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Problems and Processes in Medical Encounters: The CASES method of dialogue analysis

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Abstract

Objective—To develop methods to reliably capture structural and dynamic temporal features of clinical interactions.

Methods—Observational study of 50 audio-recorded routine outpatient visits to HIV specialty clinics, using innovative analytic methods. The Comprehensive Analysis of the Structure of Encounters System (CASES) uses transcripts coded for speech acts, then imposes larger-scale structural elements: threads – the problems or issues addressed; and processes within threads – basic tasks of clinical care labeled Presentation, Information, Resolution (decision making) and Engagement (interpersonal exchange). Threads are also coded for the nature of resolution.

Results—61% of utterances are in presentation processes. Provider verbal dominance is greatest in information and resolution processes, which also contain a high proportion of provider directives. About half of threads result in no action or decision. Information flows predominantly from patient to provider in presentation processes, and from provider to patient in information processes. Engagement is rare.

Conclusions—In this data, resolution is provider centered; more time for patient participation in resolution, or interpersonal engagement, would have to come from presentation.

Practice Implications—Awareness of the use of time in clinical encounters, and the interaction processes associated with various tasks, may help make clinical communication more efficient and effective.

Keywords

Provider-patient communication; treatment decision-making; patient education; dialogue analysis

BACKGROUND

Observational studies of clinical interactions have found that measurable features of communication are associated with more patient satisfaction [1-4], better compliance and recall of information [5], and improved health outcomes [6, 7]. Research based on coding

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speech behaviors to produce quantitative description of medical encounters goes back decades. For example, patient-centered communication [8-10] has generally been operationalized as counts or ratios of specific categories of events [10-14], such as the proportion of utterances in the psychosocial domain [15], ratio of physician to patient utterances within a visit (“verbal dominance”) [16], or ratios of patient and physician questions [17].

These methods have yielded useful insights, but do not directly capture the responsiveness of the clinician to the patient's expressed needs and wishes [18]. More broadly, interpersonal communication is a dynamic process, with events stimulated, suppressed or influenced by those preceding. Accordingly, investigators have attempted to extend quantitative analysis of clinical communication to include sequence information. One study using a standardized patient analyzed variables such as turn-taking frequency and, duration [19]. Other studies have looked for “cues” – utterances by the patient, that are presumed to call for a defined response from the physician – and coded for whether it occurred [20, 21]. But the richer possibilities for description based on sequences of speech acts, control of the agenda, how treatment decisions are made, and the relationships among such structural features, remain largely unexplored using quantitative methods, although qualitative discourse analysis does provide insights [22-25].

A recent review finds that analytic convenience has shaped research questions. Methods that look for statistically significant relationships between cues and responses are constrained to small “lags,” because combinatorial possibilities explode exponentially with sequence length. Hence “research has focused heavily on doctor's immediate responses to patients’ cues, but has less to say about more strategic processes, such as how patients’ presentation influences the doctor's eventual treatment recommendations.” (We take “strategic processes” to refer to the means by which parties achieve their goals in the interaction.) They conclude that “[F]or sequence analysis to be educationally as well as theoretically important, methods need to be applied in ways that are not just statistically robust but conceptually appropriate [26].”

The VR-CoDES system does support coding of provider responses to patients’ emotional cues and concerns which do not occur immediately, if the response explicitly references the cue [27, 28]. However, it is limited to the concept of single cues and responses, and does not capture larger scale processes. We sought to develop a method for organizing larger-scale structural information in analyses of physician-patient interactions. Our main goals were to 1) develop and implement structural categories that were intuitive and clinically meaningful; 2) conduct empirical analyses using these categories that demonstrate their usefulness.

METHODS

We began with transcripts of clinical encounters in routine outpatient care of people living with HIV, which had already been coded for speech acts using the Generalized Medical Interaction Analysis System (GMIAS – see below) [29-32]. CASES incorporates the GMIAS coding, but the structure could be overlaid on other speech-act level coding systems.

Physician and patient samples

The Enhancing Communication and HIV Outcomes (ECHO) Study was designed to assess racial/ethnic disparities in the patient-provider relationship in HIV care [33-35], and how communication and relationships impact patient experiences and outcomes [32, 36-38]. Subjects were HIV care providers, including physicians, nurse practitioners and physician assistants; and their patients at four HIV outpatient care sites in separate regions of the

United States. The study received IRB approval from all four sites. Details about ECHO procedures and subjects can be found elsewhere [32]. For this study we randomly selected 25 ECHO providers, and then randomly selected 2 patient visits per provider. Mean patient age was 46 years, 34% were female, and 76% non-white. The 50 we studied were not significantly different from the total sample on any measured characteristics [32]. Of the providers in our sub-sample, 14 were female and 11 male. Seventeen were non-Hispanic white, 2 African American, 1 Latino, 4 Asian, and one “other.” Twenty were physicians and 5 were non-physician practitioners. All had established relationships with the patients. Visits were of typical length for HIV outpatient care, a median of about 15 minutes.

The Generalized Medical Interaction Analysis System (GMIAS)

The GMIAS assigns both a topic code and a speech act code to each utterance, which makes it possible to compare interaction process among various topics [39]. Speech act codes are based on Speech Act Theory [40-42], a sociolinguistic approach which identifies the social act embodied in an utterance. The unit of analysis is defined as a completed speech act. Topic codes were originally chosen to be consistent with the widely used Roter Interactional Analysis System [43], but have more specific sub-categories (see Table 1). Interrater reliability for the GMIAS was good, with Kappas for topic codes between the developer of the GMIAS (MBL) and 3 other coders of 0.80 or better, and for speech acts 0.71 or better (details at <https://sites.google.com/a/brown.edu/m-barton-laws/home/gmias>). The GMIAS has been described in detail previously[32].

CASES: Conceptual framework

The CASES concept began with the observation[44] that “[C]entral to the appropriate evaluation of communication is the notion that communication serves goals ... [W]e have not found a coherent framework that explicitly places each participant's . . . goals central to the communication process. . .”(p. 806) Although we cannot interrogate the participants in transcribed encounters about their goals, we can observe that any number of particular problems or issues arise. Addressing each problem in some way is presumably a goal of the person who introduces it.

Tai-Seale, et al [45] identified what they called “topics” in primary care visits with elderly patients, defined as “an issue that required a specific response by the physician or patient.” (p. 1874) We used a more encompassing definition and captured additional information. CASES begins with the identification of “threads” – specific subject matter such as a symptom or complaint, medication adherence, or a psychosocial problem which may be raised by either participant. Threads may be very brief – e.g. the physician may inquire if the patient practices safe sex, the patient may answer in the affirmative, and the thread ends – or lengthy, taking up any proportion of a visit. Threads frequently reappear multiple times. They may traverse multiple GMIAS topic codes; the concept of the “subject” of a thread is different from that of topic categories. For example, a patient may mention headaches, which leads to discussion of symptoms, psychosocial stressors, and medications.

Within threads, we *a priori* identified four basic processes, labeled “Presentation,” “Information,” “Resolution,” and “Engagement.” These correspond to generally accepted broad functions of clinical encounters: sharing information about the patient's condition and circumstances; providing health education and anticipatory guidance; making a diagnosis and deciding on treatment or otherwise meeting needs or solving problems; and providing reassurance and support[46]. Not all threads have all processes; they may include only one. Presentation is defined as: Development of information about the patient's specific condition, symptoms, experiences or history. Provider reports about test results or clinical observations are part of Presentation processes.

An example of a portion of a Presentation process is:

P: Well that medication's making me still kind of nauseated. I was up 3:30 this morning throwing up. So, I think I'm getting used to it but just taking awhile.

D: Now was that the pain medication?

P: No, it's the HIV med --

D: Oh the Abacavir.

Information is defined as: Transfer of general information about the world, including the patient's conditions and treatments, which is not unique to the patient. (E.g., what diabetes is.) Information processes mostly consist of information flow from provider to patient, but patients may give Information to providers, about such subjects as social services, or biomedical information derived from other sources. An example of an information process is:

D: I give you all those medicines together for a reason. If we could get away with half of that number of medicines, I would do that. But you can't, ok?

P: Yeah.

D: Because you become resistant dude.

Resolution is defined as: Discussion and decisions about how to respond to problems or issues such as prescribing, referrals, advice about self-management, or even a decision not to take action. Note that many threads need no resolution because no problem is identified, or no action need be taken beyond what is accomplished through other processes. A resolution process may end in advice about coping, or a physician refusing a patient request. An example of a resolution process is shown below:

D: The thing is that I think we probably need to use a pillbox. Don't you think so?

P: Okay.

D: Because if you're busy like that, it will tell you specifically how you're missing it. . . . Every Sunday you put it in the pillbox, if you're skipping it will show you.

Engagement is defined as: Affective or relational exchange such as empathy, reassurance, or expression of feelings about the other party. Engagement processes are typically brief, e.g:

D: I'm really glad you're getting that hip fixed.

P: Yeah, I can't wait.

D: Yeah, yeah it's been a long time you've been dealing with that.

Some processes occur outside of "thread space": explicit agenda setting; socializing including greeting and parting rituals; and the general "wrap up" which often occurs at the end of a visit in which logistical issues are reviewed. Occasionally the resolution of a thread will occur in the midst of this process, in which case we code it accordingly, but mostly it consists of reiteration of resolutions which have already been achieved, e.g. the physician reviews the patient's prescriptions or gives directions to the phlebotomist. Physical examination is also treated separately. Clinical observations announced during the exam are coded to an appropriate thread, but the business of conducting an exam such as telling the patient to take a deep breath is not.

We label threads with two properties: how they are initiated, which we call induction; and the nature of the resolution, if any. Physicians often initiate threads with closed questions, which direct the patient to discuss a specific issue. An open question, in contrast, invites the

person addressed to initiate a thread. Sometimes speakers explicitly announce a new thread: “Let’s talk about your medications.” Occasionally, a thread is imported from a previous interaction, or a third-party messenger: “Now the nurse said you wanted to talk about your weight.” In this case, although the physician speaks first, we would credit the patient as the initiator of the thread. Frequently, speakers simply start a new thread without any specific speech act to mark the inflection. We call the initiator of a thread the “owner.” The codes for these various forms of induction are shown in Table 2.

Codes for type of resolution are shown in Table 3. More detailed explanation of these codes can be found in the coding manual, available at http://research.brown.edu/myresearch/Michael%20Barton_Laws.

Development and reliability testing

We began by having two coders (TB and TT) apply the concepts to a small number of encounters, using Atlas.ti (Scientific Software Development GmbH, © 2002-2012) software for qualitative data analysis. They conferred regularly with the first author (MBL) to establish that the concepts could account exhaustively for the entire visit, that threads could be reliably identified, and thread ownership reliably established. The group developed operational rules to resolve problematic examples. (See the coding manual.) The coders empirically discovered categories of thread induction and resolution in the data, until these were saturated and no new categories appeared. As the transcripts had been coded previously using the GMIAS, individual speech acts were already present as units of analysis.

We selected 25 of the providers at random, randomly selected two encounters for each provider, and added CASES fields to the GMIAS coded data. Early in the process, we conducted a test of intercoder reliability based on one encounter. One coder identified 17 threads. The second coder identified the same 17 threads plus one more, consisting of a single utterance: “Your blood pressure is very good,” which the other coder had included in the physical exam. (We concluded that because this was a clinical observation, it should have been coded as a thread.) Of the remaining 17 threads, the coders assigned identical speech acts to 15. Overall, there was 99% agreement on assignment of utterances to threads. Of 284 utterances assigned by one or the other coder to a thread, 28 were assigned differently as to process, for 90% agreement. As the proportion of the four processes was markedly different, the kappa statistic was lower, .55. Of the 17 agreed-upon threads, all were assigned to the same ownership. Two codes for induction were missing and there was disagreement on one. There were four differences in classification of resolution, two due to missing entries. With the correction of missing entries, we concluded that this was a satisfactory level of reliability.

Analyses

We compared patterns of GMIAS-coded speech acts among processes using the Friedman non-parametric version of repeated measures ANOVA. Next, we show how the CASES categories provide new insights into concepts of patient centeredness as they relate to physician-patient dialogue. These concepts include the dominance ratio (patient utterances/physician utterances), the question ratio (patient questions/physician questions), the percent of patient utterances that are expressives, and percentage of provider utterances which are directives. We examined the correlation between these concepts in the resolution process and in the rest of the visit using Pearson’s *r*.

RESULTS

Description of CASES categories

The number of threads per transcript ranged from three to 34 (median 14, mean 15.1). Most threads (60%) were doctor owned but there was considerable variation among visits, ranging from 18.2% to 91.7%.

Graphical representations of coded encounters are shown in Figure 1. The x-axis represents time during the physician-patient interview; denominated in utterances, not in minutes. That is, the numbers on the x-axis are the cumulative number of physician plus patient utterances. The y-axis shows individual threads, in the sequence they are introduced. Each thread occupies a separate horizontal stripe, with colors indicating process. Thread ownership and points of resolution are also marked. Note that some threads are contiguous in time, while others are interrupted and recur one or more times. Below the line, labeled with negative numbers, are the non-thread processes of socializing, agenda setting, physical exam, wrap up, and material not related to the clinical encounter, such as interruptions by a third party, or the patient taking a phone call. This is given missing value codes and is not included in our utterance counts or denominators. Some encounters visualized in this way show an orderly progression in which threads terminate one after the other and the graph rises steadily from left to right; others have a far more scattered appearance in which several recur and the visit clearly wanders among issues (additional examples are at http://research.brown.edu/myresearch/Michael%20Barton_Laws).

Patterns of GMIAS codes differ among processes

The mean number of utterances per visit was 560.7. Of these, 469.2 (83.7%) were coded to threads. The remainder were socializing (mean 33.6 utterances, 6% of the total), physical examination (15.1, 2.7%), and the other interactions shown below the line in the figure (see Table 4). Presentation was the predominant process, incorporating 61% of all utterances, or 65.8% of utterances within process-coded threads. Presentation processes are notable for the high proportion (24.2%) of provider utterances which are questions, and the strong flow of information from patient to provider (56.9% vs. 28.3% representatives). Of the total of 56 provider questions per visit, 41 (73.2%) were in the presentation processes. Thus the well known observation that providers ask many more questions than do patients in typical visits is accounted for almost entirely by the presentation process.

In the information process, patients actually ask more questions than do providers (mean 1.8 vs. 1.3) and information predominantly flows from provider to patient (71.3% vs. 13.1% representatives). Note, however, that no information process occurs in 4 out of the 50 visits, and that when they do occur they account for fewer utterances than presentation processes.

At least one resolution process occurs in all 50 visits. These constitute a smaller proportion of utterances, 13.5%, than do presentation processes, but somewhat more than information processes, 10%. Resolution processes are notable for the high proportion of provider directives – 30% of all provider utterances. This is more than 3 times the proportion in information processes (8.6%), and more than 7 times the proportion in presentation processes (4.1%). Note that provider instructions connected with physical examination, such as “Take a deep breath,” are not coded to any of the four processes. Resolution processes also feature a much higher proportion of patient commissive utterances (12.4%) than other processes. While patient expressive utterances are more common in resolution processes than in information processes (8.4% vs. 2.6%) they are actually slightly more common in presentation processes (9.8%). Since presentation processes also feature more utterances overall, the number of patient expressives is even more disparate, a mean of 2.8 in resolution processes vs. 17.5 in presentation processes.

Engagement processes occur in only 39 of the 50 visits, and constitute relatively few utterances where they do occur. As one might expect, they include a relatively high proportion of expressive utterances by both provider and patient, and a relatively high proportion of provider empathic utterances, 15%. No other process includes even 1% of provider empathic utterances. However, the total average number of such utterances in visits where any engagement process occurs at all is only 1.3.

Resolution Outcomes

Threads can have more than one resolution code – for example, a prescription and lifestyle advice. However, 653 of the total 732 threads (89%) had only one, and all but 13 (1.8%) had 3 or fewer. A plurality of threads (42.7%) are coded as “no need to be resolved” (Table 3). These may simply be an inquiry and a report of no problem. An additional 2.7% are coded as reports of non-problematic test results. In other cases, the patient reports some problem to which there is no medical solution but the provider expresses empathy (1.34%), the only need is for information (0.22%), the only outcome is diagnosis (presumably meaning treatment is unnecessary or unavailable -- 0.67%), or a decision is deferred (2.23%). The total percentage of threads which result in no decision or action is therefore nearly 50%.

More active resolutions include referrals, provision of instructions, or the physician providing an immediate service such as signing a form. A total of 145 threads – 19.8% -- had at least 1 resolution code indicating a treatment recommendation or decision: prescriptions, procedures, or lifestyle modifications. A single treatment decision was the only resolution in 91 threads, while 54 had 2 or more treatment decisions or recommendations. Of a total of 187 treatment recommendations by the provider, patients indicated acceptance or intention to adhere in 144 (77%), overtly refused in 10 (5.3%), and there was no indication of patient intentions in 33 (17.6%). Table 3 shows the complete list of resolution frequencies.

CASES categories and indices of patient-centeredness

Since resolution processes are where decisions are made, we examined the correlations (Pearson's r) between four measures of patient centeredness (see “background” and “analyses”) within the resolution process, and the overall visit (Table 5). Three of these are significant, but moderate; the proportion of provider directives in the resolution process is uncorrelated with the proportion in the rest of the visit. Thus resolution processes are not necessarily representative of the entire visit with respect to these measures.

DISCUSSION AND CONCLUSION

Discussion

These visits were dominated (61% of all utterances, 66% of utterances in threads) by the presentation process. We cannot comment about whether that is too much, too little, or just about right. However, assuming that visit length is limited, more information exchange, shared decision making, or engagement would have to come at the expense of presentation.

A second observation is that aggregating patterns of speech acts across the entire visit can be misleading. For example, we observe that information flow during the presentation process, seen in the pattern of questions and representatives, is from patient to doctor, and during the information process is from doctor to patient. During the presentation process it is arguably in the patient's interest for the physician to be asking most of the questions and for the patient to be providing most of the information. This meets the instrumental need of both parties to achieve a shared understanding of the problems under discussion. Similarly, during the information process, it is arguably in the patient's interest that the reverse occurs.

The appropriateness of these patterns can only be appreciated if processes are separated as they are in our system.

This does not imply that the questioning that goes on during the presentation process could not be improved, for example with more open ended questions [47, 48] and more inquiry into patients' experiences and perceptions [49-52]; or that the information process could not be improved with more use of techniques such as teach back [53, 54]. CASES can assess these variables.

A third observation is that speech act patterns in the resolution process are distinct from other processes in ways that may have implications for shared decision making. In previous publications we found that the fraction of provider directive utterances is much greater in dialogue about antiretroviral medication adherence problem solving than in dialogue about other topics [29, 32]. We see the same thing in the resolution process compared with other processes. The relatively high proportion of directives may be a function of the time pressure that physicians feel, a sense that a directive approach is more effective than decision making that is more shared, or both. Research that examines whether a less directive approach produces better treatment engagement, better clinical outcomes, or more patient satisfaction, is needed.

A final observation is the paucity of engagement process. While there is unquestionably a great deal of instrumental process that needs to happen in any visit, we were surprised that for these patients with HIV 11 (22%) of the 50 visits had no engagement processes, and overall only 2% of utterances were classified as engagement. It may be that providing reassurance and support are not needed in some interactions, or are only needed in limited quantities in routine visits for persons with a chronic condition. However the literature suggests that more and better interpersonal care both in HIV care [55, 56] and in chronic care in general is associated with better adherence with medications, and greater patient satisfaction [57].

Many other research questions can be addressed with this system. For example, do patients understand and retain information better when there are fewer threads? If threads are more contiguous, i.e. less broken by other threads? Are patient satisfaction and outcomes related to the proportion of patient-owned threads?

This paper has limitations. While we studied a random sample of providers and patients in 4 US cities, our findings may not be generalizable to care sites in the US that are organized differently than the ones we studied (e.g., that have longer visit times) or that have a different patient mix. We cannot know whether these findings can be generalized to patients with other chronic conditions.

Conclusion

we believe that we have shown that the CASES method provides new insight into the nature of the work done during these encounters, and improved understanding of the asymmetric speech act patterns in clinical encounters. It also provides a framework for use of information about the sequence of events to develop an understanding of the dynamic process of clinical communication. For example, it is possible to determine whether patient cues of anxiety or distress are associated with empathic or reassuring utterances by the provider at any later point in a thread, not just at close lags. Providers might immediately respond to such cues instrumentally, as by trying to diagnosis the cause of a symptom, and later provide reassurance. Parsing the encounter into threads makes such sequences identifiable.

Practice Implications

These data challenge clinicians and patients to think carefully about how they spend the precious time that they have during office visits, and to consider whether less presentation, and more information, resolution, and engagement would make for better quality care.

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Figure.
Graphic representation of two encounters

Table 1GMIAS coding categories ^{*}

General Classification	Examples of specific sub-categories
<u>Speech Act Codes and Sub-codes</u>	
Questions	
Representative	Representative questions can be open, closed, leading
Expressive	Expressive questions can be open, closed, leading
Check understanding/knowledge	"Do you understand?"
Representatives	Statements about inter-subjective reality: General, own behavior, deduction, prediction
Comprehension	Statements of understanding or lack of understanding
Expressives	Values, opinions, desires, goals
Emotions	Affect, e.g. "I'm so sad about my mother's illness"
Conversation Management	Management of turn taking or visit agenda
Empathy	Expression of emotional rapport, support or reassurance("That must have been difficult")
Directives	Recommend, mandate, encourage
Commissives	Promises, offers, permissions ("Okay, I'll set a quit date.")
Jokes	Intended humor that can be misleading if coded literally
Social rituals	E.g., ritual greeting and parting statements, "Excuse me," "Thank you."
Missing	Poor transcript quality prevents definitive coding
<u>Topic Codes and Sub-codes</u>	
Biomedical	
ARV-related	All topics related to ARVs
ARV adherence	Adherence barriers, adherence problems
ARV side effects	Specific side effects, concern about side effects
ARV prescribing	Initiation of treatment or change in regimen
ARV problem solving	Solving problems, overcoming barriers
Non ARV-related	Diagnosis, symptoms, tests, risk behaviors, and treatments
Psychosocial	Substance abuse, recovery, emotions, relationships, health of others, social services, housing
Logistics	
Non physical exam	Appointments, referrals, record retrieval
Physical Exam	E.g., "Take a deep breath"
	E.g., "Did you see the ball game?" or "Is it still raining?"
Socializing	

^{*} This is not an exhaustive list, but presents categories most essential to this report.

Table 2

Thread induction categories

Induction category	Comments and examples
Request	Pt: <i>I need you to fill out a form so I can get a wheelchair.</i> Pt: <i>I need some Vicodin.</i>
Problem presentation	Used when unclear whether problem is new or established
New problem presentation	Pt: <i>Could you look at this rash?</i> Dr: <i>You seem depressed.</i>
Established problem	Pt: <i>I'm still coughing like crazy at night.</i> Dr: <i>Hey, I learned a good new exercise for back pain.</i>
Inquiries	(Used when sub-codes are unclear or inapplicable.)
Focused question	Dr: <i>Are you taking your meds?</i> Pt: <i>What do you think is the best thing to do for a cold?</i>
Invitation question	Invites the interlocutor to introduce a topic. Dr: <i>Is there anything else you'd like to talk about?</i>
Cued	
Topic suggested by something in previous thread.	Dr: <i>How did you break your foot?</i> Pt: <i>I was high and I fell down the stairs.</i> (This might cue new thread about drug use.)
Test results	
Positive or unfavorable results requiring resolution	
Negative or favorable results not requiring action	
Standard checklist/review of systems	Dr. goes through a series of standard items and one receives a positive response
Finding on clinical examination	Announcements of negative findings (" <i>Lungs sound clear</i> ") are not coded as threads but assigned to the physical exam. However, positive findings leading to discussion become a thread induction
"Pre-agenda" topic	Speaker has been informed that the interlocutor wishes to discuss something. Dr: <i>The nurse said you wanted to talk about...</i> (This becomes a patient-owned thread.)
Narrative without identified problem	E.g., report of encounter with another provider; narrative of a psychosocial issue not indicating intervention by the provider; narrative of a past illness.

*Usually by Pt. but thread ownership establishes who makes the request

Table 3

Thread resolution categories (Note: There are 763 threads, but a total of 868 resolutions as threads may have more than one resolution.)

Resolution	Frequency	Percent
No need to be resolved	363	41.8
Treatment recommendations (eg. prescribing, procedure, behavior change)		
Patient neither refuses nor agrees	32	3.7
Patient agrees	144	16.6
Patient refuses	10	1.2
<i>Subtotal</i>	<i>186</i>	<i>21.5</i>
Provider actions, offers, promise, or decisions		
Provider promise	35	4.0
Provider action (signing form, doing test)	56	6.4
Provider offers to do something	26	3
Treatment is deferred	20	2.3
Resolved with empathy	10	1.2
<i>Subtotal</i>	<i>147</i>	<i>16.9</i>
Provision of information		
Diagnosis requiring action	5	0.58
Non-problematic diagnosis	5	0.58
Non-problematic test results	24	2.8
Instruction on how to do something	17	2.0
All other information or explanation or instruction	46	5.3
<i>Subtotal</i>	<i>97</i>	<i>11.26</i>
Thread not resolved		
Not resolved	4	0.46
No resolved because nothing can be done	20	2.3
Failure to follow up on problem	15	1.7
<i>Subtotal</i>	<i>39</i>	<i>4.46</i>
Referrals		
Sent to social service	2	0.23
Other doctor	12	1.4
SU treatment or counseling program	4	0.46
Offer for referral	2	0.23
Sent to Adherence Counselor	1	0.12
<i>Subtotal</i>	<i>21</i>	<i>2.44</i>
Miscellaneous		
Coder doesn't know	7	0.81
We know patient does not have problem being solved	3	0.35
Probably resolved but we don't have clear verbal evidence	4	0.46
Patient doesn't see it as a problem	1	0.12
<i>Subtotal</i>	<i>15</i>	<i>1.74</i>

Resolution	Frequency	Percent
Totals	868	100

Table 4

Mean number and percentage of selected speech acts within processes, per visit. (Socializing and physical exam are included in “all” but not shown in table.)

	All N=50			Presentation N=50			Information N=46			Resolution N=50			Engagement N=39		
	DR	PT	DR	PT	DR	PT	DR	PT	DR	PT	DR	PT	DR	PT	PT
Closed question	45.8	11.4	37.6	7.3	0.9	1.6	3.5	2.1	0.6	8.6%	1.2%				
Open question	8.7	1.9	6.8	1.2	0	0.2	0.5	0.3	0.4	0					
Leading question	18.8	5	14.9	3.4	0.3	0.8	1.8	0.7	0.5	0.1					
Total questions	56.4	13.6	41	8.2	1.3	1.8	2.8	2.3	1	0.1					
Representatives	99.4	108.5	53	91.4	24.1	2.9	17.3	4.6	1.2	1.1					
Expressives	18.2	23.8	9.4	17.5	2	0.8	3.2	2.8	2	1.4					
Empathy	2.2	0.1	0.7	0	0.1	0	0.3	0	1.3	0					
Directives	28.5	1.9	7.4	1.1	2.9	0	12.1	0.4	1.1	0.2					
Commissives	7.2	2.8	2.5	0.9	0.1	0.1	2.8	1.6	0.2	0					
Other	83.3	73.6	30.4	45.4	4.4	5.6	8.9	11.2	2.8	2.8					
Totals Dr/Pt % of utterances In process % of all utterances In threads	295.2	224.3	177.6	164.5	34.9	16.3	47.4	22.9	9.6	6.3					

All N=50			Presentation N=50			Information N=46*			Resolution N=50			Engagement N=39*		
DR	PT		DR	PT		DR	PT		DR	PT		DR	PT	
57%	43%		52%	48%		68%	32%		67%	33%		60%	40%	
100%			66%			10%			13.5%			3%		

All contrasts in proportions of specific speech acts by DR and PT among processes are significant at $p < .0001$ by the Friedman non-parametric version of repeated measures ANOVA, with the exception of patient expressives, $p = .007$, and patient empathic utterances, which are not significantly different.

* Eleven visits contain no engagement; 4 have no information process. Data refers only to those visits in which these processes exist.

** Conversation management, social ritual, jokes, and missing values. Most “conversation management” consists of acknowledgments, and “facilitative utterances” while the interlocutor is speaking, which signify only that the speaker is listening.

Table 5

Visit-level correlations between indicators of patient-centeredness in the resolution process, and all other processes

Indicator	Pearson's r	P value
Dominance ratio (patient utterances/physician utterances)	.42	.003
Question ratio (patient questions/physician questions)	.32	.044
Percent patient utterances that are expressives	.32	.024
Percent physician utterances that are directives	-.0857	.554