Both Trusting and Understanding Medical Advice: Assessing Patient Alliance and Confusion after Medical Consultations

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Abstract

Objective

The current objective is to validate the Medical Consultation Experience Questionnaire (MCEQ) and to examine distinctions between constructs of patient perceived alliance and experienced confusion in relation to key health outcomes.

Methods

A total of 857 participants were recruited online across two samples (adults with various medical conditions and with diabetes and/or hypertension specifically).

Results

A confirmatory factor analysis demonstrated good fit and high item loadings for the theoretical bifactor model. Item response theory analyses showed very high individual item discrimination and good test information across a wide range of values. Confusion was uniquely and significantly more strongly related to psychological distress than was alliance; the same was true for alliance with positive affect. Both alliance and confusion significantly contributed to treatment motivation. Only confusion explained unique variance in control of HbA1C levels and blood pressure after controlling for alliance and other variables.

Conclusions

The MCEQ is a valid instrument for assessing distinct constructs of alliance and confusion. Future research should focus on the unique role of confusion for patient outcomes.

Practice Implications

By using the MCEQ to assess patient alliance and confusion, it may be possible to detect and prioritize individual patient needs and improve patient outcomes.

Keywords: patient-practitioner alliance; patient confusion; assessment; patient distress; mental health; affect; treatment motivation; HbA1C; blood pressure

1. Introduction

When physicians conduct medical consultations, two key goals are establishing a good interpersonal relationship and providing information [1,2]. Success in meeting these goals can be assessed using patient reports. When the relationship goal is met, the patient perceives strong *alliance* with the practitioner; when the information goal is met, the patient experiences little *confusion*. One instrument, the Medical Consultation Experience Questionnaire (MCEQ), assesses both dimensions [3]. This instrument is unique in two important ways: first, it has better psychometric properties (clear factor structure and good discrimination); and second, it separately assesses alliance and confusion. Although the MCEQ is potentially an ideal measure of patient experience, there is only one published report **evaluating** its validity. There is a need to replicate results using different samples, and to clarify distinctions between alliance and confusion.

1.1 Unique Characteristics of the MCEQ

The MCEQ's theoretical model suggests that alliance and confusion are two distinct constructs. A physician may have interpersonal skills that facilitate trust and make patients feel valued (high alliance) but lack teaching skills that help patients understand and retain medical information (low confusion). This distinction is especially important if patients naturally perceive interactions with practitioners along these dimensions. Indeed, Sanford and colleagues found that the MCEQ scales measuring alliance and confusion demonstrated a two-dimensional factor structure in a sample of people with diabetes and/or hypertension [3]. However, factor analyses often fail to replicate; moreover, other scales purporting to measure dimensions of patient experience have demonstrated poor factor structure [4,5], suggesting that patients may struggle to distinguish between specific dimensions of experience. Therefore, it is important to

test the extent to which the factor structure of the MCEQ can be replicated in both in a similar population **to** the original study (people with diabetes and/or hypertension) and in other populations of adult patients.

The MCEQ was also designed to address a significant problem plaguing patient rating scales: other scales **are often** severely skewed, with most people selecting the most positive response option to every question [6,7]. This skewness is problematic because it reduces the test discrimination; such scales can identify highly disgruntled patients, but they cannot discriminate among the experiences of a majority of patients (who believe that minimal standards of medical care have been met). Consequently, existing scales are of limited use for making program decisions in applied settings and will fail to detect effects in studies with average patient populations. When constructing the MCEQ, Sanford and colleagues sought to identify items with the best distributional properties by using item response theory analyses in exploratory studies [3]. The final MCEQ provided good discrimination (a test information curve indicating a reliability greater than .80) across a range of people within one standard deviation above or below the latent mean. Other measures failed to achieve this target, including the widely used Consumer Assessment of Healthcare Providers and Systems [8] which provided almost no discrimination whatsoever above the mean. However, these results represent a single published report; given the importance of this issue, there is a need for replication. In addition, the original study did not report item discrimination values, a more stringent criterion for testing scale precision.

1.2 Alliance and Confusion in Relation to Affective Outcomes

Although many existing scales measure patient-practitioner alliance, patient "satisfaction", or ratings of "quality", the MCEQ is unique in separately assessing the distinct

construct of patient confusion. This is potentially important if confusion differs from alliance in predicting crucial patient outcomes. Compared to alliance, confusion should be more strongly related to psychological distress (stress, negative affect, and medical anxiety) because confusion may exacerbate perceiving medical events as uncontrollable (a key perception associated with distress) [9,10]. Crucially, such distress is associated with poor adherence to medical advice and inferior treatment outcomes [11,12]. Previous research suggests that confusion during a medical consultation is associated with distress [3,13,14], perhaps to a greater degree than the results of poor alliance. A key reason for assessing patient confusion is that confusion may have a stronger association with distress than alliance does and may explain additional variance in distress over and above alliance.

To further clarify important distinctions between alliance and confusion, it is also necessary to identify outcomes best predicted by alliance such as positive affect. Positive and negative affect are not opposites; they have different mechanisms of effect on health [15,16] and are both important antecedents of adherence to medical advice [17–20]. Interpersonal relationships contribute strongly to positive affect, because experiences of affiliation spark positive emotional responses that generalize outside the relationship [21]. Accordingly, when patients perceive a good working alliance with their practitioner they experience more positive affect toward their treatment and practitioner [22,23]. Therefore, there should be distinctions between confusion and alliance in relation to psychological distress and positive affect. Confusion should have a unique and especially strong association with psychological distress, and alliance with positive affect.

1.3 Alliance and Confusion in Relation to Patient Health Outcomes

Moreover, there is further need to validate the MCEQ by investigating how both scales predict important patient health outcomes like motivation to adhere to treatment, awareness of medical test results, and self-reported symptom control. Considering motivation, self-determination theory suggests that patients have different drives to adhere to treatment plans [24]; autonomous motivation, in which patients are intrinsically motivated to pursue treatment goals, may be most beneficial for long-term treatment outcomes [25]. Awareness of medical test results is important because patients often struggle to recall recent measurements like HbA1C and blood pressure, and poor recall of such measurements predicts poor treatment adherence and consequently, inferior treatment outcomes [26,27]. Symptom control is a generalized term referring to certain disease-specific, clinically-relevant benchmarks. For diabetes, this target is *glycemic control* (HbA1C levels < 7%) [28]; for hypertension, this target is *blood pressure control* (< 140 systolic and < 90 diastolic) [29]. Self-report control is associated with fewer physical symptoms (e.g., pain) and higher satisfaction with care [30].

Previous research suggests several reasons why both alliance and confusion should predict outcomes like motivation, awareness of test results, and symptom control. When patients perceive a high level of alliance with their practitioners, they exhibit higher levels of trust in medical advice and greater **adherence motivation** [22,31,32]. On the other hand, when patients are confused about aspects of care, they may be unwilling or unable to follow medical advice [33,34]. Accordingly, patients with chronic illnesses self-identify both lack of information and poor practitioner alliance as meaningful barriers to symptom control [35]. Previous research indicates both MCEQ scales are associated with self-report treatment adherence [3], and this work can be extended by testing how much these scales correlate with autonomous motivation, awareness of test results, and self-reported symptom control.

2. Methods

2.1 Overview

Data were collected online from two samples: first, a general sample of patients with diverse medical conditions; and second, a sample of people diagnosed with diabetes and/or hypertension. Several hypotheses were tested across both samples. First, a confirmatory factor analysis was expected to support the theoretical two-dimensional factor structure. Second, an item response theory analysis was expected to show that scales provide good discrimination. Third, distinctions between scales were expected, with confusion uniquely predicting psychological distress (stress, medical anxiety, and negative affect), and alliance predicting positive affect. Fourth, both alliance and confusion were expected to correlate with autonomous motivation for treatment adherence. Finally, both alliance and confusion were hypothesized to correlate with awareness of results and symptom control. This hypothesis was tested in Sample 2 (diabetes and/or hypertension) only, because it allowed us to assess two common, chronic conditions monitored by standard test results (HbA1C levels and blood pressure). Moreover, this association was expected to remain significant after controlling for two potentially confounding variables: time since diagnosis (which may affect symptom control) and recency of appointment (which may affect awareness of test results and symptom control).

2.2 Participants and Procedure

Sample 1 included 413 participants reporting serious medical conditions (126 men, 284 women, 3 identified as other genders; M_{age} = 53.08, *SD* = 15.56) recruited across three data collection waves (n = 133, 128, and 152, respectively). Sample 2 included 444 participants (180 men, 263 women, 1 identified as other gender; M_{age} = 53.26, *SD* = 37.87) with diagnosed diabetes (48.2%) and/or hypertension (81.3%) recruited across two waves (n = 298 and 146,

respectively). Most participants were recruited from Qualtrics panels; **additional participants were recruited from** Amazon Mechanical Turk, including 55 people in Sample 1 (Wave 2) and all of Wave 2 from Sample 2. Across both samples, 84.9% was non-Hispanic White, 7% Black, 4.2% Hispanic or Latino, 2.1% Asian, 1.1% Native American, and 0.7% other.

Qualtrics participants were invited to participate via email after requesting to participate in market research panels. Mechanical Turk participants responded to a crowdsourcing post. Participants were included if they passed all screening criteria and provided informed consent. Criteria for all waves included being located in the United States and having visited a doctor in the past year. In addition, participants needed to indicate having a serious medical condition that caused life changes (Sample 1, Wave 1), or being advised by a doctor to treat a medical condition with diet or exercise (Sample 1, Waves 2 and 3), or having a diagnosis of diabetes and/or hypertension (Sample 2). Screening items were embedded in a set of filler questions designed to obscure the inclusion criteria. The samples did not include people giving answers to foil items indicative of dishonest responding (13% of the initial pool) or **who** failed validity check items embedded within the survey (17% of those who would have otherwise qualified). The online questionnaires were similar across all waves in both samples, albeit with some differences described below. The questionnaires included the measures described below, questions about years since diagnosis and days since last medical appointment, and other questions not relevant to the current study. Questionnaires took 24 minutes to complete on average. Qualtrics participants were offered points or gift cards with a value of approximately $2.00. Mechanical Turk participants were compensated with $2.00.

2.3 Measures

Means and alpha coefficients are in Table 1.

2.3.1. Alliance and Confusion

Perceived alliance and experienced confusion were assessed in both samples using the Medical Consultation Experience Questionnaire (MCEQ) [3]. The seven-item alliance scale includes four positively-keyed items based on comparisons with a typical practitioner and three reverse-scored items assessing detachment. The confusion scale is five items. Total alliance scores range from 7 to 39 and total confusion scores range from 5 to 25. **Histograms for both scales are in Figure 1.**

2.3.2. Medical Anxiety

State medical anxiety was assessed in Sample 1 using a six-item form of the State Anxiety Inventory [36]. Items were modified to focus on medical anxiety (e.g., "When thinking about your medical condition, do you feel frightened?") and were rated on a four-point scale ranging from "Not at all" (1) to "Very much so" (4).

2.3.3. Perceived Stress

Stress was assessed in Sample 1 (Waves 2 and 3) using the 10-item Perceived Stress Scale [37]. Participants responded to items like "In the last month, how often have you felt that you were unable to control the important things in your life?" on a scale ranging from "Never" (1) to "Very often" (5).

2.3.4. Affect

Positive and negative affect were assessed in Sample 1 (Waves 1 and 3) and Sample 2 (both waves) using a modified version of the Positive and Negative Affect Schedule [16]. Participants rated how thinking about their medical treatment affected their current mood. Based on a pilot study factor analysis, the instrument was shortened to include six positive affect items

(Interested, Excited, Strong, Enthusiastic, Inspired, Determined) and six negative affect items (Distressed, Guilty, Irritable, Ashamed, Jittery, Afraid).

2.3.5. Autonomous Motivation

Autonomous motivation for treatment adherence was assessed in both samples using a modified form of the autonomous motivation subscale from the Treatment Self-Regulation Questionnaire [24]. This four-item measure focused on motivation to follow any advice recommended by a physician and included items like "The reason(s) I would do my recommended actions is: Because it is very important for being as healthy as possible" rated on a 7-point scale ranging from "Not at all true" to "Very true."

2.3.6. Awareness and Symptom Control

Participants in Sample 2 reported their most recent blood pressure and/or HbA1C (if known). For awareness of test results, unknown or impossible values were coded as "unknown" and reasonable values were coded as "known." Both systolic and diastolic blood pressure values were required for coding blood pressure as "known." Symptom control variables were similarly dichotomized to reflect the importance of specific clinically-relevant benchmarks, and to combine two interdependent blood pressure values into a single value. For blood pressure, "controlled" was defined as simultaneously < 140 systolic and < 90 diastolic [29]. For HbA1C, "controlled" was defined as 7% or less [28]. Proportions of responses coded "known" and "controlled" can be found in Table 1.

3. Results

The first hypothesis was that the MCEQ would demonstrate good factor validity. Therefore, the factor structure was tested using a confirmatory factor analysis, with the expectation that the factor validity would meet the criteria from the original validation study.

These criteria included a) good model fit (CFI > .95, SRMR < .09) [38] and b) good individual item loadings (> .55) [39]. As in the original validation study, a bifactor model was tested [40]. This model included three factors: alliance, confusion, and a third "method" factor comprising the negatively keyed items from the alliance scale. The method factor accounts for the shared method variance between items with a similar scoring format. Consistent with procedures for specifying a bifactor model, the method factor was not allowed to correlate with the alliance factor but was allowed to correlate with confusion. The fit was good in both Sample 1 (χ^2 (49) = 58.17, p = .17, CFI = 1, SRMR = .03) and Sample 2 (χ^2 (49) = 77.42, p = .006, CFI = 1, SRMR = .03). Factor loadings are displayed in Table 2. Across both samples, item loadings on assigned factors all exceeded the .55 criterion. An alternate two-factor model **excluding** the method factor was also tested, **which fit descriptively poorer than the bifactor model, but still well according to criteria, in both Sample 1 (χ^2 (53) = 257.72, p < .001, CFI = .99, SRMR = .06) and Sample 2 (χ^2 (53) = 560.51, p < .001, CFI = .99, SRMR = .088)**. **All assigned factor loadings also exceeded .55 in this model.** Therefore, the first hypothesis was supported.

The second hypothesis was that the MCEQ would demonstrate good item discrimination and test information. To evaluate individual item discrimination, cutoffs suggested by Baker were used [41], with the expectation that all items would achieve "very high" discrimination (1.7 or higher). Item discrimination values are displayed in Table 2. As expected, all items exceeded the criterion for very high discrimination (ranging from 1.9 to 4.64). To evaluate test information for each scale, test information curves were computed. These are shown in Figure **2**. The dotted lines in the figure indicate the area one standard deviation below and above the mean. Levels of information for each scale were expected to be high across this range; high information was defined as a value greater than 5. This cutoff value corresponds to a standard error of .45 (SE = 1

/ information$^{1/2}$) and a reliability of .8 (reliability = 1 – SE^2), which is typically considered good reliability. For both scales in both studies, information remained above 5 within the target range; thus, both scales met criteria for providing good information. To provide further clarity on scale discrimination, histograms based on standardized scores were created. Then, the test information curves were used to estimate the range of observed scores where information was high (above 5). As depicted in Figure **3**, this range included between 85% and 100% of sample responses for each scale.

The third hypothesis was that confusion would be uniquely related to psychological distress, and alliance to positive affect. Correlations were computed between alliance, confusion, psychological distress variables (medical anxiety and stress in Sample 1, and negative affect in both samples), and positive affect. These are reported in Table 3. In both samples both alliance and confusion were associated with all variables. Multiple regressions were estimated, with alliance and confusion simultaneously predicting each outcome. The standardized beta coefficients indicate the extent to which each scale explains unique variance in the outcome controlling for overlap with the other scale. Standardized betas are shown in Table 3. Across all analyses in both samples, each scale explained unique variance in *all* its target criterion variables and *only* its target criterion variables. To determine whether these results represented significant differences in magnitude between the effects of alliance and confusion, differences in beta weights were evaluated using a structural equation model constraining the absolute values of the two standardized betas to be equal. This produced a χ^2 value with one degree of freedom indicating whether the difference was statistically significant. All but one difference was significant; the difference between betas predicting negative affect failed to reach significance in Sample 1 (p = .051), although this difference was significant in Sample 2.

Finally, both alliance and confusion were expected to predict patient health outcomes including motivation, awareness of test results, and symptom control. Correlations were computed; these are displayed in Tables 3 and 4. Both alliance and confusion were associated with motivation as well as control of blood pressure and HbA1C, in the expected directions. Moreover, both alliance and confusion were associated with awareness of HbA1C but not blood pressure. To determine how much each scale explained unique variance in autonomous motivation, both scales were used to predict autonomous motivation in a regression equation. In Sample 1, only alliance predicted motivation, although in Sample 2 both alliance and confusion predicted motivation. The difference between betas was only significant in Sample 1.

Because the awareness and symptom control variables were dichotomous, logistic regression equations were estimated to determine the unique effect of alliance and confusion on each outcome. Each outcome was predicted using alliance and confusion, controlling for time since diagnosis and since last appointment; alliance and confusion were standardized prior to analysis. Odds ratios are in Table 4; because alliance and confusion are *z*-scores, ratios represent the odds given a one-standard-deviation change in alliance or confusion. Alliance explained unique variance in HbA1C awareness after controlling for other variables. Confusion explained unique variance in both glycemic and blood pressure control.

Due to the importance of symptom control and the strong results for confusion, predicted probabilities were calculated. Figure **4** graphs the predicted probabilities of controlling HbA1C and blood pressure for given standardized values of confusion, holding the other three predictors at their means. At a confusion *z*-score of -2 (very low confusion), there is a 68% probability of controlling blood pressure and an 86% probability of controlling HbA1C. In contrast, at a

confusion *z*-score of 2 (very high confusion), there is only a 29% probability of controlling blood pressure and a 31% probability of controlling HbA1C.

4. Discussion and Conclusion

4.1 Discussion

This study found strong evidence for the validity of the MCEQ. First, good factor validity of the MCEQ was established in a novel sample as well as a sample similar to the original validation study. Second, high item discrimination and test information were established in both samples. Third, alliance and confusion had distinct relationships with affective outcomes; alliance was associated with positive affect and confusion with psychological distress. Fourth, both alliance and confusion contributed to treatment outcomes such as autonomous motivation for treatment adherence, awareness of test results, and self-reported symptom control. It is especially important to note that confusion robustly predicted symptom control for people with diabetes and/or hypertension, independently of alliance and control variables.

The first unique characteristic of the MCEQ compared to other instruments assessing patient perceptions is the excellent psychometric characteristics emphasized throughout its development and found here. The high factor validity in both samples suggests that the measure can reliably and accurately distinguish between experienced confusion and perceived alliance as independent constructs. The item response theory analyses also suggest that, on an individual item level, the MCEQ is sensitive to interpersonal differences in alliance and confusion. Moreover, this sensitivity is displayed for the vast majority of responses, permitting a nuanced assessment of these constructs and accurate estimates for effect sizes that is not possible for existing scales (e.g., the CAHPS) for which skew is a significant problem [3,7].

The second unique characteristic of the MCEQ is its capacity to assess confusion as well as alliance, and these findings reiterate the importance of this assessment. Confusion was robustly associated with psychological distress beyond the contributions of alliance, suggesting that targeting confusion may reduce patient distress. When examining symptom control, confusion also emerged as a unique and robust predictor. However, alliance did appear to influence awareness of test results, and both alliance and confusion contributed to autonomous motivation for treatment adherence. Therefore, a two-pronged approach to measurement and intervention is suggested when considering the ramifications of medical consultations for psychological distress and symptom control.

The limitations of the current study should be acknowledged. First, all data were cross-sectional. Therefore, temporal precedence cannot be determined. Although previous longitudinal work suggests that experienced confusion might precede psychological distress [14], it is also possible that people experiencing high levels of distress cannot absorb medical information or that factors like poor health literacy may simultaneously contribute to confusion, distress, and poor symptom control [42]. Second, all data were collected online, raising potential concerns about participant honesty and generalizability. However, previous researchers have established good data quality for online collection methods of medical data using similar screening procedures [43]. Regarding generalizability, the original validation study found strict measurement invariance between online and hospital samples, suggesting that the measure functions similarly in multiple contexts [3]. Finally, symptom control was only assessed in two chronic illnesses; findings could differ for other chronic illnesses with distinct treatment plans and symptoms.

4.2 Conclusion

Future research should focus on expanding these findings using different populations and methodology. A key next step is investigating the theorized directionality of confusion and alliance influencing health outcomes using longitudinal data. Antecedents and potential mechanisms (including the affective outcomes examined here) should be included in this investigation. Supplementing retrospective patient reports with observational data would also be informative. Finally, examining the unique role of confusion in other types of symptom control (e.g., HIV viral load) would help determine **generalizability of these findings**. In conclusion, the current study provided further evidence for the validity of the MCEQ, and the correlational findings stressed the importance of assessing patient confusion in addition to perceived alliance. The importance of confusion for psychological distress and symptom control deserves further investigation, and the MCEQ is the ideal instrument for such assessments.

4.3 Implications for Practice

A major implication of the current research is the importance of effective distribution of information during medical consultations. In primary care settings, as many as four out of every five questions asked by patients goes unanswered due to time constraints [44]; these unanswered questions can lead to a spiral of online information-seeking [45] that exacerbates psychological distress [46]. Therefore, detecting and responding to patient questions during appointments should be prioritized whenever possible. However, emphasizing confusion reduction should not be misconstrued as deemphasizing alliance. Instead, it may be useful to assess both alliance and confusion as part of patient-centered care to determine individual needs. The MCEQ was designed to provide a maximally efficient option for assessing these two crucial dimensions of patient experience. It provides good discrimination with the fewest possible items, and it can be administered **following** appointments by healthcare staff or online. Moreover, given recent

debates about the effects of programs designed to streamline healthcare delivery (e.g., expanding the role of pharmacists) [47], the MCEQ provides an assessment tool for researchers and healthcare administrators to address important questions about the extent to which such programs might inadvertently damage patient-practitioner alliances or cause patient confusion.

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References

[1] H. de Haes, J. Bensing, Endpoints in medical communication research, proposing a framework of functions and outcomes, Patient Educ. Couns. 74 (2009) 287–294. doi:10.1016/j.pec.2008.12.006.
[2] L.M. Ong, J.C. de Haes, A.M. Hoos, F.B. Lammes, Doctor-patient communication: a review of the literature, Soc. Sci. Med. 1982. 40 (1995) 903–918.
[3] K. Sanford, A.S. Rivers, T.L. Braun, K.P. Schultz, E.P. Buchanan, Medical Consultation Experience Questionnaire: Assessing perceived alliance and experienced confusion during medical consultations, Psychol. Assess. 30 (2018) 1499–1511. doi:10.1037/pas0000594.
[4] E.M. Bitzer, S. Volkmer, M. Petrucci, N. Weissenrieder, M.-L. Dierks, Patient satisfaction in pediatric outpatient settings from the parents' perspective - the Child ZAP: A psychometrically validated standardized questionnaire, BMC Health Serv. Res. 12 (2012) 347–347. doi:10.1186/1472-6963-12-347.
[5] C.C. Lewis, E.S. Douglas, R.H. Pantell, M.H. Wolf, Parent satisfaction with children's medical care: Development, field test, and validation of a questionnaire, Med. Care. 24 (1986) 209–215. doi:10.1097/00005650-198603000-00003.
[6] S.P. Reise, J. Morizot, R.D. Hays, The role of the bifactor model in resolving dimensionality issues in health outcomes measures, Qual. Life Res. Int. J. Qual. Life Asp. Treat. Care Rehabil. 16 Suppl 1 (2007) 19–31. doi:https://doi.org/10.1007/s11136-007-9183-7.
[7] H.P. Rodriguez, P.K. Crane, Examining multiple sources of differential item functioning on the Clinician & Group CAHPS® survey, Health Serv. Res. 46 (2011) 1778–1802. doi:10.1111/j.1475-6773.2011.01299.x.
[8] Agency for Healthcare Research and Quality, CAHPS Clinician & Group Survey, (2015). https://www.ahrq.gov/cahps/surveys-guidance/cg/index.html.
[9] J.E. Crisson, F.J. Keefe, The relationship of locus of control to pain coping strategies and psychological distress in chronic pain patients, Pain. 35 (1988) 147–154. doi:10.1016/0304-3959(88)90222-9.
[10] T.R. Norton, S.L. Manne, S. Rubin, E. Hernandez, J. Carlson, C. Bergman, N. Rosenblum, Ovarian Cancer Patients' Psychological Distress: The Role of Physical Impairment, Perceived Unsupportive Family and Friend Behaviors, Perceived Control, and Self-Esteem, Health Psychol. 24 (2005) 143–152. doi:10.1037/0278-6133.24.2.143.
[11] L.E. Bautista, L.M. Vera-Cala, C. Colombo, P. Smith, Symptoms of depression and anxiety and adherence to antihypertensive medication, Am. J. Hypertens. 25 (2012) 505–511. doi:10.1038/ajh.2011.256.
[12] I.A. Kretchy, F.T. Owusu-Daaku, S.A. Danquah, Mental health in hypertension: Assessing symptoms of anxiety, depression and stress on anti-hypertensive medication adherence, Int. J. Ment. Health Syst. 8 (2014).
[13] L.J. Fallowfield, A. Hall, G.P. Maguire, M. Baum, Psychological outcomes of different treatment policies in women with early breast cancer outside a clinical trial, BMJ. 301 (1990) 575–580. doi:https://doi.org/10.1136/bmj.301.6752.575.
[14] B.A. Vogel, R. Leonhart, A.W. Helmes, Communication matters: The impact of communication and participation in decision making on breast cancer patients' depression and quality of life, Patient Educ. Couns. 77 (2009) 391–397. doi:10.1016/j.pec.2009.09.005.

[15] N.M. Bradburn, The structure of psychological well-being, Aldine, Oxford, England, 1969.
[16] D. Watson, L.A. Clark, A. Tellegen, Development and validation of brief measures of positive and negative affect: the PANAS scales, J. Pers. Soc. Psychol. 54 (1988) 1063–1070.
[17] M. Kleppe, J. Lacroix, J. Ham, C. Midden, "A necessary evil": associations with taking medication and their relationship with medication adherence, Psychol. Health Med. 22 (2017) 1217–1223. doi:10.1080/13548506.2017.1316412.
[18] Z. Moon, R. Moss‐Morris, M.S. Hunter, L.D. Hughes, More than just side‐effects: The role of clinical and psychosocial factors in non‐adherence to tamoxifen, Br. J. Health Psychol. 22 (2017) 998–1018. doi:10.1111/bjhp.12274.
[19] D.E. Morisky, A. Ang, M. Krousel-Wood, H.J. Ward, Predictive validity of a medication adherence measure in an outpatient setting, J. Clin. Hypertens. Greenwich Conn. 10 (2008) 348–354.
[20] S.A. Nsamenang, J.K. Hirsch, Positive psychological determinants of treatment adherence among primary care patients, Prim. Health Care Res. Dev. 16 (2015) 398–406. doi:10.1017/S1463423614000292.
[21] M.A. Ramsey, A.L. Gentzler, An upward spiral: Bidirectional associations between positive affect and positive aspects of close relationships across the life span, Dev. Rev. 36 (2015) 58–104. doi:10.1016/j.dr.2015.01.003.
[22] J.N. Fuertes, S. Rubinstein, M. Reyes, P. Iampornpipopchai, S. Mujeeb, C.R. Smith, A. Toporovsky, The physician-patient working alliance in hemodialysis treatment, Behav. Med. Wash. DC. 43 (2017) 242–250. doi:10.1080/08964289.2015.1122569.
[23] R.Jr. Noyes, O.A. Kukoyi, S.L. Longley, D.R. Langbehn, S.P. Stuart, Effects of continuity of care and patient dispositional factors on the physician-patient relationship, Ann. Clin. Psychiatry. 23 (2011) 180–185.
[24] R.M. Ryan, R.W. Plant, S. O'Malley, Initial motivations for alcohol treatment: relations with patient characteristics, treatment involvement, and dropout, Addict. Behav. 20 (1995) 279–297.
[25] A. Nouwen, T. Ford, A.T. Balan, J. Twisk, L. Ruggiero, D. White, Longitudinal motivational predictors of dietary self-care and diabetes control in adults with newly diagnosed type 2 diabetes mellitus, Health Psychol. Off. J. Div. Health Psychol. Am. Psychol. Assoc. 30 (2011) 771–779. doi:10.1037/a0024500.
[26] L.M. Guirguis, M.A. Kieser, B.A. Chewning, N.L. Kanous, Recall of A1C, blood pressure, and cholesterol levels among community pharmacy patients with diabetes, J. Am. Pharm. Assoc. 47 (2007) 29–34. doi:10.1331/1544-3191.47.1.29.Guirguis.
[27] I. Willaing, S. á Rogvi, M. Bøgelund, T. Almdal, M. Schiøtz, Recall of HbA1c and self-management behaviours, patient activation, perception of care and diabetes distress in Type 2 diabetes, Diabet. Med. 30 (2013) e139–e142. doi:10.1111/dme.12121.
[28] American Diabetes Association, 6. Glycemic Targets: Standards of Medical Care in Diabetes—2019, Diabetes Care. 42 (2019) S61–S70. doi:10.2337/dc19-S006.
[29] N.L. Keenan, K.A. Rosendorf, Centers for Disease Control and Prevention (CDC), Prevalence of hypertension and controlled hypertension - United States, 2005-2008, MMWR Suppl. 60 (2011) 94–97.
[30] M. Brod, S.E. Skovlund, K.U. Wittrup-Jensen, Measuring the Impact of Diabetes Through Patient Report of Treatment Satisfaction, Productivity and Symptom Experience, Qual. Life Res. 15 (2006) 481–491. doi:10.1007/s11136-005-1624-6.

[31] J.N. Fuertes, A. Toporovsky, M. Reyes, J.B. Osborne, The physician-patient working alliance: Theory, research, and future possibilities, Patient Educ. Couns. 100 (2017) 610–615. doi:10.1016/j.pec.2016.10.018.
[32] B. Miežienė, L. Šinkariova, E. Adomavičiūtė, The importance of perceived autonomy support and previous behaviour for autonomous motivation in patients with type 1 diabetes, Int. J. Psychol. Biopsychosoc. Approach Tarptautinis Psichilogijos Ž. Biopsich. Požiūr. 17 (2015) 57–78. doi:10.7220/2345-024X.17.4.
[33] H.B. Bosworth, D.V. Blalock, R.H. Hoyle, S.M. Czajkowski, C.I. Voils, The role of psychological science in efforts to improve cardiovascular medication adherence, Am. Psychol. 73 (2018) 968–980. doi:10.1037/amp0000316.
[34] T.A. Miller, Health literacy and adherence to medical treatment in chronic and acute illness: A meta-analysis, Patient Educ. Couns. 99 (2016) 1079–1086. doi:10.1016/j.pec.2016.01.020.
[35] J.A. Burke, M. Earley, L.D. Dixon, A. Wilke, S. Puczynski, Patients With Diabetes Speak: Exploring the Implications of Patients' Perspectives for Their Diabetes Appointments, Health Commun. 19 (2006) 103–114. doi:10.1207/s15327027hc1902_2.
[36] M.A. Abed, L.A. Hall, D.K. Moser, Spielberger's State Anxiety Inventory: Development of a shortened version for critically ill patients, Issues Ment. Health Nurs. 32 (2011) 220–227. doi:10.3109/01612840.2010.546493.
[37] S. Cohen, T. Kamarck, R. Mermelstein, A global measure of perceived stress, J. Health Soc. Behav. 24 (1983) 385–396. doi:10.2307/2136404.
[38] L. Hu, P.M. Bentler, Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives, Struct. Equ. Model. Multidiscip. J. 6 (1999) 1–55. doi:10.1080/10705519909540118.
[39] A.L. Comrey, H.B. Lee, A first course in factor analysis, 2nd ed., Psychology Press, Hillsdale, N.J, 1992.
[40] K.J. Holzinger, F. Swineford, The Bi-factor method, Psychometrika. 2 (1937) 41–54. doi:10.1007/BF02287965.
[41] F.B. Baker, The basics of item response theory, 2nd ed., ERIC Clearinghouse on Assessment and Evaluation, College Park, MD, 2001. https://eric.ed.gov/?id=ED458219 (accessed July 1, 2018).
[42] S. Dodson, T. Osicka, L. Huang, L.P. McMahon, M.A. Roberts, Multifaceted assessment of health literacy in people receiving dialysis: Associations with psychological stress and quality of life, J. Health Commun. 21 (2016) 91–98. doi:10.1080/10810730.2016.1179370.
[43] J.J. Arch, A.L. Carr, Using Mechanical Turk for research on cancer survivors, Psychooncology. 26 (2016) 1593–1603. doi:10.1002/pon.4173.
[44] A.I. González-González, M. Dawes, J. Sánchez-Mateos, R. Riesgo-Fuertes, E. Escortell-Mayor, T. Sanz-Cuesta, T. Hernández-Fernández, Information needs and information-seeking behavior of primary care physicians, Ann. Fam. Med. 5 (2007) 345–352. doi:10.1370/afm.681.
[45] N. Li, S. Orrange, R.L. Kravitz, R.A. Bell, Reasons for and predictors of patients' online health information seeking following a medical appointment, Fam. Pract. 31 (2014) 550–556. doi:10.1093/fampra/cmu034.
[46] F. te Poel, S.E. Baumgartner, T. Hartmann, M. Tanis, The curious case of cyberchondria: A longitudinal study on the reciprocal relationship between health anxiety and online health

information seeking, J. Anxiety Disord. 43 (2016) 32–40. doi:10.1016/j.janxdis.2016.07.009.

[47] A. Albasri, S. Prinjha, R.J. McManus, J.P. Sheppard, Hypertension referrals from community pharmacy to general practice: multivariate logistic regression analysis of 131 419 patients, Br. J. Gen. Pract. 68 (2018) e541–e550. doi:10.3399/bjgp18X697925.

Table 1

Means and standard deviations

Construct	Sample 1 (N = 413)				Sample 2 (N = 444)			
	M	*SD*	*n*	α	*M*	*SD*	*n*	α
Alliance	26.48	8.15	413	.91	25.82	7.66	444	.90
Confusion	6.45	4.89	413	.89	5.54	4.49	444	.89
Med. anxiety	15.67	4.85	413	.88				
Stress	28.49	8.98	280	.93				
Pos. affect	17.27	6.29	285	.97	17.78	6.28	444	.92
Neg. affect	11.63	5.50	285	.94	10.01	4.83	444	.88
Auto. motivation	23.13	5.34	413	.93	23.66	4.84	444	.92
Aware of HbA1C					66%		347	
Aware of BP					80%		419	
Controlled HbA1C					63%		142	
Controlled BP					49%		288	
Systolic BP					136.92	19.80	288	
Diastolic BP					84.69	15.55	288	
HbA1C					6.83	1.23	142	
Since appt.					107.01	96.82	444	
Since diag. (D)					8.85	9.49	347	
Since diag. (H)					9.92	9.88	419	

Note. BP = blood pressure; Since diag. = years since diagnosis of diabetes (D) or hypertension (H); Since appt. = days since last medical appointment.

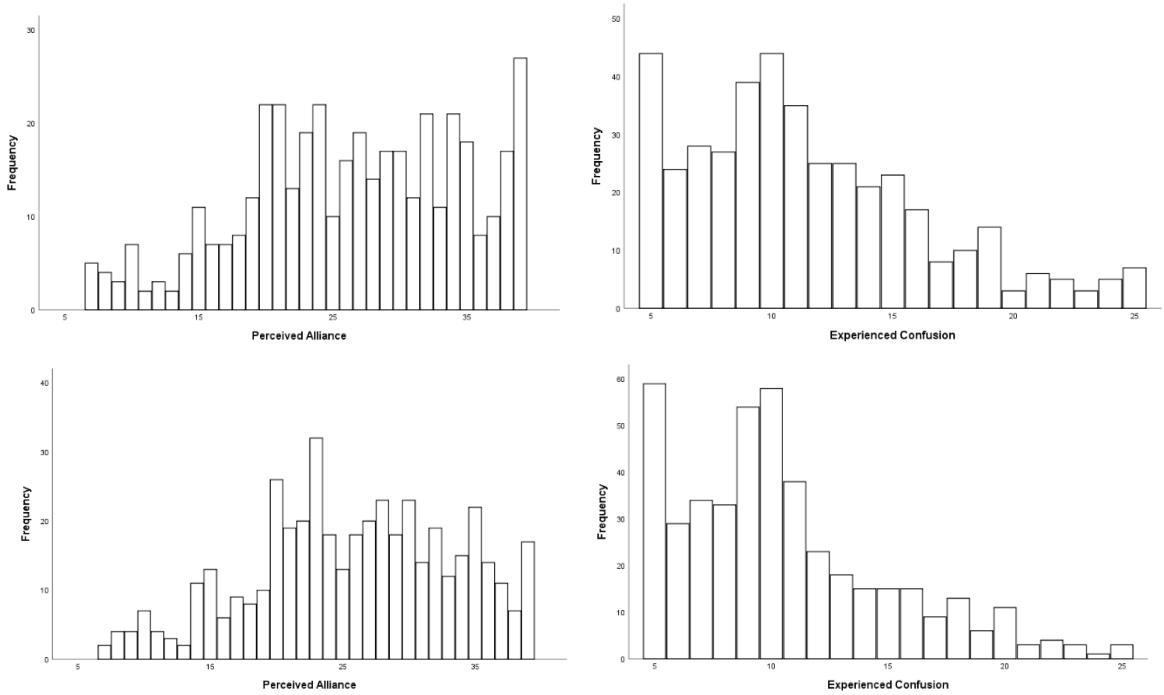

Figure 1. **Response histograms for alliance and confusion in Sample 1 (top) and Sample 2 (bottom) based on unstandardized scores.**

Table 2

Factor loadings and item discrimination

	Sample 1				Sample 2			
Item	Alliance	Confusion	Method	Discrimination	Alliance	Confusion	Method	Discrimination
Compared to a typical practitioner, how much did you feel like part of a team with this practitioner?	.74			2.11	.75			2.13
Did you feel like the practitioner was in too much of a hurry to take time to listen to you?	.76		.49	2.43	.66		.59	2.02
Compared to a typical practitioner, how much did you feel like this practitioner liked you?	.88			3.42	.88			3.34
Did you feel like the practitioner was cool and distant?	.71		.45	2.23	.64		.54	1.91
Compared to a typical practitioner, how much did you feel like you had a warm and comfortable relationship with this practitioner?	.95			4.64	.91			4.01
Did you wish that you had a different practitioner?	.79		.39	2.89	.73		.56	2.49
Compared to a typical practitioner, how much did this practitioner encourage you to say what was on your mind?	.90			3.78	.91			3.60
Did you wish that you had more information about your medical condition or treatment?		.84		2.89		.84		2.83
How confused did you feel about your medical condition and treatment?		.78		2.56		.83		2.79
After your appointment, did you have questions that the practitioner or another medical expert might be able to answer?		.69		1.90		.76		2.30
After your appointment, would it have been helpful to have anything clarified?		.87		3.46		.87		3.99
After your appointment, did you feel like your knowledge was incomplete or limited?		.94		4.22		.92		3.74

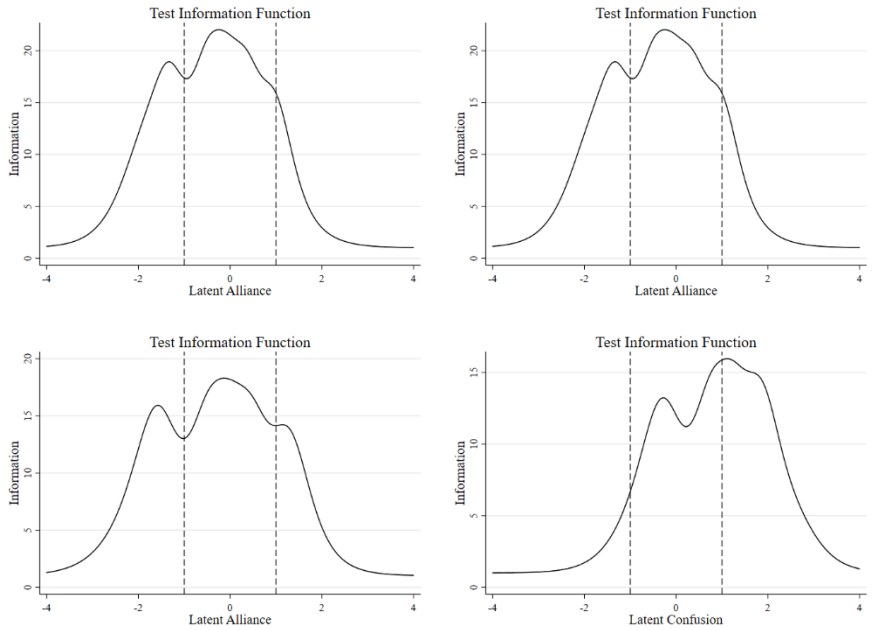

Figure 2. Test information curves for alliance and confusion in Sample 1 (top) and Sample 2 (bottom). Dotted lines indicate areas from one standard deviation below to one standard deviation above the mean.

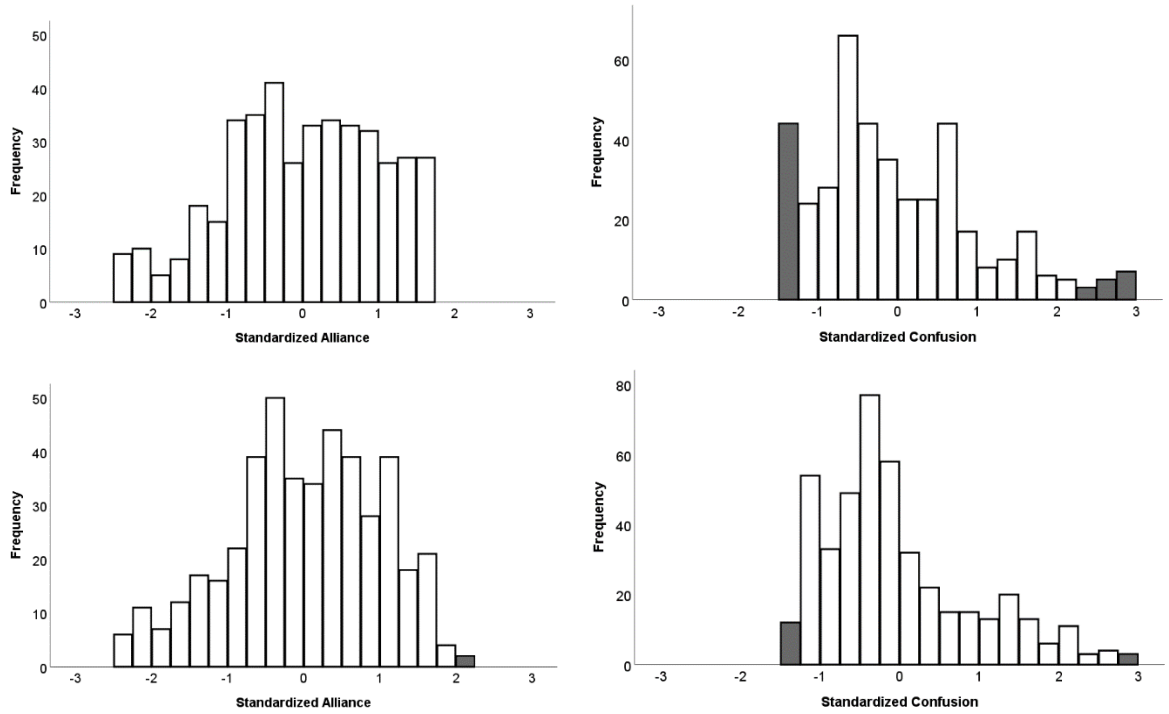

*Figure **3.***
Response histograms for Sample 1 (top) and Sample 2 (bottom) based on standardized scores. Clear bars represent scores falling in the range where information was high (defined as the range of standardized scores were the test information curve was greater than 5, rounded to the nearest .25 standard deviation unit), and shaded bars represent scores falling outside this range. In Sample 1, all scores on the Alliance scale fell within the range where information was high.

Table 3

Correlations, linear regression models, and tests for differences in beta weights

	Correlations		Standardized betas		$\chi 2$ difference	
Criterion variables	Alliance	Confusion	Alliance	Confusion	between betas	R^2
Sample 1						
Medical anxiety	-.20***	.38***	.01	.38***	48.86***	.14
Perceived stress	-.18**	.34***	.02	.35***	26.32***	.12
Negative affect	-.31***	.41***	-.12	.35***	3.82	.18
Positive affect	.47***	-.26***	.47***	.02	16.54***	.22
Auto. motivation	.40***	-.29***	.35***	-.09	7.44**	.17
Sample 2						
Negative affect	-.17***	.32**	.04	.35***	13.73***	.11
Positive affect	.26***	-.10*	.30***	.08	13.48***	.07
Auto. motivation	.30***	-.29***	.19**	-.17**	0.01	.11

Table 4

Sample 2 correlations and logistic regression models

	Correlations		Odds ratios				
Criterion variables	Alliance	Confusion	Alliance	Confusion	Since diag.	Since appt.	Pseudo R^2
HbA1C							
Awareness of results	.28***	-.20**	1.81*	1.01	1.04*	1.00	.15
Control	.24**	-.35***	1.25	0.52*	0.97	1.01	.17
Blood pressure							
Awareness of results	.03	.15*	1.00	1.01	1.04*	0.997*	.05
Control	-.01	-.22***	1.05	0.66**	1.03*	0.99	.08

Note. Since diag. = years since diagnosis of diabetes (D) or hypertension (H); Since appt. = days since last medical appointment. Both alliance and confusion have been standardized, and Nagelkerke's adjusted R^2 is reported.

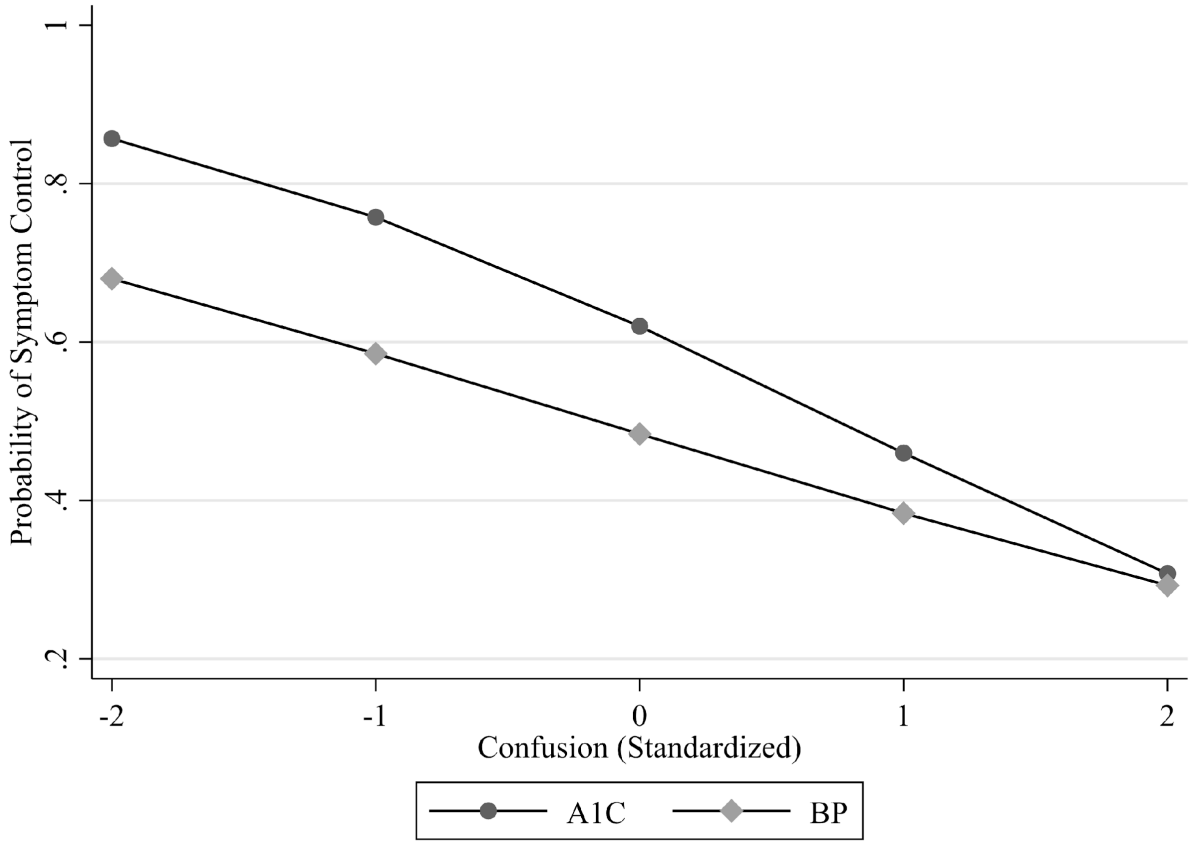

Figure 4. Predicted probabilities of controlling HbA1C and blood pressure (BP) for given *z*-scores of experienced confusion. All other predictors are held constant at their means.