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INCOHERENT DISCOURSE**

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# THE COHERENCE OF INCOHERENT DISCOURSE

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**Abstract** Some of the more ill-behaved vagaries of free-flowing conversation may seem to call into question the possibility of formal treatments of coherence in conversation. However, in this paper we show that the notions of planning and local coherence from artificial intelligence work in discourse interpretation make such treatments possible. Four fragments of an ethnographic life history interview are examined; they illustrate a negotiation of topic, an associative slide, discontinuous structure, and the emergence of a new conversational goal. In each case we show that the notions of planning and local coherence make possible an intricate analysis of how local incoherencies can disguise a larger, global coherence or of how global coherence can arise from the piecing together of locally coherent segments. Finally, we give an overview of the production of conversation based on these notions that accommodates these vagaries.

In previous papers we have examined the nature of coherence in discourse (Agar & Hobbs, 1982; Hobbs, 1985). But what about discourse that isn't coherent? In naturally occurring conversation, people often don't agree on what they are talking about; they switch topics abruptly or suddenly resume a topic that has already been closed; they lose track of what they were saying and wander off on tangents. Such phenomena might seem to call into question the whole notion of coherence in discourse and the possibility of formal treatments of free-flowing conversation. But, in fact, they do not. Just as, when we encounter coherent discourse, we may ask about the nature of the coherence that we recognise as being present, when we encounter incoherent discourse, we may ask about the nature of the coherence that we recognise as being absent. Moreover, close analysis of seemingly incoherent stretches of talk frequently reveals coherencies that were either too small or too large in scale for the analyst to have noticed at first. Those coherencies are often enough to have given the participants a sense of smooth flow of talk where the analyst *a posteriori* sees something more chaotic. Thus, there are two questions we can ask about such discourse. What is missing in the discourse that makes it seem incoherent? And what coherence is present despite the apparent incoherence? In this paper we examine four fragments of

seemingly ill-structured discourse from an ethnographic life history interview, and show how a formal treatment deriving from research in artificial intelligence (AI) on planning and on discourse interpretation sheds light on some of the intricacies of coherence and incoherence in naturally occurring conversation.

The features of conversation we examine are often regarded as defying formal treatment. Unlike many formalisms, however, the planning mechanisms investigated in AI immediately bring into the picture purposive actors with goals, operating in a concrete, changing world which constrains and is modified by executed plans. Their emphasis on hierarchical development captures the intuition that people operate from a general sense of situations to be preserved or achieved, working out the details on the basis of that general sense. Their reliance on the context-dependent knowledge of the actors derives from the intuition that people are not merely instantiating abstract structures in their behaviour, but are conscious, knowledgeable individual agents.

Some recent work applies planning to verbal material similar to the ethnographic interview considered here. Hobbs & Evans (1980) microanalyse a segment of conversation in terms of the plans that the participants seem to be trying to effect. Hayes-Roth & Hayes-Roth (1979) look at a problem-solving protocol as an example of plan formation, introducing the idea of 'opportunistic planning' to account for planning activity that is guided as much by world encounters as by the root goal. In Agar & Hobbs (1982) we used planning as a guide to the segmentation of material similar to that discussed in this article, with the purpose of showing how particular segments contribute to 'global coherence'.

In the present paper we give examples of several challenging problems and show how a fairly complex version of a planning mechanism can be used to make sense out of what is going on. The examples all come from a single interview. It is one of a series of life history interviews collected by Agar (1980) as part of more general work, ongoing since 1968, in the area of urban US heroin addict subcultures. At the time of the interview, Jack (a pseudonym) was about 60 years old, lived in New York, and had been a heroin addict since about age 15 in Chicago. This interview covers Jack's move at that age from Chicago to New York by hitchhiking, and his first few experiences in New York, including his first term in prison. The interview is described in greater detail in Agar & Hobbs (1983).

The four problems we consider are the social negotiation of a topic, associative slides, discontinuities in structure, and goal emergence. The first of these will be analysed in terms of a planning mechanism that is sketched in the next section. For the analysis of the other three problems we will need a further concept — local coherence — which is discussed on pp. 220–221.

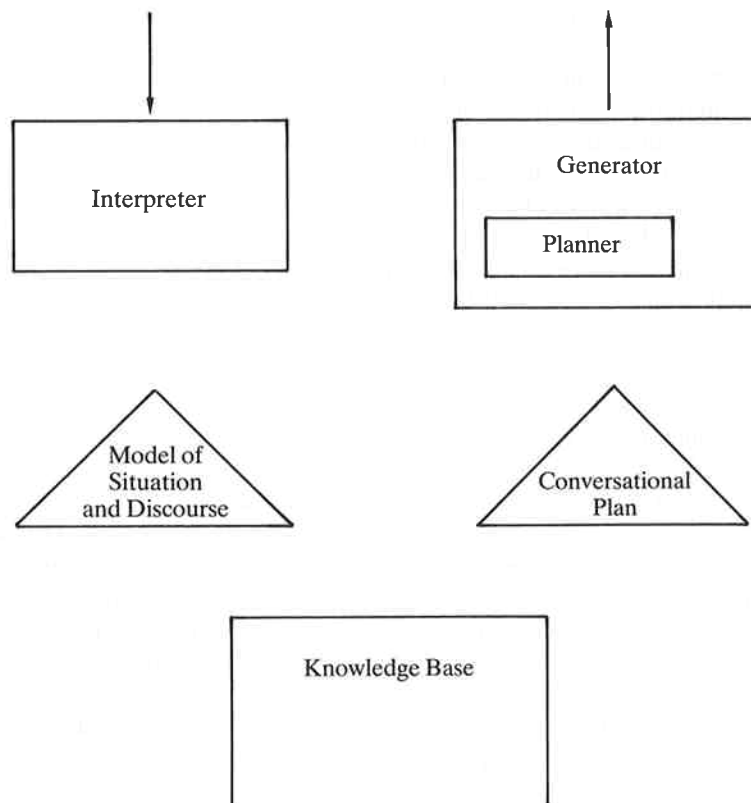
### **The Planning Mechanism**

In this section we describe a formal system which is designed to carry on conversations in the world. In subsequent sections we examine some problematic data to see whether the phenomena can be described as if they resulted from the behaviour of such systems.

The system has six components, as illustrated in Figure 1. Each of these components raises a host of problems for the cognitive sciences, but significant work has been done on all of them. Some representative citations follow the description of each component.

1. *A knowledge base* contains the knowledge and beliefs the system has available, expressed in some formal language. Important in this knowledge are facts about what the system can do to cause or enable various states or events. These events are used by the planner for bringing about its goals.

Included in the knowledge base is knowledge that is idiosyncratic to the system itself, mutual knowledge it shares with other members of various groups (e.g. a cultural group), and conventions that exist in various groups (together with the knowledge that the conventions *are* conventions). Thus, the planner will be able to access both idiosyncratic and conventional means for effecting its goals (see Clark & Marshall, 1981; Hobbs & Moore, 1985).



**Figure 1** Structure of the formal system

The knowledge base is dynamic in two respects. First, the facts it contains can be changed and deleted, and new facts acquired; this would take place relatively slowly. Second, the order in which facts are accessed can change relatively

rapidly. The latter captures the phenomenon that our degree of awareness of facts varies with context and our concerns (cf. Grosz, 1977, 1981).

2. *Models of the discourse and external situation* are formal representations of the discourse the system is engaged in and whatever else is going on in the environment. They are continually updated in response to interpreted input and influence the behaviour of the planning component (Grosz, 1977; Hobbs, 1976; Schank & Abelson, 1977).

3. A *conversational plan*, or simply a plan, is a formal representation of what the system is trying to accomplish in the world by carrying on the conversation, and the means which it is using. It is in general a treelike structure whose nonterminal nodes are goals and subgoals, i.e. logical representations of states to be brought about, and whose terminal nodes are actions that the system is capable of performing. We say 'treelike' for two reasons. We may wish to hypothesise more than one top-level goal for the speaker, giving the structure more than one root node; and branches may merge, when one subgoal serves more than one higher-level goal.

For most examples in this paper, it is sufficient to consider utterances as the primitive actions. But the planning formalism is adequate for producing phenomena within the sentence itself, such as syntax, lexical choice, and phonology. It is generally not interesting to carry our analysis down to this level, although it sometimes may be — for example, in the choice of a loaded word or in the use of vowel-lengthening for purposes of parody.

The goals that concern us most here are goals of talking about particular topics. Thus, 'goal' and 'subgoal' will be used almost interchangeably for 'topic' and 'subtopic'.

4. A *planner* is a set of procedures that use the knowledge in the knowledge base, especially the causal knowledge involving the system's own actions, to construct a plan for effecting a set of goals. The simplest way to conceptualise the construction process is 'top-down'. Given a goal, the planner searches the knowledge base for a sequence of actions that realises the goal. But it is sometimes necessary to assume a 'bottom-up' construction process as well: the planner considers possible actions and asks whether they might serve any of its goals. A particularly important resource for constructing a plan bottom-up is what we call 'local coherence' and this is a main theme of the paper (see Cohen & Perrault, 1979; Fikes & Nilsson, 1971; Newell & Simon, 1972; Nilsson, 1980; Sacerdoti, 1977; Sussman, 1975).

The planner will rarely construct an entire plan before beginning to execute. Rather, it will grow the plan up to the point at which an initial action has been decided upon, and then begin execution. As the conversation proceeds, the planner continues to develop its plan and may, in response to actions of the other participants or changes in the environment, alter portions of the plan it has already constructed (see Hobbs & Evans, 1980; McDermott, 1978).

5. The planner is embedded in a *generator*. We will consign to the rest of the generator all the activities of producing the behaviour of the system that are too low-level for us to deal with explicitly. The planner tells the other components in

the generator to generate a particular utterance, giving them at least its propositional content, and the utterance is produced.

6. An *interpreter* takes an utterance or other action of the other participants and, using the most accessible knowledge from the knowledge base, attempts to relate it to the conversational plan and to the models of the discourse and the situation. These models are updated, the knowledge base is updated (e.g. if something that was believed mutually known turns out not to be), and the planner further develops or possibly modifies the plan in response to the new information (see Bobrow & Winograd, 1977; Hobbs, 1976; Grosz, 1977; Rieger, 1974; Schank & Abelson, 1977).

In the rest of this paper we assume that the participants in the interview are using systems of this sort to produce their behaviour. For each of our conversational problems, we try to describe what is going on as the result of the behaviour of such systems.

What we are aiming toward in such an effort has been expressed well by Alfred Schutz (1953: 64):

How does the social scientist proceed? He observes certain facts and events within social reality which refer to human action and he constructs typical behaviour or course-of-action patterns from what he has observed. Thereupon he co-ordinates to these typical course-of-action patterns models of an ideal actor or actors, whom he imagines as being gifted with consciousness. Yet it is a consciousness restricted so as to contain nothing but the elements relevant to the performing of the course-of-action patterns observed. He thus subscribes to this fictitious consciousness a set of typical notions, purposes, goals, which are assumed to be invariant in the specious consciousness of the imaginary actor-model. The homunculus or puppet is supposed to be inter-related in interaction patterns to other homunculi or puppets constructed in a similar way. Among these homunculi with which the social scientist populates his model of the social world of everyday life, sets of motives, goals, roles — in general, systems of relevances — are distributed in such a way as the scientific problems under scrutiny require.

The only modification we would make to this passage is to substitute 'planning mechanism' for Schutz's 'homunculus or puppet'.

Schutz goes on to emphasise the need for consistency and adequacy in such constructions. We have aimed in this paper to satisfy the postulate of adequacy, that is, compatibility with the constructs of everyday life. In previous work (Agar & Hobbs, 1982) and in ongoing research we address the issue of consistency of explanation across a large corpus.

We assume that there are two planning mechanisms that communicate with each other. To dissociate ourselves for the present from controversial cognitive claims, we will refer to the two systems as J and M, although we will refer to the speakers of the (observable) utterances as Jack and Agar. For the sake of fluency, we present our analysis as if it were unquestionably correct, but as with all of science, one should read it as though it were in the subjunctive.

### Negotiation of Topic

Agar's ultimate aim is to collect a life history from Jack. Prior to this interview they had discussed a variety of material relating both to Jack's early life in Chicago and his later experiences in New York. In this interview Agar came to the session wanting Jack to discuss his actual move from one city to the other. The interview began as follows:

- (1.1) M: There are a lot of things that we really still need to talk about.
- (1.2) J: Yeah of course we're going to run into a lot of redundancy.
- (1.3) M: That's okay, yeah, Jack, one thing
- (1.4) J: Yes.
- (1.5) M: Let me start with this and you tell me if this is an appropriate way to phrase the question even, but for example a lot of what we talked about has been Chicago based, and you talked about—
- (1.6) J: That's recently.
- (1.7) M: Yes and you talked— yes, and you talked about getting to the point where you left Chicago.
- (1.8) J: Yes.
- (1.9) M: But what's missing is coming to New York and like moving into the city and starting to get into that whole trip.
- (1.10) J: Well that's— that's a story in itself of course.
- (1.11) M: You want to talk about that a little bit today.
- (1.12) J: Sure.
- (1.13) M: Okay.
- (1.14) J: If I— if I can pick it up.

Jack and Agar will now spend about an hour and a half together while Jack tells about the move. The passage shows how this topic is socially negotiated. As the interviewer, Agar proposed the topic and Jack accepted, though he need not have. He might have rejected it with an explanation of why it didn't make sense as a topic, or he might have suggested an alternative. This phenomenon may seem to elude formal treatment, but let us examine it in terms of the participants' interacting goals and plans within the framework developed above.

M's principal goal in this interview is to have a gap in the life history filled. At the same time, as an ethnographer he is interested in giving J a significant degree of control over the course of the interview. He can fulfill both of these goals by bringing J to the particular gap by increments, by travelling down a kind of funnel. At each point J will have the opportunity to agree or to redirect the choice of topic. M does this in three steps, each more specific than the last. First, in (1.1) he says there are lots of things to talk about. Second, in (1.3) he says there is one thing in particular. Third, in (1.5), (1.7) and (1.9), he gets specific about the particular gap — the move from Chicago. The third step is itself broken into three substeps that are temporally ordered; these are designed to lead J into the topic gradually, to allow him to orient himself to it and, at the same time, to give him further opportunities to redirect the topic. In (1.5) M mentions Chicago-based events. In (1.7) he brings J up to the events immediately preceding the trip to New York. In

(1.9) he asks about the trip itself. This then is a very orderly solution to the problem of two almost conflicting goals: directing J to a particular topic and giving J control over the course of talk.

But the desire to give control to J is also effected by means of another set of devices — the embedding of many sentences in what are almost apologetic epistemics. They are as follows:

- (1.1) . . . that we really still need to talk about.
- (1.5) Let me start with this and you tell me if this is an appropriate way to phrase the question even, but for example a lot of what we talked about . . . , and you talked about—
- (1.7) . . . you talked— yes, and you talked about . . .
- (1.9) But what's missing is . . .

Finally M has a goal that operates at every turn that is conventionally brought into any conversation by the participants — the goal of responding in a relevant fashion to J's utterances. We will look at the effects of this goal after we examine the conversation from J's point of view.

J seems to be operating at a much more local level. His only long-term goal is to co-operate with the interview. As subgoals of this and, in fact, as conventional goals associated with being in a conversation, he wants to indicate an understanding of what M tells him, and he wants to answer questions and comply with requests.

He can indicate understanding simply by saying 'yes', which is what he does in (1.4) and (1.8). But he can do so more strongly by expanding a bit on what M has said. This he does in (1.2) and (1.6). Unfortunately, since he doesn't yet know what M is aiming toward, both times J's expansion takes the conversation away from the direction in which M is trying to lead it.

Since M wants to respond in a relevant fashion before pursuing his own aims, he begins (1.3) and (1.7) with short response phrases before bringing J back to the funneling procedure he is trying to develop.

- (1.3) That's okay, yeah, Jack, . . .
- (1.7) Yes and . . .

By utterance (1.9) M has completed his request for the story. In (1.10) J indicates his understanding again, but in a way that doesn't quite agree to the request. Hence, in (1.11) M repeats the request in a more explicit form, but again embedded in epistemics in a way that gives J the maximum opportunity to refuse. In (1.12) and (1.13), J agrees to the request, and M acknowledges, and the negotiation is over.

The way J begins his story in (1.14) — 'if I can pick it up' — provides a very interesting verification of M's strategy for introducing the topic. In (1.5), (1.7), and (1.9), M worked into the story temporally, precisely in order that J would have something to 'pick up'.

Thus we have described the social negotiation in terms of two independent planning mechanisms, each of whose utterances are, for the other, part of the input from a changing, unpredictable world. M has several partially conflicting



goals which he had to 'satisfice' rather than 'satisfy', i.e. he had to obtain the best compromise among them. His plan was long-range, worked out over the course of five utterances. At each turn, however, he had to blend into single utterances material aimed at achieving different and very nearly conflicting goals. J, on the other hand, did not have a long-range plan beyond a willingness to co-operate, but rather had to plan out a response at every turn.

There is an enormous gap between a description like this and a genuinely formal treatment. Nevertheless, we have indicated in broad outline the direction such a treatment would take.

### Associative Slides

The topic has been established. However, in most conversations there will be some areas in which the talk strays quite far afield from the topic. This interview began with Agar asking and Jack agreeing to talk about Jack's move to New York. After Jack has explained *why* he left Chicago and is just telling *how* he did — by hitchhiking — an associative slide occurs. He mentions his previous experience with hitchhiking and slides into a reminiscence about a trip to Idaho.

- (2.1) J: I had already as I told you learned a little about hitchhiking,
- (2.2) J: I'd split out and uh two or three times, then come back,  
M: Uh huh.
- (2.3) J: The one — my first trip had been to Geneva uh New York,  
M: Uh huh.
- (2.4) J: And then I'd uh once or twice gone to — twice I'd gone to California,
- (2.5) And then I'd cut down through the South,
- (2.6) And I had sort of covered the United States.
- (2.7) One very beautiful summer I'll tell you about some other time that I  
spent in Idaho
- (2.8) That to this day I remember with nothing but you know happiness,
- (2.9) It was so beautiful,
- (2.10) I'll— I'll never forget it,
- (2.11) I— Right up in the mountains in these tall pine forests,
- (2.12) And it was something that you know is just— it you know—
- (2.13) J: It's indelibly in my memory,  
M: That's huh
- (2.14) J: And nothing could ever erase it.
- (2.15) M: We'll have to— we'll come back to it one day.
- (2.16) J: Yeah, sometime you ask me about that.
- (2.17) M: Okay.

This passage gives us occasion to introduce the notion of 'local coherence', a concept that will prove important in our other two examples as well. We have pointed out elsewhere (Agar & Hobbs, 1982; Hobbs, 1985) that a conversation not only proceeds in accordance with a global plan, but is also locally coherent.

Two adjacent segments, even when taken out of context, are generally related to each other. The first author (Hobbs, 1985) lists a small number of specific 'coherence relations' that typically occur between segments, such as a strong kind of temporal succession, a causal relation, explanation, semantic parallelism, elaboration, exemplification, contrast, background, and so on. These relations arise out of communicative goals that speakers have, such as promoting comprehension for the listener, and they possibly correspond to ways information is stored in memory. Each coherence relation can be defined in terms of the information content of the two segments it links. Two segments linked by a coherence relation then constitute a single segment, which can be related in turn to other segments. In this way, a treelike structure can be built up over large stretches of discourse and, if the discourse is 'well-behaved', over its entirety.

An associative slide is one way discourse can fail to be 'well-behaved'. A slide occurs when the speaker's attention to his global plan lapses, and he moves in a locally coherent fashion, perhaps through adjacent chunks in his memory. Alternatively, he may slide through locally coherent utterances when the global goals are insufficiently constraining, as we discuss on pages 223–230. In these cases, we can identify coherence relations between successive utterances. Each sentence flows smoothly into the next. But they do not compose into a large-scale treelike structure for the discourse as a whole.

In terms of local coherence, what is going on in example (2)? In utterance (2.1). J is working out a reasonable step in his global plan, namely, to explain that he had the means to leave Chicago — hitchhiking. He elaborates on this in (2.2) to (2.7) by giving several parallel examples of his experiences with hitchhiking. In (2.7), however, the slide begins. There he tells us not only that he spent a summer in Idaho, but that it was a 'very beautiful' summer. This is gratuitous information as far as the global plan is concerned. But now in a locally coherent fashion, he begins to elaborate on the beauty of the summer. In (2.8) he tells of his happiness. In (2.9) he repeats that it was beautiful. In (2.10) he says he'll never forget it. In (2.11) he gets specific about what was beautiful. In (2.13) and (2.14) he says again in two different ways that he'll never forget it.

He of course realises this is a slide, as indicated by his relative clause 'I'll tell you about some other time' in (2.7). Finally M picks up on this in (2.15), and redirects the interview back to the move from Chicago.

This analysis invites certain elaborations in our planning mechanism. In working out a plan for a set of goals, the speaker generally moves opportunistically, or even erratically, among the goals, sometimes emphasising one, sometimes another. It is by no means a tightly constrained process. This example has shown us that we must include among the speaker's goals the goal of remaining locally coherent. But this is not the full story, for local coherence is not merely a constraint; it is also a resource. Insofar as local coherence reflects memory structure, it serves as a means for finding a next thing to say. What local coherence suggests is then evaluated for its appropriateness to global concerns. In an associative slide a kind of relaxation in the planning process occurs, in which local coherence is pursued to the neglect of the global plan.

The next two examples illustrate two further varieties of this phenomenon.

### Discontinuous Structure

Jack began his account of the move to New York by telling why there was no reason for him to stay in Chicago. Referring to previous interviews, he summarised his family relationships — a devastating fight with his brother, the departure of his mother for California, and the hostility between himself and his father. Next he characterised his friends as a 'dime a dozen'. Having dealt with the issue of 'why leave Chicago', he then began to relate *how* he left Chicago. He started by reminding Agar that he had the means to leave Chicago, the ability to hitchhike.

So far, the interview (except for the slide) is quite amenable to standard notions of planning. J's goal is to describe the move: two subgoals or subtopics that he generates are 'describe why leave' and 'describe how left'. The first subgoal generates segments that 'describe fight with brother', 'describe loss of contact with mother', and so on to 'describe unimportance of friendships'. The second subgoal generates the segment about J's ability to hitchhike.

Now, however, he leaves the question '*how* did I leave Chicago' and returns to the earlier question '*why* leave Chicago', by talking about how in his travels he had seen other places that were better than Chicago, where he was not treated like 'the scum of the earth'. After this segment he returns to the question of *how* he left, discussing a friend 'Bill', explaining how he had met him and describing how they made contact and decided to leave for New York together.

The problem of interest is the interruption of the second subgoal to return to the first. Logically, the way Jack can show that there was no reason for him to stay in Chicago is to show that, for every plausible reason, that reason could not cause him to stay.

NOT (EXIST reason) (reason cause stay)  $\leftrightarrow$   
(FORALL reason) NOT (reason cause stay)

Initially for Jack, the plausible reasons are his relationships with others — family members and friends. He has to say why each of these relationships was insufficient to hold him. That Jack associates where he lives with his personal relationships is a theme exhibited elsewhere in the life history corpus. But this strategy does not lead him to access the appeal of the town itself as a possible reason for staying, and he initially closes the subtopic of 'why leave Chicago' after dealing only with the relationships.

When he interrupts the second subtopic to return to the first, it is to dispose of another plausible reason, the appeal of the city itself. The resulting structure is illustrated in Figure 2.

This is a problem for standard planning mechanisms to capture. In standard planners, subgoals are accomplished, and then one moves laterally in the tree to the next subgoal or pops up to a higher level. They may backtrack if something goes wrong down the line, but they do not exhibit the phenomenon of being reminded of another necessary subgoal for a goal that was already believed achieved. To explain why J would return to the first subtopic or subgoal, we need to assume that having supposedly disposed of that subgoal, it nevertheless remains in his plan, 'marked' as satisfied.

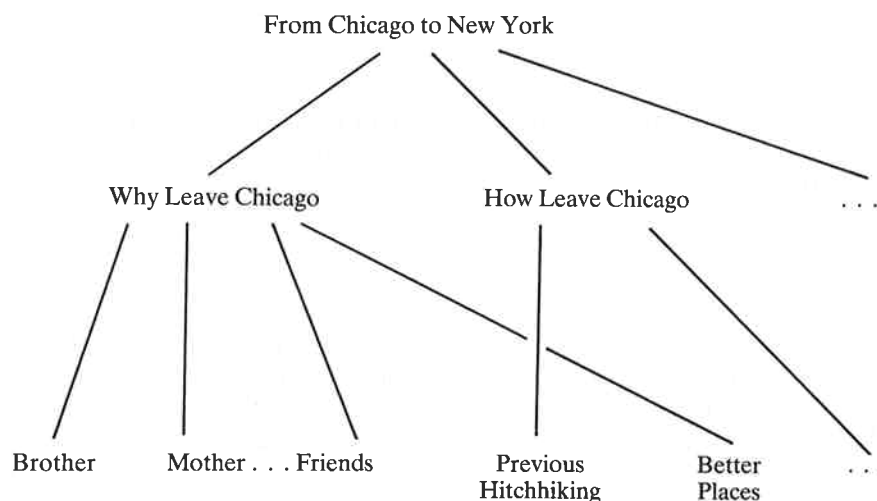


Figure 2 Discontinuous structure

When another plausible reason occurs to him, he realises that this further reason must be dealt with, and he interrupts the second subtopic to do so.

Our notion of local coherence allows us to analyse this example more deeply, for it suggests why this new reason should have occurred to him, and how he could integrate it smoothly into his flow of talk. In the previous segment, he has just been talking about his travels around the country. A natural follow-up to this is what he had learned from these experiences and one of his lessons is globally relevant. He had learned that there were places that were better than Chicago. Thus, while from a global point of view there is a discontinuity from the 'hitchhiking' segment to the 'better places' segment, locally there is a smooth transition from 'experience' to 'lesson drawn'. A naturally locally coherent continuation is seized upon and put into the service of the global plan, but at a site in the plan at which global planning would not have placed it.

### Goal Emergence

Jack goes on to give an account of his trip to New York, describing two stops on the trip in some detail. After his arrival in New York, things get most interesting from a planning point of view. The topic that had been negotiated is about to lose its guiding power — Jack is arriving in New York. Agar's request about the move from Chicago has been answered. The remainder of his question in (1.9): '... and like moving into the city and starting to get into that whole trip', is insufficiently constraining to provide much guidance, if indeed it is remembered at all. The interview can't stop since an 'interview' usually lasts from one to two hours, and Jack is being paid for them. So Jack is faced with the problem of finding a way to continue.

In the next few segments, Jack deals with this problem by shifting around among topics. In the course of this, a new goal emerges to occupy the rest of the interview: his account of his first prison experience.

We have assumed that the intuitive notion of topic corresponds to the formal notion of goal. The topic of the conversation is what the speakers *intend* to talk about. But if topic development is the top-level goal we allow ourselves to deal with, then our example of a new goal emerging from the interaction is something that cannot be described in terms of the planning mechanism we have postulated. However, J and M have higher goals, namely, to continue the interview for a certain length of time. This is not a condition to be achieved, but a condition to be maintained. It is a situational constraint, dictating that *some* action take place and limiting what that action can be. This goal must be continuously implemented by continuing to talk. There are further constraints — the talk must be about J's life — but the constraints are not very restrictive, and don't serve to limit the talk very tightly. The best strategy for continuing to talk is to tap into a productive topic, for example, a story of some duration, since this will solve the problem for a long period of time. But it is not always possible to think of a productive topic, and even when one can, some work is required to introduce it. Here it is apparent that J cannot find such a topic, so he falls back on a second 'strategy' for continuing — say anything.

He first discusses how benzedrine was becoming increasingly difficult to obtain over the counter. This problem leads him to place himself in New York. He begins to describe how he tried some drugstores, but then shifts in midsentence to his initial positive reactions to the city, comparing them with his life in Chicago. Then he talks about how he didn't mind being known as a '42nd Street hustler' but that he didn't want to become known as a 'faggot'. He explains why the life of a 'faggot' is a difficult one and gives as an example the hard life they lead in jail. Finally he talks about his first robbery and prison experience.

Again our notion of local coherence can guide our analysis of this drifting conversation. We may assume either that J has the goal of staying locally coherent or that he is just moving among adjacent memory schemata. To see in detail how J goes from subtopic to subtopic, let us look at the transition points more closely, taking a series of snapshots to trace his progress.

The transition from the trip to New York as a topic to benzedrine as a topic happens as follows:

(Splitting up with his hitchhiking companion Bill in Buffalo.)

He says yeah man I want to stay.

I said well your funeral and I split.

So I came on

Meanwhile I'm still using benzedrine inhalers

But by this time I started running into a little trouble.

(Difficulties of obtaining benzedrine at drugstores.)

And a few lines later:

Well I did get as far as New York before the shit hit the fan

When I got to New York, sure enough you couldn't buy a benzedrine or amphetamine pill anywhere.

A reasonable way to conclude the story of the trip from Chicago to New York is to tell about settling in after his arrival. For J, this means his becoming part of the 42nd Street scene. But to tell about that he first has to tell about the difficulty in obtaining benzedrine, that led him to the area initially. Thus, the benzedrine subtopic is a temporal continuation in the story of the trip and serves as background for the final wrap-up of that story. Figure 3 illustrates this. (Goals in parentheses are ones that have not yet been achieved. The upward arrows labelled 'cause' indicate that the lower event is being told as a causal motivation for the higher event. A box contains a topic or goal together with its subordinate goals or topics.)

The transition from benzedrine to 42nd Street goes as follows:

(Looking for a drugstore that would sell benzedrine.)  
 The first place I hit was on Eighth Avenue between 46th and 47th,  
 Cold turkey,  
 I started from —  
 I didn't know anything except that this was 42nd Street.  
 Uh I had already been cruised a couple of times  
 So I figured if push comes to shove, this is good headquarters  
 And uh as it turned out it was good headquarters.  
 (Learning about the 42nd Street scene.)

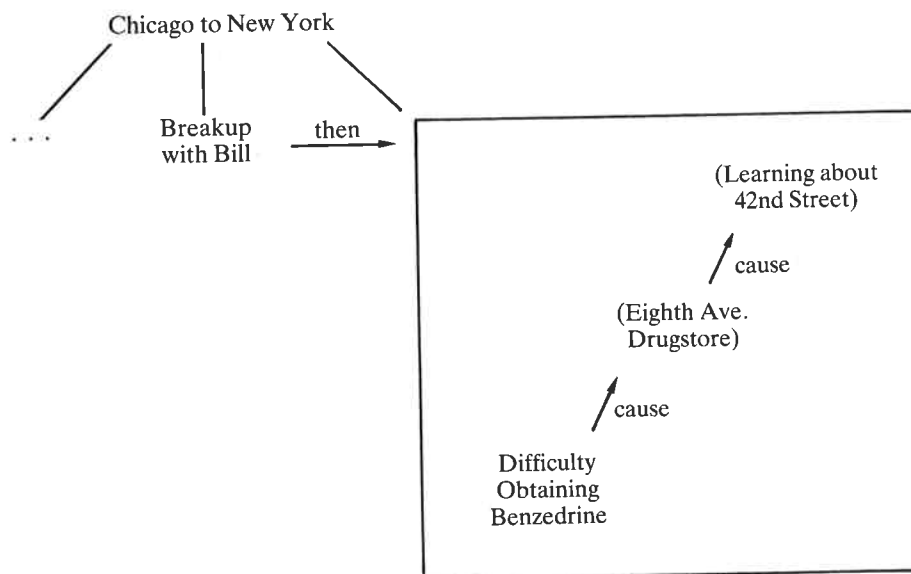


Figure 3 From 'Breakup' to 'Benzedrine'.

An alternative interpretation of this sequence of subtopics is that the shortage of benzedrine is the next episode he wishes to tell about. In the course of doing so, he mentions the drugstore on Eighth Avenue as an example of his efforts. The subtopic of 42nd Street then emerges as an expanded description of the neighbourhood of the drugstore. In the course of the description, he drifts away from whatever he was going to say about benzedrine. Figure 4 illustrates this (A '+' before a goal indicates that it has already been satisfied.) In this interpretation, J's talk is much less controlled by a global plan, much more adrift in locally coherent moves.

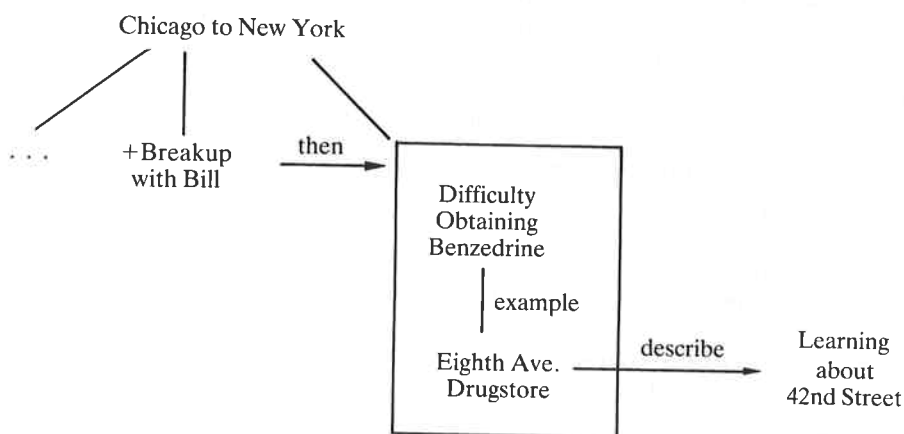


Figure 4 From 'Drugstore' to '42nd Street'

What happens next is a very curious interaction between global plan and local coherence.

In the next segment he starts to launch into a story that continues the temporal sequence, but then he is detoured as he gives some background information.

(Learning about 42nd Street.)

I—I was always quick in picking up on the scenes.

Now the first big routine that I ran into—

That is the first explosive routine,

I took—

Let me say this,

I took to 42nd Street,

It was a natural

I was just a natural for it,

It was exciting.

(Illegal activities on 42nd Street.)

We learn later that the purpose of this digression is to set the scene for the explosive routine — breaking into cars one night — but a few twists and tangles intervene.

It was on 42nd Street that he met his partner, so he first must tell about the ambience of the neighbourhood. At the same time, it is a further development of his previous subtopic — learning about 42nd Street. Figure 5 illustrates this.

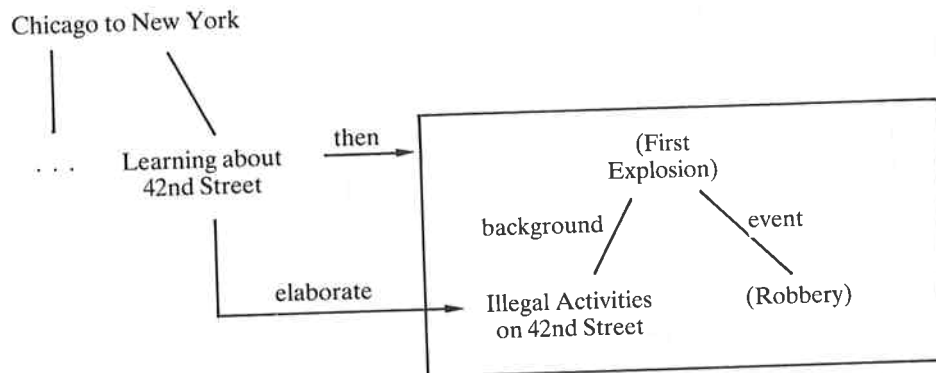


Figure 5 From '42nd Street' to 'Illegal Activities'

Next he contrasts life in New York with life in Chicago.

All of this was you know was completely new to me,  
Now I had led a—a you know a sort of open life in Chicago,  
But still in all you know it was comparatively protected.

Figure 6 illustrates this move. While 'life in Chicago' is a locally coherent contrast with the subtopic of 42nd Street, it takes J away from the story of the first explosive routine.

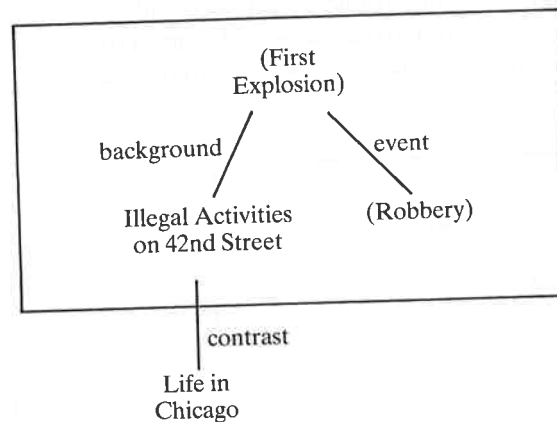


Figure 6 From 'Illegal Activities' to 'Life in Chicago'

J then sums up the contrast by saying he was on his own in New York. But although he had to shift for himself, he set limits on how he would do it.



But in New York I didn't know anybody  
 I was strictly on my own.  
 And uh the one thing that I drew the line at,  
 I—I didn't mind being known as a 42nd Street hustler  
 But I sure didn't want to be known as a faggot.

Figure 7 illustrates this.

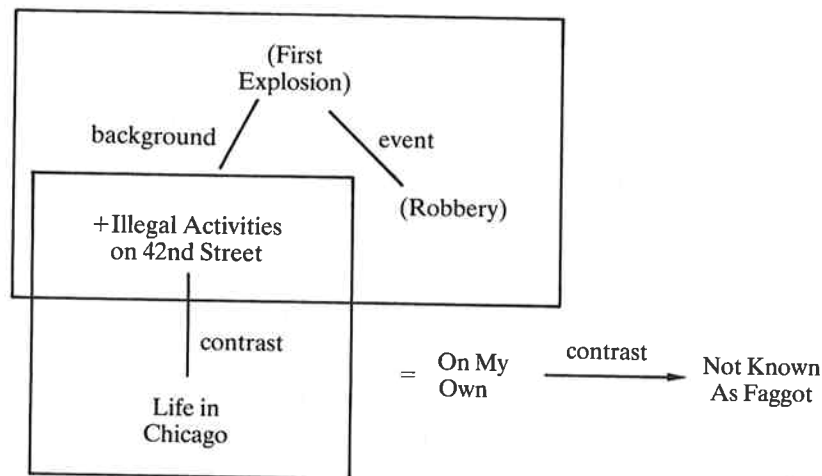


Figure 7 From 'Life in Chicago' to 'Not Faggot'

J's global plan is insufficiently constraining, and by now local constraints have taken over almost completely. To explain why he didn't want to be known as a faggot, he tells about the undesirable aspects of the life of a homosexual on 42nd Street. From there he goes on to the undesirable aspects of homosexual life in jail. His goal of telling about the first explosive routine is held in abeyance. This is shown in Figure 8.

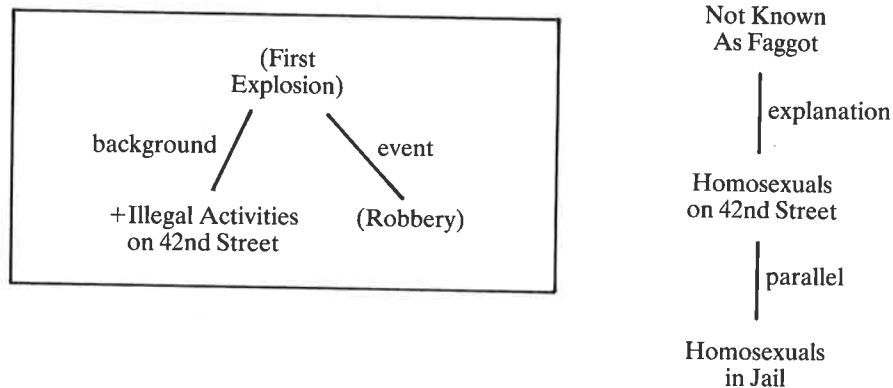


Figure 8 From 'Not Faggot' to 'Homosexuals'

Finally, as an example of the life of homosexuals in jail, he decides to tell the story of his encounter with a homosexual his first time in jail. But to do this he must tell about his breaking into cars that led to his arrest. That is, he must tell about the 'first explosive routine' that he had intended to tell about before. Thus, J now has a fortuitous overlap of goals, as illustrated in Figure 9.

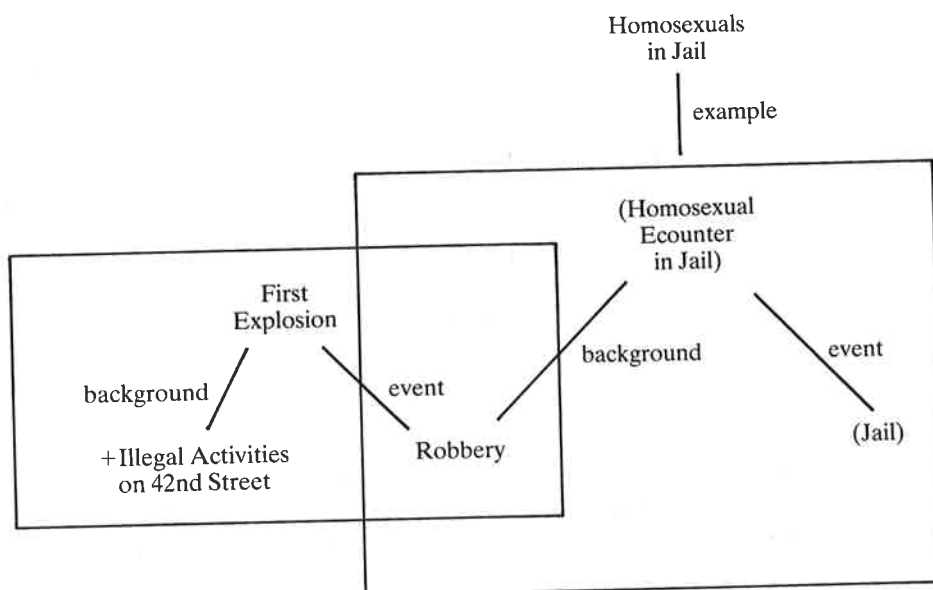


Figure 9 From 'Homosexuals' to 'Robbery'

The transition is as follows:

- (3.1) J: I'll tell you sometime,
- (3.2) Well maybe even now uh about my first experience in jail
- (3.3) Because uh I'm getting very close to it,
- (3.4) Uh the first explosion occurred one night when I was stoned out of my mind on goofballs,
- (3.5) M: Is this in jail, Jack, or back on 42nd Street?
- (3.6) J: No, this is back on 42nd Street.
- (3.7) M: Okay.
- (3.8) J: I was stoned absolutely out of my mind.

Finally he has hit on a productive topic whose development will occupy most of the rest of the interview.

In this sequence of subtopics, J's top-level goals were insufficiently constraining, and J had to wander around through locally coherent possibilities for some way to continue. Yet the top-level goals had some influence, for he ended up at the story he had originally set out to tell.

The metatalk in fragment (3) is interesting in the way it makes explicit the

structure we have just outlined. J says, 'I'll tell you sometime', which is similar to what he said in (2.7) during his previous associative slide ('. . . I'll tell you about some other time . . .') and which indicates his recognition, finally, that he has departed from his global plan. He moves back to his global plan of telling about the first explosion, sees that the story of the homosexual experience in jail is relevant to the story of the robbery, since the latter is background for the former, as indicated by 'I'm getting very close to it' in (3.3). He concludes that he can tell the story of the homosexual encounter 'maybe even now' and says so in (3.2). It is still not clear to M that J now intends to tell about the robbery as background to the experience in jail. This is cleared up in (3.5—7).

There is an interesting parallel to this kind of goal emergence in Sudnow's book (1979) on learning to play jazz piano. In his early efforts, he sought a series of techniques which, properly arranged, would produce jazz. By the end of the book, he talks of the importance of knowing where you want to get to with the music, and then taking any number of ways to get there, ways that are worked out as they are played. The former method uses global planning only. The latter involves making locally coherent moves, guided, however, by the global plan.

### Summary

The explanations we have given of these fragments of discourse are highly speculative. We have not provided evidence that this is how the talk was actually produced. In another paper (Agar & Hobbs, 1982), we have begun to explore what sorts of evidence one might appeal to.

The issue we have dealt with here is whether the vagaries of naturally occurring discourse make a formal approach to coherence impossible *in principle*, as some have claimed. The standard planning mechanism of AI needs some modification to account for naturalistic material. But we have considered examples of four serious challenges to formal approaches, and we have shown that formal techniques are not only possible, but frequently revealing. With suitable tinkering, a planner can be made to include a modifiable knowledge base that represents shared as well as idiosyncratic knowledge. The planner can work 'on the fly' in the sense that it develops a plan at least to the point at which a first action can be taken, with the planning then unfolding concurrently with the action. From this it follows that repairs can be made and that high-level goals, like the details of the plan itself, can be developed in the context of a particular situation. Moreover, the concept of local coherence allows us to examine just how this development might take place. With these modifications, the formalisms of AI look promising indeed as a tool for conversational analysis.

Using such machinery in the analysis of seemingly incoherent discourse frequently enables us to uncover its hidden coherencies. The picture that emerges is something like this. Participants go into a conversation with goals they want to achieve or maintain, and they develop more or less constraining global plans to effect these goals. The global plan of a participant can change as the conversation progresses, in response to events in the environment and in particular in response to what the other participant says. In this way the participants' plans can converge

as they reach an agreement about how the conversation is to proceed. When the global plan is elaborated down to the level of a sequence of individual utterances, the sequence generally exhibits local coherence; there are reasons one utterance follows another, and these reasons cause the discourse to flow smoothly. Global planning, however, can sometimes interrupt the smooth flow of locally coherent talk to insert isolated material of global relevance. More frequently, the global plan is insufficiently restrictive or insufficiently attended to, and local coherence takes over the production of discourse. The global plan is then developed not so much in accordance with its own exigencies, but according to what is easiest to say next. Or the global plan is abandoned entirely, temporarily, and the discourse shows a piecewise continuity but does not compose into larger structured units connected with global goals. Usually the global plan is returned to in these cases, either because its subgoals are reasserted abruptly or because the discourse drifts back into territory the global plan has already mapped out and laid claim to.

The conversation that looked incoherent at first is thus seen as the product of an intricate yet analysable interaction among the global plans of more than one participant, events that occur in the environment, and the constraints and resources of local coherence.

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