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The research reported here was supported in part by the Department of Veterans Affairs, Veterans Health Administration, Health Services Research and Development Service grant #IIR04-201 awarded to Dr. Christensen. This project was also supported in part by an Agency for Health care Research and Quality (AHRQ) Centers for Education and Research on Therapeutics cooperative agreement #5 U18 HSO16094.

Recommended Citation
The definitive version was published in *Health Psychology*, Vol 28(6), Nov 2009, 660-667. doi: 10.1037/a0016087

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RUNNING HEAD: Provider Behavior Symmetry

Patient Preference for and Reports of Provider Behavior:

Impact of Symmetry on Patient Outcomes

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Acknowledgements: The research reported here was supported in part by the Department of Veterans Affairs, Veterans Health Administration, Health Services Research and Development Service grant #IIR04-201. Dr Christensen is a Senior Scientist in the Center for Research in the Implementation of Innovative Strategies in Practice (CRIISP) at the Iowa City VA Medical Center, Iowa City, IA. This project was also supported in part by an Agency for Healthcare Research and Quality (AHRQ) Centers for Education and Research on Therapeutics cooperative agreement #5 U18 HSO16094.

Abstract

Objective: Research has suggested that congruence between patient characteristics and contextual characteristics is a more robust predictor of outcomes than either patient or context characteristics alone. The goal of the present study was to examine the degree of congruence between patient preferences for the clinical encounter and reports of analogous dimensions of provider behavior and the effects of this congruence on patient outcomes. **Design:** 218 patients with diabetes (predominately type 2) completed measures of preference for and ratings of perceived provider behavior in three domains (1) information sharing, (2) behavioral involvement, and (3) socioemotional support. **Main Outcome Measures:** Patient satisfaction, self-reported adherence, and a clinical marker of diabetic control (hemoglobin A1c) were the outcomes of interest. **Results:** Congruence in information sharing and congruence in behavioral involvement were predictive of glycemic control and self-reported adherence, respectively. Congruence in behavioral involvement and congruence in socioemotional support were predictive of greater patient satisfaction. **Conclusion:** These findings provide further support for the importance of congruence between patient characteristics and contextual characteristics in predicting patient outcomes.

Key Words: adherence, patient satisfaction, patient-centered care, shared medical decision-making

Patient Preference for and Reports of Provider Behavior: Impact of Symmetry on Patient Outcomes

Despite the development of effective treatments, the management of chronic health conditions has been limited by poor adherence. Although predictors of adherence such as depression and lack of social support (Christensen, 2004; DiMatteo, 2004a; DiMatteo, 2004b) have been identified, this research is limited by a lack of identification of which predictors are most relevant for particular patients or patient groups. One area of considerable attention with respect to patient-specific predictors is patient-provider interactions and their impact on patient outcomes including adherence, patient satisfaction, and symptom alleviation (Alamo, Moral, & Perula de Torres, 2002; Fremont et al., 2001; Roter et al., 1997; Stewart, et al., 2000). Historically, this research has characterized patient-provider interactions globally as reflecting either more patient-centered (e.g. patient autonomous) or more provider-centered (e.g. paternalistic) interactions (Roter et al., 1997; Stewart, 1984). Patient-centered interactions are often characterized by increased shared decision-making and provision of emotional support by the provider (Lambert, et al., 1997). Conversely, provider-centered interactions are characterized by an emphasis on provider expertise in decision-making and passivity of the patient (Szaz & Hollender, 1956).

Impact of Patient-Provider Interactions on Patient Outcomes

Unfortunately, recent studies on the impact of patient-provider interactions on patient outcomes have yielded modest and often inconsistent results. Some cross-sectional studies have reported a link between patient-provider interactions (e.g. mainly more patient-centered interaction patterns) and more positive patient outcomes. For example, increased patient-centered communication, typically characterized by increased information sharing and shared

decision-making, is associated with greater satisfaction (Roter, 1997), greater emotional well-being (Kinmonth, Woodcock, Griffin, Spiegal, & Campbell, 1998), and greater self-reported medication adherence (Stewart, 1984). However, other studies have failed to find a link between increased information sharing and shared-decision making and objective markers of adherence such as glycemic control, increased exercise, or smoking cessation (Kinmonth, Woodcock, Griffin, Spiegal, & Cambell, 1998; D. P. Martin et al., 1998). Furthermore, Kinmonth, et al. (1998) found that increased patient-centered care was associated with *greater* body mass index (BMI) and *higher* triglyceride concentrations. Finally, interventions designed to increase patient involvement in decision-making have failed to produce subsequent improvement in patient outcomes (Betz, Boles, Mullooly, & Levinson, 1999; Joos, Hickam, & Gordon, 1996).

Variability in Patient Preferences Regarding Patient-Provider Interactions

These inconsistent findings have led researchers to consider variations in patient *perceptions of* and *preferences for* provider behavior in addition to objective ratings of provider behavior. With respect to patient perceptions of provider behavior, recent research has suggested that patient perceptions of more collaborative communication between patient and provider (regardless of actual provider behavior or communication style) may be associated with more positive outcomes such as blood pressure control (Naik, Kallen, Walder, & Street, 2008). In addition, perceptions of greater information-sharing and collaborative decision-making have also been associated with greater satisfaction with medical care for among parents of pediatric patients (Wanzer, Booth-Butterfield, & Gruber, 2004) and among patients with cancer (Gattellari, Butow, & Tattersall, 2001). With respect to variability in patient preferences for provider behavior, several studies have suggested that patient preferences regarding patient-

provider interactions vary widely from highly provider-centered to highly patient-centered (Caress, et al., 2005; Levinson, Kao, Kuby, & Thisted, 2005; Swenson, et al., 2004).

Role of Symmetry between Patient Preferences and Provider Behavior

Given the lack of evidence that one type of patient-provider interaction or communication pattern is clearly associated with more positive patient outcomes and the high degree of variability in patient preferences, researchers have posited the importance of symmetry, or match, between patient and provider. Specifically, a match between patient preferences and actual provider style with respect to patient-provider interactions may be a better predictor of patient outcomes than either patient preferences or provider behavior alone (Cvengros, Christensen, Hillis, & Rosenthal, 2007; Krupat, Bell, Kravitz, Thom, & Azari, 2001). For example, using their Patient-Practitioner Orientation Scale, a measure of preferences for information sharing and provision of emotional support, Krupat and colleagues found that patients who endorsed a greater preference for information sharing were most satisfied when their provider also endorsed a greater preference on this domain (Krupat, Bell, Kravitz, Thom, & Azari, 2001). Similarly, among patients with diabetes, adherence was greatest among patients in dyads where both the patient and provider had congruent ratings of patient internal health locus of control (i.e., expectancies regarding the extent to which health outcomes are believed to be due to patient behavior; Cvengros, Christensen, Hillis, & Rosenthal, 2007).

Similar findings have also been demonstrated among various patient groups and using other patient preference measures. Among patients with cancer, a mismatch between preferred and perceived role in medical decision-making was associated with increased anxiety (Gattellari, Butow, & Tattersall, 2001). Among patients with HIV/AIDS, poor match between patient preferences for and perceptions of control in decision-making regarding antiretroviral medication

use was also associated with increased decisional conflict, characterized by feelings of uncertainty and lack of support in decision making (Kremer, Ironson, Schneiderman, & Hautzinger, 2007).

Limitations of Previous Work on Patient-Provider Symmetry

Despite this emerging evidence for the role of symmetry between patient and provider attitudes toward patient-provider interactions, gaps in this literature remain. Previous studies have utilized limited measures of patient outcomes, relying on patient satisfaction or self-reported health behaviors. Past work involving patient and provider attitudinal or preference symmetry has failed to examine more objective markers of patient adherence and clinical outcomes such as glycemic control among patients with diabetes.

In addition, previous work has utilized global or trait-like ratings of provider attitudes toward their behavior in patient-provider interactions (Cvengros, Christensen, Hillis, & Rosenthal, 2007; Krupat, Bell, Kravitz, Thom, & Azari, 2001), rather than examining the visit-specific behavior of providers. Within a specific visit and for different patients across the clinic day, provider behavior may vary across the previously described domains of patient-centered care (i.e. information-sharing and shared decision making and provision of socioemotional support). Specifically, providers may vary in the amount of information they provide to their patients about diagnosis and treatment and the degree to which they encourage shared decision-making with their patients. In addition, providers may vary in the amount of psychosocial information they gather from their patients and the degree to which they provide emotional support to their patients. Finally, although not often included in the traditional view of patient-centered care, provider behavior may also vary in a third domain, namely encouragement of patient involvement in behavioral management of their health. Specifically, providers may vary

in the degree to which they encourage patients to engage in self-diagnosis and self-management of some aspects of their illness.

Although the match between patient preferences and visit-specific behavior on these domains has yet to be explored, there is related research which highlights the need for assessment of other visit-specific provider behaviors in predicting patient outcomes (Kravitz, et al., 2002). Specifically, this work found that patients were most satisfied when their expectations for the clinical encounter, such as expectations for diagnostic tests or referrals to specialists, were congruent with their provider's objective behavior (Kravitz, et al., 2002; Kravitz, et al., 2003).

The Present Study

This study examined the role of symmetry between patient preferences and patient-reported, visit-specific provider behavior and its impact on patient outcomes including patient reported satisfaction with care, patient reported regimen adherence, and objectively determined glycemic control in a sample of patients with diabetes. Patients with diabetes were chosen as the study population for this study for several reasons. First, congruence between patient preferences and provider behavior may be particularly predictive of outcomes among these patients given the need for continued collaboration between patients and providers to manage this chronic condition. Also, given the high rates of poor adherence and subsequent serious consequences of poor glycemic control among patients with diabetes, there is a strong need to identify robust predictors of patient adherence in this population (DiMatteo, 2004; NIDDK, 2007). Finally, there is a readily available, valid, and reliable clinical marker of patient outcomes, namely glycemic control, for this population.

Specifically, the present study sought to examine the effect of match or symmetry across three domains of patient-provider communication: (a) information sharing and shared decision-

making, (b) encouragement of self-care, and (c) provision of socioemotional support. It was hypothesized that patients whose pre-visit preferences for provider behavior in these domains were congruent with their post-visit perceptions of what occurred in a specific clinical encounter (e.g. reports of provider behavior) would demonstrate greater satisfaction and self-reported adherence, as well as more favorable glycemic control than those with incongruent preferences for and perceptions of provider behavior.

Methods

Our total available patient population included patients with diabetes (primarily Type 2) who were seen in primary care clinics at the University of Iowa Hospitals & Clinics and the VA Iowa City Medical Center. Eligible patients were eighteen years of age and over, English-speaking, and had a confirmed diagnosis of Type 1 or Type 2 diabetes. In an effort to choose patients who had an established relationship with their provider, patients had to have seen their primary care provider for at least two appointments within the past six month period. Care was taken to ensure that patient's diabetes was managed by their primary care provider, as opposed to another specialty provider (i.e. endocrinologist). Patients were identified from appointment records to create a dataset of patients grouped within providers.

Of the 621 patients approached for participation in the study, 241 patients completed both pre- and post-visit questionnaires for a response rate of 39%. However, 23 patients reported that they were not taking oral medications or insulin injections to manage their diabetes and were therefore excluded in the final analyses, as diabetes medication adherence was a key outcome of interest, as opposed to diet or exercise adherence. The final sample of 218 patients included 137 patients recruited from the Iowa City VA Medical Center and 81 patients recruited from the University of Iowa Hospitals and Clinics. Patients in the final sample were drawn from a total of

39 providers with an average of 5.6 patients per provider. Average age of patients was 65.6 (SD=13.5) years. 77.5% of the sample was male, 91.7% of sample was Caucasian, 66.5% were married or partnered, and 74.2% of sample were retired, unemployed, or disabled. Patients had an average of 13.6 (SD=3.2) years of education.

Overview of Procedures

Approximately three weeks prior to an upcoming regularly-scheduled clinic visit for diabetes follow-up, eligible patients were mailed a study protocol packet that included a cover letter describing the study, an informed consent document, a demographic information sheet, and the pre-visit questionnaires. These questionnaires were chosen to represent preferences in three domains provider behavior (i.e. information sharing, behavioral involvement, and provision of socioemotional support). Completion of these questionnaires took approximately 45 minutes.

Following their regularly-scheduled follow-up visit patients also completed a post-visit interview, either in person or via telephone following their target appointment. Care was taken to contact patients within 48 hours of their appointment. During this interview, patients completed ratings of provider behavior, satisfaction with care, and adherence to present and past healthcare recommendations. Finally, a chart review was conducted to extract the laboratory value of hemoglobin A1c closest to the patient's target appointment. All procedures were approved by the University of Iowa and VA Medical Center institutional review boards.

Pre- and Post-Visit Questionnaires

Perceived Heath Status. Perceived health status was assessed using one item from the Medical Outcomes Study core measure (Stewart, Hays, & Ware, 1988). Patients were asked "How would you rate your overall health status?" Response choices were 1=excellent, 2=very

good, 3=good, 4=moderate, 5=poor, and 6=very poor. This item was reverse-coded such that higher scores were representative of better perceived health status.

Krantz Health Opinion Survey (KHOS). The KHOS (Krantz & Wideman, 1980) was used to assess patient preferences for involvement in their healthcare. Specifically, this measure has two subscales that assess patient preferences for (a) information sharing and shared decision-making and (b) behavioral involvement and self-management in healthcare. The Preference for Information subscale is a seven-item scale answered using a true-false format with higher scores indicating a higher preference for information and shared decision-making. The Behavioral Involvement subscale is a nine-item scale also answered using a true-false format with higher scores indicating a higher preference for behavioral involvement in healthcare. Reliability and validity for this measure have been previously documented (Krantz & Wideman, 1980).

Patient Practitioner Orientation Scale (PPOS). The PPOS contains two subscales: a Sharing subscale which assesses patient preferences for information sharing, and a Caring subscale which assesses patient preferences for the provision of socioemotional support from their provider. The Sharing subscale was not used in the present study given its significant overlap (both with respect to domain and individual items) with the KHOS Preference for Information subscale, which has been more widely used in the health preferences and attitudes literature. Conversely, the Caring subscale is the only available measure that captures the domain of provision of socioemotional support as conceptualized in the present study. The Caring subscale contains nine items which measure the degree to which the respondent believes that a patient's values and wishes and provision of socioemotional support are integral to a treatment plan. Items are answered using a 6-point scale with higher scores reflecting more patient-centered beliefs and lower scores reflecting more physician-centered beliefs. Reliability

and validity for the Caring subscale have been previously documented (Krupat et al., 2000; Krupat, Yeager, & Putnam, 2000).

Provider Behavior Questionnaire (PBQ). To our knowledge, there are no current measures that assess a patient's report of provider behavior as conceptualized in the present study. Therefore, nine items were developed to assess patient report of provider behavior during the target appointment. Items were answered using a true-false format and were written to be as objective as possible. Questions assessed provider behavior with respect to three domains: (a) information sharing and shared decision-making in the clinical encounter, (b) behavioral involvement and encouragement of self-care, and (c) provision of socioemotional support during the patient visit. These items reflect adaptations of the two subscales of the KHOS, the caring scale of the PPOS, and original items written by the primary investigator. Scores for each domain range from 0 to 3 with higher scores indicating greater provider behavior in that domain. PBQ items are presented in Table 1.

Patient-Satisfaction Questionnaire Short-Form (PSQ-18). Patient satisfaction with healthcare was assessed with the widely used two-item general satisfaction subscale of the PSQ-18 (Marshall & Hays, 1994). Both items on this measure were answered using a 5-point Likert format and coded such that higher scores were representative of greater satisfaction with care. As the unique patient-provider relationship was of interest in this study, patients were asked respond to this questionnaire with respect to their recent target visit and satisfaction with care received from their specific provider.

Self-Reported Diabetes Adherence. Self-reported patient adherence with the diabetes regimen was assessed using a single item. Patients were asked "How often do you take your diabetes medication as prescribed by your provider?" Responses choices were 1=never,

2=rarely, 3=sometimes, 4=usually, and 5=always. Again, patients were instructed to respond to this measure specifically for recommendations from their specific provider.

Glycemic Control. The laboratory value of hemoglobin A1c closest to the patient's target appointment was used in the present study as a measure of glycemic control. Hemoglobin A1c provides a measure of the average blood glucose over the prior 2-3 months and thus measures whether metabolic control has been reached and maintained within the target range.

Results

Preliminary Analyses

Preliminary correlation analyses were conducted to determine if any patient demographic or clinical characteristics were significantly associated with general patient satisfaction, self-reported diabetes adherence, or hemoglobin A1c. Correlations were conducted using the following demographic and clinical characteristics: (a) age, (b) gender, (c) ethnicity, coded as Caucasian or non-Caucasian, (d) marital status, coded as married/partnered or single, (e) employment status, coded as working or non-working, (f) years of education, and (g) self-rated health status. Poorer self-rated health status was associated with poorer self-reported diabetes control (r= .14, p=.04) and lower levels of general satisfaction (r= .14, p=.04). Younger age was associated with higher hemoglobin A1c values (r= -.18, p=.01). Unemployment was associated with poorer self-reported diabetes adherence (r= -.20, p=.01). Any significant demographic and clinical characteristics were retained as covariates in the primary analyses.

Primary Analyses

In order to determine the effect of congruence or "match" between patient preferences for and patient reports of provider behavior on patient outcomes, scores on the different measures were standardized by subtracting the individual score from the mean. Discrepancy terms were

then created for each domain of provider behavior by subtracting the report of provider behavior score from patient preference score, such that negative values were indicative of a lower patient preference score than perception of behavior score and positive values were indicative of a higher patient preference score than perception of behavior score. This yielded three symmetry scores: (a) information-symmetry, (b) behavioral-symmetry, and (c) caring-symmetry. Patients were then divided into three roughly equal groups based on these symmetry scores coded as (a) symmetrical (middle tertile), (b) low patient preference for but high perception of a specific category of provider behavior (lowest tertile), and (c) high patient preference for but low perception of a specific category of provider behavior (highest tertile).

Hierarchical linear modeling using SAS (SAS, 2008) with patients "nested" within providers was then used to test the hypothesis that symmetry in each domain of provider behavior was predictive of patient outcomes. For each outcome variable, three unadjusted models, one for each symmetry score, and three adjusted models which also included any demographic or clinical characteristics that remained significant in the preliminary analyses were tested. Model fit (denoted by R^2) was calculated as the proportion of the total variance in the dependent variable explained by the model. Effect sizes comparing two levels of an independent variable were computed as the difference between the corresponding least squares means divided by the estimated standard deviation for the total variance of the dependent variable. Significance values, effect sizes, and model fit statistics are presented in Table 2.

Predicting General Patient Satisfaction. After controlling for patient-rated health status, symmetry in information sharing and shared decision-making, $F(2,208)= 3.71$, $p=.03$ and behavioral involvement in healthcare, $F(2,205)= 3.60$, $p=.03$, emerged as significant predictors

of patient satisfaction. Symmetry in provision of socioemotional support, $F(2,211)= 2.83$, $p=.06$, emerged as a marginally significant predictor of patient satisfaction.

Pairwise analyses revealed a similar pattern of differences between symmetry groups in the behavioral involvement domain and the socioemotional support domain. Specifically, patients in the highest tertile of both domains reported significantly lower general satisfaction as compared to patients in the middle tertile of each domain. In other words, patients whose preferences and perceptions were symmetrical had significantly higher satisfaction than patients who preferred more socioemotional support than they perceived from their provider, $t(211) = -2.30$, $p = .02$ or preferred more behavioral involvement in their healthcare than they perceived from their provider, $t(205) = -2.36$, $p = .02$. Patients in the other asymmetrical group (lowest tertile) did not differ from patients in the symmetrical group. Specifically, patients who preferred less socioemotional support or behavioral involvement in healthcare than they perceived from their provider did not report lower satisfaction than patients with symmetrical preferences and perceptions. These findings are presented in Figure 1.

Predicting Self-Reported Diabetes Regimen Adherence. After adjusting for health status and employment status, symmetry in information sharing and symmetry in socioemotional support were both nonsignificant predictors of self-reported diabetes adherence. However, symmetry between patient preferred and reported behavioral involvement was a significant predictor of self-reported diabetes adherence**,** $F(2,195)= 3.39$, $p=.04$.

Follow-up analyses revealed a significant difference between patients in the middle tertile and patients in the highest tertile, $t(194) = 2.38$, $p = .02$. Specifically, those patients who preferred a high level of behavioral involvement in their healthcare but reported a lower level of this type of behavior from their provider reported significantly poorer self-reported diabetes

adherence than those patients with symmetrical preferences and perceptions on this domain. Self-reported diabetes adherence for patients who preferred a low level of behavioral involvement in their healthcare but reported a higher level of this behavior from their provider (lowest tertile) did not differ significantly from patients with symmetrical preferences and perceptions on this domain. These group differences are presented in Figure 2.

Predicting Hemoglobin A1c. After adjusting for patient age, symmetry in behavioral involvement and symmetry in socioemotional support were both nonsignificant predictors of hemoglobin A1c. Only symmetry between patient preferred and reported information sharing approached significance as a predictor of hemoglobin A1c in the unadjusted model, $F(2, 207)= 2.94$, $p=.06$. When adjusted for age, the effect of symmetry in the informational-sharing domain was slightly reduced, $F(2, 205)= 2.64$, $p=.07$.

Despite the only marginally significant findings, given the *a priori* assumption that patients in the symmetrical group would differ significantly from patients in the asymmetrical groups, additional unadjusted pairwise comparisons for symmetry in the information sharing domain were conducted. These additional analyses revealed a marginally significant difference between patients in the middle tertile and patients in the highest tertile, $t(204) = -1.77$, $p = .08$. Specifically, those patients who preferred a high level of information sharing and shared decision-making but reported a lower level of this behavior from their provider had marginally higher hemoglobin A1c values (mean=7.49%) than those patients with symmetrical preferences and perceptions on this domain (mean=6.99%). According to the American Diabetes Association recommendation of hemoglobin A1c of 7.0% or less, values for this asymmetrical group clearly fall in the problematic range. Hemoglobin A1c values for patients who preferred a low level of information sharing and shared decision-making but reported a higher level of this

behavior from their provider (lowest tertile) did not differ significantly from patients with symmetrical preferences and perceptions on this domain. These group differences are presented in Figure 3.

Discussion

The primary goal of the present study was to examine the effect of "match" between patient preferences for and reports of provider behavior in three domains, namely information sharing and shared decision-making, behavioral involvement and self-care, and provision of socioemotional support, on patient satisfaction and adherence. Specifically, it was hypothesized that greater congruence between patient preferred and reported provider behavior would be associated with better self-reported adherence, more favorable glycemic control, and greater satisfaction. The hypotheses were partially supported although the pattern differed across domains. Congruence in behavioral involvement and socioemotional support were associated with greater satisfaction with care. Congruence on the behavioral involvement domain was also associated with greater self-reported diabetes-specific adherence, and congruence in the information sharing domain was marginally associated with lower hemoglobin A1c values, indicative of better glycemic control.

Patient preferences for and perceptions of control may be a key factor in understanding these findings. Specifically, higher preferences in the information sharing and behavioral involvement domains may represent higher preference for control over the healthcare experience. Thus, when patients perceive limited control over their healthcare encounter they may attempt to regain this control by being nonadherent with provider recommendations. Previous studies have conceptualized this attempt to regain control within the framework of psychological reactance theory (Brehm, 1966). Reactance theory proposes that restriction of a valued action results in

increases in negative affect and in oftentimes maladaptive behavioral responses in an attempt to regain control. Specifically, in the case of poor adherence, when patients feel their ability to engage in a valued behavior is restricted, such as sharing in health decision-making or self-management of illness, they are likely to place increased value on this behavior and to engage in it more strongly to reassert control.

This conceptualization of nonadherence has been suggested in previous work (Christensen, 2004). For example, among a sample of patients with end-stage renal disease, greater preference for information regarding healthcare was associated with poorer adherence *only* among those patients with low perceptions of control over the dialysis treatment context. Among those patients with high perceptions of control, preference for information was unrelated to adherence (Cvengros, Christensen, & Lawton, 2004). Similarly, in past work among patients with diabetes, a match between a patient's endorsement of internal health locus of control and their provider's endorsement of internal health locus of control was predictive of patient outcomes (Cvengros, Christensen, Hillis, & Rosenthal, 2007).

The findings from the present study are consistent with this conceptualization as well. Specifically, while mismatch between patient preference and perceptions of provider behavior was associated with less favorable outcomes, this relationship was only present for one type of asymmetry, namely those patients who endorsed a high preference for a type of behavior (e.g. information-sharing or encouragement of self-care) but a perceived a low level of these behaviors from provider. Conversely, those patients who endorsed a low preference for but high perception of these behaviors (e.g. mismatch in the opposite direction) did not have significantly poorer outcomes as compared to patients with symmetrical preferences and perceptions. Thus, it appears that outcomes are not simply associated with symmetry but with asymmetry in *a valued*

direction. Further research is need to directly examine the possibility that specific tenets of reactance theory (e.g. increased negative affect, perceived restriction of control) or perhaps other previously proposed mediators (e.g. increased therapeutic alliance, increased patient self-efficacy; Epstein & Street, 2007) explain the mechanisms by which greater patient-provider symmetry resulted in improved patient adherence.

The mechanism for how symmetry between patient preferences and reported provider behavior occurs on each of these domains in unknown. One hypothesis is that provider behavior in each of these domains is trait-like and degree of symmetry is determined by the extent to which patients are fortuitously matched, or seek out, providers who have similar preferences. Alternatively, provider behavior may be more malleable and match may be due to tailoring of provider behavior in response to patient preferences. Each of these theories has a different implication for clinical practice. If providers are *unable* or unwilling to tailor their practice behavior, more careful matching of patients with providers prior to initial appointments based on key preferences would be warranted. If providers *are able* to tailor their behavior, education of providers should focus on teaching providers to recognize variations in patient preferences and teaching providers appropriate ways to tailor their care in response to these preferences. Finally, a recent study suggests that both processes may be at work in a single patient-provider interaction. Street, Gordon, & Haidet (2007) found that provider communication was influenced by both trait-like factors, such as a provider's orientation to the patient-provider relationship, as measured by the PPOS, and state-like factors, such as providers' perceptions of the patient's effectiveness as a communicator during the visit.

While the findings of the present study are provocative, the study is not without limitations. First, this study is limited by the assessment of provider behavior. The choice to

rely on patient proxy reports of provider behavior at a single appointment is not ideal and may not represent an accurate assessment of provider behavior. Furthermore, the present study only assessed the presence or absence of a provider behavior and not degree to which these behaviors occurred. Future research should include assessments of both perceived provider behavior and behaviorally-coded provider behavior. Second, this study is limited with respect to generalizability given the homogeneity of the sample. Specifically, congruence on various domains of provider behavior may be more or less important for patient outcomes in other patient groups. It is likely that this relationship is important in various chronic illness populations, including patients with hypertension, cardiovascular disease, and obesity. The study is also limited by a low response rate which may account for the marginal effect found for glycemic control. However, is it notable that despite this marginally significant findings, in comparison of the groups based on congruence of patient preferences and perceptions of behavior, those patients in the highest tertile had hemoglobin A1c values that were clearly above the recommended 7.0% while patients the in the other two groups had values below this clinical cutoff.

In addition, this study is limited by a single assessment of patient preferences. Patient preferences may vary in response to the way information is presented (Peters, et al., 2007) or in response to clinical factors. For example, patients may prefer more information-sharing and shared decision-making upon initial diagnosis and treatment planning, but may relinquish decision making to their provider after a series of failed treatments, or vice versa. Finally, additional work is also needed to further understand the mechanisms by which congruence between patients and their providers occurs (e.g. by appropriate matching of patients to providers, by modulation of provider behavior in response to patient preferences, or by both

processes simultaneously) and mechanisms by which this increased symmetry between patient and provider influences patient adherence and clinical outcomes. In particular, future studies that address the "reactance theory" of poor adherence are needed, as the design of the present study did not allow for direct testing of this theory.

Given the increasing prevalence of chronic conditions and the detrimental impact of poor adherence both at the individual and societal level, it is crucial to find robust predictors of patient adherence and to develop interventions to improve adherence. Previous literature has suggested that the search for direct or main effect predictors of adherence has yielded insufficient findings and highlighted the need for the development of more interactive and complex models for understanding adherence.

Table 1

Provider Behavior Questionnaire (PBQ) Items

Information Sharing and Shared Decision-Making		
1. Dr. Smith gave you information about your health to read or to look up at home.	Agree	Disagree
2. Dr. Smith asked about your preference regarding treatment options.	Agree	Disagree
3. Dr. Smith provided you with a full explanation of your test results and medical condition without your asking.	Agree	Disagree
Behavioral Involvement and Self-Care		
4. Dr. Smith encouraged you to learn more about managing your diabetes yourself.	Agree	Disagree
5. Dr. Smith encouraged you to use your own judgment when managing your diabetes on your own.	Agree	Disagree
6. Dr. Smith suggested that you take an active role in managing your diabetes.	Agree	Disagree
Provision of Socioemotional Support		
7. Dr. Smith asked if you had been feeling stressed or overwhelmed lately.	Agree	Disagree
8. Dr. Smith asked about any stressors in your life, such as work stress or family stress.	Agree	Disagree
9. Dr. Smith asked about your personal life.	Agree	Disagree

Table 2

Significance Values, Effect Sizes, and Model Fit for the Primary Analyses

Domain	HgA1c	DA	PSQ
Information Sharing			
p-value	0.06* (0.07*)	0.56 (0.71)	0.03** (0.03)**
R^2 value	0.00 (0.02)	0.01 (0.08)	0.02 (0.05)
Effect size	-0.31 (-0.29)		
Behavioral Involvement			
p-value	0.86 (0.88)	0.05** (0.04**)	0.04** (0.03**)
R^2 value	-0.03 (0.01)	0.03 (0.10)	0.01 (0.04)
Effect size		0.36 (0.39)	-0.38 (-0.39)
Socioemotional Support			
p-value	0.66 (0.86)	0.56 (0.71)	0.06* (0.06*)
R^2 value	-0.01 (0.01)	-0.01 (0.06)	0.01 (0.04)
Effect size			-0.38 (-0.38)

Note: Values for adjusted models in parentheses. HgA1c = hemoglobin A1c, DA = self-reported diabetes adherence, and PSQ = patient satisfaction. *Significant at the p <0.10 level. **Significant at the p<.05 level.

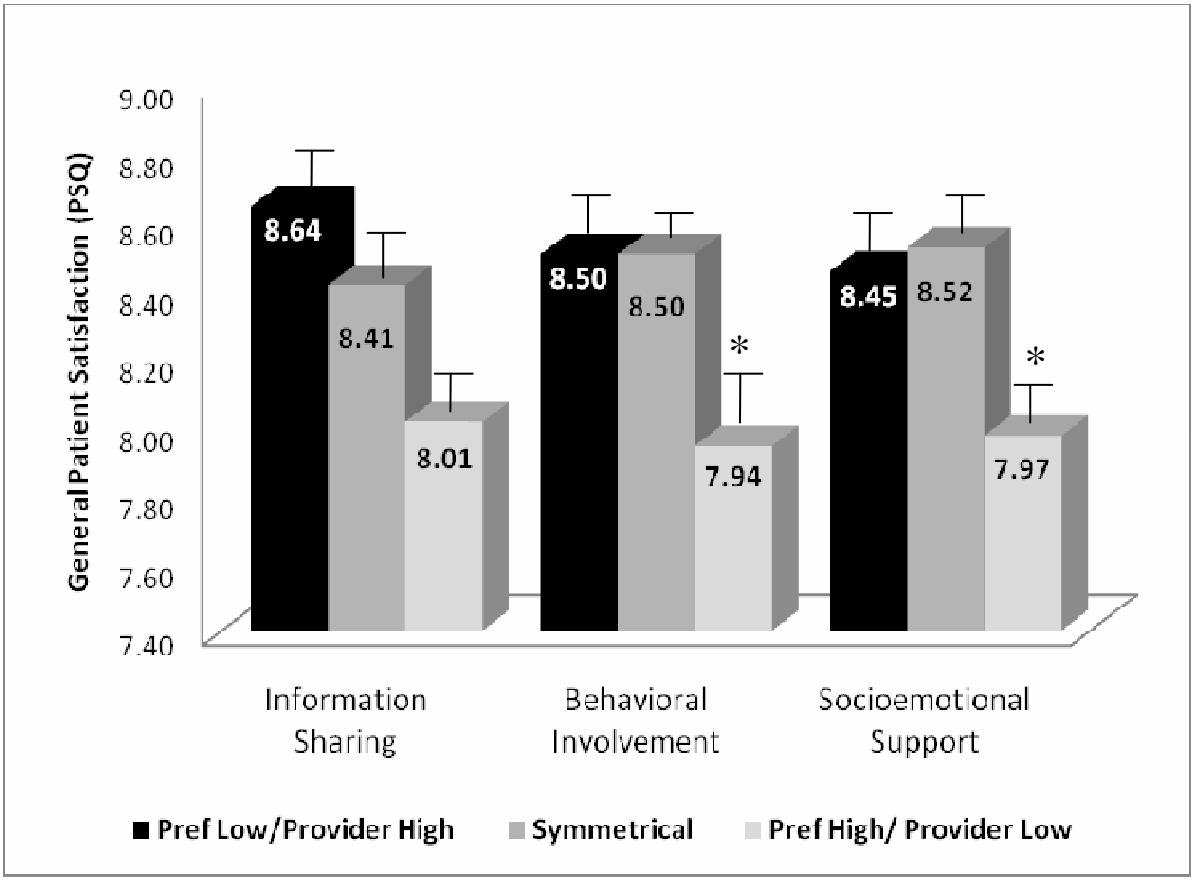

Figure 1. Effect of Symmetry on Patient Satisfaction. Higher scores indicate greater patient satisfaction. Error bars represent standard error of the mean. *Significantly lower general patient satisfaction as compared to the symmetrical group.

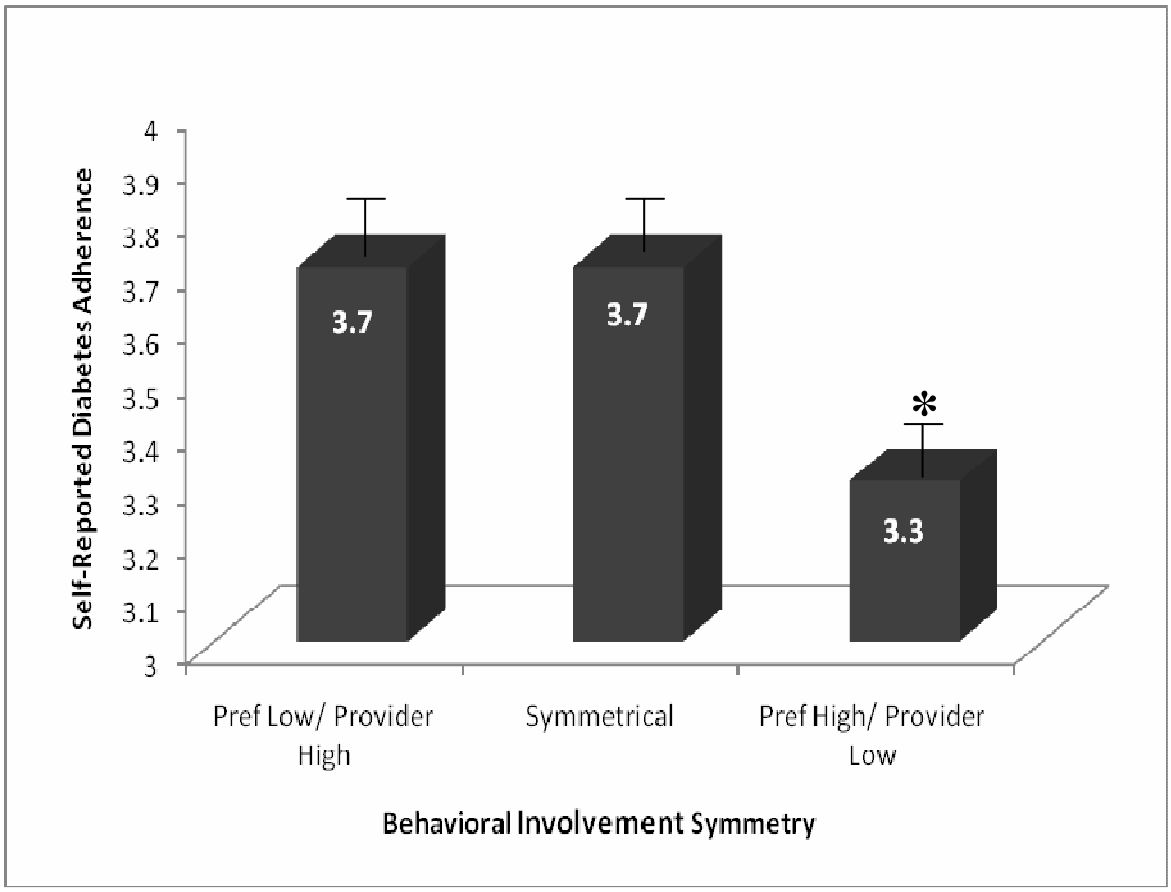

Figure 2. Effect of Symmetry in Behavioral Involvement on Diabetes Adherence. Lower scores indicate poorer self-reported adherence. Error bars represent standard error of the mean. *Significantly lower self-reported adherence as compared to the symmetrical group.

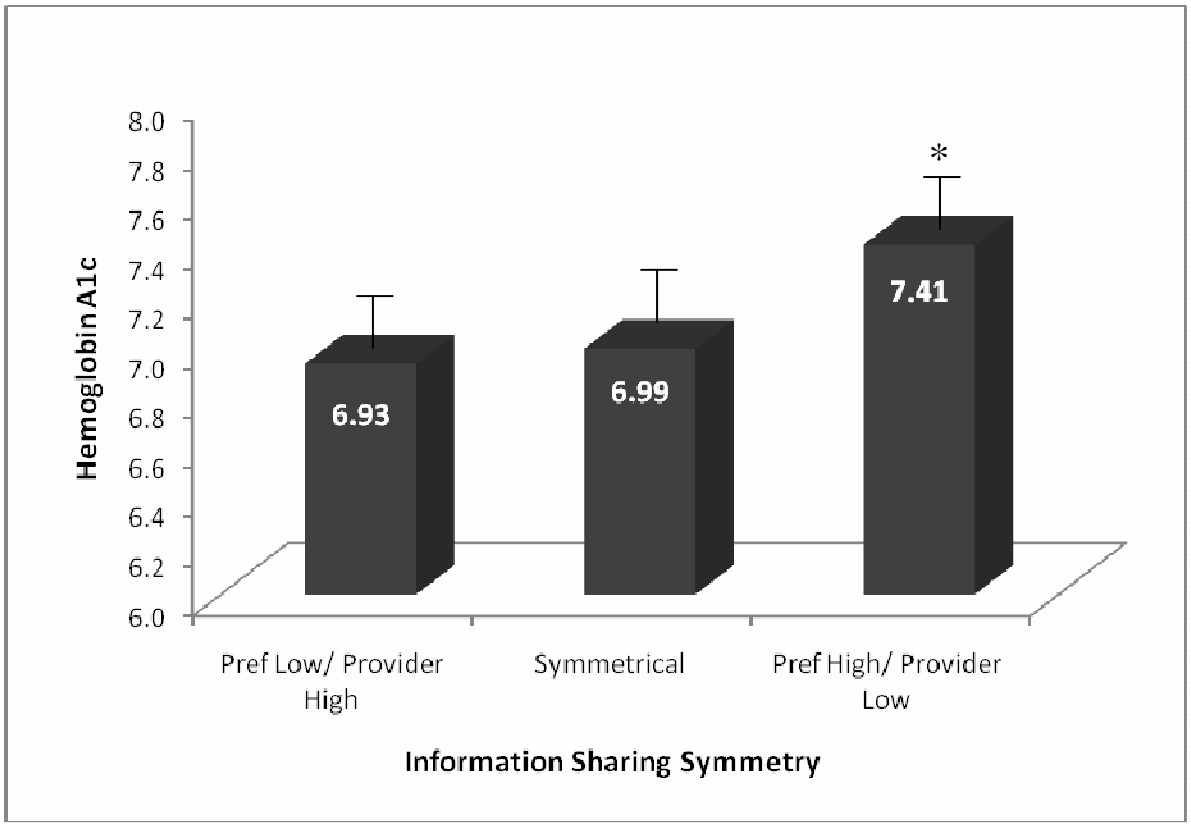

Figure 3. Effect of Symmetry in Information sharing on Hemoglobin A1c. American Diabetes Association standards recommend hemoglobin A1c of 7.0% or less. Error bars represent standard error of the mean. *Marginally higher hemoglobin A1c (p=.06), reflective of poorer adherence, as compared to symmetrical group.

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