



Published in final edited form as:

J Pain. 2013 July ; 14(7): . doi:10.1016/j.jpain.2013.02.004.

The Effect of Discussing Pain on Patient-Physician Communication in a Low-Income, Black, Primary Care Patient Population

Stephen G. Henry* and Susan Eggly†

*Division of General Medicine, Geriatrics, & Bioethics, University of California Davis, Sacramento, California

†Department of Oncology, Wayne State University/Karmanos Cancer Institute, Detroit, Michigan

Abstract

Patients and physicians report that discussions about pain are frequently frustrating and unproductive. However, the relationship between discussions about pain and patient-physician communication is poorly understood. We analyzed 133 video-recorded visits and patient self-report data collected at a clinic providing primary care to a low-income, black patient population. We used “thin slice” methods to rate two or three 30-second video segments from each visit on variables related to patient and physician affect (ie, displayed emotion) and patient-physician rapport. Discussions about pain were associated with a .32 increase in patient unease ($P < .001$) and a .21 increase in patient positive engagement ($P = .004$; standardized coefficients) compared to discussions about other topics during the same visit. Discussions about pain were not significantly associated with patient-physician rapport, physician unease, or physician positive engagement. Patient pain severity was significantly associated with greater physician and patient unease ($P = .01$), but not with other variables. Findings suggest that primary care patients, but not their physicians, display significantly greater emotional intensity during discussions about pain compared to discussions about other topics.

Perspective—This study used direct observation of video-recorded primary care visits to show that discussions about pain are associated with heightened displays of both positive and negative patient emotions. These displays of emotion could potentially influence pain-related outcomes.

Keywords

Pain; communication; affect; rapport; primary care; physician-patient relations

Physical pain is a common problem that consumes substantial time during primary care visits.^{10,15} Patients and physicians report that discussions about pain are often frustrating,^{24,43} in part because pain can be difficult to treat and raises concerns about opioid misuse. This mutual frustration may lead to ineffective and unproductive patient-physician relationships, which are associated with poor primary care pain management, especially for chronic pain.^{9,20,41} Given the well-documented connection between patient-physician

Address reprint requests to Stephen G. Henry, MD, Division of General Medicine, Geriatrics, and Bioethics, University of California Davis, 4150 V Street Suite 2400, Sacramento, CA 95817. sghenry@ucdavis.edu.

The authors have no conflicts of interest to report.

Supplementary data accompanying this article are available online at www.jpain.org and www.sciencedirect.com.

Supplementary Data

Supplementary data related to this article can be found online at <http://dx.doi.org/10.1016/j.jpain.2013.02.004>.

relationships and communication,²⁵ it is plausible that patients' and physicians' frustration during discussions about pain may adversely affect the quality of their communication; poor quality communication may, in turn, have a negative impact on patient-physician relationships and on pain management. Thus, we sought to investigate the relationship between discussions about pain and patient-physician communication during primary care visits. Based on findings from prior research,^{13,15} we also sought to understand how pain severity and percent of visit time spent discussing pain influence communication during these visits.

Two observable aspects of patient-physician communication that are likely to be influenced by discussions about pain are affect and rapport. Affect refers to displayed emotions¹⁹; rapport refers to the degree of harmony between 2 people. Affect and rapport, which can reveal clues to the emotional and relational aspects of patient-physician communication, are as important (and sometimes more important) as the content of communication during primary care visits.¹⁶ Affect and rapport are likely to be important during discussions about pain because pain is an emotional topic that can strain patient-physician relationships.^{24,43} Evidence also suggests that nonverbal aspects of communication (which can be assessed by observing affect and rapport¹⁶) influence pain management decisions.^{29,42,45} Thus, assessing affect and rapport is likely an effective way to better understand the emotional and relational aspects of physician-patient communication. Observer ratings of patient and physician affect and rapport have frequently been used to explore individuals' emotions and aspects of their relationship during clinical interactions.^{6,11,14,38}

Researchers often assess patient-physician communication by examining brief segments or "thin slices" of recorded visits rather than by examining whole visits.^{3,12} Ratings based on thin slices correlate well with ratings based on whole visits because raters' first impressions form quickly and are usually reliable for observable characteristics.¹ Rating thin slices also increases coding efficiency.

In this study, we used thin slice methods to study patients' and physicians' verbal and nonverbal communication behaviors by assessing variation in affect and rapport during video-recorded primary care visits. We then investigated whether this variation was associated with discussions about pain, pain severity, and/or percent of time spent discussing pain. We used data from a prior study^{27,28} that included video-recorded visits in an urban primary care clinic and responses to pre-visit questionnaires. We intentionally focused on low-income, black patients because of the high prevalence of pain in this patient population and because racial disparities in pain management have been well documented.³⁵ We tested 3 hypotheses. First, we hypothesized that within the same primary care visit, patients and physicians would display more negative affect and rapport during discussions about pain compared to discussions of other topics. Second, we hypothesized that patients and physicians would display more negative affect and rapport when they spent a higher percent of the total visit time discussing pain. Finally, we hypothesized that patients and physicians would display more negative affect during visits with patients who reported more severe pain, after controlling for discussions about pain and percent of time spent discussing pain.

If discussions about pain are associated with variation in patient-physician communication, future studies could investigate whether this variation is also associated with pain management decisions or pain-related outcomes. Thus, our findings may provide important information for better understanding the role of communication in health outcomes and inform interventions to improve communication about pain, pain management, and pain-related racial disparities.

Methods

Study Design and Data Sources

We used video-recorded and self-report data from a parent study of patient-physician communication in an urban primary care clinic serving a predominately low-income, black patient population.^{27,28} One hundred and thirty-three established clinic patients were recruited from the clinic waiting room prior to their visit with a participating physician without regard to their medical condition or the presence of pain. Over 98% of patients reported their race/ethnicity as black. Physician participants were 17 family medicine residents. The majority of physicians were international medical graduates and reported their race/ethnicity as Indian, Pakistani, or Asian. All visits were video recorded. Immediately before the video-recorded visit, patients completed questionnaires eliciting demographic characteristics and pain severity. Pain severity was assessed using 1 question from the Medical Outcomes Study 20-item health survey that asked patients to rate average bodily pain during the past 4 weeks (none, very mild, mild, moderate, severe, very severe).³⁷

We also used data from a secondary analysis of video-recorded visits from the same parent study.¹⁵ For the secondary analysis, a team of trained research assistants systematically observed video-recorded visits to identify discussions about pain and the exact timing of these discussions. Discussions about pain were defined as any mention of ongoing physical pain that included at least 1 of the following terms: pain, ache, hurt, sore, burn, or tender. No distinction between acute and chronic pain was possible using this system. We calculated the percent of total visit time spent discussing pain by dividing the total time spent discussing pain by the total time the patient and physician were in the room together. Findings from the secondary analysis showed that 69% of visits ($n = 92$) contained discussions about pain with a mean duration of 5.9 minutes (SD 4.6; median 5.4) comprising 34% of total visit time (SD 24%; median 30%).

The present study was approved by the institutional review boards at Wayne State University/Karmanos Cancer Institute and the University of Michigan. All participants provided informed consent as part of the parent study.

Selecting and Rating Thin Slices

We systematically selected 30-second thin slices from each of the 133 video-recorded visits. The slices selected included either a discussion about pain for the entire 30 seconds or no discussion about pain. For visits that included at least one 30-second discussion about pain ($n = 85$), we selected 3 slices: 1 from the first 2 minutes of the visit, 1 from the middle of the visit, and 1 from the final 2 minutes of the visit. At least 1 slice from each of these visits included a discussion about pain. Whether the slice(s) from the beginning, middle, or end of the visit included discussions about pain depended on where discussions about pain naturally occurred. For visits that included no 30-second discussions about pain ($n = 48$), we selected 2 slices: 1 from the first 2 minutes and 1 from the last 2 minutes. We selected 2 rather than 3 slices for visits that included no discussions about pain to save resources and increase coding efficiency. The complete selection protocol is available in Supplementary Appendix 1. We selected a total of 351 thin slices; 132 slices included discussions about pain.

Research assistants blind to study hypotheses rated each thin slice on variables related to patient-physician rapport, patient affect, and physician affect. Raters underwent two 2-hour training sessions before rating slices. Training included a brief explanation of thin slices, instructions for performing ratings, and practice with pilot data. Raters were specifically instructed to rate thin slices based on their overall impressions rather than on specific behaviors or expressions. Separate trainings occurred prior to rating rapport, patient affect,

and physician affect. All 351 thin slices were edited onto DVDs. Each rater watched slices in a different random order, watched each slice only once before rating it, and was instructed to make ratings quickly in order to capture their first impressions. Three raters independently rated each slice on variables related to rapport; 4 raters independently rated each variable related to patient and physician affect.

Rapport is a dyadic, positive concept that comprises positive affect (liking), mutual attention, and coordination.⁵ Raters assessed mutual trust along with rapport because it is another dyadic, positive concept that may be important in pain management.²³ Raters assessed the dyads using the following items on 9-point unipolar rating scales (low to high)¹²: overall rapport, liking, attention, coordination, and trust.

To assess physician and patient affect, we adapted the global affect rating section of the Roter Interaction Analysis System, a well-established system for coding patient-physician interactions.³² We selected the patient and physician affect variables most likely to be relevant to our hypotheses by reviewing prior studies of affect^{3,12,14} and of patient and physician emotions during discussions about pain.^{24,43} We limited the number of affect variables to avoid rater cognitive overload that might reduce rating quality. Raters assessed patients and physicians on the following 6-point unipolar scales (low to high): warm/friendly, tense/anxious, engaged/attentive, disagreeable/antagonistic, upset/distressed (patients only), sad/depressed (patients only), hesitant/uncomfortable (physicians only), and rushed/hurried (physicians only).

Data Analysis

We calculated the interclass correlation coefficient (ICC) of a single rating and the interrater reliability of mean ratings for each variable using the Spearman-Brown formula.³¹ We used this approach because the same group of raters assessed each thin slice. Therefore, the effective reliability of mean ratings calculated from the Spearman-Brown formula is more relevant than the ICC, which is equivalent to a weighted kappa coefficient and measures reliability of a single rating.⁴⁰ This approach has been used in other rating studies.⁸ We calculated the standardized mean for each variable to control for differences among raters. We then performed exploratory factor analysis to identify groupings among variables. We examined factor loadings, eigenvalues, and scree plots to identify variables that loaded onto common factors. When multiple variables loaded onto 1 factor, we summed those variables to generate a composite variable. We checked assumptions required for creating composite variables by examining item-rest correlations and rest score plots.²⁶ We examined Pearson correlations among composite variables. We standardized composite variables to allow comparison among variables composed of different numbers of individual variables.

To test our hypotheses, we performed a series of linear regressions using the composite variables as dependent variables. To account for slices being nested within visits and visits being nested with physicians, we used a 3-level hierarchical model with visit (ie, patient) and physician as random intercepts.

Our first hypothesis was that within the same visit, patients and physicians would display more negative affect and rapport when they discussed pain versus other topics. To test this hypothesis, we added a dichotomous independent variable indicating whether the slice showed a discussion about pain. We controlled for differences between visits by including group means as a visit-level covariate.³⁶ Therefore, each patient-physician pair served as its own control.

To test our second hypothesis—that patients and physicians would display more negative affect and rapport when they spent a higher percent of total visit time discussing pain—we

added the percent of total visit time discussing pain as an independent variable. Demographics in our sample were relatively homogeneous, so we included demographic variables as covariates only when they had significant bivariate associations with dependent variables. To test our third hypothesis—that patients and physicians would display more negative affect during visits with patients who reported severe pain after controlling for discussions about pain and percent of time spent discussing pain—we added average pain severity over the past 4 weeks as an independent visit-level variable.

We tested regression assumptions by inspecting residual plots. One percent of all slices contained no patient-physician interaction and could not be rated; we did not impute these missing data. As a sensitivity analysis, we repeated our main analyses using variables generated from the factor loadings transformed with varimax rotation.

Results

Table 1 summarizes participant demographics. Over 98% of patients reported their race/ethnicity as black. The median patient-reported pain level over the past 4 weeks was “moderate.” Over 80% of physicians reported their race/ethnicity as Indian, Pakistani, or Asian and were international medical graduates. Although no self-report data on native language were collected, observations of the video-recorded visits showed that many physicians were not native speakers of American English. Table 2 shows the mean slice rating, the ICC, and the estimated interrater reliability for each variable. Mean ratings were at the high end of the scale for variables related to positive emotions and at the low end of the scale for variables related to negative emotions. Reliability for most variables was around .7 but was notably lower for the variable tense/anxious (.44 for physicians; .55 for patients). Reliabilities $\geq .7$ are typically considered acceptable.⁴⁰ Reliability of the variables in our study is also comparable to reliabilities reported in other studies using thin slice ratings of actual patient-clinician interactions.^{2,3,12}

All 5 variables related to rapport loaded onto a single factor, so we combined them into the composite variable “rapport.” Factor analysis for patient affect revealed a 2-factor solution. We combined the variables tense/anxious and upset/distressed into the composite variable “patient unease” and the variables warm/friendly and engaged/attentive into the composite variable “patient positive engagement.” Factor analysis for physician affect also revealed a 2-factor solution. We combined the variables tense/anxious and hesitant/uncomfortable into the composite variable “physician unease” and the variables warm/friendly and engaged/attentive into the composite variable “physician positive engagement.” We recognize that these composite variable names may not capture the full complexity of the affective variables being measured. In addition, the same affective expression (eg, unease) likely serves different functions for patients and physicians due to the asymmetrical nature of patient-physician relationships. However, we felt that using parallel terms was reasonable given that the variables constituting our composite variables substantially overlapped for patients and physicians. We excluded 3 variables (patient disagreeable/antagonistic, physician disagreeable/antagonistic, and physician rushed/hurried) from further analyses because they had minimal variation across our sample. We also excluded the variable patient sad/depressed because it did not add independent information to the 2-factor solution for patient affect. Detailed factor analysis results are available in Supplementary Appendix 2.

Rapport was strongly correlated with both patient and physician positive engagement ($r = .59, P < .001$ and $.58, P < .001$, respectively). The composite variables for patient and physician positive engagement were positively correlated ($r = .23, P < .001$), as were the composite variables for physician and patient unease ($r = .17, P = .001$). The full correlation

matrix for composite variables and for the correlations between rapport and individual affect variables are shown in Tables 3 and 4, respectively.

Our first hypothesis involved the association between discussions about pain and affect and rapport. Within visits, patient unease (coefficient .32, 95% confidence interval [CI] .17–.47, $P < .001$) and patient positive engagement (coefficient .21, 95% CI .06–.35, $P = .004$) were greater during slices that included discussions about pain (Table 5, model 1). Discussions about pain were not associated with significant differences in physician positive unease, physician positive engagement, or patient-physician rapport. All dependent variables were standardized, so these coefficients can be considered roughly equivalent to Pearson correlation coefficients. These coefficients thus suggest a small-to-moderate effect size for patients and a small effect size for physicians,⁷ though both effects were observable by third-party raters. To summarize, within the same visit, patients displayed significantly greater unease and greater positive engagement when they discussed pain compared to other topics. However, discussions about pain were not associated with significant changes in physician affect or rapport.

Our second hypothesis involved the association between time spent discussing pain and affect and rapport, after controlling for discussions about pain. For every 10% increase in the percent of visit time spent discussing pain, patient unease increased by .03 (95% CI .00–.07, $P = .024$; Table 5, model 2) after controlling for patient age and income. Thus, patients showed more unease when a higher percent of visit time was spent discussing pain. Time spent discussing pain was not significantly associated with any other composite variable.

Our third hypothesis involved the association between pain severity and affect and rapport. After controlling for discussions about pain, percent of time spent discussing pain, patient age, and patient income, for every 1-point increase in pain severity (on a 6-point scale), patient unease increased by .08 (95% CI .02–.14, $P = .011$) and physician unease increased by .07 (95% CI .01–.12, $P = .013$; Table 5, model 3). Pain severity was not significantly associated with patient-physician rapport or with patient or physician positive engagement. The association between time spent discussing pain and patient unease was no longer significant after adding pain severity to our model. When patients reported more severe pain, both patients and physicians showed significantly more unease, but they showed no difference in rapport or positive engagement. Repeating our analyses using factor variables did not change any findings.

Discussion

In this primary care setting with a low-income, black patient population, we found that patients displayed significantly more negative and positive emotions (defined in this study as unease and positive engagement, respectively) when they discussed pain than when they discussed other topics during the same visit. We expected that patients would show more unease, but were surprised to find that patients also showed more positive engagement. One likely explanation is that patients experience more intense emotions and greater overall arousal when discussing pain, which translates into higher ratings of both positive and negative affect. This explanation is consistent with prior research showing that affect ratings reflect both emotional valence (ie, positive versus negative) and degree of arousal.³⁴ Patients' more intense emotions during discussions about pain may be one reason that patients often find these discussions frustrating and unproductive.^{20,43}

In contrast, we found that discussions about pain were not significantly associated with patient-physician rapport, physician unease, or physician positive engagement. One possible explanation for our findings related to physician affect is that physicians experience less

variation in their emotions when discussing pain and so display fewer changes in verbal and nonverbal communication. However, physicians, like patients, frequently report strong negative emotions related to discussions about pain.^{22,24} Thus, a better explanation may be that physicians are less likely than patients to display their emotions during discussions about pain due to training and/or experience.

Although patients showed greater unease when they spent a higher percent of total visit time discussing pain, this effect was not significant once we controlled for pain severity. As we hypothesized, both patients and physicians displayed significantly more unease during visits with patients who reported greater pain severity. These findings are consistent with a previous study that found patients who reported greater pain displayed more negative affect.¹³

Overall, our results show that within visits, discussions about pain are associated with greater patient unease and greater patient positive engagement. Across visits, pain severity, but not percent of total visit time spent discussing pain, is associated with greater patient and physician unease.

We were surprised that patient-physician rapport was not significantly associated with discussions about pain, pain severity, or percent of time spent discussing pain, especially because ratings of rapport had good interrater reliability and were correlated with patient and physician affect in the expected directions. These results suggest that discussions about pain may have a greater influence on patients' and physicians' individual communication behaviors than on the relational aspects of patient-physician communication. These findings seem to be at odds with the common assertion that discussions about pain are associated with poor patient-physician relationships and poor patient-physician communication.^{20,24,43} One possible explanation is that discussions about pain only indirectly affect relational aspects of communication, such as rapport. Relational aspects of communication during visits may also vary less than individual communication behaviors because relational aspects of communication are often shaped by strong social and institutional conventions regardless of the topic being discussed.¹⁷

Our study has several limitations. First, we studied 1 urban clinic that served predominantly low-income, black patients, and these findings may not generalize to other populations. This patient population experiences substantially more frequent and more severe pain than the general population.^{4,35} However, the visits in our sample have characteristics typical of low-income black patients' primary care experiences, which are more likely to involve resource-poor clinics and physicians who are international medical graduates.^{18,44} Second, many physicians in the study were not native speakers of American English, which may have influenced ratings. Third, our coding system could not distinguish acute pain from chronic pain, and we measured pain severity as an average over the past 4 weeks rather than current pain severity. Both acute and chronic pain can be severe and emotionally distressing, especially for patients.³⁰ However, they may have different implications for patient-physician communication. Fourth, we did not characterize the topics of nonpain discussions in our sample, and so we cannot speculate as to their content. However, as discussed above, other common primary care conditions (eg, diabetes, hypertension) lack the unique characteristics that often make discussions about pain frustrating and unproductive, such as the lack of objective tests for pain and the association with opioid misuse. Our findings therefore likely reflect specific characteristics related to discussions about pain as compared to other aspects of patient-physician communication in primary care. Finally, our thin slice selection process did not allow us to systematically evaluate whether the effect of the timing of the pain discussion (ie, beginning, middle, or end of visits) was associated with affect or rapport ratings.

Strengths of this study include the use of a novel method, thin slices, to analyze aspects of patient-physician communication during actual primary care visits. Most prior studies using this method have analyzed visits with students and actors^{12,33} or have analyzed audio (rather than video) recordings.³ Prior studies have emphasized using thin slices to increase efficiency.³³ Our findings add to this literature by showing that affect and rapport can vary substantially during a single visit, and that researchers can use thin slices to explain this variation and to investigate associations between discussion content and aspects of patient-physician communication. For example, future studies could use similar methods to identify other emotional or stressful topics in primary care.

Given the association between discussions about pain and affect, future studies should investigate whether patient and physician affect are associated with pain-management decisions or pain-related outcomes. Detailed qualitative and quantitative analyses of discussions about pain are also needed to better understand the relationships between verbal and nonverbal communication and pain-related outcomes.^{25,39} Better understanding of the links between communication and pain-related outcomes may lead to communication-based strategies for improving these outcomes.

Our study used reliable methods and direct observation of actual primary care visits to show quantitatively what patients and physicians have long reported qualitatively: pain is an emotionally charged topic in primary care, and discussions about pain are typically more emotional (at least for patients) than discussions about other topics. The frustration that patients and physicians report during discussions about pain may be related to patients' displays of emotion during these discussions, though they may not be related to relational aspects of patient-physician communication (ie, rapport). Effective patient-physician communication is a critical first step in effective pain management.²⁰ Patients and physicians are likely to notice (at least tacitly) the subtle changes in emotions that patients and physicians convey through verbal and nonverbal communication behaviors during discussions about pain. These subtle changes may influence pain-related outcomes, and prior research has suggested that they may be even more important during visits involving black patients and may contribute to racial disparities in health care.^{21,28} Primary care physicians should be aware that patients are likely to be more emotional during discussions about pain.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

The authors are grateful to Angela Fagerlin, PhD, Rodney A. Hayward, MD, Hwa-Jung Choi, PhD, Jeremy B. Sussman, MD, and many other colleagues at the University of Michigan and Wayne State University/Karmanos Cancer Institute for support and advice on earlier versions of this manuscript. Dr Henry had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Supported by Blue Cross Blue Shield of Michigan Foundation grant 1722.II (Henry & Eggly) and the University of Michigan Robert Wood Johnson Foundation Health & Society Scholars program. The parent study was supported by NICHD grant R21 HD050450 (L. Penner) and NCI Center grant P30CA22453 (Karmanos Cancer Institute/Wayne State University). During this project, Dr Henry was supported by the U.S. Department of Veterans Affairs and the University of Michigan Robert Wood Johnson Foundation Clinical Scholars program.

References

1. Ambady N, Bernieri FJ, Richeson JA. Toward a histology of social behavior: Judgmental accuracy from thin slices of the behavioral stream. *Adv Exp Soc Psychol*. 2000; 32:201–271.

2. Ambady N, Koo J, Rosenthal R, Winograd CH. Physical therapists' nonverbal communication predicts geriatric patients' health outcomes. *Psychol Aging*. 2002; 17:443–452. [PubMed: 12243386]
3. Ambady N, LaPlante D, Nguyen T, Rosenthal R, Chaumeton N, Levinson W. Surgeons' tone of voice: A clue to malpractice history. *Surgery*. 2002; 132:5–9. [PubMed: 12110787]
4. Anderson KO, Green CR, Payne R. Racial and ethnic disparities in pain: Causes and consequences of unequal care. *J Pain*. 2009; 10:1187–1204. [PubMed: 19944378]
5. Bernieri, FJ. The expression of rapport. In: Manusov, V., editor. *The Sourcebook of Nonverbal Measures*. Mahwah, NJ: Lawrence Erlbaum Associates; 2005. p. 347-360.
6. Blanch DC, Hall JA, Roter DL, Frankel RM. Is it good to express uncertainty to a patient? Correlates and consequences for medical students in a standardized patient visit. *Patient Educ Couns*. 2009; 76:300–306. [PubMed: 19604663]
7. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*. 2. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.
8. Fiscella K, Franks P, Srinivasan M, Kravitz RL, Epstein R. Ratings of physician communication by real and standardized patients. *Ann Fam Med*. 2007; 5:151–158. [PubMed: 17389540]
9. Frantsve LME, Kerns RD. Patient-provider interactions in the management of chronic pain: Current findings within the context of shared medical decision making. *Pain Med*. 2007; 8:25–35. [PubMed: 17244101]
10. Gureje O, Von Korff M, Simon GE, Gater R. Persistent pain and well-being - A World Health Organization study in primary care. *JAMA*. 1998; 280:147–151. [PubMed: 9669787]
11. Hall JA, Roter DL, Blanch DC, Frankel RM. Nonverbal sensitivity in medical students: Implications for clinical interactions. *J Gen Intern Med*. 2009; 24:1217–1222. [PubMed: 19771481]
12. Hall JA, Roter DL, Blanch DC, Frankel RM. Observer-rated rapport in interactions between medical students and standardized patients. *Patient Educ Couns*. 2009; 76:323–327. [PubMed: 19545973]
13. Haskard-Zolnerek KB. Communication about patient pain in primary care: Development of the Physician-Patient Communication about Pain scale (PCAP). *Patient Educ Couns*. 2012; 86:33–40. [PubMed: 21571486]
14. Haskard K, DiMatteo MR, Heritage J. Affective and instrumental communication in primary care interactions: Predicting the satisfaction of nursing staff and patients. *Health Commun*. 2009; 24:21–32. [PubMed: 19204855]
15. Henry SG, Eggly S. How much time do low-income patients and primary care physicians actually spend discussing pain? A direct observation study. *J Gen Intern Med*. 2012; 27:787–793. [PubMed: 22231657]
16. Henry SG, Fuhrel-Forbis A, Rogers MA, Eggly S. Association between nonverbal communication during clinical interactions and outcomes: A systematic review and meta-analysis. *Patient Educ Couns*. 2012; 86:297–315. [PubMed: 21824738]
17. Heritage J. The interaction order and clinical practice: Some observations on dysfunctions and action steps. *Patient Educ Couns*. 2011; 84:338–343. [PubMed: 21715125]
18. Howard DL, Bunch CD, Mundia WO, Konrad TR, Edwards LJ, Amamoo MA, Jallah Y. Comparing United States versus international medical school graduate physicians who serve African-American and white elderly. *Health Serv Res*. 2006; 41:2155–2181. [PubMed: 17116114]
19. Juslin, PN.; Scherer, KR. Vocal expression of affect. In: Harrigan, JA.; Rosenthal, R.; Scherer, KR., editors. *The New Handbook of Nonverbal Behavior Research*. 1. New York, NY: Oxford University Press; 2006. p. 65-135.
20. Kenny DT. Constructions of chronic pain in doctor-patient relationships: Bridging the communication chasm. *Patient Educ Couns*. 2004; 52:297–305. [PubMed: 14998600]
21. Levinson W, Hudak PL, Feldman JJ, Frankel RM, Kuby A, Bereksnyei S, Braddock C. "It's Not What You Say..." - Racial disparities in communication between orthopedic surgeons and patients. *Med Care*. 2008; 46:410–416. [PubMed: 18362821]
22. Levinson W, Stiles WB, Inui TS, Engle R. Physician frustration in communicating with patients. *Med Care*. 1993; 31:285–295. [PubMed: 8464246]

23. Matthias MS, Bair MJ. The patient-provider relationship in chronic pain management: Where do we go from here? *Pain Med.* 2010; 11:1747–1749. [PubMed: 21134115]
24. Matthias MS, Parpart AL, Nyland KA, Huffman MA, Stubbs DL, Sargent C, Bair MJ. The patient-provider relationship in chronic pain care: Providers' perspectives. *Pain Med.* 2010; 11:1688–1697. [PubMed: 21044259]
25. McCormack LA, Treiman K, Rupert D, Williams-Piehot P, Nadler E, Arora NK, Lawrence W, Street RL. Measuring patient-centered communication in cancer care: A literature review and the development of a systematic approach. *Soc Sci Med.* 2011; 72:1085–1095. [PubMed: 21376443]
26. McIver, JP.; Carmines, EG. Unidimensional scaling. Beverly Hills, CA: Sage Publications; 1981.
27. Penner LA, Dovidio JF, Edmondson D, Dailey RK, Markova T, Albrecht TL, Gaertner SL. The experience of discrimination and black-white health disparities in medical care. *J Black Psychol.* 2009; 35:180–203.
28. Penner LA, Dovidio JF, West TV, Gaertner SL, Albrecht TL, Dailey RK, Markova T. Aversive racism and medical interactions with black patients: A field study. *J Exp Soc Psychol.* 2010; 46:436–440. [PubMed: 20228874]
29. Prkachin KM, Schultz IZ, Hughes E. Pain behavior and the development of pain-related disability: The importance of guarding. *Clin J Pain.* 2007; 23:270–277. [PubMed: 17314588]
30. *Relieving Pain in America. A Blueprint for Transforming Prevention, Care, Education, and Research.* Washington, DC: Institute of Medicine; 2011.
31. Rosenthal, R. Conducting judgment studies: Some methodological issues. In: Harrigan, JA.; Rosenthal, R.; Scherer, KR., editors. *The New Handbook of Methods in Nonverbal Behavior Research.* New York, NY: Oxford University Press; 2005. p. 199-234.
32. Roter D, Larson S. The Roter interaction analysis system (RIAS): Utility and flexibility for analysis of medical interactions. *Patient Educ Couns.* 2002; 46:243–251. [PubMed: 11932123]
33. Roter DL, Hall JA, Blanch-Hartigan D, Larson S, Frankel RM. Slicing it thin: New methods for brief sampling analysis using RIAS-coded medical dialogue. *Patient Educ Couns.* 2011; 82:410–419. [PubMed: 21239135]
34. Russell JA. A circumplex model of affect. *J Pers Soc Psychol.* 1980; 39:1161–1178.
35. Shavers VL, Bakos A, Sheppard VB. Race, ethnicity, and pain among the US adult population. *J Health Care Poor Underserved.* 2010; 21:177–220. [PubMed: 20173263]
36. Snijders, T.; Bosker, R. *Multilevel Analysis. 2.* Washington, DC: SAGE Publications; 2012.
37. Stewart AL, Hays RD, Ware JE. The MOS Short-Form General Health Survey: Reliability and validity in a patient population. *Med Care.* 1988; 26:724–732. [PubMed: 3393032]
38. Street RL Jr, Gordon H, Haidet P. Physicians' communication and perceptions of patients: Is it how they look, how they talk, or is it just the doctor? *Soc Sci Med.* 2007; 65:586–598. [PubMed: 17462801]
39. Street RL, Makoul G, Arora N, Epstein RM. How does communication heal? Pathways linking clinician-patient communication to health outcomes. *Patient Educ Couns.* 2009; 74:295–301. [PubMed: 19150199]
40. Streiner, DL.; Norman, GR. *Health measurement scales: A practical guide to their development and use. 3.* New York, NY: Oxford University Press; 2003.
41. Sullivan M, Ferrell B. Ethical challenges in the management of chronic nonmalignant pain: Negotiating through the cloud of doubt. *J Pain.* 2005; 6:2–9. [PubMed: 15629412]
42. Turk DC, Okifuji A. What factors affect physicians' decisions to prescribe opioids for chronic noncancer pain patients? *Clin J Pain.* 1997; 13:330–336. [PubMed: 9430814]
43. Upshur CC, Bacigalupe G, Luckmann R. "They don't want anything to do with you": Patient views of primary care management of chronic pain. *Pain Med.* 2010; 11:1791–1798. [PubMed: 21029353]
44. Varkey AB, Manwell LB, Williams ES, Ibrahim SA, Brown RL, Bobula JA, Horner-Ibler BA, Schwartz MD, Konrad TR, Wiltshire JC, Linzer M. MEMO Investigators: Separate and unequal: Clinics where minority and nonminority patients receive primary care. *Arch Intern Med.* 2009; 169:243–250. [PubMed: 19204215]

45. von Baeyer CL. Social and pain behavior in the first 3 min of a pain clinic medical interview. *Pain Clinic*. 1994; 7:169–177.

Table 1

Participant Characteristics

Patients	N = 133	Physicians	N = 17
Male (%)	24.1	Male (%)	47.0
Mean age, years (SD)	44.0 (14.1)	Mean age, years (SD)	31 (3.4)
Black race/ethnicity (%)	98.5	Race/ethnicity (%)	
Highest education (%)		Indian/Pakistani	47.1
<High school diploma	29.0	Asian	35.3
High school diploma	54.2	White	11.8
College graduate	16.8	Black	5.9
Annual income (%)		International medical graduate (%)	88.2
<\$10,000	28.9		
\$10,000–\$29,999	35.2		
>\$30,000	35.9		
Pain severity, mean (SD) *	3.8 (1.4)		

* Measured on a 6-point scale; higher numbers correspond to greater pain.

Table 2

Mean, ICC, and Reliability of Affect and Rapport Ratings*

Variable	Mean [†]	SD [†]	ICC	95% CI	Reliability	95% CI
Patient affect						
Warm/friendly	3.56	.73	.47	.41–.52	.78	.74–.81
Tense/anxious	3.23	.69	.24	.18–.29	.55	.47–.63
Engaged/attentive	4.43	.61	.44	.38–.50	.76	.71–.80
Disagreeable/antagonistic	1.50	.65	.48	.42–.53	.78	.74–.82
Upset/distressed	2.98	.88	.42	.37–.48	.74	.70–.79
Sad/depressed	2.16	.85	.46	.41–.52	.77	.73–.81
Physician affect						
Warm/friendly	3.99	.57	.38	.33–.44	.71	.66–.76
Tense/anxious	1.56	.42	.16	.11–.22	.44	.33–.53
Engaged/attentive	4.85	.60	.38	.32–.42	.71	.66–.76
Disagreeable/antagonistic	1.34	.52	.35	.29–.41	.68	.62–.73
Hesitant/uncomfortable	1.54	.52	.34	.28–.40	.67	.61–.73
Rushed/hurried	1.33	.46	.34	.29–.40	.68	.62–.73
Patient-physician rapport						
Rapport	6.10	1.22	.42	.35–.48	.68	.62–.74
Liking	5.98	1.13	.42	.35–.58	.68	.62–.74
Attention	6.81	1.11	.42	.35–.48	.68	.62–.73
Coordination	6.09	1.20	.39	.32–.46	.66	.59–.72
Trust	5.99	1.24	.43	.36–.49	.69	.63–.74

* ICC refers to a single rating; reliability refers to the mean across raters calculated using the Spearman-Brown formula.

[†] Cells show unstandardized means and SDs. Patient and physician affect variables were rated on a 6-point scale (1 = lowest, 6 = highest); rapport variables were rated on a 9-point scale (1 = lowest, 9 = highest).

Table 3Pearson Correlations Among Composite Variables (*P* Value)

	R	Patient Positive Engagement	Patient Unease	Physician Positive Engagement	Physician Unease
R	1.00				
Patient positive engagement	.594 (<.001)	1.00			
Patient unease	-.229 (<.001)	-.0864 (.108)	1.00		
Physician positive engagement	.584 (<.001)	.227 (<.001)	-.154 (.004)	1.00	
Physician unease	-.166 (.002)	.010 (.855)	.171 (.001)	-.039 (.473)	1.00

Table 4

Pearson Correlations Between Affect and Rapport Variables

Variable	Rapport*	N	P value
Patient affect			
Warm/friendly	.61	347	<.001
Tense/anxious	-.22	347	<.001
Engage/attentive	.49	347	<.001
Disagreeable/antagonistic	-.37	347	<.001
Upset/distressed	-.21	347	<.001
Sad/depressed	-.42	347	<.001
Physician affect			
Warm/friendly	.54	348	<.001
Tense/anxious	.09	348	.096
Engage/attentive	.49	348	<.001
Disagreeable/antagonistic	.22	348	<.001
Hesitant/uncomfortable	.20	348	<.001
Rushed/hurried	-.02	348	.663
Composite variables			
Patient positive engagement	.59	347	<.001
Patient unease	-.23	347	<.001
Physician positive engagement	.58	348	<.001
Physician unease	.17	348	.002
Rapport	1.00	348	1.00

* Composite variable for rapport.

Table 5
Effect of Discussions About Pain, Time Discussing Pain, and Pain Severity on Affect and Rapport Ratings*

Dependent Variable	Independent Variable	Model 1		Model 2		Model 3	
		Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
Patient positive engagement	Pain discussed	.21	.06-.35	.20	.06-.34	.21	.07-.35
	Percent of time discussing pain [†]			-.02	-.06-.03	-.01	-.05-.04
	Pain severity [‡]					-.06	-.14-.02
Patient unease	Pain discussed	.32	.16-.47	.33	.18-.48	.32	.17-.47
	Percent of time discussing pain [†]			.03	.00-.07	.02	-.01-.06
	Pain severity [‡]					.08	.02-.14
Physician positive engagement	Pain discussed	.01	-.13-.16	-.01	-.15-.13	.00	-.14-.14
	Percent of time discussing pain [†]			-.02	-.05-.01	-.02	-.05-.02
	Pain severity [‡]					-.02	-.08-.04
Physician unease	Pain discussed	-.11	-.25-.02	-.11	-.24-.02	-.12	-.25-.01
	Percent of time discussing pain [†]			.01	-.03-.04	-.01	-.04-.03
	Pain severity [‡]					.07	.01-.12
Rapport	Pain discussed	-.04	-.24-.16	-.02	-.22-.18	-.01	-.21-.19
	Percent of time discussing pain [†]			-.02	-.07-.04	-.01	-.06-.05
	Pain severity [‡]					-.07	-.17-.03

* Models 1, 2, and 3 correspond to study hypotheses 1, 2, and 3. Coefficients for model 1 indicate the effect on ratings of discussing pain relative to discussing other topics. Results in Models 2 and 3 are adjusted for patient age and income as well as the listed independent variables.

[†] Coefficient corresponds to the effect on ratings of a 10% increase in total visit time spent discussing pain.

[‡] Measured on a 6-point scale; higher numbers correspond to more severe pain.