

USER ROUTINES FOR COMPUTER ASSISTED CONVERSATION ANALYSIS¹

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With the widespread use of personal computers for word processing purposes, the question arises inevitably how these wonderful machines can be put to other uses as well. There are many programs available on the market, to make this possible, but they may not fit the specific purposes of the individual user. Ordinarily, that user is not interested in becoming a programming expert him- or herself. So he or she may try to adapt one or several programs to his or her personal circumstances. In this way, certain *routines* may be developed, ways of using one or more programs to fit specific objectives, not foreseen as such by program designers.

In this report, I will describe in a summary fashion some of my routines for *Computer Assisted Conversation Analysis*. In these routines I have adapted the possibilities offered by a well known Word Processor, in combination with a program specifically designed to support qualitative analysis, to a way of doing CA, the comparative analysis of larger numbers of in some way similar fragments of data, in my case information gathering sequences in medical encounters. Developing these routines proved to be fun in many ways, but it also occasioned various reflections on their possibilities and limitations, and on dilemma's of CA as such. I hope my sketch is suggestive for other researchers to develop their own ways of doing their kind of analytic work².

In my view (c.f. Ten Have, 1990 a), CA is basically an interpretive enterprise. An analysis of conversational materials can never be *automatic*, that is, it cannot be delegated to a machine, i.e. a computer program. But, on the other hand, a CA researcher is accountable to his or her data in a much more basic (and detailed) way than many other kinds of qualitative analysts, i.e. ethnographers. So my efforts involve a routine for a *computer assisted* analysis, not an analysis *by* the computer, i.e. a computer program. This assistance, however, should keep the analyst in close contact with his or her data, and its details, throughout the analytic process.

THE ETHNOGRAPH

A Word Processing program has some possibilities to search for and retrieve parts of texts, but there are special programs that are specifically designed for this purpose. I used 'THE ETHNOGRAPH: A program for the computer assisted analysis of text based data'. The aims and possibilities of the program are described in a summary fashion in Chapter 1 of its Manual

¹This paper is the third in a series on various aspects of the computer analysis of texts. It summarizes and extends parts of the first and second (Ten Have, 1989, 1990 b), to which the reader is referred for further details. This text was published as Ten Have, 1991.

²My routine corresponds in part to the preparatory analytic routine proposed by E.A. Schegloff in a 'Didactic Seminar' given at the ASA Meetings in San Francisco, August 1989 and elsewhere.

(Seidel, Kjolseth, Seymour, 1988):

THE ETHNOGRAPH is a set of interactive, menu driven computer programs designed to assist the ethnographic/qualitative researcher in some of the mechanical aspects of data analysis. These programs present an efficient alternative to the often cumbersome task of managing field notes, transcripts, documents and other types of text data collected and analyzed in ethnographic/qualitative research. By turning over the mechanical aspects of work to the computer, the researcher is free to devote more time and attention to the critical interpretive aspects of qualitative data analysis. (1-1/2)

...

THE ETHNOGRAPH enables you to code, recode, and sort data files into analytic categories. You can review text, mark segments, and then display, sort, and print segments in any order or sequence you desire. This makes it easy for you to interpret and compare those segments either with each other, or with differently categorized segments. Furthermore, as you go along, you can revise your coding scheme with additions, deletions or modifications. What was once done with pencils, scissors, and paste, can now be accomplished almost entirely with your personal computer. (1-4)

The idea is that one types ones data in a word processor, converts the files into ASCII-files, let the program number the lines in the files and 'code' the printout of theses numbered files by hand. Then one types the codes in the program, after which one can do various sorts of operations with the coded files, including the searching for coded segments, the comparison of segments coded in a specific way, etc.

The program does not 'analyze' itself, it 'assists' the analyst. The program can be used to 'match' two kinds of 'maps', the text produced by members and the codes produced by the analyst, but these are basically 'independent'. In order to use the program, the researcher has to fulfill two basic tasks, one secretarial, typing the data, and another analytic, 'coding'. The latter involves attaching any label (up to 10 positions long) to any line or collection of lines.

The routine, part one: conversion

The secretarial task seems easy. The transcription system developed by Gail Jefferson³ is well established. It involves, however, the use of a set of signs, available at sophisticated typewriters, which is different from the one provided by some word processors and larger than the restricted ASCII-set used by THE ETHNOGRAPH. Extract [1] shows an example of a transcript in Jefferson format, word processor version.

[1] Fragment of a consultation, AP2#13, after the first complaint presentation, transcription Gail Jefferson, WP-version.

Dr: You ↑have had hay fever in pr[evious years.=Do you think=
Pt: [Ye:h.

³See Atkinson & Heritage (1984): IX-XVI for a description, and Psathas & Anderson (1990) for a discussion.

Dr: =this c'be playing a part=Have you been out any[[^]°where]or°
 Pt: [W e l l]no
 because I've just started a new job uh:m nursi[ng (at)=
 Dr: [[°]()°
 Pt: (Melrose) Hospital you[see well I wa:lk to work en I walk=
 Dr: [[°]Mmψ:°
 Pt: =home ((etc.))

In order to use Jefferson transcripts as data for an ETHNOGRAPH-based routine, one has first to emulate the typewriter signs on the word processor, and then transform these into characters in the limited ASCII-set, before the conversion of the files. I use the following set of conventions for this.

[2] Conventions for the conversion of WP-transcript signs to limited ASCII ones

<u>underlining</u> (stress)	->	*underlining*
°degree sign (soft)	->	#soft
·hhh (inbreath)	->	`hhh
↑arrow (rising intonation)	->	^arrow (removal of superimposition)
↓arrow (falling intonation)	->	varrow (removal of superimposition)

These changes lower the readability of the transcripts, but with some experience one can easily interpret the converted fragments. When, in a later stage, one would use selected fragments in a paper, these can be converted back to the Jefferson format. In order to ease this conversion operation, one may decide to simplify the transcripts somewhat, as I did. Such decisions depend on one's anticipation of the analytic usefulness of particular details for one's analytic project. Extract [3] shows part of the fragment given in [1], after these operations were carried through.

[3] Part of [1], after conversion of WP-signs into limited ASCII ones and some simplification

Dr: You |[^]h*a*ve had h*a*y fever in pr[evious years.=Do you th*i*nk=
 Pt: [Ye:h.
 Dr: =t*hi*s c'be playing a part=Have you been *o*ut any[[^]#where]or#
 Pt: [W e l l]n*o*
 because I've just started a new *jo*b uh:m n*u*rsi[ng (at)=
 Dr: [#()#
 Pt: (Melrose) *Ho*spital you[see well I w*a:*lk to work en I walk=
 Dr: [#M*m*|v:.#
 Pt: =home

A more basic problem concerns the fact that, in using THE ETHNOGRAPH, codes have to be attached to *lines* or sets of lines (see step 6, above). In my experience, this may produce various sorts of difficulties, related to the fact that a transcript line is an arbitrary object, not an analytic unit. It may contain various kinds of data, that one would like to code separately, for instance, the 'tail' of one Turn Constructional Component (TCC) and the 'head' of a next (c.f. Sacks, Schegloff, Jefferson, 1978: 12). THE ETHNOGRAPH's Manual suggests to type a speaker's complete utterance as one paragraph, which means that this utterance is broken down arbitrarily in 40-character lines. In order to prevent the difficulties mentioned above, I

propose to 'parse' the transcript in advance of the conversion process in Turn Constructional Components, or often even smaller components, that can be usefully coded separately, i.e. that seem to 'do' something on their own, for instance false starts. I try to keep these components below the 40-character limit, in order to create series of codeable lines, in anticipation of later work (c.f. [5]).

Then one can convert one's transcripts, typed into a word processor, and parsed into codeable components, into the ASCII-format THE ETHNOGRAPH can handle. The Manual gives detailed instruction on the format to be used and the way the conversion is to be done; I will not explicate those aspects here. Ultimately, one will be able to produce 'numbered copies' of one's data.

The routine, part two: sequential coding

The Manual's description of what it calls *Code Mapping*, suggests a kind of undirected association process, that is ultimately boiled down to a set of codes attached to lines. In my experience, such a procedure produces a fast growing and heterogeneous collection of codes which are hard to relate to each other. It seems better to restrict oneself and proceed step by step. A first one would be to build what I call a *Sequential Map* of the data.

Sequential analysis is, in many ways, the heart of CA. It takes off from the basic idea of turn taking (Sacks, Schegloff, Jefferson, 1978), and adds that 'next turns' are not arbitrarily selected, but are mostly built to fit with previous ones, which often 'project' specific kinds of continuations. The concept of 'adjacency pair' (Schegloff & Sacks, 1973) is specifically designed to explicate the organization of such connections, but sequential forms with other properties have also been described.

A major difficulty in the use of programs such as THE ETHNOGRAPH for CA, may be glossed as 'the problem of sequentiality'⁴. By providing the opportunity to code and later isolate fragments of text, such programs do not provide, from within themselves, for an analysis of sequential structures. They rather invite the consideration of utterances or larger episodes in isolation. This seems not only to reflect programming difficulties, but also a basically 'non-sequential' view of, for instance, interview material, as can be seen in *grounded theory* treatments of such kind of data.

Anticipating later steps in the program, especially *Search(ing for coded segments)*, I decided to code both utterances or lower level codeables and larger sequential units. As will be described later, this makes possible the search for types of utterances within their sequential environment.

The rationale for starting the analysis proper with a 'sequential map' is that any specific, theme-related coding should be embedded, so to speak, in a basic consideration of the sequential structure of the interaction, both at the level of single utterances and at more encompassing levels, sequential units. In this way, any specific code, such as 'pain

⁴This problem was first raised by Harrie Mazeland in a public discussion at Nijmegen University on computer assisted analysis of qualitative data, at which the program KWALITAN, developed by Fred Wester and his collaborators was presented.

(description)', would then be 'nested' within a larger unit, or even a set of nested units, such as 'Unsolicited Addition', within an 'Information-gathering Sequence'.

Basically, then, the sequential analysis involves the analyst in the identification and naming of sequential units, as well as the utterances (or 'lower' components) that together constitute such units. Common sense and the corpus of CA writings provide one with a variety of names for both the units and the components. One can adapt these labels to one's own purposes. For instance, I used labels such as 'Information Gathering Sequence', 'Question', 'Answer', 'Acknowledgement', etc. Furthermore, I decided to attach to any code an indication of the kind of unit being coded, using S for Sequence and C for any 'lower' Component. And I also added a letter to indicate the speaker, if it was a single utterance code, or of the initiator, if a larger unit was coded.

[4] Some codes used, with explanations.

SDIG = A Sequence initiated by the Doctor with an Information Gathering function
 CDQ = A 'Component' by the Doctor: a Question
 CPA = A 'Component' by the Patient: an Answer

As a general rule, then, an utterance code would carry information on its speaker and on the type it exemplifies, and it would always be 'nested' in a unit code, indicating the initiator and the kind of sequence involved.

Coding reconsidered

My experiences with these kinds of procedures forced me to reconsider 'coding' as such, both technically and analytically. For instance, I found it more comfortable, later on, not to work on a printout, as the Manual suggests, but directly on the screen. To be able to do this, I had to 'print-to-disk' the numbered version and enter this file via my word processor. After some editing, this allowed me to add codes to the right hand side of the numbers, either singly when the code only referred to that particular line, or with a number attached, indicating the 'stop line', if more lines were involved. Extract [5] provides an example.

[5] AP2#13, same as (1) but in 'parsed', ETHNOGRAPH version, numbered copy, printed-to-disk, in WP, with coding attached to it:

Dr: You ^h*a*ve had h*a*y fever	56	SDIG-88 CDQ-62 CDQI-57
in pr[evius years.	57	
Pt: [Ye:h.	58	CPCF
Dr: =Do you th*i*nk	59	CDQD1-60
t*hi*s c'be playing a part	60	
=Have you been *o*ut	61	CDQD2-62
any[^#where] or#	62	
Pt: [W e l l] n*o*	63	CPA-88 CPAD
because I've just started	64	CPAE-69
a new *jo*b	65	
uh:m n*u*rsi[ng (at)	66	
Dr: [#()#	67	
Pt: =(Melrose) *Ho*spital	68	

you[see	69
Dr [#M*m* v:.#	70 CDMR
Pt: well I w*a:*lk to work	71 CPAE-78
en I walk home	72

Especially when revising codes during the process of coding, this proved to be a less messy procedure than when scratching on the printout. Having finished the coding, I could construct a kind of 'code summary' by deleting the text-parts of the lines, only keeping line numbers and codes, to be used for entering the codes in THE ETHNOGRAPH.

[6] 'Code summary' for extract [5]

56 SDIG-88 CDQ-62 CDQI-57
 58 CPCF
 59 CDQD1-60
 61 CDQD2-62
 63 CPA-88 CPAD
 64 CPAE-69
 70 CDMR

I still experienced, however, a persistent feeling of being ill-at-ease with the 'coding' itself. Somehow, adding a code of a few letters to a sequence or utterance, even if these letters stood for a couple of words, did not seem to do justice to the objects so coded, or to my observations on these objects. In other words, doing CA involves more than just labelling utterance or sequence types. It involves extensive arguing on the basis of intense observation. My experience so far, working with THE ETHNOGRAPH, taught me that this technology could support various aspects of CA's work. But what these various routines presupposed and left unexposed was the analyst's work at interpreting utterances and sequences. This crucial step, the routines suggested, was unproblematic, or at least the analyst's own personal responsibility.

This is indeed the case. But I think further routines can be developed to incorporate the analyst's interpretive work as an integral part of the analysis at the computer. Reflecting on my experience of coding within the routines of THE ETHNOGRAPH, I remembered I felt restrained by the task of just deciding on the right code. While I sometimes made mental notes or even notes on paper regarding some observations, this kind of 'memo writing', as it is called in the tradition of *grounded theory* (c.f. Strauss, 1987: 109-29), was still structured as a side-activity in relation to the major task of coding. Using the 'coding on the screen' extension, described earlier, such memo-writing could be incorporated in a computer-based work routine as follows. Having a Numbered Copy imported into his or her word processor, the analyst adds codes to the data, i.e. to turn components, utterances and sequences. At each code, the analyst 'switches screens' to write a Memo, in the sense of giving an account for ones coding, preceded by the code given and the line number. Sorting the paragraphs produced in this way by code, one has a series of accounts for that particular code being given⁵.

⁵For reasons of space, I do not include an example here; interested readers are referred to the earlier papers, mentioned in note 1, available from the author.

After coding and memo-writing for some time, the analyst can reconsider his or her code-accounts, to see if the work achieves a satisfactory level of consistency, what kinds or arguments are used, whether specific routines are being developed, etc. This can result in a kind of 'coding instruction', of course, but also in recoding operations. In any case, it 'forces' the analyst to know what he or she is doing, and do this deliberately. Furthermore, it provides him or her with a record of ideas, stimulated by close observation, to be used in later phases of the analysis.

In this way, the researcher can produce a thorough analysis of conversational materials in terms of the concept of sequential organization, which is basic to any CA project. The CA corpus offers many other concepts which could be used for additional general routines, but none as basic as this one. I would advice, however, following Schegloff (c.f. note 3), to add one more routine, oriented to spotting instances of *repair* (c.f. Schegloff, Jefferson, Sacks, 1977). One could, quite easily, code for instances of *self-* or *other-repair*, and *self-initiation* and *other-initiation*. Repair seems to be related to basic choices and ambivalences facing participants in conversations and it seems worthwhile to focus on these phenomena early on. Additional code sets could be chosen, depending on the kinds of materials treated and the analytic goals one has, for instance related to reference-to-persons, preference organization, etc.

From a methodological point of view, the routines described involve a kind of *comprehensive data treatment*, as it has been called (Mehan, 1979). Such a strategy has virtues and drawbacks. The obligation to consistently code any turn component, utterance and sequential unit, forces the analyst to work out these labels in a systematic and well considered manner. But this coding of a larger set of instances may also lead to a focus on what can be seen as similar to a collection of cases, which may not be what is essential to their local functioning. The 'coding account procedure' should be an essential instrument for combining the goals of both looking for generality and respecting local specificity. To my mind, strictly formulated 'operational definitions' are not very useful, although some have been proposed in quantitatively oriented exercises⁶.

To summarize, my proposal for a *user routine for Computer Assisted Conversation Analysis* involves the following operations (number within [] refer to the extracts quoted above).

- 1 {Typing of the transcripts in a Word Processor} [1].
- 2 Conversion of WP-codes into ASCII-resistant codes [2]. [3].
- 3 Parsing the transcript into codeable components (TCC's and smaller ones), each on a separate line.
- 4 {Formatting into THE ETHNOGRAPH style; conversion to ASCII; numbering the lines; print numbered file to disk}
- 5 Sequential coding, of relevant components, turns and sequences, using the code-on-screen and coding-account procedures [5].
- 6 {Entering of the codes, using THE ETHNOGRAPH} [6].
- 7 Additional coding, for instance focussing on *repair*, using the same procedures.
- 8 {Entering of the codes, using THE ETHNOGRAPH}

⁶C.f. Zimmerman and West (1975: 113-115); West (1984: 55); and Frankel (1984: 157), as well as my comments in Ten Have, (1990 a).

etc.

It seems best to start this routine with a number of conversations, which are all passed through parts 1 - 4. Then one can analyze one conversation sequentially, part 5, after which one reconsiders one's codes, i.e. the accounts given, possibly leading to some changes. When this is done after part 6, one can use the SEARCH function of THE ETHNOGRAPH, to reconsider the sequences involved. When a coding routine is 'stabilized' for one conversation, one can turn to the next, etc. Additional coding and reconsidering rounds may proceed in a similar fashion.

The routine, part three: searching

Although the process of comprehensive coding is very useful in itself, especially when combined with memo-writing or the writing of coding-accounts, as I call them, the ultimate purpose of this type of analysis is to build a conceptual framework by comparing cases that are similar or different in some relevant way. For that purposes, searching for fragments, coded in a particular way, is essential.

THE ETHNOGRAPH allows for quick searches of coded data for 'components' or sequences coded in a particular way. It is my preference is to have a searched item displayed within its setting. Analyzing physician's questions, for instance, one would have to Search for CDQ nested within SDIG, or in terms of THE ETHNOGRAPH, a multiple search for +CDQ and +SDIG, choosing a 'big picture' display, showing the lines covered by both the more and the less extensive codes. For reasons of space, I only provide an example of a 'small picture', displaying just the overlapped part.

[7] Product of a multiple search for +CDQ and + SDIG, choosing a 'small picture' display.

```
AP2#13  Dr      +*AP(2):[13]*

SC: +CDQ +SDIG

#-SDIG  $-CDQ  %-CDQI
: Dr: You |^h*a*ve had h*a*y fever      56 -# -$ -%
: in pr[evius years.                    57 # $ -%
!-CPCF
: Pt: [Ye:h.                             58! # $
%-CDQD1
: Dr: =Do you th*i*nk                    59 # $ -%
: t*hi*s c'be playing a part            60 # $ -%
%-CDQD2
: =Have you been *o*ut                   61 # $ -%
: any[|^#where] or#                      62 # -$ -%
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```

In this way, the researcher can order THE ETHNOGRAPH to find data fragments flagged by him or her with particular codes during an earlier phase of the research, to support the analytic work in later phases.

The routine described above can be useful to prepare the data for this later phase, not only by guiding the parsing and coding operations, but also by 'inviting' the analyst to record his or her observations and reflections on a systematic basis. The ultimate analysis, however, is still to be done.

Discussion

I have explored the possibilities of the computer to assist in analyses of conversational data by experimenting with ways to fit the use of one particular program to both the properties of the data and my methodological preferences, and produce sensible results efficiently. This led to the development of the above routine for Computer Assisted Conversation Analysis.

As a basic program, THE ETHNOGRAPH is useful in several respects, but it has its limitations also. As its name indicates, it has been developed to assist ethnographers, who tend to work with large collections of data, which they analyze in a more or less loose, interpretive fashion. As the codification of this style of work by Glaser and Strauss (1967; Strauss, 1987) shows, it involves a conceptual typology of episodes, descriptions, attitudes, etc. somehow available to the researcher when he or she inspects the data. THE ETHNOGRAPH can be used to assist in this process by providing a kind of indexing system, which allows the quick retrieval of similarly coded fragments of data. This can be useful in order to reconsider previous coding, compare episodes considered similar in one or another respect, etc. It took, for example, a few simple commands and about 8 minutes time to have the program search for (and print) Doctor's Questions embedded within Doctor Initiated Information gathering Sequences in the transcripts of 4 consultations, coded previously. This produced 25 episodes, some including more than one question.

In order to produce this kind of result, the researcher has to do a lot of preparatory work, as described earlier. And he or she also has to restrict him- or herself in the way coding is done. It has to be limited to some rather obvious concepts that can be applied to a large number of instances, otherwise one would not have enough cases to compare. When one wants to code in a more specific manner, one tends to get lost in a growing number of codes, each built to fit particular cases. That would enable, of course, the quick retrieval of those rare instances, but it may be hard to devise codes that are easily recognizable.

Technically, the program has some serious limitations, as well as minor inaccuracies. Some of these can be circumvented, such as the fact that it only can handle ASCII-files following a specified format. This necessitates a lot of text adaptation work when one wants to use transcripts following CA conventions, but it is not a principled barrier to work with it. Another set of problems follows from the fact that entering codes is an operation completely separated from considering the data. For instance, if one had a set of selected instances - as my 25 questions - on the screen and wanted to re-code some of these or add new codes, one would have to make separate notes and enter those codes later. In fact, the set of operations one can do on the codes themselves is extremely limited, namely to a global or a selective change. For instance, one cannot automatically summarize a number of different codes in one overall code and still preserve the original ones.

My routine was meant to institute solutions to some of these problems. Their major property is the switching between working in a Word Processor and in THE ETHNOGRAPH, which allows using the latter's numbering, coding and searching facilities in combination with some

of the flexibilities Word Processors have to offer. Especially the Coding Account and Memo Writing procedures seem to be quite useful in many research settings, as a log of considerations that evolved in inspecting the data. But many problems were not solved, while some solutions led to new problems.

Using this routine involves the researcher in a kind of balancing act. On the one hand, he or she tries to use generally applicable concepts with the objective to build an abstract, although data supported, reasoning that leads to results that are relatively independent of the current data set. On the other hand, he or she will try to stay in touch with the particularity of these specific instances, faithful to their locally produced, context-dependent meanings. This kind of balancing seems basic to the CA enterprise (Ten Have, 1990 a); the proposed routine may be useful in bringing it out very clearly.

The analytic task, then, for a CA treatment of conversational materials, is the description of interactional practices that demonstrably 'produce' various kinds of 'effects', including for instance an accountable information base for a medical decision in the case of medical questioning. A program like THE ETHNOGRAPH, supplied with routines like the ones discussed above, can be helpful in carrying out such a project.

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