Patient Perception, Preferences and Participation

How much does trust really matter? A study of the longitudinal effects of trust and decision-making preferences on diabetic patient outcomes

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A B S T R A C T

Objective: To examine the impact of trust on patient outcomes (satisfaction, HbA1c, physical and mental health-related quality of life (HRQoL)) and to investigate the role of decision-making preferences in the trust–outcome relationship.

Methods: We conducted a one-year longitudinal analysis of 614 type 2 diabetic patients (mean age: 59.3 years; mean disease duration: 6.7 years). Patients’ self-administered questionnaires and medical record were used for the research. Multiple regression analyses were conducted to investigate the relationship among variables during a 12-month follow-up. Further, we used latent growth modeling (LGM) to assess changes in health outcomes and to examine how these changes were related to trust.

Results: Regression analyses revealed that trust was positively related to glycemic control, physical HRQoL, and satisfaction at 12 months. Patients with higher decision-making preferences experienced a greater increase in subsequent satisfaction. The results of LGM showed that higher levels of trust were associated with greater increases in physical HRQoL.

Conclusion: Trust contributes to improvements in health outcomes. The relationship between trust and satisfaction may be stronger among patients with higher decision-making preferences.

Practice implications: For healthcare providers, efforts should be made to cultivate patients’ trust and enhance their decision-making preferences to maximize satisfaction and improve outcomes.

1. Introduction

Trusting a physician involves accepting being placed in a vulnerable situation on the basis of a patient’s positive expectations of that physician’s intentions and behavior (i.e., his or her fidelity and technical and interpersonal competency) [1]. Research studies define a strong correlation between a patient’s trust in his or her physician and that patient’s satisfaction [2,3], and report that trust is positively associated with symptom improvement [2], earlier cancer detection [4], and health-related quality of life (HRQoL) [5]. However, there is scarce empirical information about how trust actually contributes to improvements in both patients’ objective and self-rated outcomes over time [1,6].

Trust is critical in chronic illness management and may influence patient health outcomes in a number of ways. First, because poor adherence to a treatment regimen can undermine the effectiveness of chronic patient care, patients who express greater trust in their physician report increased adherence and willingness to seek care [3,7–9]. In addition, a patient’s trust is likely to reduce his or her uncertainty and increase his or her sense of control, thereby contributing to cognitive appraisals of self-efficacy in chronic illness [10]. When patients’ sense of efficacy is strengthened, they are more likely to be resilient, to adjust better to the sick role, and to report better health status. A trusting relationship is also likely to facilitate patient–physician interaction and thus support patient disclosure [11,12]. With adequate disclosure, physicians may better understand the patient’s situation and more appropriately plan and modify treatment in order to optimize the patient’s health. Finally, trust may positively affect a person’s health status by activating nonspecific, placebo-type self-healing processes [13,14]. Therefore, we hypothesize that patients’ trust in their physician is positively associated with patient outcomes in chronic illness over time.

Despite its benefits, a trusting relationship is not without its limitations. Patients with naïve trust may fail to recognize why their own contributions to health care are important [2,15]. They may decrease their preferences for active participation in decision making [16]. However, only patients know the problems they may
face in meeting their physicians’ treatment requirements, and only they can provide information complementary to the physician’s professional knowledge [17]. They may experience fewer barriers to treat adherence in chronic illness when they also prefer an active decision-making role [18,19]. It should be noted that trust and preferences for autonomy are not on opposite ends of a single continuum. High-trusting individuals are not necessarily naive and low monitoring. In other words, when patients have high preferences for autonomy in decision making, as well as high levels of trust, they may be more confident that their physicians will listen to their concerns, answer their questions honestly, and respect their views. An ongoing partnership of trust in chronic conditions such as diabetes may further foster problem-solving, information exchange, and involvement in decision making [20]. Through shared decision making, the fit between treatment and patients’ desires and lifestyles is more likely to meet expectations and increase satisfaction. High accuracy in the cooperation with physicians may also influence improvements in chronic health outcomes [21]. Accordingly, we hypothesized that patient decision-making preferences will moderate the positive relationship between trust and outcomes such that the relationship is stronger for patients who have high levels of decision-making preferences.

This study extends the existing trust–outcome literature as follows. First, since much of the current research relies mainly on self-rated measures of outcomes [25], researchers concerned about the limitations of this data advocate for objective, independently observed outcome measures to examine health outcomes [14]. We added an objective measure as key outcomes of interest. Further, we developed a richer antecedent model, which includes the interaction between patient trust and autonomy preferences. Finally, previous research has been primarily cross-sectional [2–4,8,10], while patient–physician relationship and patient care are inherently longitudinal. Our longitudinal design significantly contributes to our ability to examine these relationships.

2. Methods
2.1. Research site and participants

We examined self-reported longitudinal data from a group of patients with type 2 diabetes drawn from one medical center, one regional hospital, and one district hospital in Taiwan. Patients participating in the study were assessed at four time points: baseline (Time 1), 4-month (Time 2), 8-month (Time 3), and 12-month (Time 4) visits. We identified patients who had been diagnosed with type 2 diabetes at least one year prior to Time 1, were taking at least one antidiabetic medication, and were at least 18 years of age. Participants must have had a previous visit with the same physician in the clinic within 6 months of the index study visit. To minimize response bias, patients were approached outside the clinics. All patients were guaranteed that their participation was entirely voluntary, and that none of their caregivers would see their responses. The study methodology and materials were reviewed and approved by the Local Institutional Review Board, and written consent was obtained from each patient before enrollment. A total of 700 patients met the eligibility criteria and were recruited between March 2006 and March 2007, and the 614 patients (87.7%) who responded were enrolled in the study. Of these respondents, 84.0% (516), 75.4% (463), and 64.5% (396) completed the 4-month, 8-month, and 12-month follow-ups, respectively. The average disease duration of patients was 6.7 years. The mean baseline HbA1C level was 7.96% (SD = 1.77%). With regard to the type of treatment, 84.9% of the patients used oral antidiabetic medications, 10.4% of the patients were on insulin therapy, and 4.7% of patients were treated with a combination of insulin and oral antidiabetic medications. The mean age of patients was 60.5 years (SD = 12.68), and 42.6% were female. Education level varied, with 20.9% reporting an undergraduate education or higher, 37.2% reporting a high school education as their highest level of education, and 41.9% reporting an elementary school education or less.

2.2. Measures

All questionnaires were translated by one of the coauthors from English to Chinese using a forward translation/backward translation methodology, followed by bilingual group evaluation and consensus [22] (see Appendix A). We assessed trust at Time 1. Patient health outcomes (glycemic control, physical and mental HRQoL) were measured at Time 1, Time 2, Time 3, and Time 4. To reduce the burden on respondents, satisfaction was only measured at Time 1 and Time 4. As patients’ desire for autonomy is a fairly stable construct that is not likely to change over short periods of time [23], patient decision-making preferences were assessed at Time 2 to reduce the effects of common method bias [24].

Control variables: Patients’ age, gender, educational level, and the duration of their diabetes were included as control variables in our analyses.

Trust in the physician: Trust was measured with 11 items from a scale developed by Anderson and Dedrick [25]. When completing the items, respondents were instructed to think of the diabetes doctor who provided their care. Thom et al. [9] provided evidence for the construct and predictive validity of the scale. The internal consistency reliability (Cronbach’s alpha) for trust measure was .85.

Decision-making preferences: Individual’s preference for involvement in clinical decision-making was measured with six items by referring to a subscale of the Autonomy Preference Index [26]. The internal consistency reliability was .66.

Objective outcome variable: We assessed objective health outcomes by measuring glycosylated hemoglobin (HbA1C; reference range 4.0–6.0%). HbA1C is a widely accepted indicator of recent (last three months) glycemic control and is a guide to clinical management [27]. The laboratory test data was obtained from medical records in a four-month period after the surveys were administered.

Self-rated health status: Self-rated health status was measured using the SF-12 (version 2, standard form) [28], which was developed to assess physical and mental HRQoL. Scoring for the SF-12’s mental component summary scale (MCS-12) and physical component summary scale (PCS-12) from the 12 questions on health is outlined in the SF-12 manual.

Satisfaction: We measured satisfaction using the Patient Visit-Specific Questionnaire developed by Davies and Ware [29]. The original scale contains nine items measuring patients’ satisfaction with outpatient visits overall. However, for the purpose of evaluating patients’ perceptions of satisfaction with their physicians, only five related items were used. The internal consistency reliability for the Time 1 measure was .93; for Time 4, it was .96.

2.3. Data analyses

Prior to analysis, the variables were examined for accuracy of data entry and missing values. No variable had a significant number of missing values. To make use of all possible data and reduce the likelihood of biased estimates, imputation of missing data was conducted using an EM-based (Expected Maximization) procedure using version 8 of the LISREL program [30].

Data was analyzed in the following major phases. First, multiple regression analyses were conducted to investigate the relationship between trust and outcomes at 12-month follow-up. As moderated multiple regression is one of the statistical tools most commonly
used for testing interactions [31,32], regression models also tested centered scores for trust, decision-making preferences, and the product terms for the trust × decision-making preferences. Finally, latent growth modeling (LGM) has recently gained widespread acceptance as a powerful approach to the description, measurement, and analysis of longitudinal change, and has several advantages over traditional methods for constructing complex and dynamic models that assess change [33]. We used LGM to model developmental change of health outcomes over one-year period.

LGMs are usually evaluated in two steps. The first step features the specification and evaluation of a basic change model (i.e., unconditional LGM) that involves just the repeated measures variable. The goals of the first step are to model the measurement errors and determine whether there is sufficient variance in the vector of change to be accounted for by other predictors in the research framework. Given an acceptable model of change, the second step in the analysis (i.e., conditional LGM) usually involves adding variables to the unconditional LGM that may predict initial status or rate of change. Estimates of the direct effects of the predictors (in our case, patient trust) on the latent growth factors indicate whether subjects’ initial levels or rates of change on the repeated measures variable can be explained by the predictors. Readers are referred to several additional studies for more technical details associated with the use of LGM [33–35].

3. Results

Comparisons between the 396 patients who completed the study and the 218 who dropped out revealed that the group of patients who did not complete the study had a lower mean age (58.2 vs. 60.5 years, p < .05) and a higher HbA1C level at Time 1 (8.35 vs. 7.52, p < .01); in addition, a lower percentage were female (33% vs. 43%, p < .05). The two groups did not differ significantly in terms of education, duration of diabetes, HRQoL, or satisfaction at Time 1. Trust was related to continuity with a physician. Patients who left their physicians between Time 1 and Time 4 reported significantly lower levels of trust at Time 1 (mean = 80.54) than those who had not left their physicians (mean = 83.45, t = −3.08, p < .01).

3.1. Multiple regression results

On a cross-sectional basis of 614 patients, trust was negatively correlated with HbA1C and positively correlated with mental HRQoL and satisfaction. We further tested using several sets of regressions, one for each dependent variable at Time 4. As Table 1 reveals, after controlling for age, gender, education, duration of diabetes, and corresponding outcomes at Time 1, trust was still found to be negatively related to HbA1C (ΔR² = .02, β = −.13). Trust also had a positive association with physical HRQoL (ΔR² = .02, β = .14) and satisfaction (ΔR² = .02, β = .17), but minimal association with mental HRQoL.

Independent variables were centered around zero to reduce multicollinearity [36]. As Table 2 shows, the trust × decision-making interaction term was significant for the relationship between trust and satisfaction (ΔR² = .02, β = .11), but not significantly related to HbA1C, physical HRQoL, or mental HRQoL.

Following Aiken and West’s [36] recommendations, the nature of the interaction was determined by plotting the relationship between trust and satisfaction at high and low levels of decision-making preferences (defined as +1 and −1 standard deviation from the mean). Fig. 1 demonstrates that, for patients with high levels of decision-making preferences, there was a stronger relationship between trust and satisfaction. Specifically, a significant association between trust and satisfaction occurred only at the higher levels of decision-making preferences (b = .23, t = 2.73, p < .01). In contrast, at lower levels of decision-making preferences the association between trust and satisfaction was not significant (b = .02, t = .16).

3.2. Unconditional LGM models

A series of LGM models were tested to determine the viability of the curve-of-factors LGM in relation to HRQoL. Each assessment of the repeated measures variable is specified as an indicator of two latent growth factors: one that represents subjects’ initial status (i.e., the intercept), and the other, the rate of change over time (i.e., the slope). Table 3 presents model fit indices and curve parameters for unconditional models of HRQoL assuming linear, freely estimated (nonlinear), and quadratic functional forms.

For physical HRQoL, the linear model does not fit the data particularly well. Leaving the functional form unspecified results in a significant improvement in model fit (χ² difference (2) = 19.94, p < .01). This nonlinear model provides the best fit to the data (χ² (df) = 10.31 (6), CFI = .98, RMSR = .032, RMSEA = .058). Adding a latent quadratic term to the model does not improve the fit substantially (χ² difference (2) = 1.94, n.s.). The more parsimonious nonlinear model, which adequately represented the underlying trajectory, was thus used for subsequent analyses.

Significant mean levels existed for the higher-order common factors of the physical HRQoL intercept (mean = 48.55, t = 90.58) and slope (mean = 1.12, t = 2.03) in the nonlinear model. Individual differences in the higher-order intercept and slope factors were

<table>
<thead>
<tr>
<th>Variables</th>
<th>Objective health outcomes</th>
<th>Self-rated outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HbA1C</td>
<td>Physical HRQoL</td>
</tr>
<tr>
<td>Control</td>
<td>Age</td>
<td>−.25*</td>
</tr>
<tr>
<td></td>
<td>Sex</td>
<td>.11</td>
</tr>
<tr>
<td></td>
<td>Education</td>
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</tr>
<tr>
<td></td>
<td>Duration of diabetes</td>
<td>.15</td>
</tr>
<tr>
<td></td>
<td>Outcomes at Time 1*</td>
<td>.30*</td>
</tr>
<tr>
<td>Independent variable</td>
<td>Trust</td>
<td>−.13*</td>
</tr>
<tr>
<td></td>
<td>ΔR² (trust)</td>
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</tr>
<tr>
<td></td>
<td>Adjusted R²</td>
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</tr>
<tr>
<td>F-value</td>
<td>8.72*</td>
<td>10.48*</td>
</tr>
</tbody>
</table>

N = 396. Tabled values are standardized regression coefficients.

* p < .05; ** p < .01; two-tailed tests.

* Each regression analysis is controlled by the corresponding outcome variable at Time 1 (HbA1C, physical HRQoL, mental HRQoL, and satisfaction, respectively).
Table 2
Regression results of the interactions of trust and decision-making preferences on patient outcomes.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Objective health outcomes</th>
<th>Self-rated outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HbA1c</td>
<td>Physical HRQoL</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>−.25**</td>
<td>−.11</td>
</tr>
<tr>
<td>Sex</td>
<td>.13</td>
<td>−.01</td>
</tr>
<tr>
<td>Education</td>
<td>−.07</td>
<td>.00</td>
</tr>
<tr>
<td>Duration of diabetes</td>
<td>.18</td>
<td>−.10</td>
</tr>
<tr>
<td>Outcomes at Time 1</td>
<td>.37</td>
<td>−.35</td>
</tr>
<tr>
<td>Trust**</td>
<td>−.16</td>
<td>−.18**</td>
</tr>
<tr>
<td>Decision-making preferencesb</td>
<td>.05</td>
<td></td>
</tr>
</tbody>
</table>

Interaction

| Trust x decision-making preferencesb | −.03 | −.07 | −.09 | .11 |
| ΔR² (interaction) | .00 | .01 | .01 | .02 |
| Adjusted R² | .20 | .24 | .20 | .23 |
| F-value | 5.10** | 8.13** | 6.55** | 7.48** |

N=396. Tabled values are standardized regression coefficients.

* Each regression analysis is controlled by the corresponding outcome variable at Time 1 (HbA1c, physical HRQoL, mental HRQoL, and satisfaction, respectively).

b Trust and decision-making preferences are all centered scores.

p < .05; two-tailed tests.

p < .01; two-tailed tests.

Figure 1. The moderating role of decision-making preferences on the relationship between trust and satisfaction.

Table 3
Model fit indexes and curve parameters for unconditional latent growth models of physical and mental HRQoL under various functional forms.

<table>
<thead>
<tr>
<th>Model fit indexes</th>
<th>Growth curve parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intercept (initial status)</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Physical HRQoL</td>
<td></td>
</tr>
<tr>
<td>Linear model</td>
<td>30.25 (8)</td>
</tr>
<tr>
<td>Freely estimated model</td>
<td>10.31 (6)</td>
</tr>
<tr>
<td>Quadratic model</td>
<td>8.37 (4)</td>
</tr>
<tr>
<td>Mental HRQoL</td>
<td></td>
</tr>
<tr>
<td>Linear model</td>
<td>21.95 (8)</td>
</tr>
<tr>
<td>Freely estimated model</td>
<td>8.39 (6)</td>
</tr>
<tr>
<td>Quadratic model</td>
<td>4.39 (4)</td>
</tr>
</tbody>
</table>

N=396. All models assume constant error variances.

a For the freely estimated model, this represents the total change over the period rather than a linear slope.

b p < .05; two-tailed tests.

p < .01; two-tailed tests.

Also significant (variances = 38.35, t = 6.24, and variance = 30.65, t = 4.01, respectively). These findings indicate that, at the group level on average, there is a significant increase (positive slope) in physical HRQoL from Time 1 to Time 4, with significant variation among patients in their initial physical HRQoL at Time 1 (intercept) and in their trajectory (slope) from Time 1 to Time 4.

For mental HRQoL, the nonlinear model again provides the best fit of data: $\chi^2 (df) = 8.39$ (6), $p = .211$, CFI = .99, RMSEA = .016, RMSEA = .043 (Table 3). Adding a latent quadratic term to the model does not result in a significant improvement in model fit ($\chi^2$ difference (2) = 4.00, n.s.). Significant mean levels existed for the higher-order common factors of the mental HRQoL intercept (mean = 49.62, $t = 7.89$) and slope (mean = .53, $t = 2.18$). Individual differences in the higher-order intercept and slope factors were also significant with variances = 50.78, $t = 5.99$, and variance = 5.75, $t = 4.17$, respectively.

We further tested the latent growth model of HbA1c. The nonlinear model does not fit the data well: $\chi^2 (df) = 43.42$ (6), $p < .01$, CFI = .91, RMSR = .044, RMSEA = .171. The significant mean levels existed only for the higher-order common factors of HbA1c intercept (mean = 7.44, $t = 7.81$), but not for the HbA1c slope (mean = .00, $t = .02$).

In summary, the results of the unconditional LGM models indicated the appropriateness of the curve-of-factors for describing the nature of physical and mental HRQoL; however, the modeling results did not support the expected underlying developmental trajectories of HbA1c.

3.3. Conditional LGM models

A key step of LGM is specifying factor loadings for the latent intercept factor and the slope factor to other variables of interest. Given an acceptable model of change, the next model tested for physical HRQoL was a nonlinear conditional model with the predictor and control variables included (Fig. 2). The conditional model resulted in the following acceptable fit indices: $\chi^2$
studies was between (14). Figure 2 presents the conditional latent growth model of physical HRQoL. Fit indexes: $\chi^2 (df) = 21.98$ (14), $p = .079$, CFI = .98, RMSR = .029, RMSEA = .052. Demographic variables of age, sex, education, and duration of diabetes were included in the model to control their possible effects on physical HRQoL over time. Values associated with each path between exogenous variables and growth factors are standardized regression coefficients. The basis terms (factor loadings) of the intercept are fixed at 1 and the basis terms of the slope are fixed $[0, *, *, 1] \cdot p < .05$; $** p < .01$; two-tailed tests.

(14) = 21.98, $p = .079$, CFI = .98, RMSR = .029, RMSEA = .052. High levels of trust were related to higher initial physical HRQoL. ($\beta = .18$, $p < .01$). The slope, with positive growth from Time 1 through 4, demonstrated that patients with initially higher levels of trust experienced greater increases in physical HRQoL from Time 1 to Time 4 than patients with lower levels of trust ($\beta = .14$, $p < .05$).

The path diagram corresponding to mental HRQoL is presented in Fig. 3. This model was estimated and found to fit the data well. Results indicated that trust significantly predicted the intercept factor such that patients with higher levels of trust reported higher initial levels of mental HRQoL ($\beta = .27$, $p < .01$); however, trust did not significantly predict the slope factor ($\beta = -.04$, n.s.).

4. Discussion and conclusion

4.1. Discussion

Much of the theoretical literature on patient–physician relationships mentions trust as an important construct, yet few studies have been devoted to investigating the relationship between trust and outcomes. Our study results showed that trust was positively related to three forms of patient outcomes: glycemic control, physical HRQoL, and satisfaction. The results of the latent growth model demonstrated that trust significantly predicted initial levels of physical and mental HRQoL. Additionally, trajectories of physical HRQoL continued to be shaped by patient trust. As continuity of care has been shown to have a positive impact on diabetes outcomes [37], the data also revealed that trust could predict continuity with a physician in a one-year period.

The results of our study are surprisingly strong when several facts are taken into consideration. Much of the past research has relied mainly on self-reported measures of outcomes [2,5,38]. This study advances our understanding of trust–outcome relationships by adding objective measures as key outcomes of interest. It is argued that coarser measures, such as global self-rated health, may achieve less statistical power [39]. Rather than measuring self-rated health with a single item as other studies on similar topics do [2,38], we adopted the more sophisticated SF-12 health survey to assess this construct. Finally, the laboratory data and reports of patient outcomes were obtained one year after trust was measured; therefore, the effects of trust may be cumulative and enduring. The longitudinal study design also minimizes potential bias of common method variance [24].

In the regression analysis, trust explained more of the variance of mental HRQoL than of physical HRQoL before adjusting for baseline outcomes. After baseline outcome variables were controlled, trust was found to be significantly related only to physical

Fig. 2. Conditional latent growth model of physical HRQoL. Fit indexes: $\chi^2 (df) = 13.96$ (14), $p = .452$, CFI = 1.00, RMSR = .018, RMSEA = .000. Demographic variables of age, sex, education, and duration of diabetes were included in the model to control their possible effects on mental HRQoL over time. Values associated with each path between exogenous variables and growth factors are standardized regression coefficients. The basis terms (factor loadings) of the intercept are fixed at 1 and the basis terms of the slope are fixed $[0, *, *, 1] \cdot p < .05$; $** p < .01$; two-tailed tests.

![Diagram](image-url)
HRQoL. Additionally, LGM showed that higher levels of trust were associated with both better physical HRQoL at baseline, and higher rates of increase over time. Although the data also revealed that trust was related to initial levels of mental HRQoL, highly trusting patients did not experience increases in mental HRQoL compared to patients who exhibited low levels of trust. Together with the regression results of trust on patients’ glycemic control, the impact of trust on functional health outcomes seemed to be greater than on mental health outcomes. As trust is a psychological state with a strong emotional component [14], it may be reasonable to expect that trust exerts stronger effects on mental health outcomes; however, there is also evidence that trust in physicians predicts ranges of health behavior that are critical for functional health [40]. For instance, patients with a higher degree of trust are significantly more likely to take prescribed medication [9], follow their doctor’s recommendations [7], and perceive less difficulty in completing diabetes-related care activities [41]. Our analyses demonstrate that trust produces stronger impacts on physical health outcomes over time, which is in contrast to previous research [5].

This study also included decision-making preferences as a moderator in the relationship between trust and outcomes. Patients with high decision-making preferences experienced a greater increase in subsequent satisfaction following their initial trust measurement than did patients with low decision-making preferences. It is interesting to note that our results showed that decision-making preferences were negatively related to satisfaction. Recent research has identified that the benefits of patient preference for involvement may be reduced when the patient wants to make decisions alone [18,42]. We found, however, that trust was able to mitigate the negative relationship between decision-making preferences and satisfaction. Patients who report the highest satisfaction are those who measure high in decision-making preferences and high in their trust. This finding implies that, for patients desiring active participation in decision making, forming trusting relationships with their physicians might significantly increase their satisfaction.

Although reported interaction effects were not significant on the health outcome measures (i.e., HbA1c, HRQoL) in this study, possible explanations highlight the difference between attitude (decision-making preferences) and behavior (active participation), recognizing that we asked about patient preferences rather than about the results of their actual clinical encounters [43]. In addition, prior research found that there are still a significant number of physicians who adopt a paternalistic approach toward their patients [44]. Even if patients desire high levels of autonomy, patient participation in decision making is less likely if their physicians do not support patients’ choice with regard to their care.

Some study limitations should be considered. First, our analyses revealed that patients who completed the study had relatively good diabetic control at Time 1. This implies that our finding may underestimate the effect of trust on diabetes outcomes. The relatively low HbA1c level in our participants may also diminish our ability to detect the trajectory of patients’ blood glucose levels in LGM. Future researchers are encouraged to include other acute or chronic complications of diabetes as outcome variables of interest. Second, researchers have argued that the relationship between trust and outcomes is probably reciprocal [14]; however, our regression analyses were performed after adjusting for patient outcomes at Time 1. LGMs further showed that trust predicted trajectories of physical HRQoL. Accordingly, we feel that a trust-to-outcome causal direction is much more likely in this study. Finally, as combining qualitative and quantitative approaches can provide a description of complex, nonlinear interactions that are not easily modeled in quantitative analyses [45], future research should integrate qualitative methods for deeper understanding of the patients’ values and experiences.

4.2. Conclusion

There is a paucity of longitudinal studies that evaluate the linkage between trust and patient outcomes. This study provided evidence that trust in physicians could contribute to improvements in patient outcomes over time. The relationship between trust and satisfaction might be stronger among patients with high levels of decision-making preferences.

4.3. Practice implications

Given the importance of trust and its impact on patient health outcomes, incorporating measurement of patient trust into the evaluation of quality of care merits consideration. For policy-makers and health care providers, the elements of physician behavior and organizational factors that can foster trust should be emphasized. We also suggest future research to develop strategies for simultaneously cultivating patients’ trust and enhancing their preferences for involvement in decision making to maximize patient satisfaction.

Acknowledgment

We would like to thank Dr. TK Peng for his input in the design of this study.

Appendix A

A.1. Trust in physician scale

Rating on Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) for each item.

1. I doubt that my doctor really cares about me as a person.
2. My doctor is usually considerate of my needs and puts them first.
3. I trust my doctor so much that I always try to follow his/her advice.
4. If my doctor tells me something is so, then it must be true.
5. I sometimes distrust my doctor’s opinion and would like a second one.
6. I trust my doctor’s judgment about my medical care.
7. I feel my doctor does not do everything he/she should for my medical care.
8. I trust my doctor to put my medical needs above all other considerations when treating my medical problems.
9. My doctor is a real expert in taking care of medical problems like mine.
10. I trust my doctor to tell me if a mistake was made about my treatment.
11. I sometimes worry that my doctor may not keep the information we discuss totally private.

A.2. The Autonomy Preference Index Decision-Making (API-D) scale

Rating on Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) for each item.

1. The important medical decisions should be made by the doctor, not by you.
2. You should go along with your doctor’s advice even if you disagree with it.
3. When hospitalized, you should not be making decisions about your own care.
4. You should feel free to make decisions about everyday medical problems.
5. If you were sick, as your illness became worse you would want the doctor to take greater control.
6. You should decide how frequently you need a checkup.

A.3. Patient Visit-Specific Questionnaire

Here are some questions about the visit you just made. In terms of your satisfaction, how would you rate each of the following?
Rating on Likert scale ranging from 1 (poor) to 5 (excellent) for each item.

1. Time spent with the person you saw.
2. Explanation of what was done for you.
3. The technical skills (thoroughness, carefulness, competence) of the person you saw.
4. The personal manner (courtesy, respect, sensitivity, friendliness) of the person you saw.
5. The visit overall.

References
