Published in final edited form as:

J Dev Behav Pediatr. 2010 ; 31(2): 83–91. doi:10.1097/DBP.0b013e3181cda770.

Therapeutic Alliance in Pediatric Primary Care: Preliminary Evidence for a Relationship with Physician Communication Style and Mothers' Satisfaction

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Abstract

Objectives: Studies in pediatric primary care suggest that interactions between parents and providers may have therapeutic impact on children's mental health problems. Methods to measure interactions specific to mental health outcomes have been developed in psychotherapy but are only beginning to be applied in primary care. We tested an adaptation of the Vanderbilt Therapeutic Alliance Scale (VTAS) for rating parent-provider interactions in pediatric primary care.

Methods: Recoding, using the VTAS, of 50 previously collected audiotapes of visits to a pediatric residents' continuity clinic. Concurrent validity of VTAS coding was measured by comparing it to independent coding using the Roter Interaction Analysis System (RIAS). Predictive validity was tested by comparing VTAS scores to parent ratings of the residents' behavior in the domains of interpersonal sensitivity, partnership, and informativeness.

Results: The VTAS demonstrated a factor structure very similar to the structure observed when it has been used to rate mental health visits. VTAS patient and provider subscale scores correlated with corresponding RIAS measures of parent and resident participation. Total VTAS scores correlated most strongly with RIAS scores indicating emotion and rapport-building statements from the resident. Total VTAS scores predicted parents' ratings of residents' interpersonal sensitivity but not ratings of partnership or informativeness.

Conclusion: It appears possible to use therapeutic alliance to rate interactions in primary care. Measuring alliance may bring greater efficiency to primary care mental health studies because of its potential specificity as a marker of mental health-related outcomes.

Keywords

therapeutic alliance; pediatric; primary care; mental; patient-centered

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INTRODUCTION

Up to 20 percent of children in the United States are thought to have an emotional or behavioral disorder.^{1, 2} Twice as many have functional problems related to behavior or feelings.³ The Surgeon General's Report on Mental Health estimated that only about a quarter of children with mental health needs receive a professional evaluation, and of those, only about one-third receives adequate treatment.⁴ U.S. and international strategies for improving mental health services for children and youth have focused on promoting primary care as a source of treatment and a point of entry to more specialized services, and have emphasized the importance of recognizing, in primary care, the relationship between parents' and children's mental health.⁵

One approach to increasing the capacity of primary care providers to help both children and parents involves building systems that take advantage of parallels between models of effective primary care patient-provider interaction such as patient-centeredness and relationship-centered care⁶ and the so-called "common factors" that influence outcomes in mental health treatment.⁷ Common factors relate to the process of care—the interaction of patient and provider in psychotherapies. They describe the *participants* in the process of care (for example, characteristics and attitudes of patients and providers), their *interaction* (the development of their relationship), and the skills providers use to influence behavior change.⁸ Participant common factors include expectations (positive or negative) about the outcome of treatment willingness to take a more active role in one's care; interaction common factors include the development of a therapeutic alliance (formation of a working relationship around shared goals); skills can include techniques that influence decisional balance across a range of issues. In adult psychotherapy, common factors are thought to account for as much as 30% of the variation in patient outcomes, compared to the 15% of variation accounted for by specific treatments.⁹

Although many other interventions such as facilitated consultation and referral, case-management and stepped care are important,^{10,11} several studies suggest that interactions between patients and providers – and thus common factors --play a necessary if not always sufficient role in the outcome of mental health treatments delivered in primary care. One study of treatment for adult depression in primary care found that physician communication enhanced the effectiveness of specific depression treatment.¹² A study of French primary care physicians found that both they and their patients considered a therapeutic relationship essential to depression treatment and an important determinant of outcome.¹³ We recently tested a training program for pediatric primary care providers based on common factor principles and found that it had an impact on mental health outcomes among the parents and children seen by trained providers.¹⁴ While there are a number of general tools for assessing physician communication competence, our study results motivated us to determine whether common factors can be measured in primary care, so that training methods can be optimized by studying the specific hypothesized mechanism by which patient-provider communication leads to better mental health outcomes.¹⁵

Therapeutic alliance is among the most studied and most reliably measured components of common factors influences on psychotherapy outcomes.¹⁶ It may be reasonable to measure alliance in primary care because its conceptualized elements—an affective bond between patient and client, plus agreement on the goals and processes of treatment—are very similar to core concepts of relationship and patient-centered care advocated for primary care practice.⁶

Alliance can be rated from three points of view: the patient, the provider, or an independent observer. Provider ratings are thought to be the least predictive of treatment outcomes,¹⁷ and patient ratings are considered problematic because they may be measuring outcome (restored

optimism, a positive view of the world in general and the therapist in particular) rather than measuring the therapeutic process that achieved that outcome.¹⁸ We thus sought to adapt an independent-observer measure that could be applied to audio or videotapes of pediatric primary care visits. We chose an existing version of the Vanderbilt Therapeutic Alliance Scale (VTAS) because (1) there was evidence in longitudinal studies of adult psychotherapy that it was strongly predictive of treatment outcome;¹⁹ and (2) it had already been applied to adolescent family therapy (Diamond GM, personal communication), a setting in which the presence of a therapist, parent, and youth patient is similar to that of pediatric visits. Since we began our work, a 5-item short form of the VTAS has been developed and found valid and reliable for mental health visits.²⁰ This could make the VTAS an especially efficient tool for studying mental health outcomes in primary care.

In this paper we describe our adaptation of the VTAS for pediatric visits and describe its psychometric properties when rating audiotapes from a study of communication between mothers and pediatric residents in primary care.²¹ We provide preliminary evidence for concurrent and construct validity in primary care by comparing the VTAS with previously coded ratings of patient and provider communication, and by examining how VTAS ratings vary with characteristics of the mother and resident that may influence the development of alliance. In particular, we hypothesized that mothers who were emotionally distressed, or who were African-American, would report lower levels of alliance, and that mothers would report higher levels when seeing female residents.^{22,23, 24} Finally, we provide preliminary evidence of predictive validity by comparing the VTAS with patient ratings of provider interaction style.

METHODS

Study Sample

In the original study, researchers visited the waiting area of the residents' clinic to systematically enroll five mother-child pairs per resident.²¹ The mother (or female guardian) and her child were eligible if they were coming for a well-child or follow-up visit with a participating resident whom they identified as their regular provider. There were no other criteria used to exclude children or mothers from participation. Mothers and residents provided written consent. The original data collection was approved by the Joint Committee on Clinical Investigation of the Johns Hopkins Hospital. The Committee on Human Research of the Johns Hopkins Bloomberg School of Public Health approved these secondary analyses.

Researchers approached 279 eligible mothers; 21 (8%) declined and 16 consented but audiotapes were not made. Thus, analysis was possible for 243 visits. The majority of the 243 visits were with African American mothers and only 21 were with white mothers. To create a sample for the study of alliance that would allow us to explore racial differences, we chose all 21 visits with white mothers and matched 21 African American mothers by age. Eight additional tapes were randomly selected for a total of 50 visits. These 50 did not differ significantly from the remaining 193 in terms of the mother's age or education, child gender, or the number of prior visits with the resident. Among the 50 visits, the number of visits per resident ranged from one to four with an average of 1.5.

Mothers and children—Twenty-six visits (51%) from the sample of 50 involved female children. Child age ranged from less than 1 year to 12 years ($M=2.4$ years). Thirty-nine children (78%) received Medicaid, eight were “self pay,” and three had another form of insurance. Mothers' ages ranged from 15 to 42 years ($M=25.7$ years); their education ranged from 7th grade to two years of college; 34 mothers (66%) had completed high school.

Pediatric residents—There were 17 visits with male residents and 33 with female residents. Of the 51 visits, 33 were with second-year residents and 17 with third-year residents. Nearly

all (48) of the visits were with white residents; one was with an Asian American resident and one with an African American resident.

Visit characteristics—Visits lasted an average of 33 minutes (range 9-60). Forty-three visits were for well-child care; five were for acute problems (diarrhea, rash) and two were for follow-up of chronic problems. Mothers reported an average of 9.4 previous visits to this resident (range 0-16).

Measures

Therapeutic alliance—The VTAS is a 38-item scale that an independent observer uses to rate each visit (in this case, by audiotape). The VTAS consists of three sections: provider behaviors, patient behaviors, and the provider-patient interaction. Each item asks the observer to make an overall judgment about an aspect of the visit on a six-point scale ranging from 0 (not at all) to 5 (a great deal). The items are summed (with some negatively worded items reversed) to yield a total alliance score with a possible range of 0-190.¹⁹ The adaptation of the VTAS used for this analysis made the instrument suitable for primary care by changing the wording in items from “patient” to “family member,” from “therapist” to “clinician,” and from “session” to “visit,” and by removing gender-specific references to the clinician or family member. Otherwise the scale was not changed.

The process for completing the VTAS involves a researcher first listening to each audiotape in its entirety. The researcher could immediately listen a second time to all or part of the visit prior to completing the VTAS. The researcher was blinded to all other information about the visit, including scores on the scales described below. Training for VTAS coding began with studying a manual adapted from coding manuals developed for the TDCRP¹⁹ and Diamond and colleagues' studies. The manual outlined general rules for coding and then criteria and examples for each item. Coders then practiced with individual cases that were not part of the study sample, comparing and discussing ratings item by item with an criterion rater (JB or LW) until they agreed to within one scale point on all items. Once coding of study recordings began, ongoing monitoring assessed test-retest and inter-rater reliability (see Results).

Parent emotional distress—Before the recorded visits, mothers completed the 28-item General Health Questionnaire to report current emotional distress. This tool has been used across cultures to screen for emotional distress in adults and has been validated against psychiatric interviews in primary care populations.²⁵ Mothers who scored 5 or higher (n=14, 28%) were considered distressed. A score of 5 or higher is associated with a sensitivity for psychiatric disorder of 85% and a specificity of 75%.

Satisfaction—At the end of the visit mothers were asked to respond to questions about their child's doctor, indicating their agreement on a scale of 1 to 5, where 1 signified strong agreement and 5 strong disagreement. The questions were similar to those developed by Street²⁶ for pediatric visits. *Partnership building* was represented by two questions (the doctor encouraged you to talk about your worries; the doctor asked for your opinion when deciding on the best way to treat your child's problem); *informativeness* was represented by one question (the doctor clearly explained why you should do the things he/she asked you to do); and *interpersonal sensitivity* by two questions (the doctor knew what health problems you wanted to talk about today; the doctor can be counted on to set your mind at ease when you are worried). As is often found with clinical satisfaction surveys, the answers to these items were skewed to strong agreement.²⁷ For analysis, responses were dichotomized into those who strongly agreed versus those with lesser degrees of agreement. For four of the five satisfaction measures this resulted in a nearly 50:50 split of the responses into greater and lesser agreement. For the

informativeness question, 35 parents of the 50 parents (70%) were classified as strongly agreeing.

Independent coding of parent-resident interaction—Tapes had been previously coded using the Roter Interaction Analysis System (RIAS).²⁸ In contrast to VTAS coding, which is based on an impression of an entire visit, RIAS coders classify all utterances by each speaker into one of several descriptive categories according to their function in the conversation. Categories include information giving, question asking, statements of empathy, and statements made to facilitate mutual interaction. Per-visit counts of each category can then be examined separately or added together. For this study, RIAS codes were aggregated to develop measures of provider patient-centeredness, parent participation, and provider dominance of the conversation.^{28,29} Providers' patient-centeredness was calculated by summing doctor talk in the categories of partnership building, information giving, psychosocial questioning, and rapport building. The parent participation measure used parallel categories to providers' patient-centeredness (parent partnership statements, information giving, question asking, statements of agreement, and statements giving emotional information). Inter-rater reliability (correlations) for individual RIAS categories aggregated to create these measures ranged from .57 to .95.²² Provider dominance was measured as the ratio of the number of resident utterances in the visit to the total number contributed by the resident and the parent.

Statistical Analysis

The VTAS and GHQ were scored using their standard published algorithms— Bivariate relationships were calculated using GEE linear regression. GEE techniques account for the nesting of observations within residents to develop appropriate confidence intervals.³⁰ Multivariate logistic GEE regression was used to model parent reports of satisfaction as a function of VTAS scores; mother's age, race, and education; and resident gender. All confidence intervals and significance values reported are from two-sided tests.

RESULTS

We first examined the psychometric properties of the VTAS since, to the best of our knowledge, it has not been previously applied to primary care. Twenty (40%) of the 50 tapes were randomly selected to assess test-retest reliability three months following their first rating. A second researcher rated another randomly-selected set of 20 tapes to assess inter-rater reliability. Test-retest correlation for the total score was $r=0.89$ and inter-rater correlation $r=0.70$. The internal consistency of the scale was good (Cronbach's alpha for the total score = 0.90; clinician scale = .82; parent scale = .90; interaction scale = .68).

We also conducted a principal components factor analysis with varimax rotation to compare the factor structure of the VTAS in our sample with the factor structure among the Treatment of Depression Collaborative Research Program (TDCRP) sample.¹⁹ Two factors with eigenvalues of 10.7 and 5.0 explained, respectively, 28 and 13 percent of the total variance. The factor structure among our sample was similar to the factor structure among the TDCRP sample. Four items loaded on opposite factors in our sample compared to their loadings in the TDCRP. Five of the six items that did not load on either factor in the TDCRP similarly did not load among our sample. An additional four items failed to load on either factor among our sample (Appendix).

Therapeutic Alliance, Patient and Resident Demographics, and Visit Characteristics

VTAS total scores ranged from 115-181 ($M=154$, $SD=14.5$). These scores were very normally distributed (skewness $-.26$, kurtosis 2.84) with a single low outlier. Removing this outlier did not substantially change the observed relationship of alliance to mother's satisfaction described

below. There were no statistically significant relationships between the total VTAS score and mother's age, mother's educational level, mother's emotional distress measured by the GHQ, child gender, or the number of prior visits with the resident. VTAS total scores were lower among visits with African American mothers compared to white mothers (-7.79 , 95% CI -15.27 , $-.309$, $p = 0.041$ accounting for clustering by resident). When we examined the VTAS subscales, this difference was accounted for by the parent subscale (-4.23 , 95% CL -7.74 , $-.69$, $p = .019$) and the interaction subscale (-2.90 , 95% CL -5.33 , $-.48$, $p = .019$) with no difference seen in the clinician subscale ($.17$, 95% CL $-.294$, 3.30 , $p = .91$).

There were no statistically significant relationships between VTAS total scores and resident gender ($p = .38$), year of training ($p = .74$), or visit length ($p = .21$) (Table 1). Similarly, there were no significant relationships of these variables with any of the three VTAS subscale scores (clinician, parent, or interaction).

Concurrent Validity with RIAS

Providers—Providers' patient-centeredness correlated moderately ($r = .39$, $p = .0048$) with the VTAS total score (Table 2). Among the VTAS subscales, it correlated most strongly (0.46 , $p = .0007$) with the provider subscale but it had no significant correlation with the parent behavior subscale (0.21 , $p = .13$) and only a marginally significant correlation with the interaction subscale ($.28$, $p = .05$). The rapport-building component of patient-centeredness was the one most strongly associated with the provider scale of the VTAS ($.42$, $p = .002$). Provider dominance of the visit was significantly and inversely correlated with the total VTAS score ($r = -.38$, $p = .007$) and parent subscale ($r = -.51$, $p = .0001$) but not with the clinician subscale ($r = -.07$, $p = .63$) or interaction subscale ($r = -.25$, $p = .08$).

Mothers—The RIAS parent participation measure was strongly correlated with the VTAS total score ($r = .54$, $p < .0001$). Among the VTAS subscales, it correlated most strongly with the parent subscale ($r = .48$, $p = .0004$), and less strongly with the interaction ($.41$, $p = .003$) and provider subscales ($.37$, $p = .008$). Mothers' emotional statements were the type of talk that most strongly correlated with VTAS ratings ($.46$, $p = .0007$), followed by question-asking ($.41$, $p = .005$). The other components of mothers' talk had correlations less than .40.

VTAS and Mothers' Satisfaction

Satisfaction with residents' interpersonal sensitivity was related to VTAS total score, but satisfaction with residents' partnership and informativeness was not (Table 3). Total VTAS scores increased by an average of 10.1 points (CI: 3.0 to 17.2) among mothers who agreed strongly that the resident knew what they (the mother) wanted to talk about, and, on average, by 8.0 points (CI: .63 to 15.4) among mothers who agreed strongly that the resident could be counted on to ease their worries.

Table 4 shows the results of logistic regressions predicting whether mothers would strongly agree that the resident knew what they wanted to talk about or could ease their worries. Both regressions find that the VTAS total score predicts stronger agreement independent of mothers' ethnicity, age, and education, and of resident gender.

DISCUSSION

The results of this study provide preliminary support for the notion that the formation of a therapeutic alliance of the kind that relates to mental health outcomes can be reliably observed in pediatric visits. The factor structure of the VTAS was similar to its structure in a psychotherapy sample, and the two largest factors account for a similar amount of the overall variance. Similarly, the mean score and its variation were similar to what was observed in the

TDCRP. Converting our total VTAS score to the way it is reported in the TDCRP (dividing by the number of items), we found a mean of 4.1 (SD=.38), compared to the TDCRP mean of 3.7 to 3.8, depending on treatment condition (SD ranging from .3 to .4).¹⁹

Perhaps most importantly, the VTAS correlated with parent reports of interpersonal sensitivity that might be considered evidence of psychotherapeutic impact. This appeared to be a specific effect in that the VTAS did not relate to parent reports of satisfaction with informativeness or partnership. Specificity for emotional communication was also evidenced by its relationship with the rapport-building subscale of the RIAS patient-centeredness measure (provider statements of concern, reassurance, empathy, and approval). We might have expected the VTAS to correlate with partnership (agreement on the goals and methods of care being an aspect of alliance). This lack of correlation could be an artifact of the way we asked about partnership, or it could indicate that the VTAS is relatively more sensitive to some aspects of alliance.

VTAS subscale scores also correlated with RIAS ratings specific to particular speakers in the visit. Provider patient-centeredness correlated most strongly with the VTAS provider scale and the RIAS patient-participation rating correlated most strongly with the VTAS parent subscale. The RIAS rating of doctor dominance was inversely correlated with the total VTAS score, consistent with past observations that doctor dominance is associated with decreased psychosocial exchange in primary care.²⁸

The VTAS interaction score had the lowest reliability of the subscales and correlated more strongly with the RIAS parent participation measure than it did with physician patient-centeredness. In contrast to items in the other subscales, several interaction subscale items ask the rater to assess interactive problem-solving. In the original study from which we drew the recordings analyzed here, the most commonly-raised problem – management of child behavior – was more often raised by parents than residents.²¹ If residents addressed these problems with prescriptive advice, we might expect little correlation with patient-centeredness, which is a measure of provider talk that includes information giving but also includes talk characteristic of discussion. The sub-scale's focus on interactive problem solving could also be the reason it does not correlate with the RIAS dominance measure – dominance is related to whether psychosocial problems are raised,²⁸ but as a ratio of talk averaged over the entire visit it may not accurately reflect the way problems are actually discussed.. These relationships might differ in visits where other sorts of problems are raised.

VTAS scores were independently lower for African American mothers compared to white mothers. Studies have found that African Americans report lower feelings of trust in medical providers compared to whites, even after adjustment for a variety of factors including income, education, and continuity of care.²² Data are mixed as to whether the results would have been different had the mothers and residents come from a similar ethnic and socio-economic background. Feelings of similarity predict patients' trust in their doctor, and ethnicity is one element of similarity, as well as age and education. However, a recent study found that a doctor's patient-centered communication style was also related, independent of other forms of similarity to patient reports of feeling similar.³¹

We had anticipated that alliance might vary with maternal emotional distress because of reports that distress is associated with increased disclosure of psychosocial problems.²⁴ However, we did not see a relationship of VTAS scores and GHQ scores, perhaps because residents did not consider maternal distress as part of their responsibility and did not respond.³² These attitudes may have changed since the time of data collection given increased emphasis on a more family-centered approach to pediatric care in general and toward mental health and other chronic conditions in particular.⁵

A shortened VTAS similar to the five-item version developed by Shelef and Diamond²⁰ may ultimately prove to be an efficient research tool for assessing alliance in primary care. Four of the five items in the Shelef and Diamond short scale loaded strongly (.67 or better) on a single factor in our pediatric data (Appendix), but the fifth, the extent to which the parent and provider agreed on goals and tasks for the visit, did not load strongly on either factor. All of the Shelef and Diamond items came from the VTAS parent and interaction subscales, so they do not account for provider behaviors. A pediatric short scale might use items from all three subscales.

Another possible research variation would be to code from video rather than audio recordings. Non-verbal communication about emotions and relationships uses both visual and aural channels, so there could be additional information gained by raters, but with the cost of more intrusive recording methods.³³

Limitations

Some VTAS items had very low frequencies in our sample. One item, rating the extent of discussion about terminating the clinical relationship, may not be applicable in primary care settings where individuals are seen over time rather than for episodes of illness.³⁴ Discussion of irrelevant comments, another item with low frequency, may be harder to discern in primary care when the agenda for any given visit may be wide-ranging and there may be more social talk at the beginning of visits. Low frequencies of items that describe patient and provider negative affect may be an artifact of this particular sample. It might have been higher had the sample included more visits with older children or adolescents, where the prevalence of behavior problems or conflict between parents and their children present at the visit might be greater. The applicability of these items to primary care needs to be assessed in a larger and more diverse sample.

A larger sample would also help us understand differences in item factor loading between primary care and psychotherapy data. Using criteria proposed by MacCallum and colleagues³⁵ we have a data set of a size that is suitable for preliminary analyses: there are several variables loading on each factor, a small number of factors, and a range of commonalities among the individual items (the average is .4, with 17 of the 38 over .5). We are able to report what Gregorich³⁶ calls configural invariance of the VTAS between our sample and the TDCRP. That is, we see a similar pattern of items within each factor, but we would need a larger sample to fully differences in the strength of item loading and thus the comparability of scores across primary care and mental settings.

In a future study one would ideally also look at primary care relationships longitudinally and focus specifically on visits in which emotional or developmental concerns were discussed. This would allow observation of how alliance develops and the extent to which it correlates with resolution of parent or child mental health problems. We measured alliance at essentially random points in the patient-doctor relationship. In psychotherapy studies, stronger correlations with outcomes have been observed by averaging alliance measures over multiple time points in treatment versus using measures from only early in treatment, but this might not be the case in primary care.¹⁹

Our study involved visits from a setting that is characteristic of medical training but may not be representative of the larger primary care world. Given our preliminary demonstration of concurrent validity, this difference doesn't threaten the validity of our results. It does, however, raise the question of whether alliance would have similar correlations with ethnicity, parental distress, or provider gender in visits with experienced clinicians in office settings. The resident visits we studied were, on average, about 8-10 minutes longer than those reported by U.S. pediatricians for health maintenance for children under 2, so there may be more opportunity for alliance to develop than in shorter visits.³⁷ A study of primary care internists found that in

the majority of their visits they used a very biomedical style of communication, with little psychosocial talk of the kind that would be expected to create the affective bonds felt to be a component of alliance.²⁸ However, residents may lack the broad clinical experience that would enable them to develop an alliance with many different types of patients.

Another possible limitation is the length of time since the study data were collected. Even residents' clinics have been affected by changes in financing that have tended to make visits shorter. However, research has reported that these changes have not modified the relationship of health outcomes with patients' trust and confidence in their primary care doctor, and the same may be true of therapeutic alliance.³⁸ We used these data because of their extensive prior, independent coding and parent post-visit reports, but based on these results would now hope to include measurement of alliance in new data collection. A subsequent study would also allow us to create a sample in which the contribution of children and teens to alliance could also be assessed.

CONCLUSIONS

It appears possible to use alliance to rate interactions in primary care. Measuring alliance may bring greater efficiency to primary care mental health studies because of its potential specificity as a marker of mental health-related outcomes. A longitudinal, observational study with a larger, more representative sample and defined psychosocial outcomes could establish the utility of measuring alliance in this setting, as could measuring alliance in the context of a primary care-based mental health intervention.

Acknowledgments

Original data collection supported by grant RO1MH 46134 from the National Institute of Mental Health. Analysis supported by NIMH grant K24 MH01790. The authors are grateful to Dr. Gary M. Diamond for providing them with his adaptation of the Vanderbilt Therapeutic Alliance Scale (as used in adolescent family therapy) and his training manual.

Appendix

Table 1

Primary care VTAS factor loadings compared to TDCRP data

Primary Care VTAS Items	Primary care data factor loading		TDCRP VTAS factor loading	
	Provider Factor	Patient Factor	Provider Factor	Patient Factor
Conveys competence	.78	.13	.82	.08
Expresses hope and encouragement	.64	.04	.41	.51
Commits self to help patient	.57	.11	.88	.11
Shows respect, acceptance	.74	.18	.75	.26
Acknowledges validity of thoughts	.71	.19	.78	.17
Makes sure patient understands goals	.74	.18	.60	-.10
Preserves self-esteem and dignity	.58	.06	.70	.15
Expresses reactions appropriately	.63	-.04	.24	-.07
Misses opportunities to help	-.70	-.11	.53	.17
Patient acts in hostile manner	-.49	-.09	-.08	-.65
Patient and provider seem to be	-.49	-.09	.02	-.64

	Primary care data factor loading		TDCRP VTAS factor loading	
Primary Care VTAS Items	Provider Factor	Patient Factor	Provider Factor	Patient Factor
engaged in power struggle				
References made to past visits/ experiences*	.45	.08	.31	.15
Provider builds sense of mutuality by using "we" and "us"	-.01	.44	.66	.08
Patient expresses that provider helps him/her feel better	-.01	.81	.01	.64
Patient experiences support**	.07	.75	.40	.78
Patient identifies with provider methods**	.29	.80	.19	.86
Patient makes effort to carry out suggestions	.31	.63	.08	.75
Patient acknowledges problems‡	.22	.70	.19	.80
Patient indicates desire to overcome Problems	-.16	.77	.20	.69
Patient talks openly	.01	.69	.17	.69
Patient explores contribution to situation	.43	.72	—	—
Patient is defensive**	-.07	-.64	.11	-.71
Patient willing to discard old behaviors	.21	.56	—	—
Patient is overly anxious	.30	-.67	.26	-.51
Patient shows enthusiasm	-.05	.81	.44	.73
Visit shows joint effort	.46	.74	.52	.75
Share common viewpoint**	.33	.75	.20	.84
Relate realistically, honestly	.29	.72	.44	.76
Both parties accept roles and responsibilities	.28	.73	.40	.78
Items Not Loading on Either Factor in Primary Care Study				
Intrudes own life story*	-.34	-.09	-.06	.10
Fosters undue dependency*	-.25	-.02	.01	-.01
Makes irrelevant comments	-.34	.08	-.14	.05
Patient shows negative attitude/missed or been late to appt.	-.05	-.29	.08	.46
Patient and provider agree on goals**	.45	.40	.41	.76
Patient and provider focus on tasks*	.00	.03	.66	.31
Patient and provider discuss termination	-.17	-.38	-.02	.73
Visit seems empty, boring*	-.15	-.15	-.30	-.17
Awkward silences*	-.07	-.03	-.03	-.38

— Item not included in the TDCRP VTAS.

* Item did not load on either of these factors in the TDCRP VTAS factor analysis.¹⁹

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Item included in Shelef and Diamond 5-item version of VTAS.²⁰

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Table 1

Bivariate associations of resident and visit characteristics with total VTAS score

Residents' characteristics	Δ VTAS*	95% confidence interval
Male doctor (vs. female)	-4.0	-12.1, 4.2
Year of residency training (year 3 versus year 2)	-1.4	-9.6, 6.8
Visit length (above mean)	4.9	-2.7, 12.4

* Change in total VTAS score associated with characteristic, calculated (with 95% confidence interval) accounting for fact that some residents had visits with more than one mother (clustering of mothers by resident).

Table 2

Correlations of VTAS scores with RIAS measures of residents' and mothers' interaction style

	VTAS total score	VTAS provider subscale score	VTAS patient subscale score	VTAS provider-patient interaction subscale score
RIAS provider patient-centeredness	.39**	.46***	.21	.28*
RIAS patient participation	.54***	.37**	.48***	.41**
RIAS provider dominance	-.38**	-.07	-.51***	-.25

All correlations are Pearson product-moment correlations.

*
p = less than or equal to .05**
p = <.01***
p = <.001

Table 3

Mothers' satisfaction versus VTAS total score

Satisfaction measure (element of satisfaction [Street]) ²⁶	Mean difference in VTAS total score [*]	95% confidence interval
The doctor can be counted on to ease my mind when worried (interpersonal sensitivity)	8.3	.63, 15.4
The doctor knew what problems you wanted to talk about (interpersonal sensitivity)	10.1	3.0, 17.3
The doctor explained why I should do the things he/she asked (informativeness)	3.6	-4.7, 11.9
The doctor asked for my opinion when deciding on a course of treatment (partnership)	2.8	-4.9, 10.4
The doctor encouraged me to talk about my worries (partnership)	-.22	-7.6, 8.0

* Absolute difference in total VTAS score associated with parent strongly agreeing with the statement versus having a lesser level of agreement (with 95% confidence interval), calculated accounting for the fact that some residents had visits with more than one mother (clustering of mothers by doctor).

Table 4

Mothers' satisfaction with affective process of visit as a function of VTAS total score and mother and resident characteristics

	Odds mother strongly agrees resident knows problems	95% Confidence interval	Odds mother strongly agrees can count on resident to ease mind	95% Confidence interval
Total VTAS score > mean	3.54	1.07, 11.79	6.24	1.72, 22.7
African- American mother	1.51	.43, 5.28	1.17	.32, 4.27
Mother's age < 25	1.26	.41, 3.88	.41	.12, 1.42
Mother's education high school or above	.78	.22, 2.74	.44	.11, 1.74
Male resident	1.58	.61, 4.14	.62	.22, 1.71

Odds ratios and confidence intervals calculated from GEE logistic regression accounting for clustering of visits within resident.