PRACTICE OBSERVED

Practice Research

Topic analysis: an objective measure of the consultation and its application to computer assisted consultations

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Abstract

A simple method has been developed to classify the verbal interaction during medical consultations in terms of the relative proportions of medical and social content and the initiator of conversational topics discussed. The method has been applied to video tape recordings of three doctors' consultations with and without a computer present to classify and compare the items discussed. Actual computer use has been shown to have a medical effect on the consultation ($p < 0.05$) and to increase the proportion of topics initiated by the doctor ($p < 0.001$). Although this was largely accounted for by the massive increase in doctor initiated medical items resulting directly from computer use, there was evidence that, for two of the doctors, these topics were replacing some of the normal social and patient initiated medical exchanges.

Introduction

There has recently been an increase in the awareness of the process of the consultation in primary care. Techniques to facilitate this process are taught to students and vocational trainees with implicit assumptions concerning desirable and less desirable attributes and outcomes. Conventional methods of audit enable consultations to

be monitored but they tend to concentrate on such measures as consultation duration, referral rates, and prescribing habits, which are largely doctor dependent. Outcome measures allow patient compliance with advice given during the consultation. The outcome, however, does not necessarily reflect the process.

The process is in many ways more difficult to study, but it is crucial that objective measures are used to provide the factual basis on which more subjective, less rigorous methods are built. This requires the common and distinct characteristics of consultations to be simplified and classified to explain the consulting process and interpret the effects of variables on it.

A review of the few objective methods of consultation analysis available showed some sophisticated multicategory methods, but these require highly skilled raters and can be too complex to yield satisfactory interpretation.¹ More practicable methods tend to be too doctor centred to assess the bilateral consultation process effectively.

A method of analysis of the consultation was required to assess the consultation in a practicable and reliable way. Sufficient sensitivity was needed to distinguish between consultations, specifically to identify the effect of a computer on the consultation interaction.

It was decided to adopt a method of topic analysis because this was seen as the most obvious way of overcoming the complexity of syntactical methods without resorting to the descriptive subjective methods used in consultation teaching.

While we have previously reported beneficial effects of using computers in the surgery to remind doctors of patient specific screening and prevention procedures, we also noted slight indications of detrimental effects.² These included an insignificant decrease in the discussion of non-computerised health education items, and a small minority of adverse patients' comments. Additionally, two of the three doctors studied seemed to add a relatively large amount of preventive discussion of computerised items with little corresponding increase in consultation duration.

In considering the specific area to which topic analysis has been applied in this research the use of a computer terminal for preventive care during the consultation has been shown to have medicalised the consultation. As previously reported computer consultations were, on average, significantly longer than controls, although the computer initiated preventive medicine stage (CIPMS) took an average of two minutes and eight seconds, implying a squeezing of the "normal" part of the computer consultation.² The proportion of medical topics has increased ($p < 0.05$), and the proportion of doctor initiated topics has increased ($p < 0.001$). Most of this change, however, is accounted for by the massive increase in doctor initiated medical topics directly attributable to computer use. There is only slight evidence of diminishing social and patient initiated content overall, comprising inconsistent findings for the different doctors. For one, the decline in social and patient initiated content is quite extreme, for another, moderate, and for the third, barely present.

The third doctor, C, also differed from the other two in the effect that the computer had on his consultation duration. Although the computer created no significant increase in consultation durations, the mean addition to Dr C's consulting times seems to be slightly greater than his CIPMS. It is, therefore, postulated that for Dr C topics discussed as a result of computer use form a direct addition to his "normal" consultation topics, which is substantiated by the results shown in table II. This may be explained by different style of computer use shown by Dr C.

We would, therefore, suggest that the more definite style of use adopted by doctors B and C introduced the characteristics of the expense of patient initiated and social topics. Since this may have repercussions on the doctor-patient relationship further studies are being undertaken to test this hypothesis and assess the impact of these changes on the important area of consultation task fulfilment.

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References

1. Penfold D. *Doctor patient consultation: a review*. In: Penfold D, Haker J, eds. *Doctor patient consultation*. London: Croom Helm, 1981: 1-13.
2. Simon-Fisher B, Haker J, Simon-Fisher S. *A study for improving the medical interview between doctor and patient*. (Unpublished research report, Department of General Practice, University of Manchester, 1983).
3. Baily RT. *Language in general practice: a method for the study of small groups*. Cambridge: Addison-Wesley, 1980.
4. Penfold D, Schuler J, Tap P, Harker P. *The consultation: an approach to learning and teaching*. Oxford: Oxford University Press, 1984.
5. Penfold D. *Analysis of the consultation in primary care: the use of audio visual recording*. *Br Med J* 1981; 290: 1209-12.
6. Pringle M, Robins S, Brown G. *Computer assisted screening: effect on the patient and on consultation*. *Br Med J* 1983; 286: 1209-12.
7. Brown G, Long BL. *General practice: a study of the verbal behaviour of general practitioners consulting their patients*. London: H.K. Lewis, 1978.
8. Foster M, Crabb-Sullivan P. *Doctors using computers: a case study*. In: Sauer M, Connolly M, eds. *Computing in human-computer communication*. London: Academic Press, 1982.
9. Nishida M. *Computers in general practice: A personal view*. *J R Coll Gen Pract* 1984; 34: 647-8.

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Appendix: Rules for "topic analysis": a method for quantifying conversation

Operational definition of a topic

- (1) A topic is brought up by one participant and discussed by both. Therefore, it entails at least two clearly linked referential statements. If the initiating comment is merely substantiated or refuted by the second participant with "yes," "no," or "and," or other gesture it is not deemed to have discussed the topic. The topic becomes valid, however, if the first participant continues with the same subject.
- (2) An isolated comment, which results in an activity, should be included even if no second verbal contribution is made—for example, "I've come for blood pressure check"—is followed by taking of the blood pressure. Examinations should therefore be recorded in brackets on transcripts.
- (3) It must be sensible to give the topic a short heading and insert the heading in a sentence of the type, "There was discussion concerning . . ."

This may indicate that the computer initiated content of the consultation replaces some other, possibly important, part of the consultation. One way in which the content of the normal consultation content could occur is exemplified by Byrne and Long in their description of phase 6 (terminating) the consultation, in particular the citation of further exchange being initiated at this late point in the consultation by patients, using such comments as, "By the way doctor?" or "While I'm here doctor?"

Computer use occurs at the same point in phase 6 of the consultation as this patient initiated behaviour invariably for two of the doctors, and occasionally for the third, which reinforces the possibility that such patient initiatives may be inhibited.

It has also been suggested that the use of computer terminals in the surgery may have repercussions on the process of the consultation and, therefore, in the long term on the doctor/patient relationship.³ A recent editorial stated that "the great strength of general practice is in the successful marriage between technological medicine on the one hand, and a personal continuing relationship on the other."⁴ Undoubtedly, the former has advanced with computerisation, but for what effect or the latter?

This paper describes the method of "topic analysis" and its specific application to video tapes of computerised and non-computerised consultations, although wider application is envisaged.

Method

Topic analysis may be applied to audio or audiovisual recordings of consultations, which may be paused and replayed, as necessary, to help classification. Transcripts of recordings are equally suitable for analysis, though the interim stage of transcribing may reduce accuracy.

The analysis necessitates the identification of topics discussed by two people and, specifically during medical consultations, their classification as medical or social, or doctor or patient initiated.

Operational definitions of "topic," "medical," "social," "doctor initiated," and "patient initiated" have been developed and refined until easy explanation to a second rater is possible, and high rates of interrater and intrarater reliability have been achieved. The rules thus derived are shown in the appendix.

Sixty patients (10 men and 10 women for each of three doctors) were selected for each of two groups from the waiting area of a health centre. They were asked to complete a mood adjective checklist before and after consultation, and for permission to video record their consultations. The selection process and method have been more fully described in another paper, which refers to the same patients groups.² For patients in group 1 consultations proceeded as normal, but for those in group 2 the consulting doctor had access to a computer terminal for use as a preventive medicine reminder system at the doctor's discretion. The consultation video tapes were sorted into three groups for analysis, one of 60 consultations for which the computer was not available, one of 21 consultations in which the available terminal had not been used, and one of 39 consultations which included computer use.

Results

An assessment of 20 consultation recordings were rated independently by two raters. Pearson's χ^2 was calculated to generate interrater reliability of 0.95 for subjects and 0.89 for initiators. A sample of 15 consultations viewed twice by an individual rater with a three month interval between viewings yielded intrarater reliability of 0.89 for subjects and 0.86 for initiators. Both interrater and intrarater reliability are, therefore, high.

In the particular application described in this paper a comparison between the three doctors in (table I group 1) controls showed that doctors B and C differ significantly in some aspects of their "normal" consulting behaviour. $A \chi^2 = 2.7$ (table 1) showed that Dr C initiated relatively more social than medical topics when compared with Dr B ($p < 0.01$). When social topics only were considered the Fisher's exact probabilities test showed a greater proportion to be patient initiated in Dr B's consultations ($p < 0.01$).

The smallest group, 21 in which the computer was available but not used, did not give large enough numbers of topics for analyses of individual doctors, but a comparison was made between groups 1 and 3 for each doctor, and between all three groups for the aggregate scores of all doctors. For the sum of all doctors (table I), no significant difference was detected between groups 1 and 2. For the sum of the medical topics in consultations by all three

TABLE I—Number (%) of topics discussed by each doctor and their classification and total number (%) of topics discussed by all doctors and their classification

	Doctor initiated medica topics	Patient initiated medica topics	Doctor initiated social topics	Patient initiated social topics
Dr A				
Group 1 (n = 20)	14/25	23/40	10/17	10/17
Group 2 (n = 21)	1/1	1/1	0	0
Group 3 (n = 11)	2/2	6/7	0	0
Dr B				
Group 1 (n = 20)	21/44	27/45	5/5	10/16
Group 2 (n = 20)	9/14	13/15	3/2	3/6
Group 3 (n = 11)	3/3	5/6	0	0
Dr C				
Group 1 (n = 20)	7/15	24/32	12/28	3/7
Group 2 (n = 21)	1/1	1/1	4/21	6/21
Group 3 (n = 11)	8/11	10/11	0	0
All doctors				
Group 1 (n = 60)	42/88	75/106	25/35	23/34
Group 2 (n = 21)	12/26	21/36	4/21	9/25
Group 3 (n = 39)	10/27	22/37	0/10	0/12

TABLE II—Mean number of topics and mean duration (minutes and seconds) per consultation for computer and non-computer consultations

Topics	No computer		Computer not used		Computer used	
	Time	%	Time	%	Time	%
Doctor A	2:35	7	4:1	100	7:34	100
Doctor B	1:30	25	3:1	63	2:40	8
Doctor C	2:40	8	2:21	6	5:44	42

Discussion

"Topic analysis" is a highly reliable tool for objectively measuring one aspect of consultation dynamics. But it has its own evidence of suitability as an evaluator of and adjunct to less rigorous methods of consultation analysis.⁵ Furthermore, has its use in computer consultations helped our knowledge concerning the effect of computer terminals on the consultation?

To answer the first question, it is sensitive enough to detect a difference between topics raised in different doctors' consultations, both for the relative content of social and medical subjects and for the initiator of social topics. If a review of the consultations in the knowledge of these differences can explain how or why they occur then we have created a useful tool for gaining insight into the consulting process.

The application of topic analysis was not too time consuming (most consultations required only one run through) and the skills required are limited to memorising the rules (appendix). It is, therefore, practical and sensitive. Whether differences in topic pattern between doctors are of any consequence remains to be clarified, but superficially it would seem reasonable to assume that differing styles of consultation will provoke dissimilar topics when several consultations are considered. Should this be the case vocational trainees could be assessed at intervals to gauge progress towards helping patients to initiate topics and increasing the scope of the consultation by increasing the overall topic count, in whichever area seems most appropriate.

Audit Reports

Assessment of the records and care of patients with diabetes

The records and standard of care offered to patients in a practice of 8000 patients were assessed by using a questionnaire administered by a practice nurse. Most of the patients with diabetes were identified by monitoring their prescriptions, but others were found through surgery consultations or home visits. Our practice nurse completed the first part of the questionnaire from the patients' records and then invited the patients to the surgery, where she administered the second part.

Ninety four patients with diabetes were identified, giving a prevalence of 11.7/1000. 18 were insulin dependent, 47 were on oral hypoglycaemic drugs, and 29 were on diet alone. It was not obvious in 36% of the records that the patient was a diabetic, the dietary advice was not clear in 30%, a note of the body weight was missing in 66%, and 62% did not mention smoking habits. There was no record of fundoscopy in 26% of the patients who were insulin dependent nor in 54% of those who were not insulin dependent.

On questioning, 28% of the insulin dependent patients denied

having any dietary instructions, 83% did not test their urine for ketones, 17% had not had fundoscopy, and 44% had not had their vision checked in the previous year; 35% smoked and 15% could not give a reasonable explanation of the relation between their treatment, diet, and blood sugar concentration. Of the ones on oral treatment, 25% did not stick to diet and none tested their urine for ketones. In the previous year 49% had not had their vision assessed and 47% had not had fundoscopy. 7% smoked and 98% did not understand the relation between blood sugar concentration, diet, and treatment. Twenty four per cent on diet alone did not stick to their diet; fundoscopy had not been checked in 45% and vision in 62%. Thirty one per cent smoked. This assessment showed that our record keeping and care were inadequate and indicated the need for a specific method for follow up and review of a patient with diabetes.—Stewart Bailey, general practitioner, Chadderton, Mary Hunt, practice nurse, Block Lane, Chadderton, Oldham OL3 7SG. (Accepted 24 May 1985)

Diuretics and hyperuricaemia

Diuretic usage and the occurrence of hyperuricaemia in a small rural practice of 1600 patients were investigated. Files held on computer enabled the ascertainment of all patients who were on continuing diuretic treatment and of patients with hyperuricaemia. All patients taking diuretics have their serum urate, electrolyte, urea, and creatinine concentrations monitored regularly.

The 115 patients who were taking a diuretic comprised 11% of those aged over 30 years. This apparently high proportion was partly due to the 9% of 40-65 year old patients being treated for hypertension, roughly 60% of whom take a diuretic. Of the 115 taking a diuretic, 52 took a thiazide, 33 a loop diuretic, and 30 a potassium sparing.

Hyperuricaemia was recorded in 43 patients, 24 while taking a thiazide. Twenty of these either stopped taking diuretics or changed to a loop or potassium sparing agent, and the remaining four continued with careful monitoring of the urate concentration. Seven patients had had gout, two while taking a thiazide. Twelve of those with hyperuricaemia had been taking a loop diuretic, but since

these agents are only weakly hyperuricemic medication has been continued. None of the group taking a loop diuretic group has had gout.

Thus my audit has ascertained that of a total of 76 patients who took a thiazide (24 stopped and 52 continuing), roughly 37% (28) had hyperuricaemia and 2.6% (2) had gout. Over 40 million prescriptions are written each year for diuretics, and most will be for continuing treatment. Although hyperuricaemia is probably not a health hazard completely, thiazide induced gout must be common and, of course, completely preventable. I think that all patients who are taking a diuretic should be regularly monitored for electrolyte disturbance, renal insufficiency, and hyperuricaemia.—Malcolm Aylett, general practitioner, Glendale Surgery, Woker, Northumberland. (Accepted 20 May 1985)

1. Fry J. *Preventive care and patient records in general practice*. *Lancet* 1983; *ii*: 1081.

2. Freeman B, Taylor S. *Random serum urate concentration as risk factor for premature mortality in middle aged men*. *Br Med J* 1984; *289*: 17-19.

Health screening by a nurse in general practice

In 1980 a survey showed that in only 38% of the notes of our middle aged patients had a blood pressure reading been recorded, and in only 19% was there a record of their smoking habits. We decided that one team member should be responsible for screening. A part time community nurse was made available to screen patients aged between 20 and 65 as they attended the surgery for other reasons. Blood pressure, smoking habits, immunity against rubella, tetanus, and polio, cervical cytology, and alcohol intake were determined and recorded on the back of the summary card.

During the first 10 weeks 384 patients were screened, of whom 69% were women. Seventeen per cent of patients smoked more than 10 cigarettes a day. Men smoked more than women and younger people more than older people. Two per cent of people had a diastolic blood pressure higher than 100 mm Hg and 1% a systolic blood pressure higher than 180 mm Hg. 43% of women had no evidence of rubella immunity and were sent for blood tests; 16% of women had not had a cervical smear within five years. 51% of patients had no evidence of tetanus immunity, and 3% of patients

drank more than 30 standard drinks a week. Patients were referred to the doctor at the nurse's discretion. All women were taught to examine their own breasts.

When most of our patients have been covered by this programme we hope to extend the screening to include diet, height, weight, exercise, and stress. Our aim is to practice primary and secondary prevention and to show patients that their health depends largely on their choice of lifestyle. Stott and Davis indicated opportunistic health promotion as one of the four subtypes of the consultation. With the pressure in daily general practice this tends to get squeezed out unless it is done by somebody who is dedicated to this task.—Irene Carston, screening nurse, Edwin Martin, general practitioner, Patricia Shepherd, practice manager, 2 Golding Road, Bedford MK40 3NG. (Accepted 16 May 1985)

1. Stott N, Davis M. *The exceptional patient in general practice: consultation*. *Br Med J* 1983; *287*: 20-3.