important to consider for individuals with psychological and medical illnesses. However, criticism has been studied most often within measures of social support, marital quality, or family interaction scales and has not been presented within the context of a theory that explains these negative outcomes. Within the context of social cognitive theory, perceived criticism can be considered as a type of negative social persuasion influencing patient outcomes because it involves verbal feedback about an individual’s behaviors. In future research, the negative health outcomes in these studies may be further explained by investigating decreases in self-efficacy which may be related to poor adherence to health routines. Past studies involving outcome measures related to glycemic control have had mixed results, and few have measured self-efficacy as a potential mediator in the relationship between criticism and health outcomes. Due to the influence that negative social persuasion can have on self-efficacy, it would be useful to understand more about how a specific type of social persuasion, such as perceived criticism might be related to self-efficacy. Additionally, due to the influence of emotional states on self-efficacy in
Bandura’s SCT, examining the relationship between perceived criticism and self-efficacy by including depressed mood or positive/negative affect could be useful in further understanding the relationship between potential sources of self-efficacy (perceived criticism; depressed mood; affect) and behavior (self-care adherence) for individuals with type 2 diabetes (Bandura, 1986).

Future research needs to address the relationship between spousal criticism, self-efficacy, and self-care adherence in adult populations with type 2 diabetes. Measuring the relationship between spousal criticism and patient adherence in type 2 diabetes and including patient self-efficacy as a potential mediator could provide more information about the mechanisms by which criticism appears to be negatively related to illness outcomes.

Current Study

The primary aim of the current study was to examine the relationship between perceived spousal criticism and levels of self-care adherence in adult patients with type 2 diabetes, and to test whether this relationship is mediated by patient self-efficacy (see Figures 4 & 5). Further understanding about the relationship between spousal criticism and patient self-care adherence could be useful in designing interventions for both patients and family members to improve patient adherence and outcomes. Although there have been similar studies in patients with type 1 diabetes and other medical illnesses, no prior studies have examined these factors in adults with type 2 diabetes or used adherence as the primary outcome measure (Koenigsberg, 1995; Wearden et al., 2000a). Additionally, no prior studies have considered a mediational factor such as self-efficacy to explain the negative relationship between spousal criticism and health outcomes in the
context of social cognitive theory. The hypotheses associated with the primary aim were: 1) self-efficacy would be positively associated with dietary and exercise adherence, 2) perceived spousal criticism would be negatively associated with self-efficacy, dietary adherence, and exercise adherence, and 3) self-efficacy would mediate the relationship between perceived spousal criticism and adherence. The secondary aim of the current study was to examine the relationship between perceived spousal criticism, self-efficacy, and self-care adherence by including measures of depressed mood and positive and negative affect. In many of the previous studies examining the influence of perceived criticism on psychological illnesses, depression has been positively related to criticism ratings and may be associated with both perceived criticism levels and self-efficacy (Renshaw, 2008; Seaburn, Lyness, Eberly, & King, 2005). However, no previous studies have examined the relationship between perceived criticism and self-efficacy, so the way in which depression or negative affect may be related to these variables is unknown. The hypotheses associated with this secondary aim were 1) depressed mood would be positively associated with perceived spousal criticism and negatively associated with self-efficacy and adherence, 2) negative affect would be positively associated with perceived spousal criticism and negatively associated with perceived spousal criticism and adherence, and 3) positive affect would be negatively associated with perceived spousal criticism and positively associated with self-efficacy and adherence. Finally, the mediational model described above was tested using depressed mood, positive affect, and negative affect as covariates to see if they change the relationship between perceived spousal criticism, self-efficacy, and self-care adherence.
Research Design and Methods

Participants

The participants in this study were individuals with type 2 diabetes from recruited from a mailing list of those who had previously participated in the Psychosocial Aspects of Diabetes Among Medical Patients in Athens Country study at Ohio University and indicated an interest in future research (de Groot et al., 2007). The inclusion criteria for the participants in this study were: (1) diagnosis with type 2 diabetes for at least one year, (2) age 18 or older, (3) married for at least one year, (4) the ability to provide informed consent, and (5) fluency in English. Two hundred seventy-three packets were sent to potential participants using participants from previous studies, participants from other diabetes-related studies, and patient lists of eligible individuals with type 2 diabetes from the co-investigators, Dr. Frank Schwartz and Dr. Jay Shubrook. Individuals were also recruited at a local community health fair, although no eligible participants were recruited through this method (See Figure 6 for a recruitment flowchart). Of those who did not respond to the questionnaire packets, 7 were deceased, and 39 were unable to be contacted (i.e., no forwarding address, disconnected phone number). After accounting for these 46 individuals, the potential sample was N=227. Follow-up phone calls were made up to four times to participants who did not respond, and complete packets were resent sent to N=50 participants who did not respond to the initial mailing. One hundred eleven participants completed the questionnaire packet and necessary consent forms, yielding a 49.0% participation rate. Three participants were excluded because of incomplete data. Ninety of the N=111 participants were married or living with a partner. An a priori power analysis was conducted using SamplePower 2.0 (SPSS, 2001) for a desired power level
of .80, including 5 predictors (spousal criticism, self-efficacy, self-care adherence, depression, and affect), $\alpha = .05$, and a medium effect size of .15 indicated that $N=91$ participants would be required. A total sample of $N=90$ used for all subsequent analyses.

Procedure

Participants received information through both mailings and phone calls. Participants were paid $15 for the time it took to complete the questionnaire packets.

Measures

Self-report questionnaires were used to measure the variables involved in the study. A demographics questionnaire was included to obtain information about age, gender, ethnicity, education, income, length of diagnosis, and current treatment.

*Perceived Spousal Criticism.* Due to variety in definitions of perceived criticism and limited psychometric data available for existing measures of criticism, four different measures of perceived criticism were used for the current study, including one developed for the purpose of the study. The single item Perceived Criticism Scale (PCS; Hooley & Teasdale, 1989) was used to measure criticism from the spouse as perceived by the patient. Patients answered the following question: “How critical do you think your spouse is of you?” with possible responses ranging from 1 (not at all critical) to 10 (very critical). The PCS has demonstrated concurrent validity with the Camberwell Family Interview when patient perceived criticism ratings were correlated with family member criticism ratings from the interview ($r=.51$). This scale also has good test-retest reliability over a 3 month follow-up period ($r=.75$). The PCS has been shown to have predictive validity in tracking relapse rates across a 9-month period in individuals with depression ($r=.64$). The PCS has also been used to predict relapse in studies involving patients with
anxiety, panic disorder, and substance abuse (Fals-Stewart, O'Farrell, & Hooley, 2001; Renshaw, Chambless, & Steketee, 2003). In terms of discriminant validity, PCS score have been shown to be independent of concurrent patient depression, anxiety, age, gender, and type of relative being rated (Hooley & Teasdale, 1989; Chambless, & Steketee, 1999).

The Family Emotional Involvement and Criticism Scale (FEICS; Shields, Franks, Harp, McDaniel, & Campbell, 1992) is a self-report measure perceived criticism and emotional involvement that was created using a random sample of patients attending a medical clinic. The scale includes 14 items on a 5 point Likert-type scale (“almost never” to “almost always”). There are two subscales with 7 items each which are Emotional Involvement (EI) and Perceived Criticism (PC). The FEICS-PC was used to assess perceived criticism in the current study. The internal consistency was found to be $\alpha = .82$ for PC. Shields and colleagues found that PC was positively correlated with depression ($r = .38$) and anxiety ($r = .35$) as measured by the Symptom Checklist-90 (SCL-90; Derogatis, Lipman, & Covi, 1973). The PC was found to be negatively correlated with measures of family climate including cohesion ($r = -.44$) and adaptability ($r = -.37$). The PC subscale has also been correlated with ratings of criticism in relatives through the Five Minute Speech Sample in a study of individuals with schizophrenia and their family members ($r = .59$; Bachmann, Bottmer, Jacob, & Schroder, 2006).

The Multidimensional Diabetes Questionnaire (MDQ) Misguided Support Behaviors subscale (MSB) was also used to assess perceived criticism (Talbot, Nouwen, Gingras, Gosselin, & Audet, 1997). The MDQ was developed using Bandura’s SCT to provide a brief measure assessing social and cognitive factors related to diabetes. There
are three sections of the MDQ assessing 1) health-related quality of life, 2) social incentives related to self-care, and 3) self-efficacy and outcome expectancies. Confirmatory factor analysis completed by Talbot and colleagues demonstrated good construct validity for the three scales related to personal, social, and quality-of-life related factors (1997). The social incentives section includes a scale of positive reinforcement behavior and a scale of unsupportive or “nagging” behaviors related to diabetes self-care (MSB). The 4 items on the MSB were modified to make them specific to the participant’s spouse/partner. Items are rated on a 7 point Likert-type scale from 0 (not at all true) to 6 (very true). The internal consistency of the MSB was found to be adequate (α = .70). The MSB scale was found to be negatively associated (r = -.11) with the MDQ Self-Efficacy scale, although it was not correlated with measures of diet and exercise self-care behaviors. No data on test-retest reliability is available for the MDQ.

The Spousal Feedback Questionnaire (SFQ) is a 14-item self-report questionnaire that was developed for the current study. The original questionnaire contained 21 items that were generated using components of constructive and destructive criticism described by Baron and colleagues (1988). The scale included items that were specific to diabetes and diabetes self-care activity. Each item was rated using a 5 point Likert-type scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Constructive criticism items were reverse scored and the 21 items were summed for a total score. A principal component analysis was completed using the original 21 items of the SFQ and total sample (N=90), which suggested a two-factor solution that explained 61.6% of the variance. After removing 7 items that did not load significantly onto these two factors, a second principal component analysis with a forced two-factor solution was completed using Varimax rotation. The
first factor (7 items) can be interpreted as examples of destructive criticism and the second factor (7 items) can be interpreted as examples of constructive criticism. The first factor explained 53.0% of the variance and the second factor explained 47.0% of the variance (see Table 9 for factor loadings). The internal consistency of the final 14-item SFQ was \( \alpha = .72 \). A more detailed discussion of the development of the SFQ can be found in Appendix C.

**Self-efficacy.** The MDQ Self-Efficacy subscale contains seven items designed to assess participants’ level of confidence in adherence to certain self-care activities including diet, exercise, SMBG, medication, and general management (Talbot et al., 1997). Responses are based on a scale of 0 (not at all confident) to 100 (very confident). The self-efficacy scale was found to be correlated with the SDSCA diet (\( r = .58 \)) and exercise (\( r = .48 \)) subscales. This scale has also demonstrated good internal consistency (\( \alpha = .89 \)) and has been used previously in studies involving patients with type 2 diabetes (Sacco, Wells, Vaughan, Friedman, Perez, & Matthew, 2005). No data on test-retest reliability is available for the MDQ.

**Patient Adherence to Self-Care Activities.** The Summary of Diabetes Self-Care Activities Measure (SDSCA) is a brief, widely used questionnaire that assesses different aspects of the diabetes care regimen: general diet, specific diet, exercise, medication, blood glucose testing, foot care and smoking (Toobert & Glasgow, 1994; Toobert, Hampson, & Glasgow, 2000). For the purposes of this study, only the general diet and exercise subscales were used. Most questions are based on self-care behaviors within the last week (e.g., “How often did you follow your recommended meal plan over the last 7 days?”). Internal consistency has been shown to be \( \alpha = .66 \) for the general diet subscale
and $\alpha = .72$ for the exercise subscale. The general diet scale has also demonstrated validity when compared to measures of fat and calorie intake ($r = -.23$) and the Food Habits Questionnaire ($r = .53$; Toobert et al., 2000). The exercise subscale has been shown to be positively correlated with exercise self-monitoring ($r = .58$) and exercise class attendance ($r = .22$). Test-retest reliability over a 3 month period was $r = .58$ for general diet and $r = .42$ for exercise.

The Rate Your Plate (RYP) self-report questionnaire was used as an assessment of dietary quality according to the National Heart Lung and Blood Institute recommendations for cholesterol, fat, and sodium intake (NHLBI; Gans et al., 1993; Gans, Hixson, Eaton, & Lasater, 2000). This 23-item questionnaire was originally designed as an eating patterns assessment tool for cholesterol screening and education programs and has been used extensively in research related to dietary patterns and chronic illnesses. Healthy eating patterns are determined by consistency with NHLBI low fat, low sodium, and low cholesterol guidelines. The items address both serving size and number of servings for 16 different food categories. Each category has 3 columns for the participant to choose from: 1) the first column is the least consistent with healthy eating patterns, 2) the second column represents “middle ground”, and 3) the last column is the most consistent with healthy eating guidelines. Each response received points according to the column (Column 1 = 1 point, Column 2 = 2 points, and Column 3 = 3 points). Higher scores indicate higher levels of dietary quality. The RYP has been negatively associated with the dietary cholesterol ($r =-.45$), calories from dietary fat ($r =-.59$), and saturated fat ($r =-.65$) subscales of the Willett food frequency questionnaire.
Depressed Mood and Positive and Negative Affect. The Beck Depression Inventory - Second Edition (BDI-II) was used to measure self-reported levels of depressive symptoms (Beck, Steer, & Brown 1996). Twenty-one questions about the presence and severity of various depressive symptoms are included in this scale. Symptoms are rated on a scale from 0-3 with higher scores indicating higher amounts of depressive symptoms. Scores can range from 0 – 63, with higher numbers indicating more depressive symptoms. Scores of 0-13 indicate minimal levels of depressive symptoms, scores from 14-19 indicate mild symptoms of depression, scores from 20-28 indicate moderate depressive symptoms, and scores above 29 indicate severe levels of depressive symptoms (Beck et al., 1996). The BDI-II has good reliability (α = .92; Beck et al., 1996) and has demonstrated validity by its positive associations with other measures related to depression including the Beck Hopelessness Scale (r = .68) and the Revised Hamilton Psychiatric Rating Scale for Depression (r = .71).

Positive and negative affect was measured using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, Tellegen, 1988). The scale consists of 10 positive affect descriptors (interested, excited, upset, strong, enthusiastic, proud, alert, inspired, determined, attentive, active) and 10 negative affect descriptors (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, afraid). Participants were asked to rate the extent to which they felt like each item during the past week on a 5 point Likert-type scale ranging from 1 (very slightly or not at all) to 5 (extremely). Items for each scale were summed for a total positive affect score and negative affect score. The PANAS has demonstrated good reliability for the positive scale (α = .87) and negative scale (α = .87). Test-retest reliability over an 8-week interval was shown to be r = .47 for both the positive
and negative scale (Watson et al., 1988). The PANAS has also been shown to be correlated with related measures of distress, depressed mood, and anxiety. The Hopkins Symptom Checklist (HSCL) is measure of general distress that is commonly used as a measure of clinical symptomatology in normal and clinical populations (Derogatis, 1974). The PANAS negative scale was positively related to total HSCL scores \((r = .74)\) and the PANAS positive score was negatively related to the total HSCL scores \((r = -.19;\) Watson et al., 1988). Watson and colleagues also found BDI-II scores to be positively correlated with the PANAS negative scale \((r = .58)\) and negatively correlated with the PANAS positive scale \((r = -.36)\).

### Analyses

Analyses were conducted using SAS 9.1 (SAS Institute, 2004). Prior to analysis, data were examined for normality, skewness, kurtosis, homoscedasticity, and multicollinearity. Rates of perceived spousal criticism, patient self-efficacy, patient adherence to diet, patient adherence to exercise, positive affect, negative affect, and depression were determined by descriptive analyses. Pearson product-moment correlations were conducted in order to determine whether there were significant associations between each of the study variables. Additionally, correlations were conducted between selected demographic variables and each of the study variables.

In order to test whether or not patient self-efficacy mediated the relationship between spousal criticism and patient self-care adherence, the following multiple regression analyses were used as outlined by Baron & Kenny (1986). See Figures 4 & 5 for the unmediated and mediated models. Age was used as a covariate in all analyses. If partial mediation occurred, a Sobel test was performed in order to determine the
significance of the reduction in the correlation between spousal criticism and patient self-care adherence has occurred after controlling for patient self-efficacy (MacKinnon et al., 2002; MacKinnon, Warsi, & Dwyer, 1995; Sobel, 1982).

Results

Sample Characteristics

Demographic characteristics for the total sample (N=90) are shown in Table 1. Fifty-three percent of participants were female, the mean age was 59.8 years (S.D. 10.6), and the majority of participants were White (90.0%). Thirty-six percent of participants reported an annual income of between $21,000-40,000 supporting an average of 2 people (S.D. 1.3). Forty-four percent of participants completed a high school degree or less and 64.0% of participants reported that they did not work outside of the home. Ninety-seven percent of participants reported that they were married and 3.0% reported that they were currently living with a partner. The mean age of onset for T2DM was 46.6 years (S.D. 12.4) and 50.0% of participants reported using oral hypoglycemic agents (OHA) treatment. Mean duration of diagnosis with type 2 diabetes was 13.0 years (S.D. 10.0).

Descriptive characteristics of the adherence, self-efficacy, perceived criticism, depression, and positive and negative affect scores can be found in Table 2. Dietary adherence was measured with both the SDSCA diet scale and the RYP measure. The mean value for the SDSCA general diet scale was 3.0 (S.D. .92) with a possible range of 1-5. Higher scores on the SDSCA general diet scale indicate greater levels of adherence. Sixty-seven percent of individuals reported that their physician or diabetes educator had recommended a meal plan or dietary guidelines. Forty-four percent of individuals reported that they “always” or “usually” followed their recommended diet or meal plan,
while 26% reported that they “sometimes” follow these recommendations. Thirty percent of participants reported that they “rarely” or “never” follow their dietary recommendations. The mean score for the RYP questionnaire was 50.9 (S.D. 7.2) with a possible range of 23-69. Higher scores indicate better dietary quality in terms of cholesterol and saturated fat content. Only 6% of participants fell into the lowest category (“many changes that can be made”), while 62% of individuals fell into the intermediate category (“some changes that can be made”), and 32% fell into the highest category (“few changes to make”). The majority of participants reported eating a diet that is very close to the NHLBI guidelines in terms of cholesterol and saturated fat intake.

The mean score for the SDSCA exercise scale was 2.2 (S.D. 1.8) with a possible range from 0-7. Higher scores on the SDSCA exercise scale indicate higher levels of adherence and greater levels of physical activity over the last 7 days. Seventy-eight percent of participants reported that their physician or diabetes educator recommended an exercise plan to manage their diabetes. Of those individuals reporting a recommended plan, the average number of minutes per week recommended by their physician or diabetes educator was 128.8 (S.D. 102.5). Forty-six percent of participants reported that they exercised for at least 20 minutes for 3 or more days in the last week. However, 60% of participants reported that they exercised the amount of time recommended by their doctor less than 25% of the time.

Self-efficacy was measured using the MDQ self-efficacy scale. Participants average confidence rating across items was 65.9 (S.D. 20.3) on a scale from 0-100 with higher scores indicating greater self-efficacy. The mean confidence rating was 67.9 (S.D. 23.4) for the diet-specific item, 53.3 (S.D. 30.9) for the exercise-specific item, and 70.9
(S.D. 25.5) for the overall diabetes treatment item. Therefore, patient self-efficacy for exercise was lower than diet and lower than the overall average score on the self-efficacy scale.

Perceived criticism was measured using 4 different questionnaires. The mean rating on the PCS was 3.8 (S.D. 3.0) on a scale from 1 (not at all critical) to 10 (very critical). Only 30.0% of participants reported a perceived criticism score greater than 5 on the PCS. The mean score on the FEICS Criticism Scale was 14.2 (S.D. 5.4) with a possible range of 6-30 and higher scores indicating greater levels of criticism. The mean score on the MDQ Misguided Support Behaviors subscale was 1.1 (S.D. 1.4) with a possible range from 0-6 and higher scores indicating greater levels of criticism. The mean score on the SFQ, the new criticism measure developed for the current study (see Appendix C for details), was 32.0 (S.D. 7.9) with a possible range of 14-70.

Symptoms of depression were measured using the BDI-II. The mean BDI-II score was 14.0 (S.D. 12.4) with a possible range of 0-63 indicating mild levels of depressive symptoms. Fifty-four percent of participants fell in the range of minimal depressive symptoms, with BDI-II scores ranging from 0-13. Seventeen percent of participants reported mild levels of depressive symptoms, with BDI-II scores ranging from 14-19. Twenty-nine percent of participants reported moderate to severe levels of depressive symptoms, with BDI-II scores ranging from 20-55. Positive and negative affect was measured by the PANAS. The mean score for the positive scale was 28.5 (S.D. 10.4) with a possible range of 10-50. The mean score for the negative scale was 18.3 (S.D. 8.4) with a possible range of 10-50.
Zero-Order Correlations Between Model Variables and Demographic Characteristics

Correlations were conducted in order to determine the relationships among the model variables and several demographic characteristics, including age, gender, ethnicity, education, income, marital status, and duration of type 2 diabetes (see Table 3). Age was positively correlated with self-efficacy ($r = .43, p<.001$), dietary adherence ($r = .26, p<.05$) exercise adherence ($r = .33, p<.01$), and dietary quality ($r = .43, p<.001$). Older individuals were more likely to report higher levels of self-efficacy, adherence to dietary and exercise recommendations, and dietary quality. Increase in age was also associated with lower levels of perceived criticism. Age was negatively correlated with the PCS ($r = -.31, p<.01$), FEICS-PC ($r = -.22, p<.05$), MSB ($r = -.24, p<.05$). Age was also negatively correlated with the BDI-II ($r = -.35, p<.001$) and PANAS negative scale ($r = -.33, p<.001$) indicating that older adults reported fewer symptoms of depression and lower levels of negative affect. Age was positively correlated with the PANAS positive scale ($r = .34, p<.001$). Higher levels of depressive symptoms were related to lower levels of income ($r = -.25, p<.05$) while higher levels of positive affect were associated with higher levels of income ($r = .32, p<.01$). Gender was positively associated with the SFQ ($r = .26, p<.01$) indicating that females scored higher on this measure of perceived criticism. Education was positively correlated with perceived criticism as measured by the PCS ($r = .21, p<.05$) suggesting that higher levels of education may be related to higher ratings of criticism levels of a spouse. Education was also positively correlated with the RYP measure ($r = .23, p<.05$) indicating that higher levels of educations may be related to higher levels of self-reported dietary quality.
Zero-Order Correlations Between Model Variables

Correlations were conducted to determine the relationships between each of the model variables including self-efficacy, diet adherence, exercise adherence, measures of perceived criticism, positive affect, negative affect, and levels of depressive symptoms (see Table 4). Higher levels of self-efficacy were associated with higher levels of dietary adherence ($r = .57$, $p < .001$), dietary quality ($r = .37$, $p < .001$), and exercise adherence ($r = .41$, $p < .001$). Dietary and exercise adherence were positively correlated ($r = .25$, $p < .05$). Higher levels of dietary quality were positively associated with higher levels of dietary adherence ($r = .38$, $p < .001$) and exercise adherence ($r = .37$, $p < .001$). The four measures of perceived criticism were all positively correlated indicating that higher levels of perceived criticism on one measure was related to high levels of perceived criticism on other measures. Higher levels of perceived criticism on each of the four measures were associated with lower levels of self-efficacy. None of the measures of perceived criticism were correlated with adherence to exercise behaviors. Perceived criticism as measured by the MSB was correlated with self-efficacy ($r = -.45$, $p < .001$) and dietary adherence ($r = -.22$, $p < .05$) but was not significantly associated with dietary quality. Perceived criticism as measured by the PCS, FEICS, and SFQ did not correlate with dietary adherence or dietary quality. Because only the MSB was significantly correlated with both self-efficacy and dietary self-care adherence it was the only criticism variable that satisfied the first step of the mediational model tests as outline by Baron and Kenny (1986). Based upon these findings, further steps to examine a possible mediational relationship between perceived spousal criticism as measured by the MSB scale, self-efficacy, dietary self-care
adherence could be examined. Other measures of criticism were not used in subsequent analyses. See Table 4 for correlations among these variables.

Tests of the Meditational Models

The following steps were taken to examine the relationship between perceived spousal criticism as measured by the MSB, self-efficacy, and dietary adherence. Age was used as a covariate in all regression models due to its association with self-efficacy and dietary adherence. Due to missing data, a total sample of N=89 was used for all regression analyses involving dietary adherence. Findings from the regression analyses can be found in Tables 5-8.

In the first step (Table 5, path c), dietary adherence was used as the outcome variable and perceived spousal criticism and age were the predictor variables in order to show a relationship between perceived criticism and dietary adherence. The overall model was significant (F(2,86) = 4.34, R²=.09, p<.05) and age was a significant predictor of dietary adherence (β=.22, p<.05). However, perceived spousal criticism was not a significant predictor of dietary adherence (β=−.17, p=.12). Therefore, perceived spousal criticism was not a significant predictor of dietary adherence while age was present in the model and further steps to test the mediational model were not performed.

The secondary set of hypotheses was identical to the steps of the mediational model described above, but the models included 1) level of depressive symptoms, 2) negative affect, and 3) positive affect respectively in addition to age as covariates to determine if the presence of these variables changed the results of the models. The first set of models included depressive symptoms as a covariate (Table 6). In the first step (path c), dietary adherence was used as the outcome variable and perceived spousal
criticism, level of depressive symptoms, and age were the predictor variables in order to show a relationship between perceived criticism and dietary adherence. The overall model was significant (F(3,85) = 3.00, R²=.10, p<.05), but perceived spousal criticism, level of depressive symptoms, and age were not significant individual predictors of dietary adherence. No further analyses were completed with depressive symptoms, as the first requirement of the mediational analysis was not met.

The second set of models included negative affect as a covariate (Table 7). In the first step (path c), dietary adherence was used as the outcome variable and perceived spousal criticism, negative affect, and age were the predictor variables in order to show a relationship between perceived criticism and dietary adherence. The overall model was significant (F(3,85) = 3.04, R²=.10, p<.05), but there were no significant individual predictors of dietary adherence. Therefore, since the first requirement of the mediational analysis was not met, no further analyses were completed with this set of variables.

The third set of models included positive affect as a covariate (Table 8). In the first step (path c), dietary adherence was used as the outcome variable and perceived spousal criticism, positive affect, and age were the predictor variables in order to show a relationship between perceived criticism and dietary adherence. The overall model was significant (F(3,85) = 3.98, R²=.12, p<.05), however there were no significant individual predictors of dietary adherence. Therefore, no additional analyses were performed with this set of variables as the first step of the mediational test was not met.

Although perceived spousal criticism (as measured by MSB) was negatively correlated with dietary adherence (r = -.22, p<.05), it was not a significant predictor of dietary adherence when age was included in the model as a covariate. Therefore, no
relationship was found between perceived spousal criticism and dietary adherence that could not be accounted for by age so it was not necessary to test the possible mediational effect of self-efficacy on this relationship.
Discussion

The current study examined the relationship between perceived spousal criticism, dietary adherence, exercise adherence, and self-efficacy in a predominantly White, middle-aged, community sample of adults with type 2 diabetes. The primary aims were to examine the relationship between these variables to determine if self-efficacy mediated the relationship between perceived spousal criticism and self-care adherence. The secondary aims were to examine the relationships between these variables and levels of depressive symptoms, positive affect, and negative affect.

Primary Aims and Hypotheses

The mean values for patient self-efficacy and self-care adherence were similar to the mean values found in similar samples of patients with type 2 diabetes (see Table 2). Although there have been no known studies of perceived spousal criticism in type 2 diabetes, mean values on criticism scales were similar to those found in other studies of patients with psychological and physiological illnesses (Miklowitz et al., 2005; Shields et al., 1992; Talbot et al., 1997; Wearden et al., 2000a). However, the majority of participants in the study rated spouses low on the PCS, with less than 30% of participants rating their spouse/partner higher than a 5 on a scale from 1-10. It is possible that participants rated their spouses/partners lower on scales of perceived criticism due to social desirability. Although social desirability was not measured in the current study, a longitudinal study with a subsample of these same participants found high levels of social desirability within the sample (Risaliti, 2006). Although social desirability was not correlated with diet or exercise self-care adherence in this previous study, it is possible
that social desirability may have influenced individuals rating of perceived criticism from their spouses/partners.

One of the primary hypotheses of the current study was that perceived spousal criticism would be negatively associated with patient self-care adherence. Perceived spousal criticism as measured by each of the 4 measures was negatively associated with patient self-efficacy, suggesting that higher levels of perceived spousal criticism was associated with lower levels of patient confidence in their ability to carry out diabetes self-care related tasks. Patient self-efficacy was positively associated with dietary adherence, exercise adherence, and dietary quality. Therefore, individuals with higher levels of confidence in their ability to carry out diabetes-related self-care tasks were more likely to rate themselves higher on measures of self-care adherence. However, results indicated that out of the 4 measures of perceived spousal criticism used in the study, only the MSB subscale of the MDQ was significantly associated with any measure of self-care adherence. Therefore, it was not feasible to test the majority of the possible mediational models because they did not fulfill the first step of mediational testing outlined by Baron & Kenny (1986). One of the reasons that this relationship was found for the MSB measure of criticism may be the types of items included in this questionnaire. The MSB was initially developed as a measure of negative support behaviors in family members (Talbot et al., 1997). Each of the items on the MSB assesses the degree to which a spouse/partner “hassles” the participant about their diabetes self-care activities. This questionnaire did not use the words “critical” or “criticism” in any way. However, the language of the items fits well with the definition of criticism in terms of social persuasion: negative feedback about a certain behavior. It is possible that this description
of critical behavior fit better with participants’ experience of feedback from spouses/partners than more overt examples of criticism. However, once age was included as a covariate in the regression analysis including MSB scores and dietary adherence, MSB was no longer a significant predictor of dietary adherence. Therefore, it was not possible to complete mediational testing for any combination of perceived spousal criticism variables and adherence measures.

Previous studies have found a negative association between perceived spousal criticism and health outcomes such as blood pressure and HbA1c (Wearden et al., 2000a). However, fewer studies have considered adherence as an outcome variable of interest in studies of perceived spousal or family criticism (Fiscella & Campbell, 1999). It is possible that the self-report measures of self-care adherence did not adequately capture the variability in adherence to diet and exercise routines. The RYP measure of dietary quality was included as a more objective measure of adherence to diet recommendations. Although RYP is also a self-report measure, participants rate how often they eat certain types of foods without making a judgment in terms of how often they adhere to their recommended diet. The total score is indicative of how close the individual’s current diet is to recommendations for saturated fat and cholesterol intake. However, the RYP questionnaire was also not significantly correlated with any measure of perceived spousal criticism. Mean scores on the RYP in the current sample were higher than in past studies (50.9 vs. 39.5) and less than 6% of participants were categorized in the lowest group in terms of dietary quality. One of the reasons that there was no relationship between RYP and perceived spousal criticism is that RYP assesses types of foods eaten more often than quantities of foods. Therefore, individuals may in fact be eating “correct” foods, but the
measure cannot accurately assess if they are adhering to recommended portion sizes. In future studies, an objective measure of adherence such as a food log or actimeter would be useful to thoroughly assess whether or not there is a relationship between perceived spousal criticism and adherence.

It is also possible that the relationship between perceived spousal criticism and self-care adherence was not strong because there is a direct association between perceived spousal criticism physiological health outcomes. Wearden and colleagues have suggested that perceived spousal criticism may influence physiological changes due to stress (2000a). Therefore, previous research that has demonstrated increased negative health outcomes with higher criticism levels may not have found a similar relationship between criticism levels and adherence because the criticism may have directly influenced the physiological changes.

Secondary Aims and Hypotheses

Due to the relationship between mood states and self-efficacy according to Bandura’s SCT, the mediational model described above was also evaluated in the presence of three different types of mood variables: levels of depressive symptoms, negative affect, and positive affect. These variables were correlated with each of the other study variables to determine the relationships between mood states, self-efficacy, self-care adherence, and perceived spousal criticism. It was hypothesized that depressed mood would be positively associated with perceived spousal criticism based on previous studies related to criticism and major depressive disorder (Miklowitz et al., 2005; Shields et al., 1994). However, levels of depressive symptoms as measured by the BDI-II were only positively associated with two of the measures of criticism: the FEICS-PC and SFQ.
Higher levels of depressive symptoms were not related to higher scores on the PCS as had been found in previous studies (Miklowitz, et al., 2005). The majority of individuals in the study had minimal or mild levels of depression symptoms. Therefore, the relationship between PCS and depressive symptoms might not be as strong as in prior studies using a sample with major depressive disorder.

It was also hypothesized that levels of depressive symptoms would be negatively associated with self-efficacy, dietary adherence, and exercise adherence. These relationships have been found in an earlier study using a subsample of the same participants (Risaliti, 2006). The results only partially supported this hypothesis, as higher levels of depressive symptoms were associated with lower levels of self-efficacy and lower exercise adherence, but there was no relationship between levels of depressive symptoms and dietary adherence. This may be related to the lack of variability in the adherence measures used in the study. In terms of negative affect, it was hypothesized that this construct would also be positively associated with perceived spousal criticism and negatively associated with self-efficacy, diet adherence, and exercise adherence. The results did support the hypothesis that higher levels of negative affect were associated with lower levels of self-efficacy but there was no relationship between negative affect and either measure of self-care adherence. As with the BDI-II, higher levels of negative affect were associated with higher levels of perceived spousal criticism on only two scales: the FEICS-PC and SFQ.

Positive affect was hypothesized to be positively associated with self-efficacy and self-care adherence and negatively associated with perceived spousal criticism. Results demonstrated that higher levels of positive affect were in fact related to higher levels of
self-efficacy, but there was no relationship between positive affect and either measure of self-care adherence. Higher levels of positive affect were related to lower levels of perceived spousal criticism as measured by the FEICS-PC and SFQ.

Limitations

One of the main limitations of the current study is that no causal relationships can be determined due to the cross-sectional design. Although the proposed mediational model assumes that perceived spousal criticism may contribute to lower levels of patient self-care adherence, causality cannot be determined from these analyses. Furthermore, due to the cross-sectional nature of the study design it is possible that some of these relationships may be reversed. For example, it is possible that if individuals are not adhering to diet or exercise plans, this may lead to more criticism from their spouses or partners. Similarly, if patients are not adhering to their self-care routines, they may experience a decrease in self-efficacy. Without measurement at more than one time point for each of these variables it is impossible to determine causality within these relationships. It may be useful for future studies to use a sample of newly diagnosed individuals with type 2 diabetes in order to get baseline levels of perceived criticism from spouses and partners and to observe if these levels change with length of diagnosis. This would help to clarify the relationship between perceived spousal criticism and patient self-care adherence.

Another limitation is the use of self-report questionnaires for all the variables. Although self-report measures of perceived criticism have been shown to be correlated with observational interviews and speech samples from family members, higher levels of criticism are generally detected when observer ratings are used rather than patient ratings.
(Hooley, 1989). Participants may also feel uncomfortable expressing negative views of feedback from their spouse/partner on measures of criticism. Self-care adherence is also difficult to accurately measure using self-report due to the inaccuracy of patient recall, lack of clarity regarding diet and exercise recommendations, and social desirability.

Finally, the sample in the current study may not be representative of the general U.S. population with diabetes. The sample was predominantly White (90.5%), nearly 50% had an annual income above $40,000, and all of the participants lived in the same geographical area. Therefore, this limits the generalizability of these findings to samples that are more diverse in terms of socioeconomic status, ethnicity, and geographical residence.

**Implications**

The current study found that perceived spousal criticism is negatively related to patient self-efficacy. While previous studies have shown a direct relationship between criticism and health outcomes, the mechanisms by which these negative outcomes occur has not been clear. By including self-efficacy as a potential mediator, one of the primary aims of the current study was to evaluate a potential explanation for the negative association that has been found between criticism and health outcomes in the past within the context of Bandura’s SCT. Although the mediational analyses could not be completed due to the lack of relationship between perceived spousal criticism and adherence, there does appear to be a relationship between perceived spousal criticism and self-efficacy. Due to the involvement of spouses in everyday activities related to diabetes care, this is an important finding. Although self-reported adherence was not related to perceived criticism, future research may explore relationships between other outcomes such as
patient quality of life, patient satisfaction with treatment, or behaviors that may interfere with adherence such as binge eating. Additionally, further research is needed to explore the potential direct relationship between perceived criticism and health outcomes by examining reported stress, inflammatory markers, or perhaps immune function as possible mediating factors.

Currently, there are limited opportunities for diabetes education for family members and few interventions that are designed to ease communication related to diabetes care. Further research into the impact of perceived spousal criticism may be useful in guiding educational programs or interventions for family members that will help them to effectively communicate support and concern for their family members with type 2 diabetes. Additionally, for clinicians working with individuals with type 2 diabetes, these findings may be important in terms of strengthening patient defenses against negative feedback in the form of criticism. For individuals with type 2 diabetes, learning how to communicate their needs to family members about feedback may be important to enhancing self-efficacy.
References


Figure 1. Self-Efficacy and Bandura’s Social Cognitive Theory

![Diagram of Self-Efficacy and Social Cognitive Theory]

Figure 2. Sources of Self-Efficacy

![Diagram of Sources of Self-Efficacy]

Figure 3. Types of Social Persuasion

![Diagram of Types of Social Persuasion]
Figure 4. The unmediated model of the relationship between spousal criticism and patient self-care adherence with path c representing the total effect.

Figure 5. The mediated model of the relationship between spousal criticism and patient self-care adherence with patient self-efficacy. Path c’ represents the direct effect of spousal criticism on self-care adherence with patient self-efficacy in the model.
Figure 6. Recruitment Flowchart

Previous Longitudinal Participants
N=188

Patients from Physician Lists
N=79

Referrals from Other Studies
N=6

Comunity Health Fair Recruitment
N=0

Total Packets Mailed
N=273

Unable to Contact\textsuperscript{a}
N=39

Deceased
N=7

Declined
N=25

No response/incomplete\textsuperscript{b}
N=91

Completed Packets and Consents
N=111

Married or Living with a Partner
N=90

\textsuperscript{a}Unable to contact due to incorrect address and/or disconnected/incorrect phone number

\textsuperscript{b}No response to mailed packets and follow-up phone calls or failed to complete questionnaire packet
Table 1

*Demographic Characteristics (N=90*)

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>%</th>
</tr>
</thead>
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<tr>
<td><strong>Age</strong></td>
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<tr>
<td><strong>Sex</strong></td>
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<tr>
<td>Male</td>
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<td>46.7%</td>
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<td>Caucasian</td>
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<tr>
<td>21,000-40,000</td>
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<td>36.4%</td>
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<td>41,000-60,000</td>
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<td>22.7%</td>
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<tr>
<td>More than 60,000</td>
<td>24</td>
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<td><strong>Treatment Type</strong></td>
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<td>Diet Only</td>
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<td>Oral Agents</td>
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<tr>
<td>Insulin</td>
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<tr>
<td>Combination Therapy</td>
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<td>Received Diabetes Education (Past 2 Years)</td>
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<td>20.2%</td>
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<tr>
<td>Smoking (Current)</td>
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<td>Yes</td>
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</table>

*Due to missing data N=89 for education and N=88 for income*
Table 2

Self-Efficacy, Self-Care Adherence, Criticism, Positive Affect, and Negative Affect: Descriptive Statistics (N = 90)

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>Obtained Range</th>
<th>Possible Range</th>
<th>Cronbach’s Alpha</th>
<th>Prior Studies</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
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<td>MDQ-SE(^a)</td>
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<td>20.3</td>
<td>16.4-100</td>
<td>0-100</td>
<td>.85</td>
<td>Talbot et al., 1997</td>
<td>64.2</td>
<td>20.8</td>
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<tr>
<td>SDSCA(^b) Diet Scale</td>
<td>3.0</td>
<td>.92</td>
<td>1-5</td>
<td>1-5</td>
<td>.59</td>
<td>Glasgow et al., 1989</td>
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<td>.91</td>
</tr>
<tr>
<td>SDSCA Exercise Scale</td>
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<td>1.8</td>
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<td>0-7</td>
<td>.83</td>
<td>Glasgow et al., 1989</td>
<td>2.89</td>
<td>1.18</td>
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<td>Rate Your Plate</td>
<td>50.9</td>
<td>7.2</td>
<td>33-67</td>
<td>23-69</td>
<td>.83</td>
<td>Gans et al., 2000</td>
<td>39.5</td>
<td>5.0</td>
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<td>PCS(^c)</td>
<td>3.8</td>
<td>3.0</td>
<td>1-10</td>
<td>1-10</td>
<td>N/A</td>
<td>Miklowitz et al., 2005</td>
<td>5.2</td>
<td>2.8</td>
</tr>
<tr>
<td>FEICS-PC(^d)</td>
<td>14.2</td>
<td>5.4</td>
<td>6-30</td>
<td>6-30</td>
<td>.76</td>
<td>Shields et al., 1994</td>
<td>13.3</td>
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</tr>
<tr>
<td>MDQ – MSB(^e)</td>
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<td>1.4</td>
<td>0-4.8</td>
<td>0-6</td>
<td>.85</td>
<td>Talbot et al., 1997</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>SFQ(^f) – Total Scale</td>
<td>32.0</td>
<td>7.9</td>
<td>14-52</td>
<td>14-70</td>
<td>.72</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>BDI-II(^g)</td>
<td>14.0</td>
<td>12.4</td>
<td>0-55</td>
<td>0-63</td>
<td>.95</td>
<td>de Groot et al., 2005</td>
<td>14.4</td>
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<tr>
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<td>28.5</td>
<td>10.4</td>
<td>10 – 50</td>
<td>10-50</td>
<td>.95</td>
<td>Watson et al., 1988</td>
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<td>18.3</td>
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<td>10 – 48</td>
<td>10-50</td>
<td>.93</td>
<td>Watson et al., 1988</td>
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<td>7.0</td>
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</table>

\(^a\)MDQ-SE: Multidimensional Diabetes Questionnaire Self-Efficacy Subscale  
\(^b\)SDSCA: Summary of Diabetes Self-Care Activities  
\(^c\)PCS: Perceived Criticism Scale  
\(^d\)FEICS: Family Emotional Involvement and Criticism Scale  
\(^e\)MDQ-MSB: Multidimensional Diabetes Questionnaire Misguided Support Behaviors Scale  
\(^f\)SFQ: Spousal Feedback Questionnaire  
\(^g\)BDI-II: Beck Depression Inventory - II  
\(^h\)PANAS: Positive and Negative Affect Scale
Table 3

Zero-Order Correlations of Model Variables and Demographic Characteristics (N = 90)

<table>
<thead>
<tr>
<th>Variables</th>
<th>MDQ-SE</th>
<th>SDSC-D</th>
<th>SDSC-E</th>
<th>RYP</th>
<th>PCS</th>
<th>FEICS-PC</th>
<th>MSB</th>
<th>SFQ</th>
<th>BDI-II</th>
<th>PAS</th>
<th>NAS</th>
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<td>Age</td>
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<td>.26*</td>
<td>.33**</td>
<td>.43***</td>
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<td>-.22*</td>
<td>-.24*</td>
<td>-.06</td>
<td>.35***</td>
<td>.34**</td>
<td>-.33**</td>
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<tr>
<td>Gender</td>
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<td>-.08</td>
<td>-.14</td>
<td>.04</td>
<td>.09</td>
<td>.06</td>
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<td>.26*</td>
<td>.17</td>
<td>-.15</td>
<td>.18</td>
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<td>-.12</td>
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<td>.19</td>
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<td>-.01</td>
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<td>.21*</td>
<td>.11</td>
<td>.04</td>
<td>.03</td>
<td>-.09</td>
<td>.12</td>
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<td>.12</td>
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<td>-.25*</td>
<td>.32**</td>
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<td>.00</td>
<td>-.04</td>
<td>-.19</td>
<td>-.05</td>
<td>-.09</td>
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<td>-.02</td>
<td>.03</td>
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<td>.06</td>
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<td>-.08</td>
<td>.02</td>
<td>.00</td>
<td>.00</td>
<td>.10</td>
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</tbody>
</table>

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

*Note: Demographic variables were coded as follows: Gender (1=Male, 2=Female), Ethnicity (1=White, 2=Other), Education (1=High school or less, 2=Trade school/part college, 3=4-year college degree or more), Income (1=0-20,000, 2=21,000-40,000, 3=41,000+), Marital Status (1=Married, 2=Living with a partner).
Table 4

Depression, Positive/Negative Affect, Self-Efficacy, Self-Care Adherence, and Perceived Criticism: Correlations (N = 90)

<table>
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<th>Variables</th>
<th>1</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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</thead>
<tbody>
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<td>1. MDQ-SE</td>
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<td></td>
</tr>
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<td>2. SDSC-D</td>
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</tr>
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<td>3. SDSC-E</td>
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<td>.25*</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>4. RYP</td>
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<td>.38***</td>
<td>.37***</td>
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<td></td>
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<td>-.07</td>
<td>.01</td>
<td>-.01</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. FEICS-PC</td>
<td>-.33**</td>
<td>-.16</td>
<td>-.14</td>
<td>.04</td>
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<td>.29**</td>
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<td>-.18</td>
<td>.18</td>
<td>.34**</td>
<td>.17</td>
<td>.34**</td>
<td>.85***</td>
<td>-.59***</td>
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</table>

*p<.05  **p<.01  ***p<.001
### Table 5

*Summary of Regression Analyses Testing the Mediational Role of Self-Efficacy in the Relationship Between Perceived Spousal Criticism and Dietary Adherence (N = 89)*

<table>
<thead>
<tr>
<th>Predictor Variable(s)</th>
<th>Criterion Variable</th>
<th>F</th>
<th>R²</th>
<th>B</th>
<th>SEβ</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Criticism (MSB)</td>
<td>Diet Adherence</td>
<td>4.34*</td>
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<td>-.11</td>
<td>.07</td>
<td>-.17</td>
</tr>
<tr>
<td>Age&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>.02</td>
<td>.01</td>
<td>.22*</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01  ***p<.001
<sup>a</sup>Age was included as a covariate in all models

### Table 6

*Summary of Regression Analyses Testing the Mediational Role of Self-Efficacy in the Relationship Between Perceived Spousal Criticism and Dietary Adherence with Level of Depressive Symptoms in the Model (N = 89)*

<table>
<thead>
<tr>
<th>Predictor Variable(s)</th>
<th>Criterion Variable</th>
<th>F</th>
<th>R²</th>
<th>B</th>
<th>SEβ</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Criticism (MSB)</td>
<td>Diet Adherence</td>
<td>3.00*</td>
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<td>-.10</td>
<td>.07</td>
<td>-.15</td>
</tr>
<tr>
<td>BDI-II</td>
<td></td>
<td></td>
<td></td>
<td>-.01</td>
<td>.01</td>
<td>-.07</td>
</tr>
<tr>
<td>Age&lt;sup&gt;a&lt;/sup&gt;</td>
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<td></td>
<td></td>
<td>.02</td>
<td>.01</td>
<td>.20</td>
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</table>

*p<.05  **p<.01  ***p<.001
<sup>a</sup>Age was included as a covariate in all models
Table 7

Summary of Regression Analyses Testing the Mediational Role of Self-Efficacy in the Relationship Between Perceived Spousal Criticism and Dietary Adherence with Negative Affect in the Model (N = 89)

<table>
<thead>
<tr>
<th>Predictor Variable(s)</th>
<th>Criterion Variable</th>
<th>F</th>
<th>R²</th>
<th>B</th>
<th>SEβ</th>
<th>β</th>
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</thead>
<tbody>
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<td>Perceived Criticism (MSB)</td>
<td>Diet Adherence</td>
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<td>-.15</td>
</tr>
<tr>
<td>PANAS – Negative Scale</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agea</td>
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<td>-.01</td>
<td>.01</td>
<td>-.08</td>
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<td>.02</td>
<td>.01</td>
<td>.19</td>
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</table>

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

aAge was included as a covariate in all models

Table 8

Summary of Regression Analyses Testing the Mediational Role of Self-Efficacy in the Relationship Between Perceived Spousal Criticism and Dietary Adherence with Positive Affect in the Model (N = 89)

<table>
<thead>
<tr>
<th>Predictor Variable(s)</th>
<th>Criterion Variable</th>
<th>F</th>
<th>R²</th>
<th>B</th>
<th>SEβ</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Criticism (MSB)</td>
<td>Diet Adherence</td>
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<td>-.09</td>
<td>.07</td>
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</tr>
<tr>
<td>PANAS – Positive Scale</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Agea</td>
<td></td>
<td>.02</td>
<td>.01</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

aAge was included as a covariate in all models
Appendix A: Supplemental Text

Social Cognitive Theory

Marital Relationships and Chronic Illness

Marital Relationships and Type 2 Diabetes

Criticism and Expressed Emotion Research
Social Cognitive Theory

Bandura’s social cognitive theory has been used to describe the reciprocal interaction between behavioral, personal, and environmental factors that contribute to health behaviors (1977; See Figure 1). Social cognitive theory was developed in response to social learning theory that suggested that individuals can learn within a social context, using modeling and imitation (Miller & Dollard, 1941). Bandura initially expanded upon social learning theory by including vicarious reinforcement, or learning through others’ experiences. Bandura also incorporated more cognitive factors into social cognitive theory because earlier theories such as social learning theory often simplified behavior to a direct response to the environment (Bandura, 1977). The environment represents factors that are external to an individual, including both the physical and social characteristics of an individual’s situation (Bandura, 1977). Social cognitive theory differs from other theories of human behavior in that it incorporates reciprocal determinism, or the dynamic interaction between personal factors, environmental factors, and behaviors (Bandura, 1986). Social and environmental factors influence individuals through psychological and cognitive mechanisms, rather than directly guiding behavior. Therefore, individuals are agents in their own behavior and not only reacting to their environment (Bandura, 1999). The three factors of environment, personal factors, and behaviors are constantly interacting and influencing one another, which allows for a more fluid model of human behavior. The theory explains how individuals acquire and maintain certain behavioral patterns, while also providing guidelines for interventions that might successfully modify these behaviors by addressing personal and environmental factors.
One important personal factor that Bandura added to the social cognitive model is self-efficacy. Self-efficacy is defined as one’s confidence in their ability to successfully carry out a certain behavior (Bandura, 1994; Rosenstock, Strecher, & Becker, 1988). Individuals with higher self-efficacy expect positive results, while those with less confidence in their abilities imagine less favorable outcomes (Bandura & Schunk, 1981). Self-efficacy can be influenced by personal and environmental factors in the social cognitive model such as observational learning, social influences, situational factors, and reinforcements (Bandura, 1977). Self-efficacy has been studied extensively within the context of health behavior (Baranowski et al., 2002). Although not as relevant to predicting simpler, short-term health behaviors such as receiving an immunization or a screening test, self-efficacy can be very useful in understanding long-term behaviors and lifestyle changes such as weight loss, smoking cessation, and adherence to self-care routines. Self-efficacy has been shown to be predictive of health behaviors and outcomes in many chronic illnesses such as asthma, arthritis, chronic obstructive pulmonary disease, and diabetes (Allen, Becker, & Swank, 1991; Bandura, 1977).

The concept of self-efficacy has been used in research involving a variety of health behaviors including obesity treatment and weight loss, smoking cessation, and research predicting postoperative behaviors of patients undergoing cholecystectomies (Clark, Abrams, Niaura, Eaton, & Rossi, 1991; DiClemente, Prochaska, and Gibertini, 1985; Godding & Glasgow, 1985; Oetker-Black, Hart, Hoffman, & Geary, 1992). A review of 21 behavior studies involving smoking behavior, weight loss, contraception, alcohol abuse, and exercise behaviors found that self-efficacy was an important predictor of both behavior change and maintenance (Strecher, DeVellis, Becker, & Rosenstock,
Higher self-efficacy in patients has been shown to predict better health outcomes than lower self-efficacy levels in patients with similar health status (Holman & Lorig, 1992).

Marital Relationships and Chronic Illness

The interactive relationship between marriage and health has recently been studied more extensively in terms of chronic illness (Kiecolt-Glaser & Newton, 2001; Trief, Grant, Elbert, & Weinstock, 1998; Trief, Himes, Orendorff, & Weinstock, 2001). Researchers generally consider three different components of marriage that relate to health: marital status, marital quality, and marital interactions (Burman & Margolin, 1992). Marital quality is generally defined as the way each spouse subjectively describes the marriage while marital interaction considers more objective measures of spousal behavior such as speech samples or observed cooperative tasks (Spanier & Lewis, 1980; Siegel, 1986). Support is considered to be a component of marital quality, although it can be evaluated through measures of marital interaction (Burman & Margolin, 1992).

Spousal support, both positive and negative, can dramatically influence health outcomes and psychological well-being in individuals with chronic illness because of their involvement with the daily activities involved with disease management (de Ridder, Schreurs, & Kuiper, 2005). This has been documented in many types of disease including cardiovascular disease, arthritis, multiple sclerosis, and diabetes (Fisher & Weihs, 2000). Many support models consider the influence of marriage on illness positively, either through a direct effect or indirect effect of stress buffering (Cohen & Willis, 1985). However, these models do not often take into account the negative impact that spousal
support can have on a patient and less research has considered the impact of negative marital interactions or support in the context of chronic illness (Martire, 2005).

Self-efficacy has recently been considered more in the context of spouses and chronic illness (Martire, 2004). Due to their involvement in daily activities related to chronic illnesses, spouses are considered to be an important source of verbal persuasion. In intervention studies that include patients and spouses, patient self-efficacy appears to improve along with health outcomes when positive verbal persuasion from spouses is increased, suggesting a possible mediational relationship (Keefe et al., 1999; Riemsma et al., 2003). Spousal confidence or positive spousal beliefs about a patient’s illness have been considered in some of these studies as well. This is another example of a type of verbal persuasion that patients may receive from spouses. One recent study of congestive heart failure patients demonstrated that spousal confidence was related to patient self-efficacy and was an even stronger predictor of patient survival than patient self-efficacy alone (Rohrbaugh et al., 2004). Therefore, spousal beliefs about a patient and their illness can also have a dramatic effect on health outcomes, and appear to influence patient self-efficacy as well. In type 2 diabetes, spousal feedback about their beliefs about a patient’s ability to effectively manage their diabetes may be an important factor to consider.

Marital Relationships and Type 2 Diabetes

Self-care regimens in disease management are essential for improving health status and preventing illness-related complications and spouses can potentially improve or inhibit these behaviors through interactions with the patient. This is especially true for individuals with diabetes, due to the multiple aspects of self-care including diet, exercise, medication, blood glucose monitoring, foot care, and other routines (Gonder-Frederick,
Cox, & Ritterband, 2002). One study has specifically considered marital relationships in this context. Although measures of adherence were not included, Trief and colleagues (2001) that higher levels of marital adjustment and intimacy predicted lower levels of diabetes-related distress and better adaptation to the illness. A similar prospective study showed that these marital qualities also appeared to predict lower distress and adaptation over time (Trief, Wade, Britton, 2002). These studies provide compelling evidence to suggest that marital relationships can impact diabetes in adults with type 2 diabetes and some have highlighted spousal conflict as a possible mechanism that influence the management of the disease. However, types of verbal persuasion from spouses, such as criticism, has not been defined or measured consistently in any study. It is often only one aspect of a family or marital scale that assesses a broad range of family characteristics. Within the context of social cognitive theory, it may be useful to further explore the role of social persuasion from spouses in order to determine the influence it may have on patient self-efficacy and patient outcomes.

Criticalism and Expressed Emotion Research

Examples of spousal social persuasion, specifically criticism, can be found within the context of expressed emotion research. Expressed emotion (EE) is a theory related to family conflict that was originally developed to explain relapse rates in patients with schizophrenia (Vaughn & Leff, 1976). Family members of patients with high EE were observed to be more critical, hostile, and emotionally over-involved with the patients. The Camberwell Family Interview (CFI) identified family members as being either low or high EE status. The criticism component of EE is normally defined as comments of dislike, annoyance, or resentment with accompanying negative voice tone. This definition
fits well with the destructive criticism definition outlined by Baron (1986). The hostility component is described as expressions of blame or resentment towards the patient because of their illness. Emotional over-involvement is considered to be overprotective, intrusive, anxious, or protective behavior in family members. Additionally, family members who are emotionally over-involved may identify excessively with the patient (Vaughn & Leff, 1976). In the Camberwell Family interview, family members are asked to speak about the patient in their absence and the content is rated in terms of number of critical comments, emotional overinvolvement, and warmth (Vaughn & Leff, 1976; van Humbeeck et al., 2002). These high-EE ratings proved to be a better predictor of relapse than any other factor studied in the patients (Hooley, 1986). EE became a useful way to characterize family members in many settings outside of schizophrenia as well. Although many relatives in EE studies are not spouses, there are a number of studies that included spouses or examined the specific role of spouses in the relationship between EE and outcomes.

EE has been studied in many psychological illnesses including depression, anxiety disorders, and eating disorders (Wearden et al., 2000a). In a study of 38 married patients with depression who completed the CFI 3 and 9 months after discharge, Hooley and colleagues found that critical comments were significantly associated with relapse rates. While overall EE accounted for 13% of the variance in outcome, criticism accounted for 38% of the variance in relapse rates (1986). A more recent study of 47 elderly adults hospitalized for major depression used the Five Minute Speech Sample, which is a briefer version of the CFI, to measure levels of EE in relatives (Hinrichsen & Pollack, 1997). Although EE was not related to relapse outcomes, when data from
patients with adult child relatives were analyzed separately, high-EE predicted higher rates of relapse. Therefore in this particular sample, adult children may have been more influential than spouses in terms of EE (Wearden et al., 2000a). Other studies have found similar results in terms of higher rates of relapse being associated with higher levels of EE in patients with bipolar disorder (Miklowitz et al., 2005). Parental EE has also been shown to be related to treatment drop-out rates, severity of illness, and illness outcome in samples of adolescents with anorexia and bulimia nervosa (Blair, Freeman, & Cull, 1995; le Grange, Eisler, Dare & Hodes, 1992; Szmukler, Eisler, Russell, & Dare, 1985). One study of patients with post-traumatic stress disorder found that the criticism component of EE predicted approximately 20% of the variance in outcome measures (Tarrier, Sommerfield, & Pilgrim, 1999). Other studies have found similar results in samples of individuals with alcohol abuse, agoraphobia, and social phobia (Wearden et al., 2000a). A recent meta-analysis suggested that EE is an even more robust predictor of relapse and poor outcomes for a number of psychological disorders when compared to schizophrenia (Butzlaff & Hooley, 1998). Furthermore, when individual aspects of EE have been examined in relation to patient outcome, criticism appears to be the strongest predictor of negative health and behavior outcomes (Hooley, 1986; Hooley & Licht, 1997).

More recent studies have used EE within the context of medical illnesses, including asthma, epilepsy, obesity management, and diabetes. The majority of the studies related to asthma and epilepsy involved samples of children and measured parental EE. Results from these studies indicate that greater frequency of asthma attacks and greater frequency of seizures are both related to higher parental EE ratings (Wearden et al., 2000a). Two studies have examined the relationship between obesity treatment and
EE. One study of a sample of 28 married women measured husbands’ EE ratings (using the CFI) to compare relapse rates (regaining 20% of original weight loss) among the women after 5 months (Fischmann-Havstad & Marston, 1984). Husbands were classified as high-EE using a threshold of 3 or more critical comments during the interview, and results indicated that 72% of the high-EE group relapsed, while only 10% of the low-EE group reached the same level of weight regain after 5 months. Another study involved 30 obese patients participating in a calorie-restricted diet intervention (Flanagan & Wagner, 1991). The CFI was used to rate key relatives in terms of high or low EE status, using both emotional overinvolvement and number of critical comments as criteria. The results indicated an association between weight loss after 5 months and EE status at the start of the program, with 83% of patients with low-EE relatives losing weight while only 17% of patients with high-EE relatives had the same outcome after treatment.

Klausner and colleagues measured familial criticism and glucose control in patients with type 1 diabetes who were enrolled in the Diabetes Control and Complications Trial (DCCT; 1995). Patients were recruited from both the intensive and conventional treatment groups in the DCCT. A total of 86 patients and individuals they identified as key relatives (i.e., spouses, parents, etc.) completed measures of criticism (both ratings of perceived criticism by the patient and ratings by family members) in addition to the CFI to assess number of critical comments. A significant relationship was found between family member ratings of criticism of the patient and HbA1c \( (r = .46, p < .05) \) but only in patients involved in the intensive treatment program. These findings suggest that the impact of perceived criticism may be particularly salient in individuals attempting to adhere to more strict care regimens, such as the intensive routine in the
DCCT. However, perceived criticism and number of critical comments during the interview were not significantly related to HbA1c. The mixed results may be due to the heterogeneous sample of family members that included 25% parents. Although the key relatives in this study included many spouses, no analyses were conducted to consider the impact of spouses when compared with other key relatives in the study. Another possible explanation for the mixed results may be the physiological factors involved in HbA1c levels which may be influencing levels of glucose control.

Koenigsberg and colleagues examined the association between perceived criticism levels of relatives and glycemic control in three different studies of adolescents and adults with type 1 diabetes (1993; 1995). In one study, patients whose relatives made more critical comments during a family interview had poorer glucose control ($r = .44, p< .01$). In the other two studies, no association was found between relatives’ criticism and glucose control. However, patients with psychiatric comorbidities, including depression, were excluded from these analyses. This may have influenced the results, due to the apparent vulnerability to critical comments that is seen in patients with depression (Hooley & Teasdale, 1989; Wearden et al., 2000a). It is also important to note that considering glycemic control alone may not be an appropriate dependent variable to understand psychosocial variables in diabetes. There are numerous factors that influence glycemic control, including physiological characteristics that have a great deal of variability across individuals (Koenigsberg, 1995). Most researchers agree that perceived criticism does not directly impact glycemic control, but instead influences the patients’ management of their illness (Koenigsberg, 1995; Wearden et al. 2000a). Accordingly, self-care adherence may be a better marker of the impact of perceived criticism due to the
benefits that can be obtained from consistent adherence and disease management, and the clear association between adherence and lower complications (DCCT, 1995; Wearden et al., 2000a).

The study conducted by Wearden and colleagues (2000b) considered adults with type 1 diabetes and their partners’ level of criticism. The study included 60 couples, who completed the CFI. The study included measures of glucose control, in addition to patient diabetes management, depression, and anxiety. It also considered marital adjustment, measured by the Spanier dyadic adjustment scale, as this variable have been associated with high criticism levels in prior studies (Barrowclough & Parle, 1997). Diabetes management was rated for insulin adherence, SMBG, diet adherence, and precautions against hypoglycemia by interviewers on a scale from 0 (inadequate in more than one area) to 4 (good in all areas). Only 13% of the participants had partners with “high” criticism ratings (more than 6 critical comments during the interview) and criticism was not related to HbA1c. However, results indicated that participants with “high” criticism spouses had lower diabetes management ratings ($U = 151$, $p < .05$), more negative appraisals of their diabetes ($U = 123$, $p < .012$), marital adjustment ($U = 125$, $p < .05$), and higher levels of depressive symptoms ($U = 132$, $p < .02$). Although these findings limited due to the small subsample of participants with highly critical partners, these results suggest that there may be a relationship between spousal criticism and self-management behaviors in type 1 diabetes. This provides further evidence that considering self-management may be more useful than glycemic control as a study outcome, due to the multiple physiological factors that cause individual variation in glycemic control.

Overall, findings from the EE literature seem to indicate that high-EE status is
associated with negative outcomes in both psychological and medical illnesses (Butzlaff & Hooley, 1998; Wearden et al., 2000a). Furthermore, criticism appears to be one of the most important components of the EE construct, with results indicating that the strongest associations in many studies were between levels of critical comments and outcomes. Therefore, criticism is an important type of spousal social persuasion to consider in studies of medical illness, and may be useful within the context of type 2 diabetes.
Appendix B: Study Measures

Demographics Characteristics

Self-Efficacy Scale

Spousal Criticism Scales

Diet and Exercise Adherence Scales

Depressive Symptoms and Affect Scales
Demographics Questionnaire

For the following questions, please FILL IN THE BLANK or CIRCLE the answer that best describes you. All of the information you provide will be used only for research purposes. It will not be shared with your doctor.

1. What is your age? ________________ (years)

2. What is your gender/sex? (circle one)
   1. Male 2. Female

3. How old were you when you were diagnosed with diabetes? Age:________

4. What type of diabetes do you have? (Circle only one. If you are not sure, ask the researcher to help you).
   1. Type 1 diabetes (insulin dependent or juvenile onset diabetes)
   2. Type 2 diabetes (non-insulin dependent or adult onset diabetes)

5. How do you take care of your diabetes? (Circle one.)
   1. Diet only
   2. Pills
   3. Insulin injections
   4. Pills and insulin injections
   5. Insulin pump

6. Have you participated in a diabetes education program in the last two years? (circle one)
   1. Yes 2. No

7. If yes, about how many hours of diabetes education have you received in the last two years?
   ________ Hours

8. How many office visits have you made to your primary care doctor in the last two years?
9. Of these, how many visits have you made specifically for your diabetes?

10. How many visits have you made to a diabetes specialist such as endocrinologist, diabetologist, or diabetes educator in the last two years?

11. How many visits to the Emergency Room have you made for your diabetes in the last two years?

12. How many visits to Express Care have you made for your diabetes in the last two years?

13. Do you currently smoke?

   1. Yes    2. No

14. If yes, how many packs per day do you smoke?   ________ packs

15. Have you had a glycosylated hemoglobin (HbA1c or average blood sugar) checked by your doctor?

   1. Yes    2. No

16. If Yes, when was your most recent test? (Please fill in date)____________________________

17. What were the results?   ________________________________

18. How many years of education do you have (circle one)?
Less than high school
High school diploma or GED
Trade School after High School
Part College
4-year College Degree
Masters or Post-Degree Education
Other: __________________________

19. Do you work outside the home?

   1. Yes  2. No

20. If YES, please tell us your job title: ______________________________

21. If you have a spouse, partner or other adult living in the home that helps pay the bills, does she/he work outside the home?

   1. Yes  2. No

22. What is your annual income BEFORE taxes? Please CIRCLE the range that best describes your TOTAL yearly household income.

   0 - $10,000
   $10,000-$20,000
   $21,000-$40,000
   $41,000 - $60,000
   $61,000 - $80,000
   $81,000 - $100,000
   More than $100,000

23. How many people are supported by this income: _____________ People

24. Do you own your own home/apartment/trailer?

   1. Yes  2. No
25. Do you have a checking account?
   1. Yes  2. No

26. Do you have a savings account?
   1. Yes  2. No

27. How hard is it to make ends meet each month?
   1. Very Hard
   2. Hard
   3. Not Hard, Not Easy
   4. Easy
   5. Very Easy

28. Do you have difficulty paying your bills?
   1. Yes  2. No

29. During the last few years, how would you describe your financial situation?
   1. Getting better
   2. Staying the same
   3. Getting worse

30. So far as you and your family are concerned, how satisfied are you with your present financial situation?
   1. Very Satisfied
   2. Somewhat Satisfied
   3. Neither Satisfied or Dissatisfied
   4. Somewhat Dissatisfied
5. Very Dissatisfied

31. How hopeful are you about your financial situation?
   1. Pretty hopeful
   2. More or less hopeful
   3. Not hopeful at all

32. My ethnicity is:
   a) White, Caucasian, European, not Hispanic
   b) Asian, Asian-American, Pacific Islander or Oriental
   c) Black or African American
   d) Hispanic or Latino
   e) American Indian
   f) Mixed; parents are from two different groups.
   g) Other (write in):______________________

33. My father’s ethnicity is: (write in letters from above list)_______________________

34. My mother’s ethnicity is: (write in letters from above list) ______________________

35. What is your marital status (Please circle one)?
   a) Married
   b) Living with a partner
   c) Single
   d) Divorced
   e) Separated
   f) Widowed
   g) Other
The Multidimensional Diabetes Questionnaire: Self-Efficacy Scale

Please rate how confident you are about the following diabetes self-care activities by choosing any number between 0 (not at all confident) and 100 (very confident).

<table>
<thead>
<tr>
<th>Rating (0-100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How confident are you in your ability to follow your diet?</td>
</tr>
<tr>
<td>2. How confident are you in your ability to test your blood sugar at the recommended frequency?</td>
</tr>
<tr>
<td>3. How confident are you in your ability to exercise regularly?</td>
</tr>
<tr>
<td>4. How confident are you in your ability to keep your weight under control?</td>
</tr>
<tr>
<td>5. How confident are you in your ability to keep your blood sugar under control?</td>
</tr>
<tr>
<td>6. How confident are you in your ability to resist food temptations?</td>
</tr>
<tr>
<td>7. How confident are you in your ability to follow your diabetes treatment (diet, medication, blood sugar testing, exercise)?</td>
</tr>
</tbody>
</table>
Spousal Criticism Scales

*Family Emotional Involvement and Criticism Scale*

Please circle the number that shows how much you agree or disagree with each of the following statements about your relationship with your spouse/partner.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th></th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My spouse/partner approves of the way I live my life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. My spouse/partner thinks I should be more active.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. My spouse/partner doesn’t like the way I take care of myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. My spouse/partner doesn’t like how I handle money.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. My spouse/partner tries to get me to change.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. My spouse/partner approves of things I do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

*Perceived Criticism Scale*

Please rate the following questions on a scale from 1 (not at all critical) to 10 (very critical).

<p>| | | | | | | | | | | |</p>
<table>
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<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How critical do you think your spouse/partner is of you?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>
**Spousal Feedback Questionnaire**

Please circle the number that shows how much you agree or disagree with each of the following statements about your relationship with your spouse or partner.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My spouse/partner tells me specific ways to improve my diabetes.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>My spouse/partner criticizes my diet in front of other people.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>My spouse/partner offers advice to increase my exercise behavior in a friendly way.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>My spouse/partner blames me for my high blood sugars.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>My spouse/partner becomes angry when they talk to me about my diabetes care.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>My spouse/partner reminds me of mistakes I’ve made in the past with my diabetes care.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>My spouse/partner doesn’t let their concerns about my diabetes build up.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>My spouse/partner doesn’t want me to make my own choices when it comes to my diabetes.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>My spouse/partner shares concerns about my diet when we are in private.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10.</td>
<td>My spouse/partner thinks about my feelings before talking to me about my diabetes.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11.</td>
<td>My spouse/partner tells me I can’t do anything right with my diabetes.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12.</td>
<td>My spouse/partner uses a harsh tone when they talk to me about my diet.</td>
<td>Strongly Disagree</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13. If my spouse/partner thinks I need to check my blood sugar they let me know right away.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. My spouse/partner won’t let me forget my past diabetes failures.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. My spouse/partner waits to talk to me about my diabetes until we are alone.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16. My spouse/partner makes me rely on them to take care of my diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17. My spouse/partner shares specific ideas to help me to exercise.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18. My spouse/partner says I don’t exercise because I’m lazy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19. My spouse/partner doesn’t give me credit for the little things I do to help my diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20. My spouse/partner makes comments about my diabetes when we’re in public places.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21. My spouse/partner encourages me to take care of my diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

**Misguided Support Behaviors Scale**

Please rate the following way on a scale from 0 (not very often) to 6 (very often).

<table>
<thead>
<tr>
<th>My spouse/partner:</th>
<th>Not very Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hassles me about my diabetes medications.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2. Hassles me about exercise.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3. Hassles me about my diet.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4. Hassles me about measuring my blood sugar.</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Summary of Diabetes Self-Care Activities

Thank you for taking the time to fill out this questionnaire. The questions below ask you about your diabetes self-care activities during the past 7 days. If you were sick during the past 7 days, please think back to the last 7 days that you were not sick. Please answer the questions as honestly and accurately as you can. Your responses will be confidential.

Diet

A. Has your doctor or diabetes educator given you a meal plan or diet guidelines to treat your diabetes?

1. Yes  2. No

The next few questions ask you about your eating habits over the past 7 days. If your doctor or dietitian has not given you a specific diet, answer Question 1 according to the general guidelines you have received.

1. How often did you follow your recommended diet or meal plan over the last 7 days?

2. What percentage of the time did you successfully limit your calories as recommended in healthy eating for diabetes control?
   _____ 0% None_____ 25% (1/4)______ 50% (1/2)______ 75% (3/4) _____ 100% (all)

3. During the past week, what percentage of your meals included high fiber foods, such as fresh fruits, fresh vegetables, whole grain breads, dried beans and peas, and bran?
   _____ 0% None_____ 25% (1/4)______ 50% (1/2)______ 75% (3/4)_____ 100% (all)

4. During the past week, what percentage of your meals included high fat foods such as butter, ice cream, oil, nuts and seeds, mayonnaise, avocado, deep-fried foods, salad dressing, and bacon and other meat with fat or skin?
   _____ 0% None_____ 25% (1/4)______ 50% (1/2)______ 75% (3/4)_____ 100% (all)

5. During the past week, what percentage of your meals included sweets and desserts such as pie, cake, jelly, soft drinks (regular, not diet drinks), and cookies?
   _____ 0% None_____ 25% (1/4)______ 50% (1/2)______ 75% (3/4)_____ 100% (all)
Exercise

B. Has your doctor or diabetes educator given you advice or a plan about exercise to help manage your diabetes?

1. Yes  2. No

If yes, how many minutes per week did your doctor recommend that you exercise? ________________________________

6. On how many of the last 7 days did you participate in at least 20 minutes of physical exercise?

0  1  2  3  4  5  6  7

7. What percentage of the time did you exercise the amount suggested by your doctor? (For example, if your doctor recommended 30 minutes of activity.)

_____ 0% None______ 25% (1/4) _____ 50% (1/2)_____ 75% (3/4)_____ 100% (all)

8. On how many of the last 7 days did you participate in a specific exercise session other than what you do around the house or as part of your work?

0  1  2  3  4  5  6  7

Glucose Testing

C. Has your doctor or diabetes educator given you advice or a plan to test your blood sugars for your diabetes?

1. Yes  2. No

9. On how many of the last 7 days (that you were not sick) did you test your glucose (blood sugar) level?

_____ 1. Everyday_____ 2. Most days _____ 3. Some days____ 4. None of the days.

10. Over the last 7 days (that you were not sick) what percentage of the glucose (blood sugar or urine) tests recommended by your doctor did you actually perform?

_____ 0% None______ 25% (1/4) _____ 50% (1/2)_____ 75% (3/4)_____ 100% (all)
Diabetes Medication

D. Has your doctor prescribed insulin for you to control your diabetes?

1. Yes  2. No

If YES, how many insulin injections PER DAY has your doctor recommended that you take for your diabetes?

____________________________________________________

11. How many of your recommended insulin injections did you take in the last 7 days that you were supposed to?

_____ 1. All of them _____ 2. Most of them _____ 3. Some of them
_____ 4. None of them _____ 5. I do not take injections to control my diabetes.

E. Has your doctor prescribed pills for you to control your diabetes?

1. Yes  2. No

If YES, how many pills PER DAY has your doctor recommended that you take?

____________________________________________________

12. How many of your recommended number of pills to control diabetes did you take that you were supposed to?

_____ 1. All of them _____ 2. Most of them _____ 3. Some of them
_____ 4. None of them _____ 5. I do not take pills to control my diabetes.
## Rate Your Plate

Think about the way you usually eat. For each topic, put a check mark in column A, B or C.

<table>
<thead>
<tr>
<th>Topic</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Red Meat</strong></td>
<td>Usually eat: Three time a week or more</td>
<td>Usually eat: Twice a week</td>
<td>Usually eat: Once a week or less OR, I am a vegetarian</td>
</tr>
<tr>
<td><strong>Red Meat Choices</strong></td>
<td>Usually eat: High fat cuts such as ribs, brisket, T-bone steak, prime rib, sausage</td>
<td>Sometimes eat: High fat cuts such as ribs, brisket, T-bone steak, prime rib, sausage</td>
<td>Usually eat: Lean beef cuts such as round, sirloin, flank; lean pork and lamb cuts as loin and leg; and veal OR, I rarely eat meat OR, I am a vegetarian</td>
</tr>
<tr>
<td><strong>beef, pork, lamb, veal</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ground Meat, Burgers</strong></td>
<td>Usually eat: Regular, chuck or lean ground beef with more than 15% fat</td>
<td>Usually eat: Ground sirloin or round, ground turkey, or ground beef with 10 – 15% fat</td>
<td>Usually eat: Ground turkey breast or vegetarian patties like Boca™ or Garden burgers™ OR, I rarely eat ground meat or burger OR, I am a vegetarian</td>
</tr>
<tr>
<td><strong>Chicken, Turkey</strong></td>
<td>Usually eat: Fried chicken and/or fried fish and shellfish</td>
<td>Sometimes eat: Chicken, turkey, and other poultry with skin</td>
<td>Usually eat: Chicken, turkey and other poultry without skin</td>
</tr>
<tr>
<td><strong>Fish</strong></td>
<td>Usually eat: Fish less than once a week</td>
<td>Usually eat: Fish once a week</td>
<td>Usually eat: Fish twice a week or more</td>
</tr>
<tr>
<td><strong>Chicken and Fish Choices</strong></td>
<td>Usually eat: Fried chicken and/or fried fish and shellfish</td>
<td>Sometimes eat: Fried chicken and/or fried fish and shellfish</td>
<td>Usually eat: Chicken and fish that is baked, broiled, grilled, poached or roasted</td>
</tr>
<tr>
<td><strong>Cold Cuts, Hot Dogs,</strong></td>
<td>Usually/often eat:</td>
<td>Sometimes eat:</td>
<td>Usually eat:</td>
</tr>
<tr>
<td><strong>Breakfast Meat</strong></td>
<td>Salami, bologna, other cold cuts, hot dogs, bacon, sausage</td>
<td>salami, bologna, other cold cuts, hot dogs, bacon, sausage</td>
<td>Roast beef, turkey breast, ham or low-fat cold cuts, low-fat hot dogs, low fat bacon/sausage OR, I rarely eat processed meats</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Serving Size of Cooked Meats</strong></td>
<td>Usually eat: Large portion, 7 ounces or more</td>
<td>Usually eat: Medium portion, 4 to 6 ounces</td>
<td>Usually eat: Small portion, 3 ounces of less</td>
</tr>
<tr>
<td><strong>Meatless Main Dishes</strong></td>
<td>Rarely eat: Meatless main dishes</td>
<td>Usually eat: Meatless main dishes less than twice a week</td>
<td>Usually eat: Meatless main dishes twice a week or more</td>
</tr>
<tr>
<td><em>Such as all bean chili, bean burrito, lentil soup, meatless spaghetti sauce</em></td>
<td>Usually eat out or get take-out food: Twice a week or more</td>
<td>Usually eat out or get take-out food: Once a week</td>
<td>Usually eat out or get take-out food: Less than once a week OR, I usually eat low-fat restaurant meals</td>
</tr>
<tr>
<td><strong>Eating Out</strong></td>
<td>Usually eat: 6 or more egg yolks per week</td>
<td>Usually eat: 4-5 egg yolks per week</td>
<td>Usually eat: 3 egg yolks or less a week OR, I usually eat cholesterol free egg substitutes</td>
</tr>
<tr>
<td><strong>Egg Yolks</strong></td>
<td>Usually drink and use: Whole milk and cream</td>
<td>Usually drink and use: 2% reduced fat milk</td>
<td>Usually drink and use: 1% or fat free (skim) milk</td>
</tr>
<tr>
<td><strong>Cheese</strong></td>
<td>Usually eat: Regular cheese, such as cheddar, Swiss and American</td>
<td>Usually eat: 2% milk cheese</td>
<td>Usually eat: Reduced fat or part-skim milk cheese OR, I rarely eat cheese</td>
</tr>
<tr>
<td><em>Includes cheese on pizza, sandwiches, snacks and in mixed dishes</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Milk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Frozen Desserts</strong></td>
<td>Usually eat: Premium or regular ice cream, ice cream bars and sandwiches</td>
<td>Sometimes eat: Regular ice cream, ice cream bars and sandwiches</td>
<td>Usually eat: Sherbet, sorbet; low-fat frozen yogurt or ice cream</td>
</tr>
<tr>
<td>Cooking Method</td>
<td>Usually add: Oil, butter or margarine to the pan</td>
<td>Sometimes add: Oil, butter or margarine to the pan</td>
<td>Usually: Broil, bake or steam without fat or oil added or use non-stick cooking spray (Pam™)</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cooking Fats and Oils</td>
<td>Usually use: Butter or stick margarine, shortening, bacon drippings and/or lard</td>
<td>Usually use: Liquid or tub margarine for cooking and baking</td>
<td>Usually use: Oils such as olive and canola for cooking OR, I cook without adding fat/oil</td>
</tr>
<tr>
<td>French fries, egg rolls, etc.</td>
<td>Usually put: Butter, stick margarine on bread, potatoes, vegetables, etc.</td>
<td>Usually put: Liquid or regular tub margarine on bread, potatoes, vegetables, etc.</td>
<td>Usually put: “Light” tub or spray margarine on bread, potatoes, vegetables OR, I eat them plain</td>
</tr>
<tr>
<td>Salad Dressing and Mayonnaise</td>
<td>Usually use: Regular salad dressing or mayonnaise</td>
<td>Sometimes use: Regular salad dressing and mayonnaise</td>
<td>Usually use: Light, reduced fat or fat free salad dressing or mayonnaise</td>
</tr>
<tr>
<td>Snacks</td>
<td>Usually/often eat: Regular chips, crackers and salted nuts. Movie theater popcorn</td>
<td>Sometimes eat: Regular chips, crackers and salted nuts</td>
<td>Usually eat: Fruit, vegetables, low-fat whole grain cracker, unsalted nuts, baked tortilla chips, air popped popcorn</td>
</tr>
<tr>
<td>Desserts and Sweets</td>
<td>Usually/often eat: Donuts, cakes, cookies, pies, pastries, chocolate</td>
<td>Sometimes eat: Donuts, cakes, cookies, pies, pastries, chocolate</td>
<td>Usually eat: Fruit, angel food cake, low-fat desserts and sweets</td>
</tr>
<tr>
<td></td>
<td>Usually eat:</td>
<td>Sometime eat:</td>
<td>Usually eat:</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Grains</strong></td>
<td>White bread, white rice, low fiber cereals such as corn flakes, Rice Krispies™, etc</td>
<td>White bread, white rice, low fiber cereals such as corn flakes, Rice Krispies™, etc</td>
<td>Whole grain breads, brown rice, whole grain pasta, whole grain cereals such as oatmeal, bran cereals,</td>
</tr>
<tr>
<td><strong>Breads, cereals, rice, pasta</strong></td>
<td>Usually eat: White bread, white rice, low fiber cereals such as corn flakes, Rice Krispies™, etc</td>
<td>Usually eat: White bread, white rice, low fiber cereals such as corn flakes, Rice Krispies™, etc</td>
<td>Usually eat: Whole grain breads, brown rice, whole grain pasta, whole grain cereals such as oatmeal, bran cereals,</td>
</tr>
<tr>
<td><strong>Fruits and Vegetables</strong></td>
<td>Usually eat: 1 serving or less a day</td>
<td>Usually eat: 2 to 4 servings a day</td>
<td>Usually eat: 5 or more servings a day</td>
</tr>
<tr>
<td></td>
<td>One serving = ½ cup or 1 small piece of fruit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PANAS

Directions:

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent you have felt this way during the past week. Use the following scale to record your answers.

(1) = Very slightly or not at all (2) = A little (3) = Moderately (4) = Quite a bit (5) = Extremely

<table>
<thead>
<tr>
<th></th>
<th>Very slightly or not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Interested</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Distressed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>Excited</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>Upset</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>Strong</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>Guilty</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>Scared</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>Hostile</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9.</td>
<td>Enthusiastic</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10.</td>
<td>Proud</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11.</td>
<td>Irritable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12.</td>
<td>Alert</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13.</td>
<td>Ashamed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14.</td>
<td>Inspired</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15.</td>
<td>Nervous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16.</td>
<td>Determined</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17.</td>
<td>Attentive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18.</td>
<td>Jittery</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19.</td>
<td>Active</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20.</td>
<td>Afraid</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Appendix C: Supplemental Analyses

Development of the Spousal Feedback Questionnaire (SFQ)
Although there are existing measures of general criticism in families, there is only one known measure of criticism that is specific to diabetes: Multidimensional Diabetes Questionnaire (MDQ) Misguided Support Behaviors scale (MSB; Talbot, Nouwen, Gingras, Gosselin, & Audet, 1997). Existing measures of both general and diabetes-specific criticism contain items that relate to very different definitions and interpretations of criticism and provide few examples of both destructive and constructive criticism. Therefore, in order to understand the relationship between spousal criticism and diabetes care, the development of a more comprehensive spousal criticism measure related to diabetes is needed. For the purposes of the current study, a 21-item self-report questionnaire of diabetes-specific constructive and destructive criticism was created.

Participants were 90 married adults with type 2 diabetes living in Appalachia who completed paper and pencil questionnaires as part of a longitudinal study examining psychosocial issues in type 2 diabetes. For sample characteristics please see Tables 1-2. Participants completed a demographics questionnaire and three established measures of spousal criticism, including the Perceived Criticism Scale (PCS), the Perceived Criticism subscale of the Family Emotional Involvement and Criticism Scale (FEICS), and the Misguided Support Behaviors (MSB) scale of the Multidimensional Diabetes Questionnaire (Shields, Franks, Harp, McDaniel, & Campbell, 1992; Hooley & Teasdale, 1989; Talbot et al., 1997). Additionally, participants completed the Spousal Feedback Questionnaire (SFQ) which is a 21-item questionnaire of constructive and destructive criticism that was developed for the purposes of the study.

Items for the SFQ were generated using components of constructive and destructive criticism (Baron, 1988). Constructive criticism involves feedback that is
specific, timely, considerate, encouraging, and given in a private setting. Examples of items related to constructive criticism include:

*My spouse/partner tells me specific ways to improve my diabetes.*

*My spouse/partner shares concerns about my diet when we are in private.*

*My spouse/partner encourages me to take care of my diabetes.*

Destructive criticism involves feedback that is non-specific, not given in a timely manner, negative or threatening, given in a public setting, or focusing on internal causes. Examples of items related to destructive criticism include:

*My spouse/partner tells me I can’t do anything right with my diabetes.*

*My spouse/partner uses a harsh tone when they speak to me about my diet.*

*My spouse/partner makes comments about my diabetes when we’re in public.*

Each item was rated using a 5 point Likert-type scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Constructive criticism items were reverse scored and the 21 items were summed for a total score.

A principal component analysis was completed using the original 21 items of the SFQ, which suggested a two-factor solution that explained 61.9% of the variance. After removing 7 items that did not load significantly onto these two factors, a second principal component analysis with a forced two-factor solution was completed using Varimax rotation. The first factor (7 items) can be interpreted as examples of destructive criticism and the second factor (7 items) can be interpreted as examples of constructive criticism. The first factor explained 53.0% of the variance and the second factor explained 47.0% of the variance (factor loadings can be found in Table 9). The internal consistency was
α=.72 for the final 14-item SFQ, α=.84 for the 7-item destructive criticism scale, and α=.82 for the 7-item constructive criticism scale.

The total 14-item SFQ scale was correlated with demographic variables and only gender was significantly related (r = .26, p<.05). This indicated that females were more likely to have higher scores on the SFQ. The SFQ was found to be positively correlated with each of the three other measures of perceived criticism (r = .23, p<.05 to r = .29, p<.01; see Table 4 and Table 10). Although higher levels of criticism as measured by the SFQ indicated higher levels of criticism on the other measures, the fact that these correlations were fairly low may indicate that there are different components of criticism that the SFQ has measured that are not included in the three other measures. The two subscales of the SFQ were not significantly related (r = -.14, p=.17) indicating that they are in fact measuring different components of criticism. When the relationship between the SFQ subscales and other measures of criticism were examined, only the destructive criticism subscale was significantly correlated with these measures (see Table 10) which further suggests that the constructive criticism scale may be measuring a different, but related construct. Total SFQ scores were also positively correlated with BDI-II scores (r = .37, p<.001) indicating that individuals with higher perceived criticism were more likely to have higher levels of depressive symptoms. This is consistent with other research that has studied measures of health-related constructs (such as health-related quality of life) using samples of individuals with type 2 diabetes and found a relationship between psychiatric symptoms and scores (Jacobson, de Groot, & Samson, 1997).

The results suggest that the SFQ may be a useful measure of spousal criticism to use for individuals with diabetes. The final scale contains aspects of both constructive
and destructive criticism and is correlated with three established measures of criticism. In this initial sample, the SFQ also demonstrated internal consistency. However, the sample size is modest and further research will be needed to demonstrate the construct validity, discriminant validity, and test-retest reliability of this measure.
### Table 9

**Factor Loadings (Varimax Rotation) for Spousal Feedback Questionnaire:**

**2 Factor Solution**

<table>
<thead>
<tr>
<th>Proportion of Variance</th>
<th>Factor I Loadings</th>
<th>Factor II Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>53.0%</td>
<td></td>
<td>47.0%</td>
</tr>
</tbody>
</table>

**Destructive Criticism**

2. My spouse/partner criticizes my diet in front of other people.  
5. My spouse/partner becomes angry when they talk to me about my diabetes care.  
6. My spouse/partner reminds me of mistakes I’ve made in the past with my diabetes care.  
8. My spouse/partner doesn’t want me to make my own choices when it comes to my diabetes.  
11. My spouse/partner tells me I can’t do anything right with my diabetes.  
12. My spouse/partner uses a harsh tone when they talk to me about my diet.  
20. My spouse/partner makes comments about my diabetes when we’re in public places.

**Constructive Criticism**

1. My spouse/partner tells me specific ways to improve my diabetes.  
3. My spouse/partner offers advice to increase my exercise behavior in a friendly way.  
9. My spouse/partner shares concerns about my diet when we are in private.  
10. My spouse/partner thinks about my feelings before talking to me about my diabetes.  
15. My spouse/partner waits to talk to me about my diabetes until we are alone.  
17. My spouse/partner shares specific ideas to help me to exercise.  
21. My spouse/partner encourages me to take care of my diabetes.
Table 10

Zero-Order Correlations of SFQ and Related Measures of Criticism (N = 90)

<table>
<thead>
<tr>
<th>Variables</th>
<th>SFQ&lt;sup&gt;α&lt;/sup&gt; Total</th>
<th>SFQ – D</th>
<th>SFQ - C</th>
<th>PCS&lt;sup&gt;b&lt;/sup&gt;</th>
<th>FEICS-PC&lt;sup&gt;c&lt;/sup&gt;</th>
<th>MDQ-MSB&lt;sup&gt;d&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFQ Total</td>
<td>_</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFQ Destructive</td>
<td>.50***</td>
<td>_</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFQ Constructive</td>
<td>.79***</td>
<td>-.14</td>
<td>_</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCS</td>
<td>.28**</td>
<td>.30**</td>
<td>.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEICS-PC</td>
<td>.29**</td>
<td>.50***</td>
<td>.01</td>
<td>.56***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDQ-MSB</td>
<td>.23*</td>
<td>.49***</td>
<td>-.09</td>
<td>.48***</td>
<td>.52***</td>
<td></td>
</tr>
</tbody>
</table>

*<sup>p</sup><.05 **<sup>p</sup><.01 ***<sup>p</sup><.001

<sup>α</sup>SFQ: Spousal Feedback Questionnaire
<sup>b</sup>PCS: Perceived Criticism Scale
<sup>c</sup>FEICS: Family Emotional Involvement and Criticism Scale
<sup>d</sup>MDQ-MSB: Multidimensional Diabetes Questionnaire Misguided Support Behaviors Scale