# THE STRUCTURAL ANALYSIS OF VERBAL INTERACTION

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## ABSTRACT

This thesis is a study of the structural similarities between language and social behaviour. It is intended to show two things: firstly that a number of social psychological problems can be approached by analysing behaviour sequences in certain ways; and secondly that the study of conversation as an example of this approach reveals a number of interesting features of discourse structure. In particular it suggests that the arrangement of speech acts in sequences to form conversations is like the arrangement of morphemes in sequences to form sentences, so the temporal structure of a conversation (and possibly other forms of social interaction) may be viewed as the manifestation of an underlying language or code.

Chapter 1 outlines the objectives of the study and the models and methods available. It starts with an overview of the traditional perspective of social psychology and the criticisms which have been levelled at it in recent years. It has been suggested for instance, that social psychologists tend to treat stimuli and responses as physical events, without regard for the meaning they convey to the actor; that they use artificial and unrealistic situations for their laboratory experiments; and that the theories they test are too simplistic, and framed at the same level of description as the empirical observations which support them. In contrast the natural sciences have tended to postulate enduring qualities of the systems studied which could not be observed directly, but which gave a economical account of a diversity of observed phenomena. These remarks about the techniques of natural science and social psychology suggest that we should look for some pattern of behaviour during social interactions which may be observed,

and from which the more abstract properties of the actor may be inferred. Such a pattern may be found in the sequences of events which make up a conversation.

The study of sequences and structures is more common in other disciplines than in social psychology, so there is a great deal we can learn from analogies with other structural sciences. The resemblance between behaviour sequences and sentences is introduced in chapter 1, and explored in greater detail in later parts of the thesis. Analogies with the study of games, chemical structures and 'systems' are also introduced at this point.

In the final section of chapter 1, a number of methodological issues are discussed;the relative merits of emic and etic techniques; ethical problems which may arise if subjects are deceived or recorded surreptitiously; the limitations of atomistic psychology; the attractions of mechanistic explanations; the need to take account of the creativity which is evident in the actor's behaviour; and the representation of behavioural meaning.

Chapter 2 contains a brief review of work on the structure of conversations under five headings: naturalistic observation and recording; linguistic analysis; interaction process analysis; simulation; and experimentation (including some laboratory observation and recording). Most of the authors agree that this subject is in its infancy, and while they have contributed substantially to the understanding of social interaction they do not provide a unified model of the structure of discourse. Their work is open to several criticisms. It is often based on an arbitrary classification of the events which are thought to make up an orderly sequence. Structures are often described

as Markov chains when in reality they seem to be more complex, and there is little attention to behavioural semantics.

In Chapter 3 the experimental work on conversation begins with four feasibility studies. These are intended to demonstrate that successive utterances are tailored to suit their context, thus generating a non-random sequence of events. This influence of verbal context on utterance choice may be seen when all verbal aspects of the utterances are present, when syntactic variations have been controlled, and even when syntactic and semantic features have been removed leaving a string of speech act classes. To show this, subjects were asked to reassemble unfamiliar natural dialogues, given their component utterances in random order. This is possible even when syntactic cues as to the original sequence have been reduced. To show that conversation consists of non-random sequences of speech act classes (and that subjects can give an accurate account of the nature of this non-randomness) a group of subjects was asked to supply intuitive values for a matrix of transitional frequencies in the format used by Bales (e.g. 1953). The subjects' judgements were found to correlate significantly with Bales' data.

Chapter 4 is an examination of particular aspects of the sequential structure of conversation. There are two experiments in which different orders of statistical approximation to conversation are judged for their realism. They show agreement between subjects, an increase in perceived realism as the order of approximation is increased, and an unchanging quality of simulation after the fourth or fifth order of approximation. This suggests that most of the influences on utterance selection are to be found in the immediately preceding three or four utterances. That is not to say that the sequence of events cannot be broken off and resumed, and in another experiment

such nested sequences were judged to be nearly as commonplace as linear structures, unless there was a cross-nesting of relations between utterances. In the latter case where two episodes of talk are initiated one after the other, then the first is completed and finally the second, subjects' ratings of likelihood of occurence were considerably lower.

In a further experiment on nested sequences subjects were asked to indicate which utterances were related in linear and nested examples, and to rate the examples for plausibility. In the case of the nested strings the relations between utterances were sometimes illocutionary and sometimes constative. That is to say that some of the relations were like those between questions and answers, or accusation and denials, while others involved logical sequiturs of semantic content, such as the possible dependence of the answer given to one question on the answer given to another. The results showed that subjects do recognise the nested structure and yet regard it as no less plausible than a linear structure, in which each speech act relates to the one before. They also respond to relations between utterances at the performative and constative levels of description.

Three related experiments were conducted in which subjects were asked to choose the more likely of two verbal responses when they were offered in two verbal contexts. The first of these experiments concerned the remedial sequence described by Goffman (1972). The subjects' judgement indicated no significant difference in the probability that the sequence would include the final stages of <u>appreciation</u> and <u>minimisation</u> rather than <u>new topic offer</u> and <u>acceptance</u> as a function of the presence or absence of an <u>accusation</u> at the outset. In the second of these experiments a significant difference was

found, in that subjects felt actors more likely to respond to attacks with counter-attacks and concessions with concessions in a dispute, than to respond to attacks with concessions, and concessions with attacks. In the third such experiment subjects judged confession to be a likely sequitur to accusation, and denial to a neutral enquiry about possible guilt, rather than denial as a sequitur to accusation and confession as a sequitur to enquiry. These results are not to be seen as reliable findings, but as methodological examples.

In chapter 5 the 'linguistic analogy' is discussed. There are a number of similarities between language and social behaviour sequences which suggest that the latter could be investigated by the same sort of techniques as the former. Both involve regular sequences of events in which order rather than mere presence or absence of items is of the greatest importance. Linguistic and behavioural structures may be described by the assignment of events to classes (paradigmatic structure) and the constraints upon the deployment of those classes (syntagmatic structure). The syntagmatic structure of language or behaviour may be described by a stochastic model in which transitional probabilities between event strings are recorded, or by some kind of non-stochastic or syntactic model. The use of generative models of the sequence of events entails the use of generative rules in linguistics and social psychology. The relation between the observed course of events, and its implications or meanings also need to be explored whether one is dealing with language or social interaction.

There are methodological implications of the linguistic model of social behaviour as well as conceptual ones. Parametric description of events according to their dimensional properties give way to discrete categorical and taxonomic descriptions. The

actor's knowledge of the social world (his communicative competence), which enables him to produce observed behaviour patterns, and the generative rules which correspond to that knowledge, become a focus of attention.

The suitability of linguistic models for work in other disciplines has often been recognised, and a brief acknowledgement is given to workers using similar methods in anthropology and psychology. The linguistic analogy also suggests the form that a programme of structural research should take. First one must investigate surface structure. This raises three issues: the unitisation of the behaviour stream(marking boundaries between discrete behavioural events); the classification of events; and the syntagmatic relations between event classes. When some information about surface structure is available three more issues may be explored: the nature of the semantic relation or 'deep structure' of behaviour and its relation with the surface; the generative process by which the actor arrives at his performance; and the practical consequences of being able to predict the outcome of certain behavioural sequences.

The classification of verbal events as a necessary part of structural analysis is influenced by the work of Austin (1962) and Searle (1965 & 1969) on performative utterances or speech acts.

In chapter 6 the 'surface structure' of discourse is studied according to the programme of research set out in chapter 5. The unitisation of the behaviour stream is discussed and found to be relatively unproblematic when dealing with verbal behaviour, but more difficult when the actor's non-verbal repertoire is involved. A classification of speech acts is attempted using the technique of test-frame analysis.

The results do not show a clear paradigmatic structure, possibly because the constitutive rules of discourse are more sensitive to context than those for language. A theoretical classification is proposed and used in a subsequent sequence analysis. This takes the form of a simulation in which three sets of dialogues were produced: one by random selection of speech act classes; one in accordance with the sequencing rules under test; and one control set produced by a group of subjects. Ratings of well-formedness by a second group of subjects showed the control dialogues to be the most realistic. The rule-governed set were given somewhat lower ratings and the random strings very much lower ratings still. This concludes the analysis of surface structure for the time being, although further work will be required before a definitive model is found.

Chapter 7 is a brief discussion of the concept of deep structure as applied to the linguistic analysis of social behaviour sequences. It appears to be true of both language and social behaviour that systematic arrangements of events carry information to the observer although the string of events and the information inferred from it have no necessary one-to-one correspondence. In some cases any ambiguity may be resolved by relabelling the nature of the events and the relations between them. Such ambiguities are called surface structure ambiguities and depend only on the properties of surface structure. In other cases ambiguities arise which cannot be resolved by redescription of the surface structure. This suggests that each of the semantic representations which may be derived from a single surface structure should be related to a separate (deep) structure.

Chapter 8 contains a brief discussion of two remaining issues arising from the linguistic analogy: the nature of the

generative process in vivo by which the actor arrives at his performance, and the possible practical applications of a predictive model of social behaviour sequences in determining the outcome of a crucial course of events. A possible application of generative rules to the description of person and situation interactions in the determination of behaviour is also discussed.

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# PREFACE

Most of the material in this thesis is set out in the conventional format, but there are a few features which need some explanation. There is only a small literature in this field, and that is reviewed in chapter two. The remainder of the theoretical work which relates to the proposed model of social interaction is drawn from other disciplines, particularly generative linguistics. That will be discussed in chapter five after the experiments in chapters three and four have demonstrated some of the basic properties of the discourse system.

The empirical work is described as a series of 'experiments', although some of them are more similar in nature and purpose to the elicitation procedures used by linguists and anthropologists. They are used to discover the cognitive structures and rules by which the actor orders his social world, and in this sense are designed to generate rather than to test psychological hypotheses. They do give rise to a number of predictions about how people will respond to particular situations, which would enable the theories to be put to a more conventional experimental test at a later stage.

The chapters are divided into hierarchically arranged sub-units headed with four kinds of type. For ease of cross reference each section also has a number indicating its place in the hierarchy.

Every chapter begins with a brief abstract of its contents as a series of notes, each bearing the number

of the section in which it is elaborated. There is a short summary at the end of each chapter.

Diagrams and tables which are relevant to a particular passage of text appear with that passage, others which have more general relevance are placed in appendices, together with all transcripts.

Unfortunately the details of the analogy which is drawn between social psychology and linguistics cannot be conveyed without the use of a certain amount of linguistic terminology. This will be kept to a minimum, and a glossary is provided in appendix D.

'...one sibling in the social science family, the important subscience of interpersonal verbal behaviours, is only just beginning to focus its eyes, move its lips and utter a few sounds which its parents fondly believe are publicly intelligible.'

Murray, 1951: 434

'Of all truths relating to phenomena, the most valuable to us are those which relate to the order of their succession. On a knowledge of these is founded every reasonable anticipation of future facts, and whatever power we possess of influencing those facts to our advantage.'

Mill, 1851: 335

# CHAPTER 1 INTRODUCTION

1.1. The pattern of human social behaviour is predominantly a pattern of events in time. A description of this pattern should enable us to test and falsify hypotheses about the processes which regulate social behaviour.

1.2. The study of behaviour sequences can be modelled upon the methods of other disciplines which investigate the arrangement of events or particles to form coherent structures. The analogy between the study of behaviour sequences and linguistics is particularly useful.

1.3. The nature of the human behaviour stream compels us to study it by means which can account for an arbitrary action/meaning relationship, and for complex mutual influences and statistical interactions between the events which form the elements of the system.

In this chapter a number of ideas will be introduced, and discussed briefly. They will appear again in more detail in the later chapters. There are three sections describing the purposes of the project, the models and analogies which will be used, and the main kinds of research methods which are available. Not all these concepts are original, and their precedents in the literature will be acknowledged in chapter 2.

## 1.1 OBJECTIVES

This is a study of the structure of conversations. It is intended to show that the verbal aspects of social interaction(and possibly the non-verbal ones as well) can be treated as part of an unknown language or code. Each event in the interaction can be regarded as a single symbol, and the succession of events viewed as the product of an underlying 'grammar'.

That might seem like a strange objective, but the reasons for it will become apparent if we start by considering the different methods, and rates of success of the natural sciences on one hand, and social psychology on the other. Then we shall see why the methodology of social psychology has been under attack in recent years (Argyle, n.d.a.), and why the subject matter and techniques of social psychology may have to change to some extent if we are to benefit from the insights of the older sciences. We shall also see why a particular approach to the study of behaviour sequences seems to offer a key to the understanding of an important aspect of social life.

The last century has been a time of great success for natural scientists. The work of physicists and biologists has enlarged our understanding of the physical environment, and given us the power to control large parts of it. Engineering and medicine have flourished in the wake of pure scientific discovery, and a number of changes have been brought about which are(arguably) for the general good. The same cannot be said of the social and

behavioural sciences. They do not have anything like the coherent picture of their subject matter which is available in chemistry or astronomy, for example. The discoveries which have been made are often hard to inte grate, and whole areas remain unexplained. Some people would argue that this is inevitable, since the nature of human behaviour is quite unlike the phenomena of the natural world; others would go to the other extreme and claim that the domains of matter, energy and meaning are so similar that the experimental method which has proved so successful in physics, can be applied without modification to psychology. The answer is probably to take the middle course. We can approach social psychology as a physical scientist would, provided we are prepared to modify the logic of discovery at certain points. The conflict between mechanism and mentalism in psychology. will be one of the main issues in this thesis. It has been made explicit at the outset, so that it can be identified in the following chapters when particular aspects of the analysis of discourse are discussed.

Let us go back to the first principles of scientific psychology to locate this study in a broad context. The general problem is to explain the behaviour of the social actor by relating it to some enduring qualities or processes of mind. To do that one must first discover those regularities of behaviour which testify to an orderly generative process, and then infer from the behaviour patterns the nature of a device that could produce them. One would then complete the hypothetic-deductive argument

by postulating the existence of some such device, predicting further regularities of behaviour, and doing experiments to look for them. This course of events is surprisingly rare in social psychology. There is often no mental structure or process postulated, and the outcome of an experiment only demonstrates the relation between dependent and independent variables. As no reference is made to the source of that relation no enduring property of mind is discovered. Consequently such studies, which are really micro-sociological or ethological, rather than social-psychological, are often hard to integrate and the various behaviour patterns which are observed have to be viewed as isolated phenomena, rather than the different manifestations of the same process or processes. The first methodological point then, is one which has been generally appreciated in the natural sciences, but has often been overlooked in the behavioural sciences in the attempt to avoid the pitfalls of introspective mentalism: a respectable scientific account can include hypothetical objects or forces in addition to those which are observed directly. Were it not for the postulation of lines of magnetic force, invisible particles,even the concept of causality itself, the data of physics would be as hard to integrate as the data of social psychology.

> As a general designation for psychology, behavioural science is about as apt as 'meter reading science' would be for physics.....
>
> Chomsky, 1963: 328

The argument that the principles of logical positivism are unsuited to social psychology is presented in detail in Harré & Secord(1972). They go on to argue that a truly scientific study of social behaviour must incorporate a new model of social man, as a self-regulating rule-following agent, and not an object driven blindly by the forces of nature. They advocate a 'new paradigm' for research in which the capacity of the actor to monitor his behaviour and provide accounts of his actions is of central importance. A number of the features of this new paradigm(also illustrated in the studies reported in Stone & Farberman, 1970) will be discussed and adopted here.

The first step is to find some pattern in the actor's behaviour which will indicate how it was produced. Social behaviour is patterned in all kinds of ways. The probability that a particular item of behaviour will be emitted in a specified interval of time is influenced by a number of factors, each forming the focus of a particular school of psychological thought. The probable form of behaviour changes from one actor to another and from one situation to another. A large part of the variance can only be accounted for by unique combinations of actor and situation, (Mischel, 1973; Argyle & Little, 1972). The greatest observable influence on the eflux of motor information from the individual's brain (and hence on his behaviour) is the influx of stimulus information. It is the central theme of experimental psychology that responses are related primarily to each other and to the past history of stimulation, assuming the nature of the brain itself to be a constant. In its unelaborated form this is the stimulus-response view of psychology.

The important relation between stimulus and response is emphasised by the motor skill model of social interaction (Argyle, 1967) and supplemented by the addition of a motivational component. This is shown diagramatically in Figure 1.1.

Figure 1.1

When the motor skill model of psychology deals with the actor's behaviour in relation to the physical world, the 'feedback loop' of mutual influence in Fig.1.1 passes through one physical system and one behavioural one. If the diagram is redrawn to represent social behaviour in a dyad, the picture changes, and the previously distinct events of input and output become equivalent for the outside observer, since each event constitutes an output for one actor while at the same time providing an input for the other, (provided each actor is attending to the other's behaviour). This feedback loop does not behave as a closed system (Beishon, 1971) as each actor will produce some behaviour which escapes the other's attention, and will attend to some events which do not arise from the other's behaviour. The dyadic picture(figure 1.2) is very like Saussure's (1916:29) speaking circuit.

Figure 1.2

As an approximation to dyadic behaviour, it is acceptable to regard the system as closed, and bounded by the dotted line in fig. 1.2. This means that only those events will be considered which are responses by one party

Figure 1.1 The Motor Skill Model of Social Interaction Argyle, 1967: 94

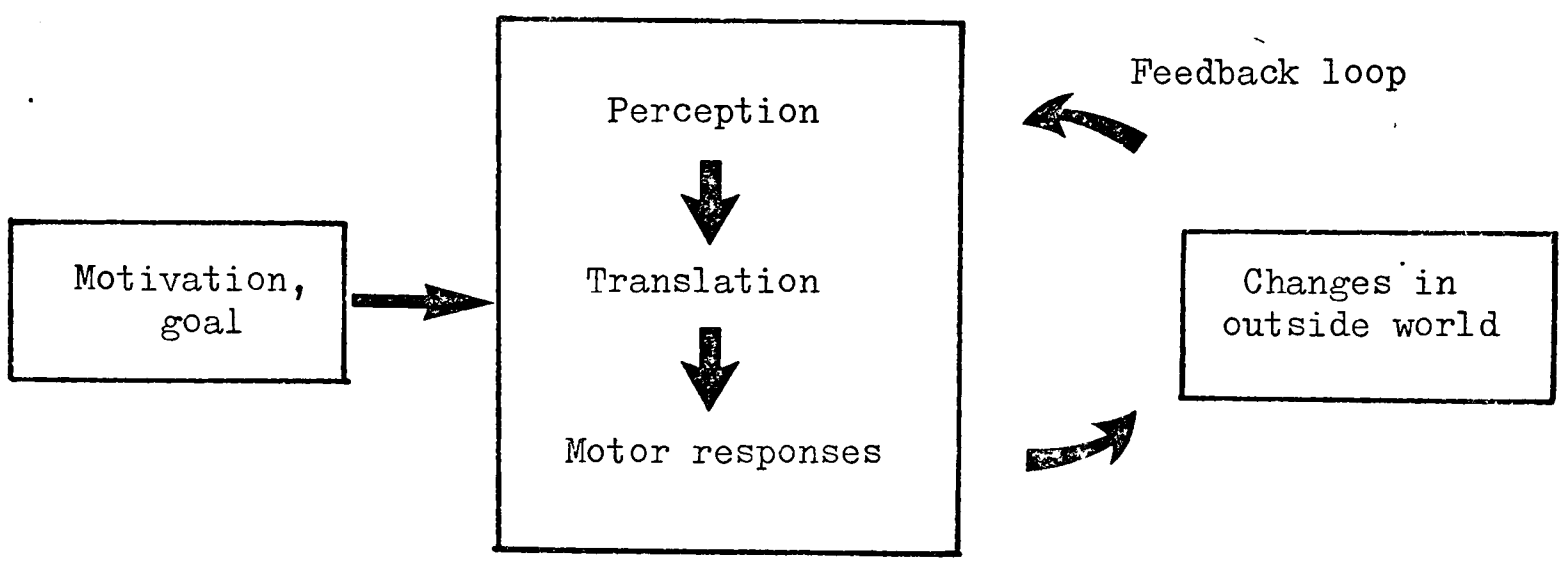
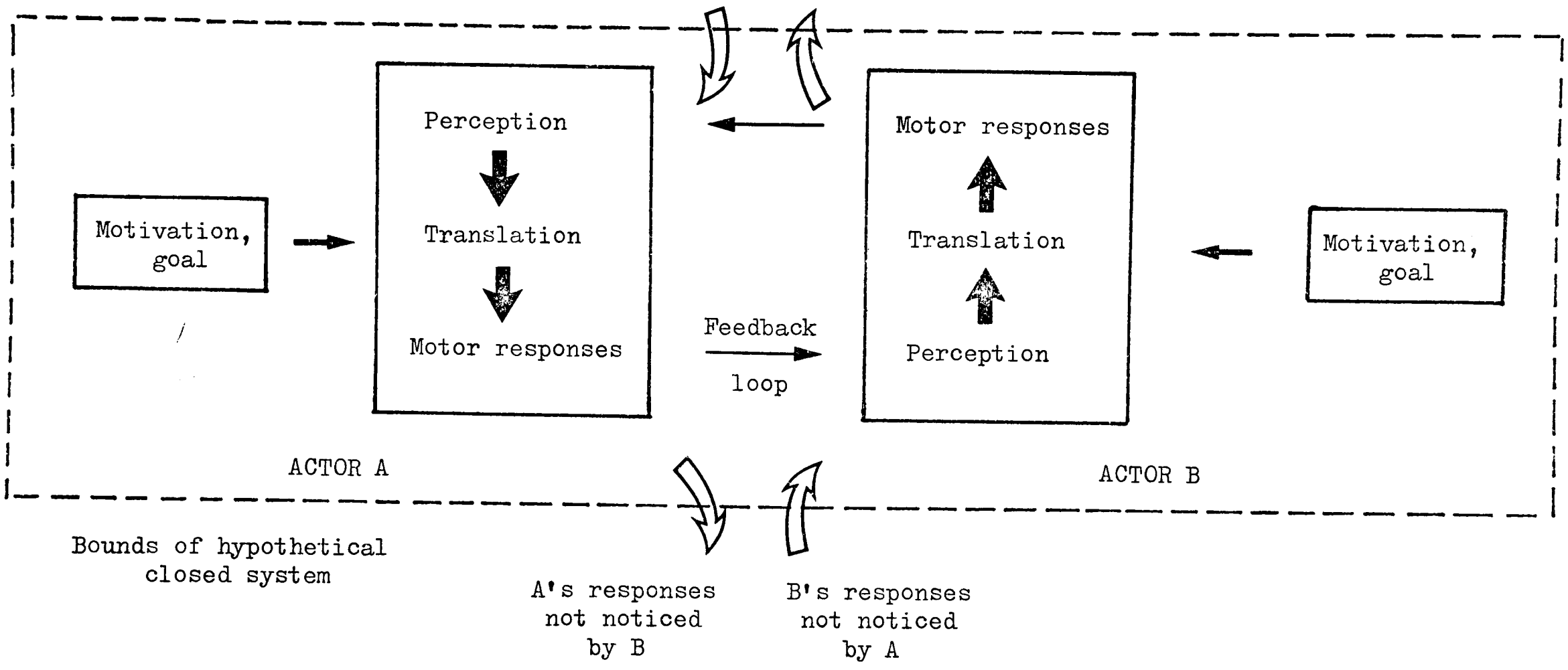


Figure 1.2 A Model of Dyadic Interaction



to the dyad and stimuli for the other.

The elements of the systems which have received most attention from psychologists are the perception and response processes of each individual, often referred to as the encoding and decoding processes. The encoding and decoding of non-verbal communication(N.V.C.) has been extensively studied by such authors as Ekman & Friesen (1969); Argyle(1972);and Mehrabian (1972). The verbal counterpart of these studies is provided by workers in linguistics (.e.g. Chomsky, 1957; 1965) and particularly those concerned with semantics (e.g. Katz & Foder, 1963; Fillmore, 1968; Chomsky, 1971). The concern of linguists with the encoding and decoding of language is emphasised by their use of the term speaker/hearer for the language user. The experimental investigation of language production and comprehension has fallen to psycholinguists (cf. Miller, 1951; Miller & McNeil, 1968; and Greene, 1972) while the effect of sociological variables on the use of specific speech codes has been the central issue in sociolinguistics (eg. Brown & Gillman, 1960; Brown & Ford, 1961; Bernstein, 1962; Lawton, 1968; and Labov, 1970).

This concern with the means of encoding and decoding messages, verbal and non-verbal, has overshadowed the study of the process of translation, whereby the semantic representation (or decoded form) of an incoming message affects the semantic representation of outgoing messages. In terms of the analogy which is often drawn between human psychology and the workings of a computer program, these studies have sought to discover the routines of the

compiler which convert FORTRAN or ALGOL into binary machine code, while neglecting the algorithm in core which governs the form of the computation which is carried out, and hence the relation between input and output. The aim of the present project is to investigate the translation process by describing the input/output relations of the individual - his transfer function - in certain aspects of social interaction. However as fig 1.2. shows, a third party observing a dyad sees the sensory input to actor A as equivalent to the response output of actor B (while the assumptions of the closed system are valid). Working from this perspective the observer is justified in transforming the problem so as to treat the relationship between an output by A and the previous inputs to A, as equivalent to the relationship between the output from A and the previous outputs from B. Similarly B's responses may now be viewed as a function of A's previous actions, so the whole issue of input/output relations, or translation processes may be transformed to one of behaviour sequences.

By focussing on behaviour sequences in this way, we can describe any simple S-R relations in social behaviour, in addition to the more complex patterns which may arise. The behaviour stream would only be suitable for a simple S-R analysis, if it were constituted in a particular way. It would have to consist of a sequence of events, each of which occured with a probability determined only by the nature of the immediately preceding event. Such a series is called a Markov chain (Kemeny & Snell, 1960). A Markov chain may be uniquely described by a matrix of

transitional probabilities, giving for each possible pair of antecedent and sequitur, the conditional probability of a transition occuring to give rise to the sequitur, given the antecedent has occurred. The Markov chain is the simplest of a family of mathematically specified sequences known as finite state or stochastic series. The higher order members of the family may also be uniquely described by matrices of transitional probability, provided they show the probability of any item occuring after a specified arrangement of several previous items, rather than just the immediate antecedent .

Needless to say, the stream of human social behaviour may not have the stochastic properties which would make it suitable for Markov analysis (a point which is elaborated in section 4.3). The analysis of behaviour sequences may be extended to overcome the limitations of the simple S-R or Markov model. One necessary modification is to study each item of the actor's behaviour in relation to the preceeding item of his own behaviour, as well as in relation to the preceeding item of the other's behaviour. To return briefly from the perspective of the outside observer to that of the individual actor, this means that response-response contingencies are now included, in addition to the stimulus-response contingencies of output upon input. Bales (1953) acknowledged the importance of both these influences upon the production of social behaviour by presenting his analysis of small group problem solving as a table of reactive tendencies (the individual's S-R contingencies), and a table of proactive tendencies (R-R contingencies). The terms reactive and proactive(from

Murray, 1951) will be used to distinguish between items of behaviour as related to previous behaviour of another actor, and items of behaviour as related to previous behaviours of the same actor.

To capture the likely form of social interactions the model should be extended further to relate each item of behaviour to more than one preceeding item of behaviour by self and other. Now the argument revolves around the general question of how each item of social behaviour that goes to make up an interaction is related to the recent history of events in that interaction. Does social interaction operate as a kind of chain-reaction, and if so, what constrains the form that the chain of events may take?

One aspect of the search for a systematic relationship between items of social behaviour, and the past history of the interaction in which they occur, has to do with the ongoing structure of the actor's own behaviour. The events of a social interaction need not be subject to social influences alone. Many items of behaviour will be fashioned to fit the framework of the actor's plans, in the hope of carrying him towards his chosen goals. This aspect of the structure of behaviour was discussed at length by Miller, Galanter and Pribram (1960), who reject the idea of the simple S-R schools of thought in favour of a model in which behaviour is seen in relation to the actor's mental image of the world, and his plans for dealing with it.

> What an organism does depend on what happens around it. As to the way in which this dependency should be described, however, there are, as in most matters of modern psychology, two schools of thought. On the one hand are the optimists, who claim to find the dependency simple and straightforward...
>
> Arrayed against the reflex theories are the pessimists, who think that living organisms are complicated, devious, poorly designed for research purposes, and so on. They maintain that the effect an event will have upon behaviour depends on how the event is represented in the organism's picture of itself and its universe.
>
> Miller, Galanter and Pribram(1960: 6).

The 'pessimists' seem to have the more realistic view, but some of the cause for pessimism may be dispelled by the study of behaviour sequences, if we are able to discern in them the effect of the plans, rules, strategies, and so on, which direct the actor in the maze of his own cognitive world. Of course the effects of simpler mechanisms: response matching, social learning, reinforcement, and the like, should not be ignored, but their influence will also be imprinted upon the behavioural stream, to be recognised during the sequence analysis for whatever part they play in fashioning behaviour.

Social behaviour must be described before it can be explained. The pattern of events which figures in the description is predominantly one of events as they are deployed in sequences, and these appear as input/output sequences when seen by the actor, or as output/output sequences formed by several actors, when seen by an outside observer.

It has been assumed that interaction consists of a number of discrete behavioural events, produced by the actors in perfect alternation. This is an approximation

which corresponds to some kinds of social behaviour better than others. On the whole it is hard to apply to NVC, while fitting the verbal aspects of interaction quite well. For this reason, among others, conversation structure is the main topic of this thesis. A model of social interaction based on conversation has a number of attractions, as speech is a central aspect of social behaviour. It may also help to redress an imbalance in our understanding of social behaviour, which stems from the almost exclusive attention paid in the past to NVC by students of interaction , and bring us nearer to the synthesis of verbal and non-verbal studies which is essential if interaction as an integrated process is ever to be fully understood. As Argyle (1969) points out

> 'Human social behaviour consists primarily of the exchange of verbal utterances, but until recently there has been little contact between the work of social psychologists and linguists. Social psychologists have overlooked the detailed content and organisation of utterances, as causes and effects of behaviour. Linguists on the other hand have considered speech in isolation from its interpersonal setting, and have paid little attention to whether utterances are intended to convey information, produce action or express feelings, or to differences due to the method of communication, e.g. face-to-face, telephone, writing...'

Another approximation has been made, in assuming that dyadic interaction is representative of the behaviour of groups of all sizes. In some ways this is reasonable. The principles of conversation structure are likely to be invariant whether they are studied in dyads or larger groups. Some problems, such as coalition formation, or the choice of next speaker from a group of listeners, do not arise in dyads. They are, however, relatively minor

issues, and can be left out of the account until more universal features have been described.

So now the task and the reasons for choosing it should be clear: the study of dyadic conversation as a rule governed sequence of contributions from the two participants, bearing in mind possible extensions of this simple model to include some aspects of non-verbal behaviour, and the interactions of larger groups.

## 1.2 MODELS

There have not been many studies of behaviour sequences in social psychology, so it is useful to examine the methods and concepts developed in other disciplines which habitually deal with sequences and structures. The universe of discourse is always a set of elements whose arrangements in space or time or some logical array, are governed by rules or laws. Moreover these arrangements, configurations or structures are essential for the understanding of the system, since each structure behaves differently if its constituent elements are rearranged. The essence of the system cannot be captured by an account which only deals in the presence or absence of elements. The distinction is sometimes drawn between those structures which do not involve the deployment of elements in time (synchronic structures), and those which do(diachronic structures), such as the arrangement of paint spots on a finished canvas as opposed to the pattern of musical notes which form a melody(Saussure, 1916). (The terms

synchronic and diachronic were introduced originally to distinguish between the form of language of a given time as opposed to the process of historical change. Here they will be used to distinguish any static and changing structures.) The same structure can have synchronic and diachronic aspects, like an embryo for example. The organs of the embryo may be studied as they fit together at a particular stage of development ( a synchronic structure), or the changes in embryonic anatomy with the passage of time may be charted (a mixture of synchronic and diachronic structures). A similar combination of spatial and temporal patterns may be expected in social interaction. Certain aspects of behaviour, features on the actors face, individuals in a crowd, limb positions or population densities, are all part of social synchronic structures, but they change with time to give us a moving, diachronic picture of social reality.

The following sections are only intended to introduce the most useful analogies. Each will be explored in detail when it is used to illustrate particular aspects of the structure of conversation.

### 1.2.1 LANGUAGE

The best models for the arrangement of speech acts in sequences to form conversation, comes from another level of linguistic description, namely the arrangement of morphemes in sequences to form sentences. This analogy (insofar as it is appropriate) suggests that we should look for a structure described by cognitive rules rather

than physical laws; that the rules may be known, potentially at least, by competent native users of the system; and that rules of sequence exist which operate on classes of elements (such as noun, verb, adverb and adjective) rather than on particular elements (such as 'run', 'table', 'blue', and 'slowly'). In the same group of analogies are those with codes, computer languages and programs, and systems of symbolic logic. The latter particularly suggests the well-formed formula as an object of study, and illustrates how an abstract formal descriptive system can reveal structural isomorphisms which would not be apparent with a more superficial ( and more complete) description. For instance the equivalence of form between syllogisms only becomes clear when the content of their individual propositions is omitted. The same may be true of social behaviour. There may be a temporal pattern in conversation, which only appears when the dialogue is represented as a string of event classes.

The importance of sequential structure as a feature of language was recognised by Miller and Selfridge (1950). Their comments only need a few changes to the units of description, to be equally fitting as an account of conversation structure.

> 'Communicative behaviour, perhaps more than any of man's other activities, depends upon patterning for its significance and usefulness. An accidental inversion of letters or words or sounds can produce grotesque alterations of a sentence, and to scramble the elements at random is to turn a sensible message into gibberish....
>
> We can dependably produce and distinguish only a small number of different letters or speech sounds. We must use these few elements to talk about millions of different things and situations. To stretch these few elements to cover these many needs, we are forced to combine elements into patterns and to assign a different significance to each pattern.'
>
> (Miller & Selfridge, 1950:176)

Temporal pattern is such a fundamental feature of interaction, and particularly conversation that it is hard to imagine what the disordered counterpart of a normal conversation would be like. Some indication of the meaningless and unfamiliar nature of such a conversation can be found in Laffal's (1965: 85) example of schizophrenic discourse:

> A: What is your name?
>
> B: Well, let's say you might have thought you had something from before, but you haven't got it any more.
>
> A: I'm going to call you Dean.

Interestingly each of the utterances in this passage is acceptable in itself. Even the comment of the schizophrenic patient (B) could be seen as quite normal in other contexts. Its only fault lies in its use after A's question. Clearly a conversation where intrinsically sensible remarks are offered in random sequence, is no conversation at all.

Not all aspects of the structure of sentences corresponds exactly to their counterparts in the study of conversation. The sub-components of a sentence, phonemes, morphemes or words, recur (with certain acoustic variations) and are used again and again in different contexts. In contrast it is most unusual for speech acts to recur. The pattern of their use depends on their identification with particular categories or classes of act. In this way we might regard 'Hi', 'Hello', and 'How are you' as recurrent instances of the act greeting, in the same way that we regard the use of 'table', 'chair', and 'spoon' as instances of the class noun when they appear in sentences.

The use of complex behavioural sequences does not arise in conversation simply so as to make the system more economical as Miller and Selfridge suggest for sentences. Indeed it would be possible to envisage a language which did not use sequences, if the speaker/hearer were willing to use a new symbol for each message, as is the case in some simple codes and signalling systems. The same cannot be said of social interaction, since by definition it requires the contribution of more than one actor, and hence more than one act. It is only when several contributions are made to an ongoing behaviour stream by two or more actors, that social interaction may be said to occur. Therefore the issue of arrangements or sequences is <u>always</u> present.

### 1.2.2 GAMES

The structure of a conversation is also similar to the structure of a game. Very often in a game the participants make their moves in some kind of alternating sequence, and again the effect of a move upon the game depends upon the sequence of prior events, the <u>state of play</u>, which the move follows. In chess, the move of King to Queen's Knight 4, will win the game on some occasions and lose it on others. So too with a conversation, the same utterance may be polite or rude, absurd or wise, arrogant or humble depending on the occasion of its use. In conversations, as in games, the interpretation of an event may depend on its context. It is also useful to borrow from the world of games the distinction between rules(which allow the players to avoid sanctions or misunderstandings), strategies(which allow the players to

achieve their personal goals within the framework of the rules), and conventions (which embody the habitual patterns of play). Of course games differ from interactions in being mainly competitive and having highly formalised rules.

### 1.2.3 CHEMISTRY

The analogy between conversation structure and molecular structure is a little more obscure, since it likens a synchronic physical structure to a diachronic cognitive one. However the principles are much the same. Again there is a set of elements, whose possible combinations are constrained (by the laws of chemical bond formation, in this case). The structure of a molecule illustrates nicely two important properties of such a system. First, there is the use of element classes (the families of the periodic table of elements, Mendeleev, 1879). It is on the basis of class or family membership that the behaviour of elements may be predicted. It is true that there are differences of a kind within each family, atomic weight, atomic number, and possible radioactive properties vary from one element to another, but their essential structural feature, the combination which they can form with other elements, remains the same for all family members. The same may occur with speech acts. Certain categories may emerge which are homogeneous with respect to their combinatorial properties, but heterogeneous in other respects, such as the syntax and semantics on their constituent sentences.

The second point to emerge from the chemical analogy is the importance of accounting for structure, as well as

simply the composition of molecules (or social episodes). For instance the early studies of protein chemistry were hampered by a lack of techniques to investigate the arrangement of atoms in space. The best picture available came from studies where the molecule was destroyed, and its composition reported as being so many per cent carbon, a certain per cent hydrogen, and so on. This is useful in the early days as an approximate characterisation of the objects of study, and gives a crude means of discriminating between one 'molecule' and another, but it is a travesty of the delicate architecture that gives the protein its most vital biological properties. This aspect of the analogy also suggests reasonable features for the study of conversation or social interaction structures. Here too it is possible and perhaps useful to smash the 'molecules' of social life, to report that interaction X consisted of certain percentages of time spent in gaze, mutual gaze, talking, looking while talking, etc. but it hardly does justice to the intricacies of interaction, nor would such an account enable the observer to follow a plot, to attribute motives, attitudes or beliefs to an actor, or to perform any of the usual interpretive tasks which are possible given the fully structured behaviour stream.

### 1.2.4 SYSTEMS THEORY AND CYBERNETICS

These disciplines abound in rich analogies for the study of social behaviour. The S-R model of psychology with which this discussion began, embodies the control theory notions of feedback loops, and transfer functions. The distinction in systems theory between open and closed

systems has already been mentioned.

These are not the only analogies which point to features we should look for in so beautifully structured a system as human conversation. The synchronic structures of the other sciences; genetics, anatomy, topology, geology; or the diachronic structures of music, poetry, physics and astronomy are all potential sources of theory.

The detailed implications of these models for a structural analysis of conversation, will be explored later as the model develops. For the present, it is enough to know that these models are sources of theory and methodology, and to appreciate the main points of equivalence between them.

The similarities which exist between conversation sequences and other objects of scientific study have not come about by accident. The point is not simply to show that there are a few examples dotted about the literature of natural science which can be used to illustrate the arguments of linguistic structuralism, although that would be useful in itself. The real point is that the analysis of structure has come to be a dominant preoccupation of scientists in recent times, and the search for structure in language and behaviour is part of this move towards a structural description of the world.

> The fact of the matter is that our conception of science now, towards the end of the twentieth century, has changed radically. Now we see science as a description and explanation of the underlying structures of nature; and words like structure, pattern, plan, arrangement, architecture constantly occur in every description that we try to make.
>
> Bronowski, 1973: 112

## 1.3 METHODS

### 1.3.1 EMICS AND ETICS

The study of conversation is an interdisciplinary enterprise which has obvious links with empirical, quantitative disciplines like experimental psychology on the one hand, and rational, qualitative disciplines like linguistics on the other. This poses a dilemma in the choice of methods, and more seriously in the underlying model of man, which justifies that choice of methods. It must be emphasised that the solution to this dilemma, is a question of research policy and of belief. It is an issue in the philosophy of science which cannot be resolved by reference to any empirical data (which are currently available). The dispute, which closely resembles that over mind/body dualism, is not so much between two world views, as between two rhetorics for describing the same world view, although irreconcilable differences between the two approaches may exist. As with the discussion of models for the discourse system, these issues cannot be explored in detail until they arise in the development of the theory. For the time being, the issues need only be acknowledged as relevant to the choice of experimental methods and their underlying theoretical perspective.

The first issue has to do with the role of subjects in the investigation. They could be treated as particles in the physical world, compelled to act in certain ways by the inexorable forces of nature; or as free agents of a kind like the investigator, gathering and processing information upon which to base their choice of action, and possessed of a (limited) knowledge of their own

behaviour, and its habitual patterns of occurence which they can offer in behavioural accounts(Scott & Lyman, 1968). If we take the first view, then we shall be attracted to etic (Pike, 1967) methods of study. We shall deal in observations of the actor as he conducts his conversations, measurements of physical variables, frequency counts of the units which are used, and inferences about mechanisms of production. This is to treat behavioural science in the fashion of Newtonian mechanics, and to view the actor as a black box whose workings can only be inferred from their external signs. If we choose the second model of man, then the intuitions of the actor become a potential source of data and an integral part of an emic study. Attention turns from the physical properties of behaviour to the judgements the actor makes of meaning, and propriety of use. The subject becomes an informant, and the experiment an elicitation procedure. This latter approach draws our attention to the competence of the actor, the knowledge he needs to have about the social world to produce and interpret novel behaviour in accordance with its rules and conventions. This is in contrast to the study of performance, which is descriptive of the use the actor makes of his signalling repertoire, and the factors which lead him to send some possible messages rather than others. For the investigation of social interaction it may be useful to make a further distinction between three kinds of competence, differentiated by the particular aspect of behaviour about which the actor knows. These might be called semiotic competence for competence in the usual

linguistic sense, the ability to use symbols and form interpretations correctly, avoiding formulations which are syntactically or semantically anomalous; moral competence for the knowledge of social propriety dealing in ethics and politeness, the ability to be well-mannered and to avoid breaches of etiquette; and descriptive competence for the ability of the native actor to describe the habits of use, and to provide the same sort of information as an etic study. One might expect the three kinds of competence to be tapped by the three questions: 'Is this sequence of events meaningful?', 'Is it polite?', and 'Would it occur?'. These three kinds of competence differ in the aspect of behaviour reported (meaningfulness, politeness, or probability) not in the kind of activity concerned(speech, NVC, etc.). To make the latter distinction terms like linguistic , communicative or behavioural competence will be used.

The investigation of competence by emic methods, rather than performance by etic ones introduces the idea of a synthetic, generative model rather than a simple analytic one. One of the great successes of structural methods in all branches of science has been their application to the synthesis of new forms. Just as the chemist is able to create new substances by virtue of his knowledge of elements and bonds, or the computer programmer new routines from his knowledge of FORTRAN symbols and syntax, the psychologist may realise the potential for new behavioural configurations, new ceremonial forms, new strategies for the resolution of conflict, if he uses communicative competence as his

material, with its emphasis on possible rather than naturally occuring structures, rather than the more restricted domain of observed performance.

> The notion of an underlying order in matter is man's basic concept for exploring nature. The architecture of things reveals a structure below the surface, a hidden grain which, when it is laid bare, makes it possible to take natural formations apart and assemble them in new arrangements. For me this is the step in the ascent of man at which theoretical science begins. And it is as native to the way man conceives his own communities as it is to his conception of nature.
>
> Bronowski, 1973: 95

When social competence is better understood, social performance will become an easier and more useful object of study. The terms and concepts for describing behavioural sequences will have been developed, and observed performance insofar as they form a sub-set of the idealised behaviours discovered in studies of competence, may be identified and labelled. The game analogy will illustrate this point. The newcomer to a game is introduced first to the rules and the terminology, so that he appreciates the full range of activities and interpretations which fall within the scope of that game, before considering the strategies and tactics which render one permissible move more desirable (and more frequently used by skilled players) than another.

### 1.3.2 ETHICS

The study of social competence also helps to overcome two ethical problems. The first has to do with the conduct of experiments, and the need in many etic studies of social performance to place the subject in a carefully engineered situation to observe his reactions. This often involves a measure of deception since the subject is not

allowed to know in advance the true nature of the situation and the extent to which apparently chance events are the crucial features of his experimental setting. At worst the subject may be severly frightened, degraded or disillusioned by the events which transpire during the experiment, although such incidents are fortunately rare. In investigations of social competence by emic methods, the subject is cast in the role of confidant and advisor to the investigator, and is encouraged to acquire a full understanding of the elicitation procedure before it begins. Naturally the procedure is only suitable for behaviours of which the actor has some conscious awareness.

The second ethical problem is even more grave. It concerns the use of psychological findings in and on the community at large. The fear is often voiced that a well-developed science of psychology would place enormous and undesirable power in the hands of certain groups, which could be used to manipulate the rest of us into a state of slavish submission. Certainly there has always been great attention paid to those aspects of psychology which claim to change the attitudes and behaviour of the individual. This is a reflection of the natural desire not only to understand the world but also to change it. A benign outcome of this desire is to be seen in the growth of medical science; but other applications of scientific knowledge are less reassuring. If anything, the emphasis in the study of social behaviour, on behavioural competence, would militate against its abuse. The purpose is to discover and perhaps to enrich the knowledge which the native actor draws upon in fashioning his <u>own</u> behaviour in accordance with his <u>own</u> goals. It is not a theory

of external control, or of unwilling response to ungovernable stimuli. We study the linguistic competence of the speaker/hearer, to enable language users to formulate and interpret utterances as he chooses, not to force upon him a particular, predetermined use of words. Let us hope that the acquisition or enhancement of social competence will bear the same fruit for the social actor.

### 1.3.3 ATOMISM AND HOLISM

The traditional methods of science are atomistic. That is to say that they treat the world as a collection of elements or constituents whose properties remain invariant as they appear in different contexts and structure Insofar as this is valid it is reasonable to study the world by analytic methods, investigating each component in isolation, and assuming that the attributes it displays under such circumstances are representative of its behaviour in its usual setting. Such assumptions are implicit in the idea of a scientific laboratory as a place to which samples from the outside world may be taken, without changing those properties which are of interest. It may be that some parts of the natural world do not share this useful consistency of behaviour, but show a great sensitivity to their setting and context. That is not to postulate anything anti-logical or metaphysical in their behaviour, but simply to entertain the possibility that the behaviour of the elements in a system responds to extrinsic situational determinants as well as intrinsic ones. This possibility seems particularly plausible in the case of human behaviour, and has given rise to great concern among experimental social psychologists, and even

greater concern among their critics, that their findings have no general validity. Experiments on subject pool X, in laboratory Y, at time Z may well be conducted with sufficient rigour to convince us that the result is typical of behaviour while conditions XYZ obtain, without giving any support at all to the idea that similar behaviour would occur in other circumstances.

A part of this criticism may be met by the careful use of the controlled experiment in which performance under one set of circumstances is compared with that under circumstances which are identical in all respects but one. This is satisfactory if the dependency of behaviour on the one changing factor is invariant as the other factors take new values. For instance, if a system has three variables, a, b, and c, it is possible to investigate the relationship between a and b by treating a as an independent variable, b as a dependent variable, while keeping c constant. As a is set to different values $a_1$, $a_2$, $a_3 \ldots a_n$ the corresponding values of b ($b_1$, $b_2$, $b_3 \ldots b_n$) are measured. The correspondence between the paired values of a and b is used to calculate a mathematical summary statement of their inter-relationship, but it is only known to be valid for a particular value of c. It may be the case, as with the gas laws, that each of the three variables is a function of the other two, but the relation between any two is not a function of the third. So the volume of a fixed mass of a gas depends on its temperature and pressure. However the way in which volume depends on temperature does not change with pressure (being directly proportional); and the way that volume depends on pressure does not

change with temperature (being inversely proportional). If our hypothetical three variable system behaves in a similar way, everything is simple, but for some systems this is not the case. When c has one value, a increases with b, when c has another value, a decreases as b increases, and when c takes a third value a remains unchanged (or follows a power law, disappears, ceases to be relevant of whatever). This is called a statistical interaction where

$$a = f_1(b)$$

$$\underline{\text{AND}} \quad f_1 = f_2(c)$$

of course when more variables are involved, the higher order functions like $f_2$ become part of a regressional series, and great complications set it. For some psychological experiments the presence of statistical interaction is no more than a minor annoyance to be encompassed within an analysis of variance. Very often the <u>interaction terms</u> of such an analysis which express this sort of higher-order interdependence between variables, are the major findings of the study. This may be misleading, since a system which is so riddled with interactions may only show the particular interaction of interest in <u>higher order</u> interactions with other variables which have been unwittingly set to bizarre levels in the experiment. This difficulty can be minimised by using an analysis of variance for <u>random effects</u>. Such an analysis includes in the error term for any effect, the variance due to its interaction with any other random effects in

the system. This has the effect of depressing the F ratio for that effect, insofar as it is altered by interaction with other variables.

When the problem posed by such complex interactions becomes insurmountable by experimental means, the next recourse is to observation, and multivariate analysis. Now the system is allowed to run free and adopt several of its naturally occuring states. A number of variables are measured in each state and subjected to factor analysis for instance, or cluster analysis, regression analysis or other multivariate methods. Eventually a methodological watershed is reached, after which it becomes uneconomical to add further refinements to the existing techniques, and the policy of choice is to adopt some kind of holistic methodology, in which a structure or system is always viewed in its entirety, rather than as a sum (however elaborately calculated) of its parts. Examples abound in linguistics. The semantic properties of a word or morphemes are uniquely associated with that particular configuration of phonemes or graphemes. No amount of careful scrutiny given to the individual letters, will yield fragments of meaning which may be reassembled to give the semantics of the word. The problem is complex and no simple solution will suffice. However social psychology has been in error by using techniques which are too atomistic, far more often than it has erred in favour of holism. It is interesting to note that the change of emphasis in the psychology of language and social behaviour from an atomism modelled on Newtonian

mechanics, to a holistic system such as the physics of relativity or quantum mechanics, would only restore to the science of mental life an insight from which the physical sciences have borrowed, since Einstein's first interest in relativistic systems was said to stem from discussions of linguistic relativity with his schoolmaster Winteler (Jakobson, 1972).

As Harré and Secord(1972) point out, the increasing preoccupation of psychologists with the minutiae of experimental design and control is not so much a step on the road to scientific respectability, as a retreat from the pinnacle of past sophistication into an epistemological second-childhood. It is ironic that psychology should model itself on a discipline like physics, and yet treat as progress each move towards simpler and more atomistic experimental designs.The use of emic elicitation procedures allows us to overcome many of the pitfalls of atomistic methodology. The actor's understanding of his everyday world is not altered as radically when he steps into a laboratory, as is his overt social behaviour or his willingness to abdicate his normal sense of responsibility in favour of an experimenter's instructions(Milgram, 1974). Configurative relations are a part of his knowledge of the social world, and even if they are not available for explicit description, they influence his judgement on various issues. This is like saying that a speaker/hearer is a reliable judge of what is a sentence and what is not, and inferring from his judgement whatever rules and interactions are necessary to create a syntax having observational adequacy. (That is a syntax having the power to distinguish all and only

those strings of morphemes which are sentences. This procedure is not without its limitations, such as the imperfect agreement which is achieved between speaker/hearers, but it is nevertheless a far more fitting way to tackle the problem of structure of language than a conventional experimental procedure, which sets out to give a rigorous treatment of nouns in one study, and verbs in another, In many respects, the ideal compromise between the two approaches has been reached by the related disciplines of linguistics and psycholinguistics. Most of the theoretical or conceptual work is done by linguists, using discovery procedures which are well suited to the complexity of their material, while empirical falsification is offered by the experiments of the psycholinguists, providing the essential empirical arbiter of scientific acceptability.

### 1.3.4 MECHANISTIC EXPLANATION

Among the other consequences of using an emic methodology to study social competence, is the implication it bears for our chosen model of man. Emic studies are most easily reconciled with that model of man which deals in cognitive rather than mechanistic processes. Agency is restored to the human being, and behavioural choice is shaped by the powers of the actor and the enabling condition of his environment, not by blind reaction to physically defined stimuli,(Harré and Secord, 1972). This is in direct opposition to the mechanistic view.

The place of actor's accounts in our explanatory scheme is like the place a system of native folk medicine

would have in an anthropological report. For example when a native informant says he is ill because he is haunted by the spirit of his dead grandmother, the anthropologist does not abandon his knowledge of physiology and assume that this explanation is literally correct. The true cause of the disease may still be spinal meningitis, whatever the native believes. His account is of value, not in explaining the disease process itself, but in explaing the meaning it has for him, and the way he reacts to it. So when the actor gives some judgement about the nature of conversation, that account is not to be seen as replacing the physiology of speech production, but as indicating the meaning which is given to patterns of noise and movement. The conscious reactions of the actor to an event which is meaningful for him, will relate to what he believes to be true about the event, not what really <u>is</u> true. So we should study the former rather than the latter in order to understand the reasons for his behaviour.

It is still the case,of course,that other aspects of social behaviour, such as those of which the actor is unaware, are best studied by etic methods.

### 1.3.5 CREATIVITY

The structure of conversation is also like the structure of sentences in being creative. We need to account for the diversity of the conversations or sentences the individual could generate and interpret, not the repetitive aspects of his performance. It may be argued of both language and discourse that they generate

an infinite population of well-formed instances, which are discriminable from an infinite set of ill-formed strings, and such systems must be described by a rule system with an infinite generative capacity. This claim may be viewed in its strong or weak forms. Its weak form only implies that the system employs some stochastic process which can meander from state to state until infinitely long, and hence infinitely varied strings are produced. In the strong sense in which it is used of language, it means that the rules are <u>structurally recursive</u>, generating strings which like an infinite regressional series, can be seen to be potentially interminable from even a small sample. Using the symbol → for 'rewrites to', or 'may be replaced by', examples of recursive rules may be represented thus:-

$$A \rightarrow A + B \qquad \underline{\text{or}}$$

$$\begin{pmatrix} A \rightarrow B + C \\ B \rightarrow A + D \end{pmatrix}$$

The applicability of recursive rules to conversation structures will be discussed later. Their relevance at present is that they suggest a degree of potential creativity and flexibility in the discourse system that could only be investigated adequately by the use of emic techniques.

### 1.3.6 BEHAVIOURAL SEMANTICS

There is one last methodological issue to be considered: the goal which the theory seeks to attain. If it is merely to give us a description of the strings of behaviour which occur or are judged to be meaningful - the counterpart of a grammar achieving observational

adequacy - the task is relatively straightforward. If, however, we are to consider the semantics of behaviour, the tendency for one sequence of behaviour to lead us to one set of inferences about the actors, while another behaviour sequence leads us to another, we shall have to consider the possible relations between the observed behaviour stream and the semantic representation which the observer erects from it. There may be a deep structure to social behaviour in the same way as there is said to be a deep structure to a sentence (Chomsky, 1965). With this possibility in mind, it is only prudent to use methods which would be capable of bringing such a structure to light. This will be discussed in more detail in Chapter 7.

The relative merits of emic methods versus etics; competence versus performance; holism versus atomism, and so on, have been presented as separate issues. In practice, however, these aspects of research policy tend to align themselves with one of two major perspectives. On one hand there is the 'experimental psychological' approach associated with atomism, etics, experimentation, additivity, performance, mechanism, positivism and determinism; and on the other hand is the 'linguistic' approach typified by holism, emics, discovery procedures, relativity, competence, rules, mentalism and agency. Either approach would be impoverished by a complete ignorance of the other. The ideal solution would be found in the reconciliation of the two, so as to combine the virtues of both. Such a union of social psychological perspectives might be modelled upon the successful marriage which has

occurred between theoretical linguistics, and experimental psycholinguistics. Theoretical work must precede empirical tests. So at this early stage of conversational analysis there is most need for those methods which produce quasi-linguistic theories, not because they are superior, but because they represent an earlier stage in the natural history of the subject. At a later stage the validity of the model can be tested against the observed behaviour of the real social actor.

The methods which are used in the following studies are chosen and modified from the repertoire of linguistic and psychological techniques so as to allow for the following likely properties of the discourse system.

1) There is an arbitrary relationship between symbol and meaning which prevents the use of data recording physical stimulus properties and contingencies, as the basis for an analysis of meaning. Harré and Secord(1972) refer to this as the 'act/action' structure of behaviour, which relates specific patterns of sound or movement (movements) to their socially meaningful counterparts (actions),and thence to large meaningful units(acts).

Inferences about the nature of acts from observations of action can only be made for simple behaviour, in instrumental systems, where the outcome depends on physical laws. The behavioural 'meaning' of an oyster-catcher's onslaught on the shell of its prey, is easy to discern because the outcome depends on the laws of physics. That being the case, there will only be certain velocities, angles, torques and frequencies which prove successful,

and two behaviours which are similar in these respects, may be seen as being functionally similar, and reliably assigned to the same category. If, however, the outcome rested on the tacit agreement between bird and shell-fish as to their conventions and rules for the use of symbols, it would no longer be reasonable to assume that behaviours of similar form carried similar meaning, or even that behaviours of dissimilar form were dissimilar in meaning. When the whole exchange is conducted symbolically as in the case of conversation, the assumption which prevails among some ethnomethodologists (e.g. Garfinkel, 1967) that the meaning or propriety of a symbolic act, may be inferred from its symbolic response, is inappropriate. In the technique which has come to be known as 'Garfinkelling' for example, the investigator breaks what he takes to be a social rule, and then observes the consequences. A sanction applied by other actors will indicate when a rule has been broken. This is strange reasoning since an investigator who knew/acceptable behaviour when he saw it would not need the procedure, and one who did not would be unable to distinguish between correctly and incorrectly applied sanctions, and in alien cultures may be unable even to recognise the sanctions themselves.

2) The elements of the discourse system fall into classes whose members stand in <u>paradigmatic</u> relation to each other, and <u>syntagmatic</u> relation to the members of other classes. That is to say that members of the same category share the relation of exchanging for each other in certain contexts, while members of different categories share the relation of combining together to form a well-formed string, or a sequence meeting some criterion of

structural integrity. Consequently, each new instance is to be evaluated by some categorical rather than dimensional scheme. The phenomenon of categorical perception (for instance as it occurs in phonology, Liberman, et al. 1957) compels us to use the category boundaries which are apparent to the actor, even though the stimuli are continuously distributed on their physical dimensions. It may prove useful to recognise some dimensional variation, such as intensity, within each category or paradigm, just as Katz and Fodor (1963) use distinguishers which can represent comparative or dimensional information in their semantic theory, in addition to categorical markers.

3) The system is creative. Accounts must be provided for an infinite variety of well-formed strings which may be generated and interpreted.

4) The discourse system may be regarded as an object of study in its own right, abstracted like the notion 'the language L' from the observed behaviour of actual speakers or actors.

5) The system is highly configurative and relativistic. The probability of use, and propriety of interpretation associated with any element in the structure of an ongoing conversation, is highly dependent on the configuration it forms with other items.

6) The most obvious experimental procedure, that of presenting a subject with an utterance as if it were an independent variable, and observing the response, cannot be used. The stimulus utterance would only have experimentally controlled and invariant properties, if it could stand in controlled and invariant relations to its context. But the subject generates part of the context, and his behaviour

cannot be controlled as an aspect of the independent variable. Somehow, the relationship of each item of behaviour to its whole context must be studied.

7) The discourse system, like a language has syntactic rules, because some combination of elements (speech acts) form permissible well-formed structures in the system, while others do not. This is unlike the rules for forming, for instance, arabic numerals from the digits 0 to 9. In that system there is a set of structural semantic relations, but no syntax. That is to say that any digit string is permissible and meaningful (ignoring decimal points, commas, and arithmetic operators, for the sake of this example), but that each different combination of digits represents a different quantity or conveys a different meaning. Language and conversation rules are more complex. They allow only certain configurations of elements (defined by syntactic rules), and different members of the permissible set carry different meanings (defined by semantic rules). This raises a methodological problem in that only some strings are 'grammatical', and these are the only ones from which the grammar may be correctly inferred. The problem is confounded because syntactic rules are imperfectly applied in everyday life, so the set of structurally permissible strings does not correspond with the set of strings to be observed in use. Nor is one a sub-set of the other. A confusing distinction exists. On the one hand there are permissible strings, which lie outside the set of observed use. These are of particular practical interest since they represent the possible domain of the synthetic use of the system, to form new but naturally comprehensible ceremonial or behavioural

modes to overcome existing problems. And on the other hand there may be members of the set of observed usages which lie outside the domain of comprehensible rule governed sequences. These would also be of interest, since they would provide a population of misunderstandings for structural analysis and classification. It should be emphasised that unless there is an explicit statement to the contrary, the terms permissible, well-formed, proper and the like refer to the dimensions of semiotic competence, not moral competence. The behaviours which are referred to as ill-formed, impermissible or improper, are those which disobey the rules for the clear use of signals and are prone to mis-interpretation, not those which are rude or immoral. Of course there will be certain sub-groups in the population who also understand codes and jargons which are meaningless to everyone else. For the time being the distinction will only be used of widely shared non-technical language.

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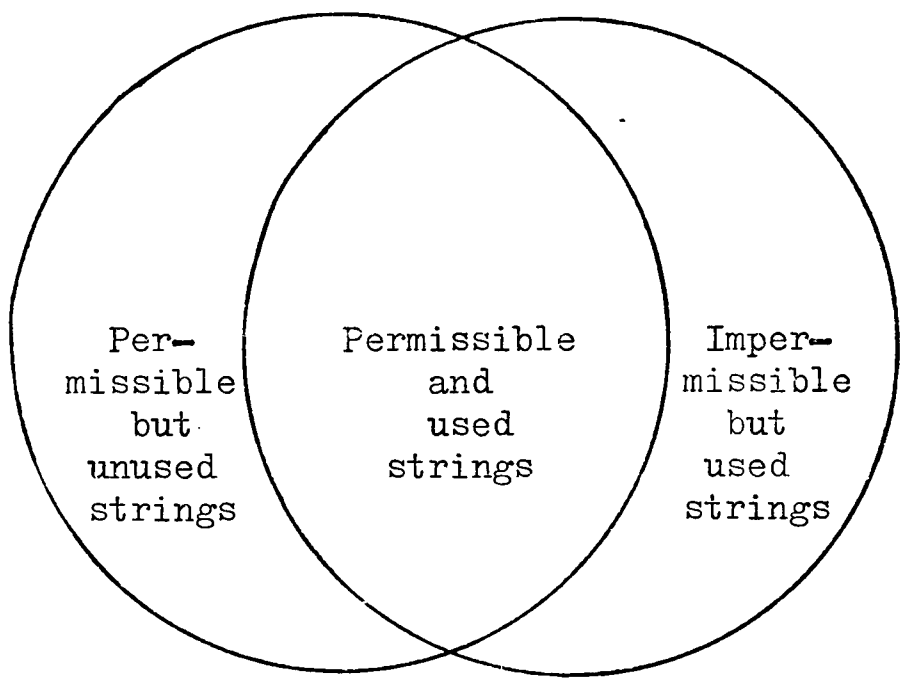
Figure 1.3

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The problem for the advocate of etic methodology is to describe set A, from observations of set B, when there is no available information on the extent or nature of the overlap.

Given that the aim is to study the discourse system DCS, as an abstraction like the language L, there are two overwhelming reasons for choosing emically based methods. First is the need to discriminate between items of behaviour lying inside and outside the system. This distinction rests on criteria of propriety and well-formedness which are only available from the native actor, who has

Figure 1.3 The relation between well-formed and observed sequences



(potential) knowledge of the rules. Secondly, the system has to be analysed in terms of its sub-components, and these are defined by the discontinuities of meaning among the population of elements, not by discontinuities in the distribution of their observable physical properties.

Once this part of the project is under way and some overview is available of the units of discourse and the kinds of relations which can exist between them, an etic study of those behaviours which actually occur would become much more feasible. The same is true of the various branches of linguistic analysis, where emic studies of idealised data have tended to provide the necessary concepts and units for the later etic study of regional variations, individual differences and frequency distributions.

## 1.4 SUMMARY

Behaviour sequences have a unique part to play in our understanding of human social behaviour. The process by which the individual actor translates input into output, which is the essence of his behavioural pattern, appears to the observer as a series of outputs from several actors, or a behavioural sequence.

Conversation provides the ideal subject matter for the study of such sequences. Furthermore, an analysis of conversation can help to close the division which has existed in the past between studies of language and studies of social behaviour.

Methods of analysis are already well developed in other disciplines which have had more dealings with the

problems of sequence analysis than has social psychology. For this reason the approach to behaviour sequences advocated here will be related to a number of similar problems in the understanding of language, codes, games and other similarly structured systems.

The peculiar nature of conversation means that experimental studies are only appropriate with certain modifications. Judgemental data must be used extensively, and applied to complex configurations of speech acts.

oOo

## CHAPTER 2 AN OVERVIEW OF THE LITERATURE

2.1 The analysis of discourse by direct observation has been attempted a number of times. It has the advantage of dealing with real conversation in natural settings, but tends to lead to rather disappointing results. Those aspects of conversation structure which are amenable to direct observation are usually familiar to the layman. Arbitrary categories are often used to classify events, and the studies are usually confined to short and simple sequences of utterances.

2.2. Linguistic analyses are more formal and elaborate, and hence often more thought-provoking, but they may have dubious validity if they are not related to some procedure for empirical verification or falsification.

2.3 Interaction process analyses allow for elaborate recording of interaction, but when used in the laboratory the situations which can be engineered only represent a small part of the world of talk.

2.4 Computer simulation is a very exacting method of study as all relevant factors have to be specified to the machine in detail. Perhaps for this reason there have been few conversation simulations to date, and those which have been written have only been able to produce very simple dialogue.

2.5 Experiments and detailed measurements of the verbal aspects of conversation have been rare. The contentsof a realistic conversation are hard to manipulate, control and repeat in an experimental fashion, without the essence of the generative process, its spontaneity

being destroyed. The experiments which have been done have looked mostly at paralinguistic and non-verbal aspects of conversation: floor-apportionment and turn-taking signals.

Until recently the interface between language and social behaviour has attracted surprisingly little attention A number of studies have tried to locate language within the rhetoric of social phenomena using concepts like class, role, environmental deprivation and so on, but it is only in the last few years that any attempt has been made to reverse the process, and to fit the events of the social world into the scheme of language and language-like processes.

Studies of conversation sequences have been carried out in a number of disciplines using different methods and with varying success. Some of the major studies will be described below under the five methodological headings of naturalistic observation and recording; linguistic analysis; interaction process analysis; simulation and experimentation. These categories represent a rough continuum running from those methods which provide face validity at the expense of analytical rigour, to those which do the reverse.

The literature relating to the technical features of the present model of discourse structure, which has its origins in the theory of generative linguistics, will be discussed in later chapters. Other aspects of the relation between language and social behaviour should be borne in mind, but they cannot be given any detailed treatment here. These include the effects of the speakers' situation, role and class on verbal style; the use of non-

verbal signals in conversation; studies of verbal content; and the role of language in elaborate communication networks and systems.

## 2.1 NATURAL OBSERVATION AND RECORDING

The best known example of this approach to conversation analysis is to be found in the work of Harvey Sacks' group at the University of California, Los Angeles. Their interest began with Sacks' Ph.D. thesis on the strategies which people use to obtain help in times of crisis, using as 'data' the transcriptions of telephone calls made to an American police department. The work is for the most part unpublished, but a detailed account is available from duplicated class notes from Sacks' courses at U.C.L.A., and from manuscripts circulated by the group. Their aim (Schegloff and Sacks, 1973) is to

> '...explore the possibility of achieving a naturistic observational discipline that could deal with the details of social action(s) rigorously, empirically and formally.'
>
> Schegloff and Sacks, 1973: 289

As they point out in the same article

> '...two basic features of conversation are proposed to be (1) at least, and no more than, one party speaks at a time in a single conversation; and (2) speaker change recurs.'
>
> Schegloff and Sacks, 1973: 293

This is the point of departure for one of their principle lines of analysis, which has to do with the organisation of speaker turns, and the selection of a next speaker, as each speaker turn is completed. The taking of turns is organised by a <u>turn constructional component,</u> which embodies the content of the turn until a <u>transition relevance place</u> is reached. This is the point in the turn where the speaker may be seen to have finished, and

at which the turn allocation component is used. These form two groups. Group a) contains those in which next turn is allocated by the present speaker, and group b) consists of those techniques by which the next speaker selects himself, principally by simply starting to speak. The use of these components is governed by rules such as the following from Sacks, Schegloff and Jefferson (n.d.: 10)

> At any next(of which 'initial' is an instance) unit-type's next(of which initial is an instance) transition-relevance place:
> (a) if the utterance-so-far is so constructed as to involve the use of a 'current speaker selects next' technique, then the party so selected has rights, and is obliged, to take next turn to speak, and no others have such rights or obligations, transfer occurring at that place.
> (b) if the utterance-so-far is so constructed as not to involve the use of a 'current speaker selects next' technique, self selection for next speakership may, but need not, be instituted, with first starter acquiring rights to a turn, transfer occurring at that place.
> (c) if the'utterance-so-far' is so constructed as not to involve the use of a 'current speaker selects next' technique, then current speaker may (but need not) continue, unless another self selects.

This rule also embodies the finding that starting to speak first provides a means of capturing the floor for the next turn. This paper emphasises the variability of turn taking, pointing out that turn size varies, as do turn order and turn content. Furthermore the organisation of turn taking is unrelated to the contents of the turns.

> '...'First turns' in a structurally characterizable set of circumstances properly take 'greetings'; and 'next turns' can in a variety of closely describable ways be constrained by 'prior turns'. We note only that in conversation such constraints are organised by systems external to the turn-taking system. One aspect of conversation's flexibility is a direct and important consequence of this feature of its turn taking organisation: its turn-taking organisation, and thus conversational activity per se operate independent of e.g., the 'topic(s)' in it.'
> Sacks, Schegloff and Jefferson(n.d.:

This latter point is most important as it emphasises an underlying assumption, on which the analysis of conversation structure rests: namely that the semantic content of successive turns at talking may be disregarded when conversations are viewed as a rule-governed sequence of speech acts.

Having found that procedures exist whereby one speaker may, on completion of his turn, appoint the next speaker, Sacks et al. turned their attention to one such device: the adjacency pair (Sacks, n.d.b; Sacks, Schegloff & Jefferson, n.d.; Jefferson, Sacks & Schegloff, n.d.; and Schegloff & Sacks, 1973). The adjacency pair is distinguished by five features:

1) They consist of two utterances, which
2) are adjacent in the conversation, and
3) produced by different speakers.
4) They have a particular relative ordering of parts, (the first pair part preceding the second pair part.)
5) They have 'discriminative relations'. ('... the pair type of which the first pair part is a member is relevant to the selection among second pair parts.')

This fifth feature implies that in using a particular first pair part, the speaker not only gives the addressee the right and obligation to be next speaker, but also constrains the responses he may make. Examples of adjacency pairs include Greeting-Greeting, Question-Answer, 'Goodbye-Goodbye', Complaint-Excuse, Offer-Accept/Refuse, Request-Accept/Reject and Compliment-Acceptance.

Very often the use of a first pair part leaves the next speaker with several alternative types from which to choose his second pair part, so the chain reaction which is established is one which branches in an indeterminate way.

Special uses of adjacency pairs are also discussed. The routine of 'opening up closings', whereby the normal chain reaction is broken, employs an adjacency pair which allows consecutive speakers to offer and accept an end to the conversation. Laughter is also a special case, forming a turn constructional component in its own right, and contributing to the adjacency pair of a 'laughable' and its laugh.

Of course conversations contain longer sequences, than the adjacency pair. Some, like the riddle sequence of question, counter-question, response, or the introductory sequence of greeting, introduction, orientation are standard set pieces having more than two components. Others are constructed from the basic adjacency pair, using such devices as the insertion sequences (Jefferson, 1972; Sacks, n.d.b; and Jefferson, Sacks & Schegloff, n.d.). The insertion sequence operates like the embedded or nested sequences which occur in sentences, in which the ongoing connected chain of events is interrupted by a new sequence and the resumed. The 'not hearing' sequence is a good example:

1A: What is the time?

2B: What did you say?

3A: I asked you what the time was.

4B: It's three o'clock.[1]

Sacks(n.d.b: 04 APR 72, p.21.) discusses even more complex

insertion sequences like 'Can I borrow your car?', 'When?', 'This afternoon', 'For how long?', 'A couple of hours', 'Okay' which has the form (Q (q.a.) (q.a.) A). The importance of side sequences is greater than may be apparent at first sight. They are commonplace and their existence requires little proof. The fact that they do exist immediately invalidates any linear stochastic model of conversation sequences (that is any model attempting to describe or explain the occurence of certain sequences of states or behaviours, by reference to a set of transformational probabilities governing the likelihood of any act following immediately after another specified act or group of acts.)

Another way in which utterance pairs or chains may be linked to form larger units is by the use of tying rules. These establish the continuity of the discussion, demonstrate that the new speaker has understood what went before, and provide him with an elliptical code in which new points may be made. For example, the exchange 'What happened last night?' 'John and Lisa went to the movies' 'What did they see?' begins with an adjacency pair(of question and answer) while the third utterances is tied to the first two by syntactic and semantic links: the use of 'they' for John and Lisa; 'did...see' in reference to 'last night'; and so on. Such links are produced by typing rules, (Sacks, n.d.b: 09 NOV 67, p3.)

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[1] This notation is used for my own examples of conversation, SPEECH-ACT-NUMBER SPEAKER-NAME: UTTERANCE. In quotations from other authors the original notation is used.

An even longer-range link back to a previous item may be established by the use of constructions like 'I still say though...' or 'As you were saying the other day...' Such utterances have important implications for our conception of discourse structure which will be discussed in chapter 4.

One of the most striking features of conversation is described by Sacks (n.d.a, chapter 2, p.39) which I will call a context sensitive constitutive rule:

> '...for some sorts of things, the very recognition of what the item is turns on its placement. That is to say, for example, for the category 'answers', that something is an 'answer' turns on it placing after a recognisable question; where answers do not have, by and large, the sorts of form that permit their de-contexted recognition. Various sorts of things, like 'I went to the movies' are seeable as 'answers' via their placement.'

This context dependent identification process, the use of chameleon categories, is seen in its most extreme form in the interpretation of inactivity or silence. If an item is expected in a given context, an omission is seen as a failure to produce that particular item. Such items, which may be seen to occur when they do occur, and seen to have been omitted when they do not, are referred to as observably oriented to features, (Sacks, n.d.a: chapter 2, p.39; and n.d.b:lecture 1, Spring, 1972, p.2.)

Sack's analysis is based on the concept of social rules which are detected in the following way:

> 'There are whole ranges of obvious ways we could go about it, which are conventional social science ways to do things. We all, after all, know that any rule is failed -- forget about being violated -- sometimes. So let's just count this as one of the variations in what is after all some kind of distribution of conformities, and don't worry about it otherwise, unless the number gets too large. If the number stays rather small, then we still have the rule. If the number gets very large there can be a question about the rule, and we

> might not talk of it as a rule but as something like an option.'
>
> (Sacks, n.d.b:Lecture 3, Spring,1972, p3).

The breaking of rules is noticed by participants, and gives rise to the use of remedial sequences, in which laughter plays a part.

Utterance completion was found to occur on occasions when one speaker faltered, or left his turn at a point where the sentence could be continued. At other points in their analysis Sacks et al. report on other features of conversation structure. Reference to persons was found to employ terms allowing minimisation and recipient design, that it they were short and comprehensible. Categorisation devices are used in narrative interpretation allowing the observer to infer that in, for instance, the passage 'The baby cried. The mommy picked it up.' it is the babies own mother who is picking it up, and not some woman who has earned the title by giving birth to a different infant (Sacks, 1972b). Elsewhere we learn that filled pauses (like 'ummm') are used at the beginning of turns so as to enclose periods of silence which would otherwise be relegated to the no-man's land between utterances; and that the conversationalist not only listens to other speakers to discover what they are saying, but also to himself to discover what he is saying. Topic openers are used consisting of 'questions pulling longer-than-answer responses', and collapsed sequences occur, in which certain stages are implied but not said.

The work of Sacks and his colleagues has been discussed here (and quoted) at some length, as it is not widely distributed, and yet often acclaimed as the first

real onslaught on the problem of conversation. The shortcomings of Sacks' method are evident in the passages quoted here.

With exception of a few useful ideas like the adjacency pair, and the 'observably oriented to feature', Sacks' results are disappointing. His method of examining minute extracts of recorded dialogue, which, if representative of anything at all, can only be representative of the point he wishes to make, is given no theoretical elaboration or justification. Perhaps it is fortunate that most of his observations are so obvious as to provoke little debate. The individual rules and concepts he introduces are never embedded in a unifying scheme of methods or findings, while his analysis combines extremes of informal speculation and formal description. His quasi-logical analysis (Sacks, 1972a:32) of the rules governing the use of <u>categorisation devices</u> include:

> It is our task to show that for any population N (where N is equal to or larger than 1) there are at least two categorisation devices available to Members, each of which (devices) (a) can categorise each member of the population N in such a way that one does not get for any Member of the population the pairing (population Member + no category member), where (b) no member of either device is a member of the other. Any device that satisfies constraint (a) will hereafter be called a Pn-adequate device, type 1. ...
>
> <u>Consistency rule</u>. If some population of persons is being categorised, and if a category from some device's collection has been used to categorise a first Member of the population, then that category or other categories of the same collection may be used to categorise further Members of the population. As a correlate of the consistency rule, the following may be proposed: <u>Category Relevance Rule 1</u>. If any Pn-adequate device is appropriate for categorising some population, then any category of such a device may be used on each Member of the population to provide a count of how many are and how many are not Members of that Category. ...

> Economy Rule. For any population N, on any occasion of categorising Members, whether the consistency rule or some combining rules are necessary, the task may be complete if each member of the population has had a single category applied to them.

When such meticulous care is taken to explain that a categorisation scheme should contain a category suitable for each thing to be categorised; and that the task is complete when each item has been assigned to its category, it is a pity that the categories are left undefined and the rules of their use unjustified.

Sacks' prose style adds to the confusion, as in his discussion (1972a:37) of the categorisation collection 'R'.

> 'Since it is altogether central to the use of R in the search for help that it has the sort of standardisation we have proposed, let us here and now locate what in the materials the formulation permits us to observe, to see the culturally-provided-for orderliness of.'

Sacks' choice of materials is often strange, and on occasions he attempts analyses, based largely on prosodic features of utterances, using type-written transcriptions rather than tape recordings or sound spectrograms. His treatment of sequences moves from one level of description to another, so that the adjacency pair of a 'laughable' and its laugh, cannot be seen as categories which exclude other adjacency pairs like question and answer. Sacks' main contribution has been to draw attention to the field of conversation analysis, and to point out its rich potential, but that potential is still far from being fulfilled.

One of Sacks' colleagues Emmanuel Schegloff, has published several studies of conversation structure using the same methodology. Best known is his (1968) treatment of the beginning of telephone conversations. Looking

for a mechanism by which the regular alternation of speakers was established, he investigated the choice of first speaker, in a number of tape recorded telephone conversations. The first hypothesis (called the distribution rule) suggested that the recipient of the call spoke first, followed by the caller. This was found to be true in all but one deviant case. Then, instead of treating this as a deviant case, which would not invalidate a rule defined according to some notion of shared propriety, Schegloff amended his rule so as to account for all observed cases, arriving at the summons-answer sequence. This says that the call is initiated when one part issues a summons which the other answers, which is as much as to say that the alternation of speaking is established by the strategy of one party speaking first and the other responding. The strange concept of a rule which is used here produces two problems. First it runs counter to the spirit of work on social competence, rules, proprieties and sanctions; and second in so doing it sets itself an inductive problem. The usual treatment of rules would allow the one deviant case to be ignored, while suggesting that further deviant cases at large in the unsampled population of possible telephone calls posed no great problem. If, however, the rule is to encompass all observations, one must concede that other deviant cases might occur in a larger sample, leading to the conclusion that two party phone calls may exist where one or other or neither or both parties takes the role of the first speaker!

Spier (1972) uses the Sacks approach to conversational structure and covers much of the same ground. He also discussed the structure of conversation in groups larger than the dyad, finding that while the dyad conforms to the expected ABAB distribution of talking, the triad does not usually give rise to ABCABC cycles. Spier shares Sacks' talent for elaborating the obvious, pointing out, for example, that the minimum requirements for the existence of a conversation include a speaker, a hearer and some speech, (Spier, 1972: 401). Again the occurence of chain reactions in conversation is pointed out, providing the rationale for a system of sequence analysis. Spier calls this phenomenon the 'hearer transformation problem'

> 'The hearer transformation problem' can be formulated as follows: A hearer being in receipt of an utterance can determine from its recognisable properties what those properties provide for in the way of possible next utterances and from them he can make a selection of a next utterance.'
>
> (Spier, 1972: 409)

Churchill(n.d.) proposed a similar approach to the more limited domain of questioning and answering. Like Schegloff he talks of 'rules' and 'grammars' as devices for discriminating between what occurs and what does not, which we have seen to be misleading, and fraught with methodological pitfalls. A classification scheme having eight categories is used to describe possible responses to questions, while observed sequences are represented by a flow diagram. Again the same kind of criticism applies, the analysis is speculative, and the result (apparently) obvious. It would seem perfectly logical to claim either that conversation is a complicated thing

requiring the use of special discovery techniques, and the attention of a trained sociologist; or that it is relatively transparent, revealing its structure to any interested observer, without specialist help; but the illogical implication of the studies discussed so far, is that trained social scientists are required to draw to our attention, features of the world so conspicuous that they can identify them at first glance.

Cicourel's (1973) study of cognitive sociology draws upon conversational materials to illustrate the use of rules and interpretive procedures to generate a cognitive representation of the social order. A number of linguistic concepts are used as well, to point out an interesting parallel between the processes of interpreting language and that of understanding the social world. In both cases a 'normative consensus' is required, and both rule systems employ a kind of deep structure to embody the semantic representation suggested by directly observable surface structure features. The use in ethnomethodology of shared understandings about the nature of everyday life is likened to the linguistic use of the native speaker's intuitions, when describing linguistic competence.

Goffman (1972) examined the way in which utterances may be linked in conversation using the following constructions

1) The initiator of one interchange also initiates the next

$A^1$: 'Where have you been?'

$B^1$: 'The bookstore.'

$A^2$: 'Get anything?'

$B^2$: 'No.'

2) The terminator of one interchange initiates the next

$A^1$: 'Where have you been?'

$B^1/B^2$: 'The bookstore./Did you fix the tap?'

$A^2$: 'No."

3) Two exchanges are initiated by one speaker, and then both are completed by the next

$A^1/A^2$: 'Hi./Say, I owe you five bucks.Here.'

$B^1/B^2$: 'Hi./I'd forgotten.'

4) One exchange is embedded within another

$A^1$: 'What'll ya have?'

$B^2$: 'Ya got those almond things?'

$A^2$: 'Not today, honey.'

$B^1$: 'Black coffee and a toasted muffin.'

(Goffman, 1972: 179)

Collins & Collins(1973) describe the conversational structures which may be formed by the alternation of particular speakers and addressees. Their two basic forms are the dyadic response where a speakers's remark elicits a response directedback to him; and the triadic reponse where the remark elicits a response directed to the third party. They do not deal with patterns of form or content.

Coulthard (1973) studied classroom conversations between teachers and pupils, using transcribed tape recordings of the proceedings. The aim was to produce a performance grammar for the observation of 'typics'. This is strange, since it implies that the observational basis of a performance model is to be combined with an idealisation of the data as used in studies of competence. Despite this methodological anomaly, some interesting findings emerged. Certain words were found to mark transaction boundaries like 'Well', 'Right', 'Now' and 'O.K.'

which are similar in form and function to the devices reported in Schegloff and Sacks (1973) for 'opening up closings'. The 'unitary exchange' between teacher and pupil, which is the structural building block of longer transactions, was found to be a Teacher-Pupil-Teacher triadic sequence, rather than the dyadic Teacher-Pupil exchange which was expected (cp. Sacks on adjacency pairs). A five part sequence was observed for the teachers' questions to the class, consisting of

1) The question, which the teacher puts to the class at large.
2) Bids, which the pupils make, for example by raising their hands, to show they feel able and willing to answer.
3) Nomination, by the teacher, of a pupil to attempt the answer.
4) The answer.
5) Evaluation of the answer by the teacher.

This is a nice example of a well structured sequence of conversation, although it is not entirely spontaneous. This routine for dealing with questions is often deliberately suggested to the teachers during their training, and enforced as a teaching method in the classroom. It has the effect of compelling all the children to prepare an answer, which is not the case when the more obvious sequence of nomination, question, answer, evaluation is used. Two rules were used by teachers to transform commands to their pupils into a 'softened' form.

1) An declarative or interrogative concerned with a forbidden activity in the classroom is used to mean STOP that activity.

2) Any interrogative, with the subject 'you', and the verb 'can', 'could', 'will' or 'would' and a feasible action is used to mean CARRY OUT that action.

In their recent book Sinclair & Coulthart (1975) report in further detail on their studies of classroom interaction. They developed a descriptive system for classroom events, intended to satisfy four criteria: it should have a finite number of terms; clear rules for assigning events to categories; the capacity to represent all the data; at least one impermissible sequence. Their coding system is hierarchical with lessons containing transactions containing exchanges containing moves containing acts. The acts are marker, starter, elicitation, check, directive, informative, prompt, clue, cue, bid, nomination, acknowledge, reply, react, comment, accept, evaluate, silent stress, meta-statement, conclusion, loop, aside. These are clearly attuned to the classroom situation. A category scheme for general discourse analysis would need other categories like blame, apologise,insult etc., while placing less emphasis on the elicitation of information. Certain specimen exchanges are analysed in detail, but there is no specific model of classroom interactions in quantitative or generative terms. A large number of studies of classroom interaction have been carried out in America (e.g. Bellack et al. 1966; Amidon & Hough, 1967; Flanders, 1970). These studies are all quite acceptable for their own purposes, but they are of limited usefulness here, as they are confined to classroom

situations and events, and because they use a stochastic analysis of sequences. The limitations of this procedure will be examined in later chapters.

One problem with the study of conversation is always the collection of suitable materials for analysis, by means which do not invade the subjects' privacy. Soskin and John (1963) found a novel solution to the problem by using young married couples as volunteers, who were sent to the natural and variegated setting of a holiday camp, wearing small radio transmitters which relayed their conversation to the investigators, as the couple moved freely about the camp. With the exception of a period at night, the recording was continuous, taking in a number of activities and interaction settings. Their view of verbal behaviour, like that of most authors who consider language in its social context, includes the central role of conversation in controlling the social world, as opposed to the narrower view of language as a code for transmitting information, which is often taken by pure linguists.

> 'A record on one person's talk over a long period of time is a record of the means by which that person tries to achieve, maintain, relieve or avoid certain intrapsychic states through the verbal management of his relations with his social environment.'
>
> (Soskin and John, 1963: 229)

Utterances were classified by assignment to one of six functional classes:

1) Expressive, such as 'Ouch', 'Wow'.
2) Excogitative, in which the subjects thoughts are verbalised, for example, 'What have I done wrong here?'

3) Signones, which report subjective states of the speaker such as 'I'm cold'.

4) Metrones, expressing value and obligation, for example 'Yours is the best one here.'

5) Regnones, which give commands, permission, requests

6) Structones, which convey information.

These categories are used in the subsequent analysis of the corpus of transcribed conversation. The ecological analysis relates episodes of talk to their environmental setting; the structural analysis deals with times spent talking by each participant, and the functional analysis records the proportion of utterances belonging to each of the six categories above. There was also a dynamic analysis employing a six point scale of affect, and a phase analysis showing how the use of each functional class fluctuates from one phase of interaction to another. The scheme of six functional categories, permits analysis of a conversation according to the role of the speakers. For example the use by 'Roz' and 'Jock' of utterances from the six categories was significantly different: Roz used more expressive utterances, while Jock used more regnones and structones.

Some of the best treatments of discourse structure in recent years have come from American sociolinguist William Labov. He gives some rules for discourse analysis (Labov, 1970), such as:

1) If A utters a question of the form $Q\text{-}S_1$, and B responds with an existential E (including 'yes', 'no', 'probably', 'maybe' etc.), then B is heard as answering A with the statement $E\text{-}S_1$

For example

A: Are you going to work tomorrow?

B: Yes

B's reply is seen as equivalent to 'Yes I am going to work tomorrow.'

2) If A makes a statement about a B event, it is seen as a request for confirmation.

For example:

A: You live on 115th St.

B: No. I live on 116th St.

3) If A requests B to perform an action X at time T, A's utterance will be heard as a valid command only if the following preconditions hold: B believes that A believes(it is an AB event that)

a) X should be done for a purpose Y

b) B has the ability to do X

c) B has the obligation to do X

d) A has the right to tell B to do X

For example, the following commands do not satisfy these pre-conditions, and are therefore seen as joking, insulting or otherwise invalid as normal commands:

Drop dead

Go jump in the lake

Get this dissertation finished by the time I get back from lunch.

4) If A makes a request of B about whether an action X has been performed, or at what time T X will be performed, and the four pre-conditions (as for commands) hold, then A will be heard as making an underlying form

<u>B: do X!</u>

5) If A has made a request, and B responds with a request for information, A reinstates the original request by supplying that information.

Labov also introduces the useful notion of a two stage rule scheme for the analysis of discourse. One set of rules (for interpretation and production) relate particular utterances to their functions; and the other set of rules (rules of sequence) relate one function to the next.

> 'There are no simple one-to-one relations between actions and utterances; rules of interpretation (and their nearly symmetrical rules of production) are extremely complex and relate several hierarchical levels of 'actions' to each other and to utterances, Sequencing rules do not operate between utterances, but between the notions performed with those utterances.'
>
> (Labov, 1970: 80)

Unfortunately Labov's diagram which makes this point even more clearly, is set out in a way which implies that the successive action/utterance units form a Markov chain, which is not the case, and is almost certainly not Labov's intended meaning.

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Figure 2.1

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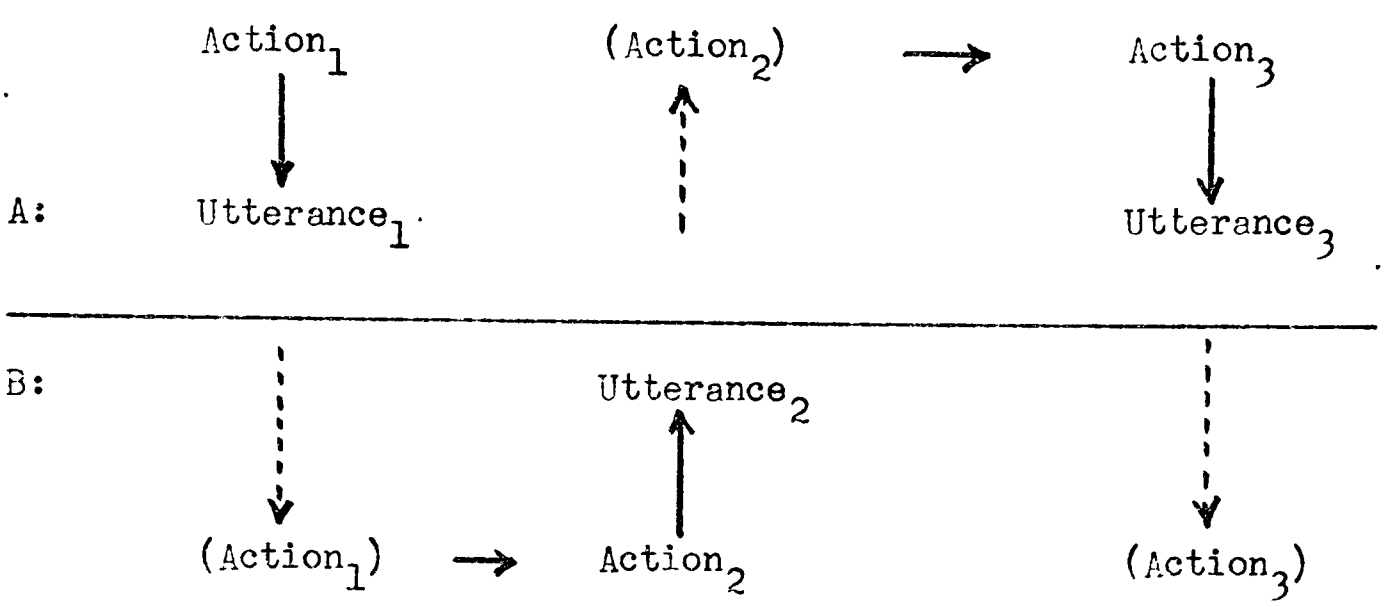
In a later paper (Labov, 1972), further rules for the analysis of discourse are presented, some of which apply to the game of 'sounding' or 'playing the dozens' in which ritual insults are exchanged by Negro adolescents.

1) If A makes a request for information Q-$S_1$, and B makes a statement $S_2$ in response that cannot be expanded by the rules of ellipsis to the form $XS_1Y$, then $S_2$ is heard as an assertion that there exists a proposition P known to both A and B:

$$\frac{\text{If } S_2, \text{ then (E) } S_1}{}$$

where E is an existential operator, and from this proposition there is inferred an answer to A's request:

Figure 2.1 Dialogue Structure Labov, 1970: 81




→ sequencing rules

------→ rules of interpretation

⟶ rules of production

(E) $S_1$.

For example

A: Are you going to work tomorrow?

B: I'm on jury duty.

2) A rule for ritual sounding. The sound has the structure

T(B) is so X that P

where T is the target of the sound, X is the attribute of T which is focussed upon, and P is a proposition that is coupled with the attribute by the quantifier so...that to express the degree to which T has X.

For example, 'Your mother is so ugly that she looks like Flipper', often rendered in elliptical form as 'Your mother look like Flipper.' The rule for the identifiation and interpreation of a sound may be summarised:

If A makes an utterance S in the presence of B and an audience C, which includes reference to a target related to B, T(B), in a proposition P, and

a) B believes that A believes that P is not true and

b) B believes that A believes that B knows that P is not true...

then S is a sound, heard as T(B) is so X that P where X is a perjorative attribute, and A is said to have sounded on B.

As with most of Labov's work the treatment is elegant and scholarly, and if only we had a similar understanding of other kinds of verbal exchange perhaps Labov would not have had to begin this article with the comment

> 'Linguists have not made very much progress in the study of discourse. By and large, they are still confined by the boundaries of a sentence. If discourse analysis is not a virgin field, it is at least technically so in that no serious penetration of the fundamental areas has yet been made.'
>
> (Labov, 1972: 120)

One of the most useful things to emerge from the observational studies of conversation is a consensus about the nature of the task, and the sort of selectional process which is involved when a speaker chooses his next utterance. This is summarised by ethnographers Frake(1964:127)

> 'If messages were perfectly predictable from a knowledge of the culture there would be little point in saying anything. But when a person selects a message, he does so from a set of appropriate alternatives. The task of the ethnographer of speaking is to specify what the approriate alternatives are in a given situation and what the consequences are of selecting one alternative over another.'

and Basso (1972: 68)

> 'These studies may be viewed as taking the now familiar position that verbal communication is fundamentally a decision-making process in which, initially, a speaker, having elected to speak, selects from among a repertoire of available codes that which is most appropriately suited to the situation at hand. Once a code has been selected, the speaker chooses a suitable channel of transmission and then, finally, from a set of referentially equivalent expressions within the code. The intelligibility of the expression he chooses will, of course, be subject to grammatical constraints.
>
> But its acceptability will not. Rules for the selection of linguistic alternates operate on features of the social environment and are commensurate with the rules governing the conduct of face-to-face interaction. As such, they are properly conceptualised as lying outside the structure of language itself.'

Observational studies of conversation suggest the following conclusions. The natural use of language in conversation is varied and complicated. It is also very familiar to us all, so it seems unlikely that very much will be gained by direct observation alone, which is not already common knowledge. Categorisation of events poses a great problem, particularly as studies of inter-observer reliability alone cannot demonstrate that a particular system is valid. Observational techniques as they exist at present lend themselves best to the observation of the association between contiguous events, whereas real conversational structures may require more elaborate description.

## 2.2. LINGUISTIC ANALYSIS

This section will include some studies of discourse analysis, insofar as they have a bearing on the analysis of conversation, and several items which are similar to those presented in 2.1, except that they take their origins from theoretical and quasi-linguistic issues, rather than observations of actual verbal performance.

Foremost in this cateogry are the studies of prose texts by Harris (1952) who suggested that the techniques which linguists have evolved for studying sentence structure could be applied to larger units of analysis.

> 'The first problem arises because descriptive linguistics generally stops at sentence boundaries. This is not due to any prior decision. The techniques of linguistics were constructed to study any stretch of speech of whatever length. But in every language it turns out that almost all the results lie within a relatively short stretch, which we may call a sentence. That is, when we can state a restriction on the occurence of element A

> in respect of the occurence of element B, it will almost always be the case that A and B are regarded as occuring within the same sentence.'
>
> (Harris, 1952: 1)

Harris emphasises the importance of capturing the paradigmatic relations between elements of the discourse system by casting them into equivalence classes. When this is done associated pairs of items may be tabulated in a double array, showing the sequence of occurence(syntagmatic relations) along the rows, and the equivalence classes (paradigmatic relations) down the columns. In this way the structure of the passage may be formalised and certain inferences made about its logical implications. For instance if the following subject predicate pairs were found in a text

AB : AC : ZB

we could deduce

A = Z

and, therefore

ZC

In a later book (1963) Harris elaborates these ideas to produce a scheme for the analysis of a passage of technical jargon.

As a basis for a conversational analysis method it has two drawbacks. The first, and minor, difficulty is that Harris' scheme deals with short (roughly clause length) units in the structure of monologue, according to semantic content of the units. A scheme for conversation analysis would have to deal with larger units (of speech act or sentence length) in the structure of multi-party conversation, according to the social function of the utterances. So Harris' scheme would not

be directly applicable without modification. The second problem is more serious. He suggests that units are assigned to the same equivalence class if, and only if they are found in equivalent (verbal contextual) environments. But that only transfers the problem from the search for equivalent units to the search for equivalent environments; it does not solve it. It is true of both, that exact recurrences are rare,and intuitive judgements of functional equivalence, suspect.

Gunter (1966) attempted to identify classes of utterance, and inter-utterance relations with particular prosodic contours. He said 'A given variety of a sentence signals its own particular kind of relevance to its context.' and, furthermore, that the signalling was done largely by the pattern of stress on the sentences. For example if

1A: John went to town.

were to be followed by

2B: WHY did he GO?

or by

2B: Why did HE go?

it would be heard as calling into question the reason for a visit in the first case, and the choice of John as visitor in the second. Using such considerations, categories like recapitulation, replacement and addition are derived for the stages of a discourse, each with its distinctive prosodic features.

Pêcheux (1971) used the linguistic concept of paradigmatic relations to produce a set of minimal utterances joined by connectors -- logical operators such as 'and', 'but', 'if' -- whose paradigmatic proximity is estimated

by reference to a table giving weighted contributions to a Boolean vector on the basis of similarities of subject, verb, tense, etc. The values for this coefficient of paradigmatic proximity are then used in an assessment of verbal recall. This technique would be hard to apply to the analysis of conversation since, like most discourse analytic systems it deals with narrative and argument, rather as a symbolic logic would, not with the greater diversity of utterance types which occur in conversation. Also a simple calculation of morphosyntactic similarity is far too naive a basis for a set of equivalence classes of the kind needed in the analysis of conversation.

Bross and Stermole (1973) devised a computer program based on Harris' system which they used for the computerised analysis of surgical reports. Yet again the same shortcomings are found, as far as a potential means of conversation analysis are concerned: the system focusses on the logical-propositional aspect of language, and encompasses a very limited set of utterance types.

Hymes (1967) proposed a model to integrate a number of aspects of language in its social context. He points to the importance of a number of aspects of situated language use which may be grouped into Settings, Participants, Ends, Act sequences, Keys, Instrumentalities, Norms and Genres, which for mnemonic convenience spell SPEAKING. The concept of communicative competence is used as the more inclusive counterpart to linguistic competence, embodying rules of presentation, relevance, and so on. He advocates the use of certain features of linguistic methodology in the study of sociolinguistics including the context-sensitive re-writing rule notation for the

representation of sequential structure.

Searle (1965) analysed promises, using the kind of rules which Labov adopted later to describe sounding. Searle suggested the following defining characteristics of promises.

Given that a speaker S utters a sentence T in the presence of a hearer H, then, in the utterance of T, S sincerely (and non-defectively) promises that p to H if and only if:

1) Normal input and output conditions obtain
2) S expresses that p in the utterance of T
3) In expressing that p, S predicates a future act A of S
4) H would prefer S's doing A to his not doing A, and S believes H would prefer his doing A to his not doing A
5) It is not obvious to both S and H that S will do A in the normal course of events.
6) S intends to do A
7) S intends that the utterance of T will place him under an obligation to A
8) S intends that the utterance of T will produce in H a belief that conditions (6) and (7) obtain by means of the recognition of the intention to produce that belief, and he intends this recognition to be achieved by means of the recognition of the sentence as one conventionally used to produce such beliefs
9) The semantic rules of the dialect spoken by S and H are such that T is correctly and sincerely uttered if and only if conditions (1)-(8) obtain.

There follow five rules for the use of the function indicating device 'promise'.

Rule 1. Propositional content rule. P is to be uttered only in the context of a sentence (or larger stretch of discourse) the utterance of which predicates some future act A of the speaker S.

Rule 2. A preparatory rule. P is to be uttered only if the hearer H, would prefer S's doing A to his not doing A, and S believes H would prefer S's doing A to his not doing A.

Rule 3. Another preparatory rule. P is to be uttered only if it is not obvious to both S and H that S will do A in the normal course of events.

Rule 4. Sincerity rule. P is to be uttered only if S intends to do A.

Rule 5. Essential rule. The utterance of P counts as the undertaking of an obligation to do A.

This is an interesting analysis. It clearly embodies the features which we, as users of such devices, associate with promising, including the all important intention of S to do A. It is particularly interesting to note the close correspondence between the features which are used to define a promise, and the rules for its use. This contradicts the spirit of the earlier part of the same article in which the constitutive rules (which define units), and the regulative rules which provide for their correct use, are seen as quite independent. This issue will be explored further in chapter 5.

Having arrived at such a perspicuous analysis, by the use of native intuition, it would be reassuring if

it could be put to an empirical test. But it is hard to see what predictions may be derived from this which are objectively falsifiable. The content of the rules concerns the propriety of using and interpreting promises in certain ways, so the most direct prediction would be that a larger sample of native actors would agree that any instance of a promise they were shown, which conformed to the rules, was properly conducted and interpreted. They should also form the converse judgement that any promise which did not follow the rules was ill-formed. This kind of prediction is useful, particularly in combination with other rules, in building up a picture of how social discourse may be meaningfully carried on, provided that the naive assumption is not made that such rules relate in any simple way to the lines of demarcation between the kinds of speech act which are observed to occur, and those which are not.

Ervin-Tripp (1969) provides a rule scheme, in which a number of influences on language production may be integrated under the headings of alternation, sequencing, and co-occurence rules. These are rules which provide respectively for paradigmatic relations, syntagmatic relations and stylistic consistency between utterances.

The linguistic analyses of conversation structure seem to offer a much richer potential for the exploration of complex forms, than does the observational technique described earlier. The linguistic analysis does need some empirical support, though, from observational or experimental studies, in order to show that it is not merely an inaccurate speculation on the conduct of discourse.

## 2.3. INTERACTION PROCESS ANALYSIS IN THE LABORATORY

This group of studies used laboratory settings, and procedures which include careful coding and recording of interaction events, but no experimental intervention in the course of the behaviour. Foremost in this category are the studies by Robert Bales (e.g. 1953) of Interaction Process Analysis. The method was devised for the study of problem solving groups, but has since been used in a number of contexts including the investigation of doctor-patient interactions, (Korsch & Negrete, 1972) and the interaction of people at conferences (Bales, 1955). Bales' procedure employs a twelve category system for coding each item of verbal behaviour and some non-verbal ones, during a group discussion task, typically involving two to ten people. The twelve categories come from Bales' observations, theories about the crucial elements of group problem solving, and studies of coder reliability, they do not appear to be equivalence classes, constituted so as to embody the paradigmatic relations which exist between utterance types. This is a disadvantage of the method which may account in part for its limited success. The twelve categories of act are:

1) Shows solidarity, raises other's status, gives help, reward.

2) Shows tension release, jokes, laughs, shows satisfaction.

3) Agrees, shows passive acceptance, understands, concurs.

4) Gives suggestion, direction, implying autonomy for other.

5) Gives opinion, evaluation, analysis, expresses feeling, wish.

6) Gives orientation, information, repeats, clarifies, confirms.

7) Asks for orientation, information, repetition, confirmation

8) Asks for opinion, evaluation, analysis, expression of feeling.

9) Asks for suggestions, direction, possible ways of action.

10) Disagrees, shows passive rejection, formality, withholds help.

11) Shows tension, asks for help, withdraws 'Out of Field'.

12) Shows antagonism, deflates other's status, defends or asserts self.

The interaction, thus coded, may be represented in a number of ways. Comparison of the numbers of each event type, may be made within or between interactions, giving an indication of the style and emotional tone of discussion. For instance, in one study, a discussion which was rated by members as satisfactory, was found to consist of acts in the proportions Agrees 24.9%, Disagrees 4.0%; while another discussion rated as unsatisfactory consisted of Agrees 9.6%, Disagrees 12.4%. This is a relatively crude analysis, since it disregards the structure of the interaction, rather like the early studies of protein chemistry cited in the analogy of section 1.2.3 which had to destroy the molecular structure in order to report on its composition. A more sophisticated representation is to be found in Bales' transitional frequency matrices, which show the frequency with which one of the twelve act categories follows each of its twelve possible antecedent types. The terms reactive and proactive are used to distinguish between transitions from the last act of one speaker to the next act by a new speaker, and the transitions from act to act within the talk of the same speaker. It is here that other shortcomings of the

category scheme become evident. The categories are very broad, leaving out a number of subtle distinctions between utterance types and functions. Consequently the frequencies in the transition matrices are relatively low. Highly probable transitions like asks for suggestion leading to gives suggestion only occur on 35.8% of occasions on which suggestions are sought. The highest transitional frequency of 73.7% is for asks for orientation leading to gives orientation. One virtue of Bales' category scheme is that it embodies an elegant symmetry. The first six categories are positive, while the last six are their negative counterparts. Items 1 - 3 and 10 - 12 are concerned with the task, while 4 - 9 deal with the socio-emotional state of the group. So four groups of three items are formed, being respectively positive-social, positive-task-related, negative-task-related and negative social.

Bales also found that if group members were rank ordered according to the number of acts they produced, the number of remarks addressed to each man preserved the same rank order. So the man who says most, has most said to him; the man who says second most, has second most said to him, and so on. This applies wherever the speaker stands in the rank ordering.

These findings were incorporated in a kind of simulation of group discussion, the '$T_5$ Model', which used ranges of random numbers to represent the probabilities from the tables of reactive and proactive tendency.

Bales has also used this system to show how the characteristic use of his twelve act types varies from role to role in the group, and from phase to phase of

a long debate.

Bales' work should not be underestimated. It is one of the best precedents we have to date for studies of conversation structure. However it does have its limitations, of which some have already been mentioned. A particularly serious handicap arises from the presentation of the sequence analyses in the form of transitional frequency tables. It implies a kind of simple Markov structure which is inadequate in two respects. Firstly it does not account for enough past information in estimating the probability of a next act being drawn from a particular one of the twelve categories. A representation which relates each act to the previous two, three, or four would account for more of the variance and enable reactive and proactive influences to be represented together in one table. At present the combination of reaction and proaction to give a uniform impression is difficult. For example the highest value in the reactive tendency matrix is 73.7% for asks for orientation leading to gives orientation. The most likely sequitur to gives orientation is agrees. But from the proactive tendency matrix we see that the sequence

1A; Asks for orientation

2B: (Any intervening act)

3A: Agrees

has only a 1.1% occurence, with five other outcomes more likely, and five others equally likely. In fact it is only the seldom used category 12 (shows antagonism) which is a less frequent third member of this sequence. Of course these very low frequencies cannot be compared with any confidence, and the reason for the apparent disagreement

between reactive and proactive tables may be resolved by assuming that after

1A: Asks for orientation

2B: Gives orientation

the most likely next act of Agrees is normally performed by person C, and so fails to show in A's proactivity record. Suffice is to say that having tabulated the structure of two unit interchanges, this cannot be used to build up a picture of larger sequences. As was pointed out in 1.3 in the discussion of interactive effects, there is certainly no justification for assuming that transitions between verbal events are independent and that the probability P of seeing category string X Y Z, given X, or

$$P(XYZ|X)$$

is

$$P(XY|X) \times P(YZ|Y)$$

Unless the assumption of independence is justified (which it is not), there is no inference which may be validly drawn about the sequence XYZ for the study of XY and YZ. It is perfectly possible to envisage a system where X leads to Y with monotonous regularity, and Y most commonly leads to Z, but XYZ is never observed because the generative rule is Y leads to Z except after X. For instance in written English ci is common, ie is common, but cie is prohibited.

This introduces the second objection to transitional frequency analysis. Even if a longer string of past events is accounted for, so that matrix shows P(WXYZ|WXY), say, rather than simply P(YZ|Y), the model is still inadequate because it assumes an even regular progression of influence along the chain of events, with each element being strongly

influenced by those which are nearest to it. But as the description of side sequences by Jefferson, Goffman, and others has shown, one very plausible structure for conversation is the nested or self-embedded sequence. Now, the most intimate structural relations are found between items which are some way apart in the string, while adjacent items may be unconnected. Some means must be found of analysing longer strings of acts, without making assumptions of independence, or linearity.

Bjerg (1968) made a number of 'clandestine recordings' of couples, which he later discussed and interpreted with them. (Harrĕ and Secord (1972) use the term negotiation of accounts for the process whereby actors and investigators arrive at psychologically meaningful reports of their activities.) Bjerg decided that the interactions could be seen as exchanges of messages, goods or moves(according to the linguistic, economic or game models). He described and labelled a number of discrete activities which he called agons. The list is very exhaustive and includes agons relating to the exchange of information or goods, the expression of power, esteem, love and justice, and the activities of hurting, blaming, and consoling. Bjerg's agons will be discussed further in the section (6.2) on categorisation of events. Bjerg's analysis is a further illustration of the richness and complexity of the procedures and routines of social life, but his results only take the form of descriptions and examples so there are no precise predictions to be tested.

Ferrara (1973) developed a method of recording verbal interaction, by using the segments of a circular

chart, to represent actor, recipient of act, category of act, and time. Categories are left largely to the discretion of the user although four (positive, negative, raises problems, solves problems) are suggested. These correspond roughly to the four main blocks of three categories in Bales' system. Apart from the convenience which this particular chart offers, the method has no advantages over Interaction Process Analysis.

Laboratory observations of interaction events and sequences tend to show the same faults as the field observations. The categories are rather arbitrary, the sequences are assumed to be too simple, and the studies are analytic rather than synthetic. Consequently they may suffer the same limitations as corpus-based linguistic analyses. Furthermore, there is a special problem with laboratory situations. The discussion are nearly always between strangers, and are contrived by the investigator. They may well be unrepresentative and unrealistic, and provide the subjects with less information and motivation than they would have when talking spontaneously.

## 2.4 SIMULATION

A number of natural language computer simulations have attempted to preserve the response tendencies of the human speaker/hearer to the extent that utterances which are input to the program elicit plausible replies, in addition to receiving other syntactic and semantic treatments. This has entailed a certain effort to produce a simulation of discourse structure, albeit incidental to the primary purposes of the simulations.

Weizenbaum's (1967) DOCTOR program produced responses after the fashion of a non-directive therapist. This is a simple discourse structure in which the usual responses are that of calling into question the previous assertion of the 'patient', reflecting emotion and encouraging the 'patient' to describe his problems in greater detail.

Winograd's (1972) simulation is altogether more sophisticated. Its principle concerns lie in the domain of syntax and semantics (which as one of the main innovations of the system are treated together throughout). The discourse structures involved are still (intentionally) simple, but they contain some points of interest. The program uses a computer display screen, showing geometrical figures, as its universe of discourse. The dialogue between program and operator concerns the movement of these figures, and is typified by the following extract in which the operator will be called 'A', and the program 'B'.

1A: Pick up a big red block

2B: O.K.

3A: Grasp the pyramid.

4B: I don't understand which pyramid you mean.

5A: Find a block which is taller than the one you are holding and put it into the box.

6B: By 'it' I assume you mean the block which is taller than the one I am holding.

7A: .....

As a feat of natural language programming this is a tremendous achievement, but as a discourse it is still primitive. The exchanges are only two units in length, and the connection between units is formed at the level

of propositional content rather than a wide variety of performative types. Three utterance classes are used question, declarative and imperative, although subtle distinctions like reports on action, and requests for confirmation, may be seen in the above material. In producing a coherent discourse structure the program had to account for three levels of context dependency. Local discourse dependency governs the interpretation of elliptical forms, so a question like 'Why?' or 'Where is it?' can only be properly answered when interpreted in the light of (at least) one previous utterance. Overall discourse dependency governs the interpretation of common phrases in the light of the topic of conversation, so 'the board' will figure differently in discussion of company policy, and carpentry. There is also a context dependency in the interpretation of items which requires a knowledge of the world in addition to a knowledge of the language. In the sentences

The boy fell off his bike because it ws faulty.

and

The boy fell off his bike because it was raining.

the different referents for 'it' cannot be detected from linguistic features alone.

Insofar as this program deals with the structure of discourse, it has to do with propositional content of utterances and the logical relations between them, which is a minor consideration for the student of social behaviour. The same is true of the Simmons and Slocum (1972) study of discourse simulation, which employs a semantic net of concepts and relations. The narrative

structure of monologue may be preserved, but the subtleties of dialogue are largely unrepresented.

The work of the philosopher Turing (1950) is often cited in the context of simulation studies, although his contribution was not in the production of simulations per se. He discussed the objective criteria which might be used in deciding whether a device was or was not 'intelligent', suggesting as one such criterion the 'imitation game'. This requires the device to pass for an intelligent being (namely a human) when the performances of the two are compared. For example, subjects might be asked to conduct a verbal interaction over a teletype link with a respondent who was either human or a computer. If the subject cannot decide the nature of his partner with better than chance accuracy, as a result of this conversation, then the simulation may be said to behave like a thinking being. The argument was introduced as an example to clarify our conception of what it is to attribute intelligence to a person or thing, but has since been used as an experimental procedure for the evaluation of simulations, and will be used in this study to evaluate artificial rule systems.

The study of conversation by simulation offers exciting possibilities of complex methods of discourse structure which are generative and creative and whose predictions(output) may be tested by comparison with real corpora of speech. That must remain an exercise for the future, however, as a simulation requires far more specific description of speech patterns than can yet be provided.

## 2.5 EXPERIMENTATION

This section includes those studies in which detailed observations and measurements of conversation were made by means other than an interaction process analysis.

Experiments on the conduct of conversation have been rare, partly because of the difficulties outlined in section 1.3, and those which have been performed have tended to avoid the central issue of what people say and when, in order to concentrate on the 'battle for the floor', and the signals used to negotiate the roles of speaker and listener. Kendon (1967) found that the non-verbal signal of looking at another person in the region of his eyes, variously known as gaze or Looking when performed by only one actor, and mutual gaze or eye-contact when performed simultaneously by both members of a dyad, was used to effect a smooth exchange of the roles of speaker and listener. Typically the speaker looks slightly less than the listener, during a long utterance. Then during the last few seconds of his utterance the speaker's probability of Looking rises from about 55% to about 75%, while the listeners probability for Looking falls 65% to about 25%. If this signal is not used the exchange of speakers may be impaired by long pauses between utterances.

Speech amplitude serves as a signal to resolve battles for the floor, (Meltzer, Morris & Hayes, 1971). When interruptions or simultaneous speaking occurs, the outcome may be predicted from a) the change in the interruptee's vocal amplitude from before to during the interruption and b) the difference between the interruptee's

and interrupter's amplitude during simultaneous speech. It is not surprising to learn that one way of winning a contest for the floor is to 'shout down' the opposition, and the claim made in the artide that it heralds an age of 'social psychophysics' seems unwarranted. The idea that social behaviour may be viewed as a simple function of a few physical variables would not generalise far beyond this level of description. Morris (1971) also deals with the outcome of periods of simultaneous speech, but by rather more elaborate means. The members of his subject pairs sat in different rooms, conversing over an audio link like a domestic telephone. The signals were passed through an attenuator controlled by an on-line computer, so that boosts in the transmitted amplitude of a speakers voice could be simulated by temporary reductions in attenuation. The computer was programmed to detect bouts of simultaneous speech, and insert amplitude boosts on certain trials. The relationship was recorded between amplitude boosts, and interruption outcomes, and three conclusions reached.

1) Amplitude is causally related to interruption outcomes.

2) Amplitude increments are only effective if made by the 'defender' of the floor.

3) Subjects whose attempts are continually thwarted 'retaliate' by boosting their own vocal amplitude when in the role of defender.

Duncan's analyses (1972 & 1973) of turn taking in conversation encompass a greater variety of signals and ploys. He finds that turn-yielding signals include the use of middle intonation; a drawl on the final syllable;

termination of a hand gesture; sociometric sequences such as 'but uh', and 'or something'; a drop in pitch or loudness with drawl; and completion of a grammatical clause. The use of continued gesture acted as a signal to suppress bids for the floor, and the present speaker could be encouraged to continue by the listener's use of back-channel communications like nods of the head, brief requests for clarification, and brief summaries of the speakers recent points.

The opportunities for speaker change are also governed by the content of speaking turns, as described by Sacks, Schegloff and Jefferson (n.d.), and by the syntactic structure of their component utterances. In an unpublished study Argyle(n.d.b) presented subjects with tape-recorded examples of interruption, and asked them to judge to what degree each interruption violated the rules of polite conversation. The tapes included interruptions at different points in the structure of the first speaker's sentence, and the perceived propriety of interruption was found to vary accordingly. Interruptions at the end of a sentence were viewed as most acceptable, followed by those at the end of a clause. Interruptions in mid-clause were least acceptable. The length of the interrupted utterance made no difference. This provides experimental confirmation for Sacks' theory that the speaker turn contains transition relevance places at which bids for the floor may legitimately be made. The various studies of speaker change are hard to integrate, since their authors place such different emphasis on the factors involved. Meltzer et al. consider the role of non-verbal cues in effecting speaker change, while Argyle reports the

effects of message structure, and Sacks, the influence of message content. A fourth school of thought seeks to relate the distribution of speech and silence in the dyad simply to the immediate history of speech and silence. Jaffe, Feldstein and Cassota (1967) find that the probability of an individual speaking in a 300 msec interval of time, may be predicted from the state of talk in the previous 300 msec interval, as represented by the four possibilities of A speaks, B speaks, both speak, neither speak. Thus the distribution of talking seems to adhere closely to Markovian principles, with little additional power being added to the prediction by the consideration of longer interaction histories. They also find that the predictions of an 'independent decision' model hold good. That is to say that each speaker seems to take the decision to speak independently, with the result that simultaneous speech occurs with a probability equal to the product of the probabilities that A speaks, and B speaks.

In a later elaboration of this approach, Feldstein (1972) investigated other temporal features of the pattern of speech and silence. His method is complex, using computers and an analog/digital converter to record the occurence of speech and pauses. Many of the findings seem disappointingly obvious, given the care that was used in producing them. For example his matrix of correlations between vocalisation, pauses, switching pauses and simultaneous speech, shows amongst other things that his two categories of vocalisation correlate positively, the two categories of silence correlate positively, and each kind of vocalisation correlates negatively with each

kind of silence. This seems rather like saying that in a finite interval of time, the more one talks, the less one keeps silent - an observation we can have little reason to doubt. His recursive model of sound and silence, which is presented in the form of an argument in the predicate calculus, embodies this feature in premise (5)

> '...The first... assumes as true for all individuals and all vocalisations that at any given instant of time, or any given interval of time(or both), an individual either vocalises or does not vocalise, but not both. Put another way, it is not possible for individuals to both vocalise and not vocalise at the same time.'
>
> (Feldstein, 1972: 106)

This and other premises allow the periods of vocalisation, pausing, simultaneous speech and switching pauses to be defined and correlated, but it is hard to see what predictions such a model could produce which would be of practical or theoretical importance.

The difficulties of performing experiments on conversation are exemplified by Webb's (1972) study of speech rate in interviews. He tried to control for variations in interviewer performance which might disrupt the experimental investigation of interviewee performance. In order to achieve this degree of control the interviewer was replaced by a prerecorded audio-tape playing from another room, a technique which is referred to as a methodological advance under the name of the 'automated standard interview'. In practice the procedure seems to do more harm than good for the experimental paradigm, since all visual cues are omitted, which may have interacted in important ways with speech rate; the essential contingency between utterances which characterise any conversation is lost; the interviewer is confined to vague de-contextualised

utterances such as

> 'Would you like to carry that on a bit further and round it out a bit? Perhaps you could tell me something about some of the other things that you know or have heard about!'

A more realistic control would be to use interviewer utterances in each experimental condition which stand in a constant relation to their verbal context, rather than simply using the same utterances. This, however, would require a knowledge of utterance types, and conversation rules which is well beyond our present capability.

Those rare studies which have dealt with the content of conversational components, and their interrelations have often employed the model of exchange theory as their theoretical base. Using such a framework Heller (1972) reports that subjects responded to challenging interview conditions with attempts to meet and overcome the challenge. Also subjects whose defensive style allows them to be more open in admitting personal concerns do so more frequently in moderately stressful interview conditions than in more subjectively pleasant and less threatening conditions. Similarly Foa and Foa (1972) analyse dyadic interaction as an exchange of interpersonal resources, but this approach leads to even higher levels of abstraction, operating over longer periods of time, than are required for sequence analysis in conversation.

In a series of unpublished papers (McGuire & Lorch, n.d.a; McGuire & Lorch, n.d.b; McGuire & Coleman n.d.), McGuire et. al. used a teletype link over which subjects could converse with another human or a natural language

program. In 22 out of 24 cases subjects decided in the first five exchanges whether their interloqutor was human, machine or unknown, and their decision remained unchanged in all cases throughout 90 minutes of interaction. Subjects ratings of the conversations were not significantly altered by the belief that they were interacting with a machine or a human. Four 'modes' of conversation were observed: associational (sharing experiences and beliefs); problem solving; interrogation; and clarification of actual or assumed misunderstandings. Again these studies work at too high a level of abstraction for the present purpose. The generation of 'acceptable reply types' is discussed in relation to three types of rule

1) Language conduct rules (having to do with the pragmatics of context)

2) Coding and decoding rules (concerning syntax and semantics)

3) Statement generation rules (embodying motives and values).

The rules are never made explicit, other than by reference to broad categories like 'rules governing the acceptibility of certain symbol strings', so there is little in the way of concrete predictions that can be tested.

Laboratory studies of conversation structure are difficult to perform by the obvious means of manipulating the performance of one speaker (as an independent variable) and observing the effect on the speech of the other (the dependent variable). Two major problems arise. If the confederate is to be fully controlled he cannot react to the subject, so one aspect of the sequence is distorted; and if each response by the subject is to be set in a

predetermined context, then his own proaction will have to be restricted. The difficulty is overcome to some extent in studies of verbal conditioning and ingratiation by the use of general stimulus and response categories.

The studies which can be successfully carried out using conventional experiments concern behaviour at a much lower level of description than the speech act sequence, and can shed very little light on the topic of interest here.

## 2.6 SUMMARY

Conversation structure has been studied in the past by a variety of methods all of which have their drawbacks. Natural observation uses arbitrary categories and simple sequences, as do laboratory applications of interaction process analysis, which suffer from the additional problem of having to engineer realistic artificial situations. Linguistic analysis and computer simulation are both promising, since they allow for complex formal systems which create discourse sequences, and hence suggest possible generative processes as well as simply describing patterns of output. Experimental procedures involving the direct manipulation of behaviour seem most unsuitable.

A methodological compromise seems to be indicated, based on the four stages of hypothetico-deductive methodology. First we need to collect and supplement our informal onservations so as to form the first outline of a workable theory. This will be discussed in chapters 3 and 4. Then some kind of overall model must be proposed which has a generative capacity. It should be able to

produce all and only those speech act sequences which are sensible conversations and assign a correct structural description to each. Insofar as that is achieved, the rules become a potential model for the performance and generative process of the social actor, although further data of a different kind would be needed to test that possibility. The third stage is prediction, in this case that the strings produced by the generative rules turn out to be conversation-like, and fourthly that prediction must be tested experimentally. Stage two, the theoretical model will be described in general terms in chapter 5, and more specifically in chapter 6; and the making and testing of predictions will be reported in the latter part of chapter 6.

In this way all the methods described here may be brought to bear on the problem. Observational and judgemental studies determine the form of a workable theory, which is couched in linguistic terms. A kind of simulation exercise converts general rules to particular strings, whose realism may be assessed in an experiment.

oOo

# CHAPTER 3 FEASIBILITY STUDIES

3.1 Utterances are used in spontaneous conversation in non-random sequences.

3.2 Variations in the syntactic form of the utterances may be reduced, in which case a residual pattern emerges governing their semantic content and performative quality.

3.3 When the effects of syntax and semantics are controlled a sequential pattern is found to operate on abstract categories of speech acts.

3.4 The speech act pattern has also been demonstrated by an experimental technique in which subjects 'negotiate accounts' in a discussion group.

## 3.1 EXPERIMENT 1

### 3.1.1 INTRODUCTION

The brief review of the literature in Chapter 2 showed that relatively little work has been done on the structure of conversation, and those studies which do exist, have addressed a number of disparate topics, without reference to any unifying theoretical framework. Furthermore, some of the results have been speculative, and unsupported by experimental findings. In short the field is open, leaving even the basic principles to be firmly established. The first and most fundamental issue in the study of conversation structure has to do with the very existence of a structure -- the sine qua non for a project like this. The idea of a structure implies that the object of study (in this case conversation, in its broadest sense including dispute- negotiation, argument,

and so on) is a thing of many parts (which correspond roughly to the individual utterances, 'lines' or 'turns-at-talking' of different speakers), and that the arrangement of parts to form the whole is not a haphazard matter, but a complex process in which some configurations may be allowed to occur, while others are not. Also some of the permissible arrangements may be found to occur more frequently than others. The former constraint belongs to the realm of communicative competence, and the latter to the domain of performance.

This experiment is orientated towards observed performance, and seeks to demonstrate that spontaneous dyadic conversation between individuals employs utterances in a patterned, predictable sequence, demonstrating the existence of a conversation structure worthy of further investigation.

It may seem strange to begin the enquiry with a demonstration that structures exist, when they cannot be described or give rise to behavioural predictions until much later. What is it to say of a system that it is structured when there is not even a single feature of the structure which can be identified? The question is best met with an analogy. Suppose the claim were made that a computer program was available which turned English prose into some esoteric language, L. There are sceptics who would like to test this claim, but who do not speak L. They submit passages of English to the device for translation, but are unable to recognise in the output the internal consistencies which would be apparent to the fluent speaker of L. Nor can they detect the lawful

dependencies of output upon input which would impress the bilingual user of English and L. In desperation they decide to ignore the properties of L itself, in order to concentrate on the simpler issue of whether or not the device produces an output which stands in any predictable relation to the input. This they are able to do by using the facility for translation from L to English to recover the English form of one of their original passages. For this test to work three things must be true

1) The English - L translation must follow some pattern.
2) The L - English translation must follow some pattern.
3) A certain reciprocity must exist between the English - L, and the L - English procedures.

Then, the inference may validly be made that the output of 'L' is patterned, and that it stands in a predictable relationship to the English input, without there being any aspect of the pattern of 'L' which is apparent to the observer.

A similar argument is used in this experiment. The systematic 'translation' to be detected is not from one language to another, but the input/output translation of the human speaker hearer which appeared in the motor skill model of section 1.1. If the speaker normally translates the past history of a conversation into a set of systematic constraints on the form and content of his next utterance then it may be possible to employ a reverse translation to retrieve the history of events from the nature of the individual utterances. It should be possible therefore, to reconstitute the correct sequence of such

a conversation, when given its component utterances in the wrong order. That was the essence of this experiment. As with the example of computer translation quoted above, the experiment would only work if three assumptions about the nature of conversation and conversationalists are all true.

1) Spontaneous conversation employs utterances in non-random sequences, which is to say that each utterance has characteristics which relate systematically to those of previous utterances.

2) The native user of the discourse system has an understanding of these patterns, which may be called upon in making judgements about the speech of others.

3) The native speaker's beliefs about conversation patterns are largely correct.

These are tested simultaneously in the experimental hypothesis that subjects can reassemble an unfamiliar dialogue with greater than chance accuracy when presented with its component utterances in random order.

### 3.1.2 METHOD

The experiment was conducted in two parts, the first to produce a set of spontaneous dialogues; and the second to assess their sequential structure, by the reassembly of utterance sequences.

#### 3.1.2.1 Dialogue generation

Four pairs of subjects were used, who were students and junior research staff at the University of Oxford. There was a male/male pair, a female/female pair and two male/female pairs. All subjects were aged 18 - 25. Pairs 1, 2 & 4 were acquainted before the experiment, and pair

3 were strangers. Each pair was shown into a waiting room to await the arrival of a (ficticious) third subject. Their conversation while waiting was tape recorded, using concealed microphones and recording equipment in an adjacent room. Subjects were then debriefed, and told the true nature and purpose of the experiment and the reason for the originally misleading instructions. In all cases they gave their permission for their conversation to be transcribed and used in the later stages of the experiment. The subjects' anonymity was preserved throughout, and the few proper names and places which occurred in the conversations were replaced by fictional equivalents.

Twenty consecutive lines of each dialogue were used, starting with the introduction of a major topic after a steady state had been reached. Each utterance was typed on a separate 4" x 6" file card, bearing no other information as to the original speaker or the nature of the sequence, which later subjects could use. On the back of each card was a code letter relating to a key from which the correct sequence could be checked by the experimenter.

Interruption and simultaneous speech were represented on the cards by quoting any interruption in parenthesis at the start of the interrupters next utterance card: for example,

(Why...?/Bill probably said...) Why was that?

would represent the case in which the person who said 'Why was that?' had interrupted the other's previous utterance with 'Why...?' and 'Bill probably said...' This notation was chosen as it allows all the speech of both actors to be represented, without introducing stray cues to the overall sequence, as could have been the case

if interruptions were placed on the card of the interrupted speaker.

3.1.2.2 Resequencing

Ten student subjects(six males, four females, aged 17-25) were asked to resequence each of the four dialogues, given ten minutes for each. The order of presentation of the 20 cards in each set, and the 4 sets in the experiment was randomised. It is no easy matter to restore to near-random order, a set of 20 cards which have been systematically arranged, and it was most important that no residue from one subject's solution be inherited by the next. So a means of shuffling the cards was used, which had been shown in a pilot experiment to convert a perfect sequence, quickly and easily, to one whose pattern was undetectable using the scoring system which the experiment was to employ.

The subjects were allowed ten minutes practice with a similar set of cards before the start of the experiment. The following instructions were read by all subjects:

> The Task
>
> You will be given four packs of cards, each consisting of twenty items. You should consider the four packs as completely separate tasks, working at each for 10 minutes and then going on to the next. The four packs should be considered in the order they are given to you.
>
> The Cards
>
> Each pack of twenty cards contains twenty consecutive 'lines' of the conversation between two people -- one 'line' on each card. They are in random order when you are given them, and your task is to reconstitute the original order of the dialogue. There is a code letter on the back of each card -- these were assigned to the cards at random so you CANNOT work out the correct order from these!

Time Limit

If at the end of a ten minute period you have not completed your re-ordering of the pack you are working on, you should nevertheless finish immediately and proceed to the next pack. Any cards which you cannot place should be put into or on or under the pack in such a way as to preserve the sequences you have already formed. In other words DO NOT insert spare cards into the middle of a sequence which you believe to be correct.

Presentation

Your answer will consist of the pack of cards handed back to the experimenter with the first utterance of the conversation (face upwards) on the top of the pack, and so on to the last at the bottom.

Practice

You will be allowed to practise for ten minutes with a similar set of cards which does not form a part of the main experiment.

Other points for consideration

1) These extracts were drawn from the middle of ongoing conversation, and so, even when correctly sequenced, may appear to start and end abruptly.

2) In reconstructing the original order you should include the following factors in your reasoning:

a) The relationship of each utterance to the previous utterance by the other person, ie. the card before it in the series.

b) the relationship of each utterance to the previous utterance by the same person, i.e. the card two places before it in the series.

c) The identity and attitudes of the two speakers.

d) The fact that as each speaker speaks alternately, alternate cards in the sequence will represent the utterances of the same person. To make this clear while you are sorting the cards, you may find it helpful to lay them out in such a way that you can indentify the speaker as well as the sequence, for example by forming a staggered row like the black squares on two adjacent lines of a chess board.

Interruptions

In some places one speaker started to 'talk over' the other, this is represented on the cards by a remark in brackets on a card belonging to the interrupting party. Thus his interruptions appear at the start of his next utterance or at the end of his last one. Separate interruptions are divided by the sign '/'.

Questions

If you have any questions, either now or while you are doing the task, please feel free to ask them.

Thank you.

The sequences produced by these subjects were scored in three ways:

1) Slot scores a count of the number of occurences of card number n in nth.position in the series.

2) Reactive scores a count of the number of occurences of card n, followed immediately by card (n+1).

3) Proactive scores the occurence of card n followed by any other followed by (n+2).

Each such occurence constitutes a correct 'item'. The data were expressed as the number of subjects correct on each item, rather than the number of items correctly identified by each subject. In this way a profile of the points of greatest and least structural inte grity within each dialogue was obtained. Also the recognition of one item by several subjects may be regarded as independent events, making the data more amenable to statistical treatments. This assumption does not apply to the recognition of several items by the same subject.

The probability of achieving a given score under the null hypothesis that subjects were performing at chance, was estimated as follows:-

Slot scores. Under the null hypothesis, each card may be placed with equal likelihood in any of the 20 positions, thus having a probability of 0.05 of assignment to the one correct place.

Reactive scores. There were 19 reactive pairs in each pack (1-2, 2-3,... 19-20). Each one treated as a

single item could be combined in 19! ways with the 18 remaining cards, giving 19! occurences of each item in 20! possible assortments, and again a 0.05 probability of correct identification.

Proactive scores. There were 18 proactive pairs in each set of cards (1-3, 2-4,... 18-20) and each may have one of 18 other cards in its middle position. This group of three may combine in any one of 18! ways with the remaining 17 cards, to give a probability of identifying any pair of $\frac{18 \times 18!}{20!}$ or 0.047.

Interestingly the apparently simpler argument that each of the 18 proactive pairs combines with the remaining 18 cards in one of 19! possible ways, giving a probability of detection of 0.05, is incorrect, as may be seen if a similar argument is applied to the assortment of a small number of items, whose combinations can be tabulated in full.

Thus the likelihood of m out of 10 subjects recognising a given sequence by chance is

$$\frac{10!}{(10 - m)!m!} (p)^m(1 - p)^{10 - m}$$

where p is the probability of correct sequencing of a single item on each score, quoted above (by the Binomial Test, Siegel, 1956: 36 -42).

### 3.1.3 RESULTS

Transcripts of the four dialogues used may be found in Appendix E. Table (3.5) gives a summary of the number of items recognised by various numbers of subjects, analysed dialogue by dialogue and score by score. There is also a histogram for each dialogue showing how subjects'

performance varied from place to place in the ongoing structure of the conversation. Items consisting of two cards are identified by the number of the second,

| | |
|---|---|
| Figures | 3.1 |
| | 3.2 |
| | 3.3. |
| | 3.4 |
| Table | 3.5 |

(The same numbering scheme is used throughout for figures and tables, giving first the chapter number, and then the number of the particular insertion.)

All three indices of correct sequencing (slot, reactive and proactive scores) produced a number of items placed with greater than chance accuracy. On the slot scores 9 out of 80 items (11%) were placed correctly by 4 or more subjects(for each, $p < 0.01$). On the reactive scores 26 out of 76 (34%) of items were placed correctly by four or more subjects ($p < 0.01$), and on proactive scores 19 out of 72 (26%) were placed correctly by three or more subjects ($p < 0.01$). There were three reactive pairs which were identified correctly by 9 out of 10 subjects($p < 10^{-10}$).

Figure 3.1 Experiment 1

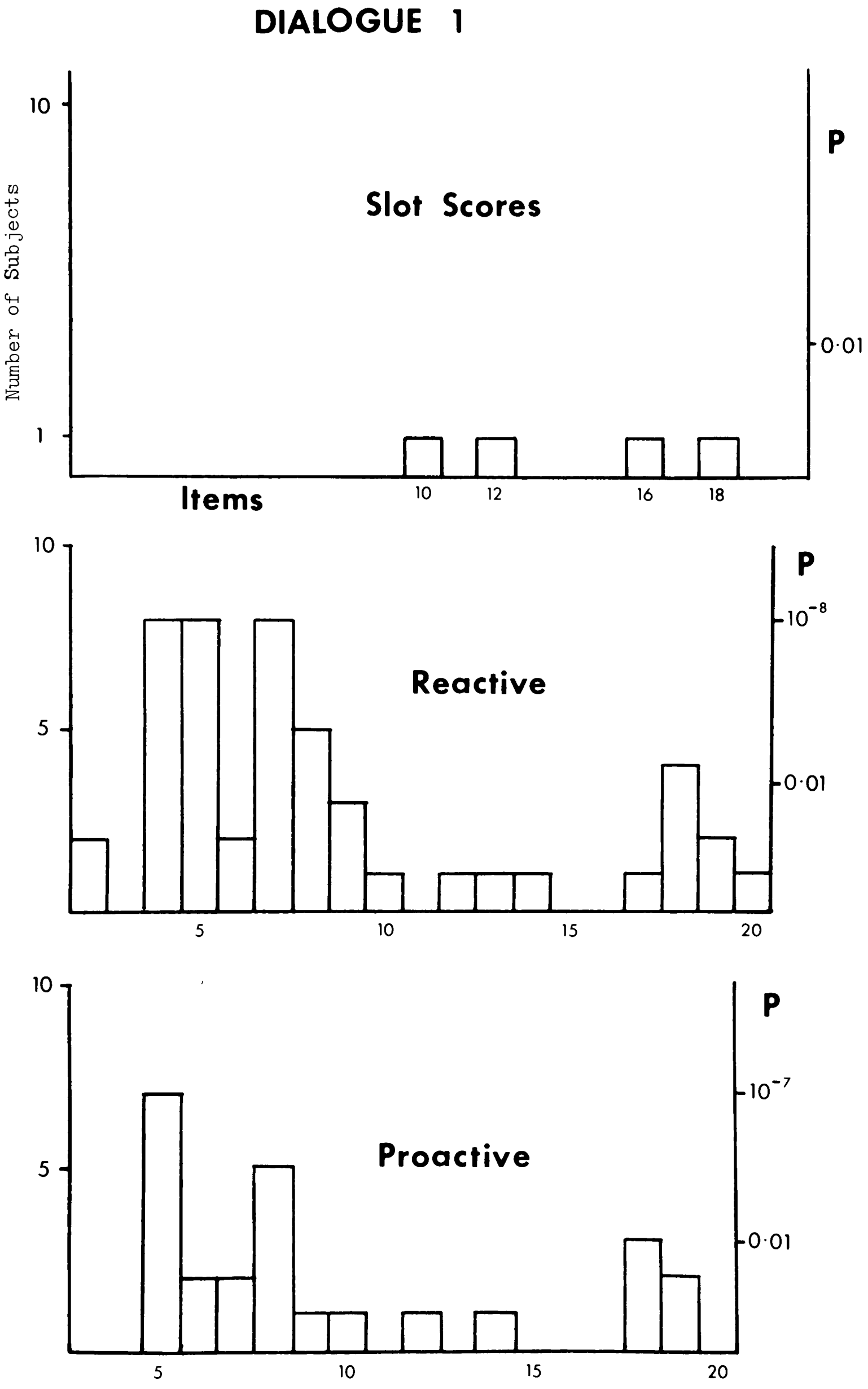


Figure 3.2 Experiment 1

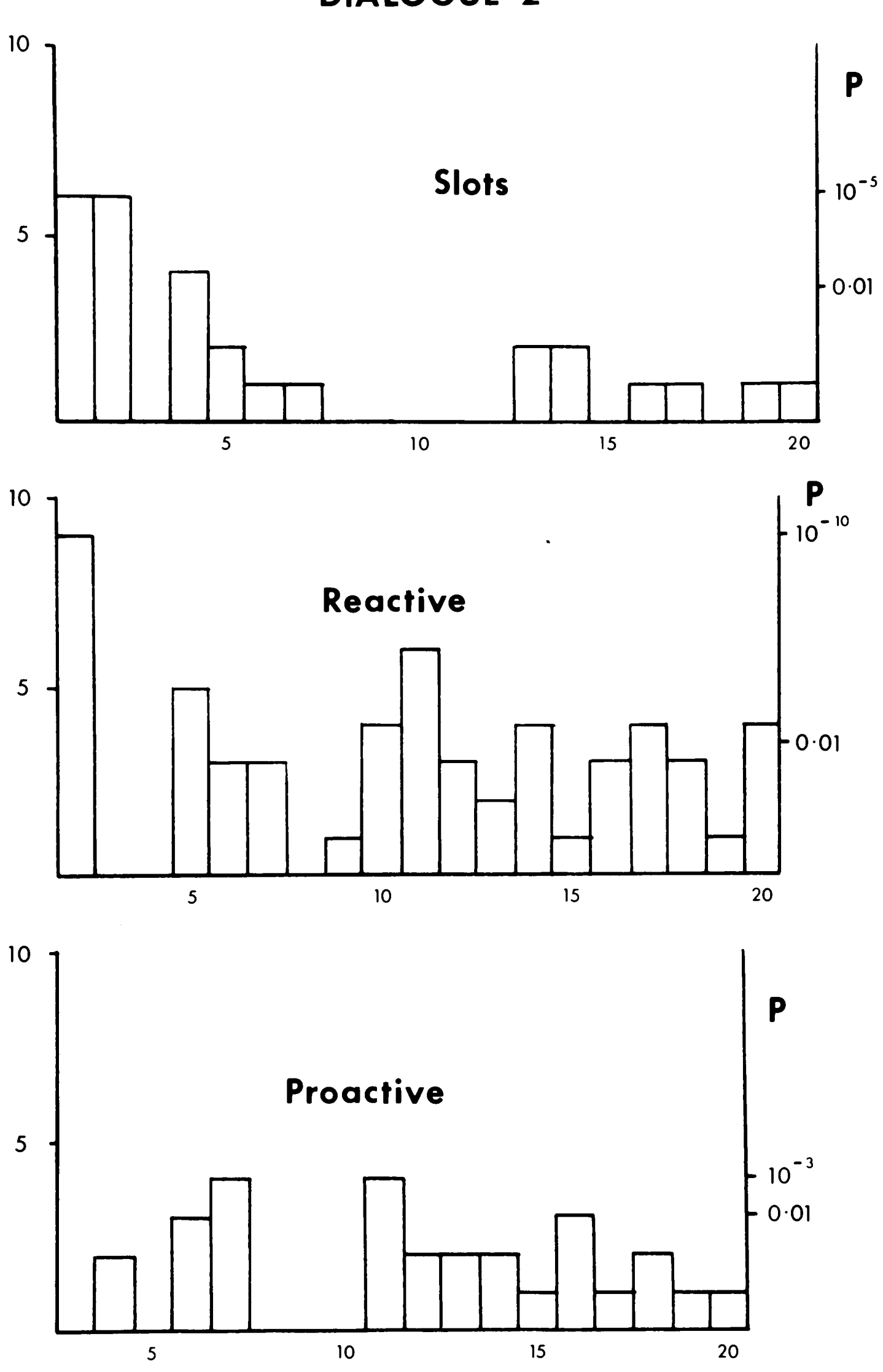


Figure 3.3 Experiment 1

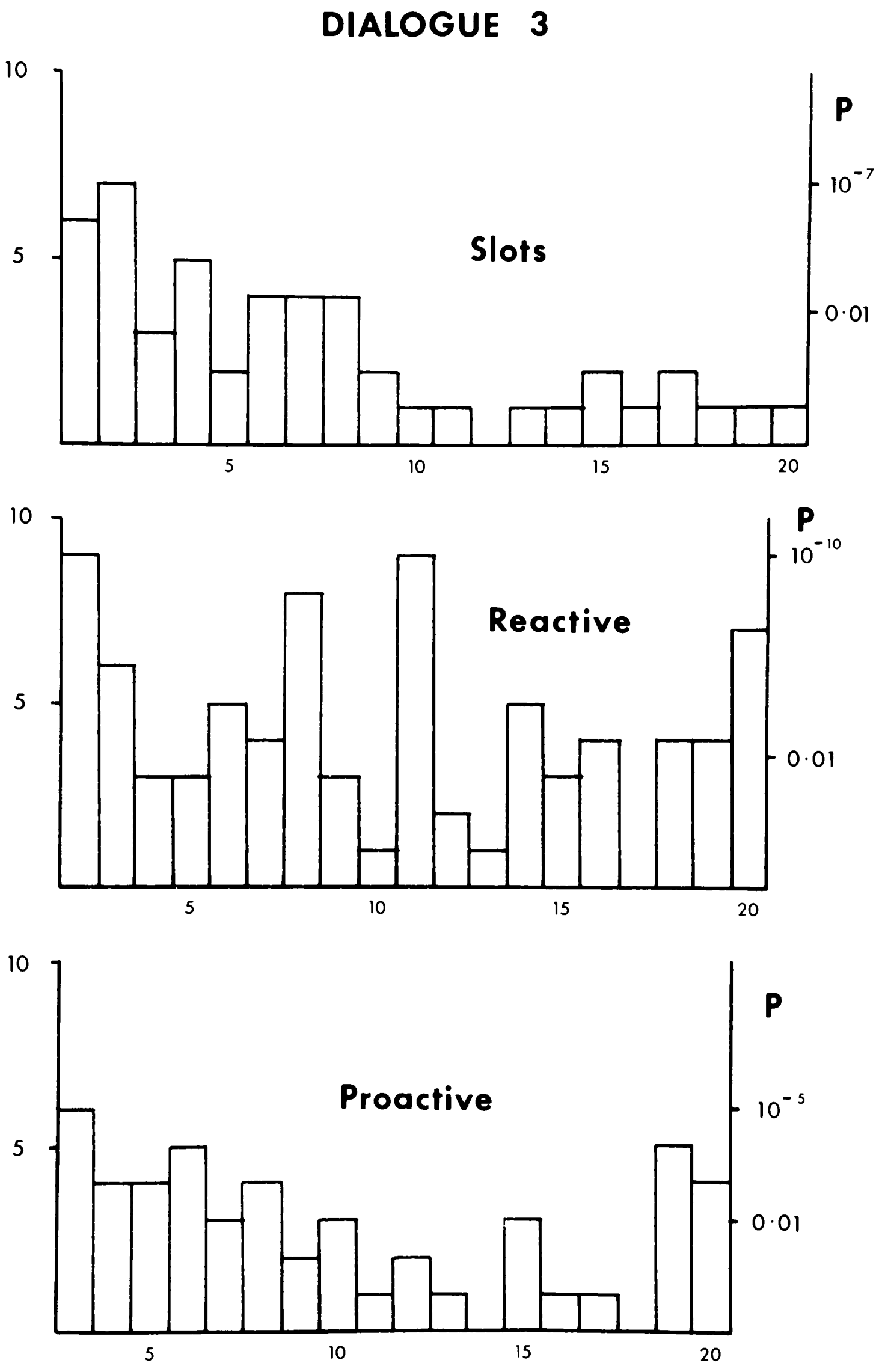


Figure 3.4 Experiment 1

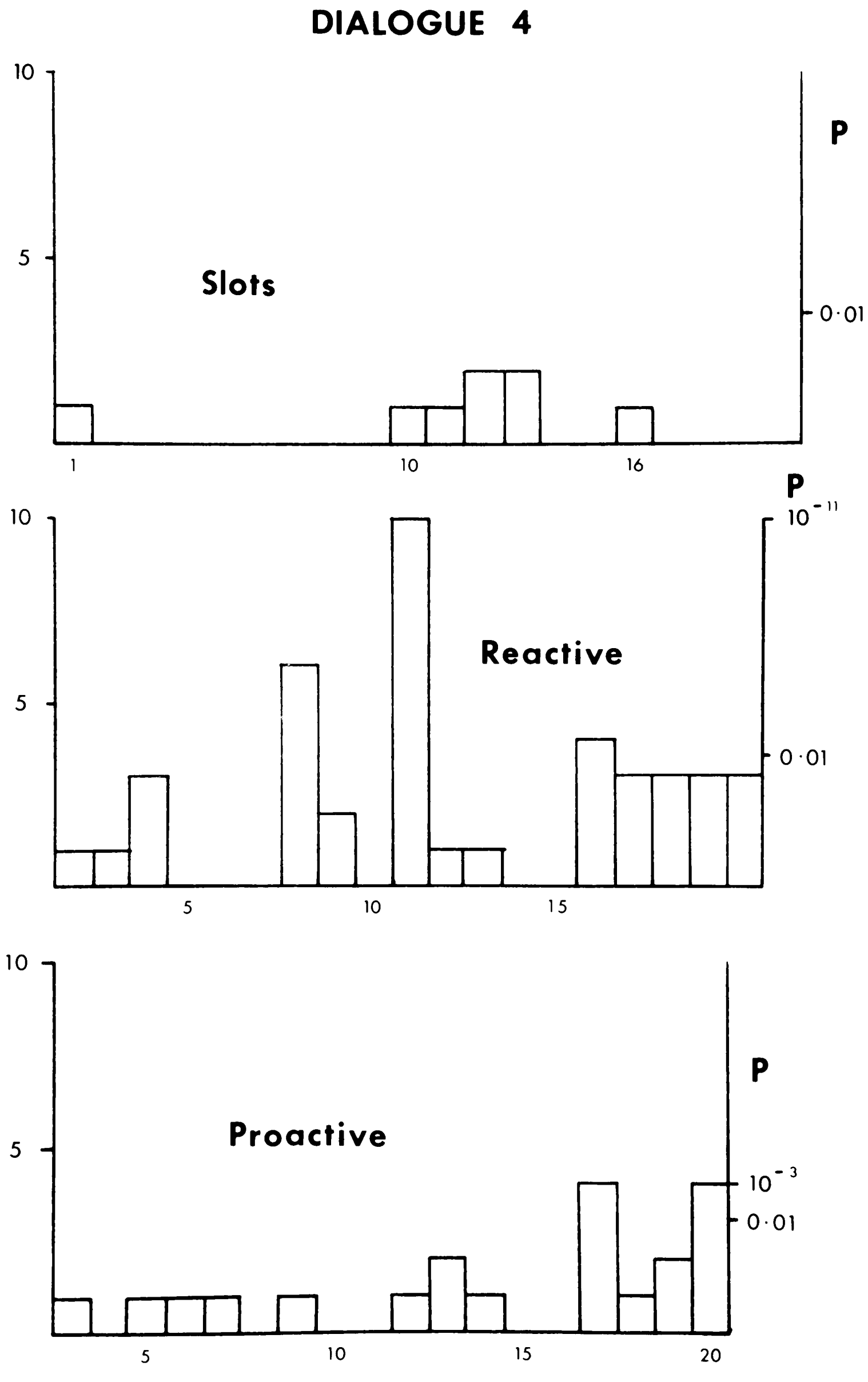


Table 3.5

Number of utterances assigned to correct slot by m out of 10 subjects, total = 20.

| | m and probabilities of occurrence under null hypothesis | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | ns | ns | ns | 0.05 | 0.01 | $10^{-4}$ | $10^{-5}$ | $10^{-7}$ | $10^{-8}$ | $10^{-10}$ | $10^{-11}$ |
| Dailogue 1 | 16 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dialogue 2 | 8 | 6 | 3 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |
| Dialogue 3 | 1 | 8 | 4 | 1 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| Dialogue 4 | 14 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Number of reactive pairs correctly identified by m out of 10 subjects, total = 19.

| | m and probabilities of occurrence under null hypothesis | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | ns | ns | ns | 0.05 | 0.01 | $10^{-4}$ | $10^{-5}$ | $10^{-7}$ | $10^{-8}$ | $10^{-10}$ | $10^{-11}$ |
| Dialogue 1 | 4 | 6 | 3 | 1 | 1 | 1 | 0 | 0 | 3 | 0 | 0 |
| Dialogue 2 | 3 | 3 | 1 | 5 | 4 | 1 | 1 | 0 | 0 | 1 | 0 |
| Dialogue 3 | 1 | 2 | 1 | 4 | 4 | 2 | 1 | 1 | 1 | 2 | 0 |
| Dialogue 4 | 6 | 4 | 1 | 5 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |

Number of proactive pairs correctly identified by m out of 10 subjects, total = 18.

| | m and probabilities of occurrence under null hypothesis | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | ns | ns | ns | 0.01 | $10^{-3}$ | $10^{-4}$ | $10^{-5}$ | $10^{-7}$ | $10^{-8}$ | $10^{-10}$ | $10^{-12}$ |
| Dialogue 1 | 8 | 4 | 3 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Dialogue 2 | 5 | 4 | 5 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dialogue 3 | 2 | 4 | 2 | 3 | 4 | 2 | 1 | 0 | 0 | 0 | 0 |
| Dialogue 4 | 6 | 8 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |

### 3.1.4 DISCUSSION

The hypothesis is supported by the results. Subjects were able to reassemble the conversations with greater than chance accuracy, reaching significance levels of $10^{-10}$ and $10^{-11}$ on a few items. This suggests that the original dialogues did embody some systematic relationship between verbal context and the nature of each utterance; that the pattern is one on which the native speaker can pass judgement from his own knowledge of the speech community, and that a consensus may be reached by the judges which is reasonably accurate. In the terms of section 1.3 these findings indicate that communicative performance has a temporal pattern; that descriptive competence is shared by native speakers; and it is largely accurate.

As to the nature of the sequences which were used, further inferences could be drawn. The histograms for each dialogue may be compared with the transcript to give an idea of the properties of the strongly and weakly sequenced strings, and of the kind of sequential constraints which are operative. In the linguistic analogy this corresponds to a parsing operation which indicates the surface structure of the dialogue. The derivation of a phrase structure for the dialogues in the form of a plot of the probability of associating pairs of items, is similar to the technique used in Johnson's (1965) psycholinguistic experiment. He gave subjects eight sentences to learn, and, upon recall, plotted the probability of any word being wrong given that the previous word was right. These transitional error probabilities were greatest at grammatical phrase boundaries, indicating that the subjects' cognition of the sentences had been structured in accordance with the predictions of

the grammar. Here, there is no formal grammar, but a similar argument could be invoked in support of this procedure as a possible means of discovering episode boundaries

In making such judgements two things should be considered. Firstly the reactive and proactive scores are not independent indices, and a subject who produces a string of items in correct sequence will necessarily contribute to both reactive and proactive scores. This is how the measures were meant to function. Their purpose was not to distinguish between the influences which are 'purely reactive' and those which are 'purely proactive', it would be impossible to do so. The three different scores were included so that they might detect between them a structure which as yet defies explicit description. The one inter-score comparison which can be made is between slot scores and the other two. The slot scores are much lower.(11% of slot scores were significant at $p < 0.01$; as opposed to 26% of the proactive scores, and 34% of the reactive scores.) This confirms that the structural rules, such as they are, are relative rather than absolute. With the exception of procedures like greeting and leave-taking, the rules relate utterances to each other, rather than to fixed positions like '14th utterance'.

Secondly, the probability of a particular sequence being recognised is not only a function of the intrinsic properties of that sequence, but also of the number of other items in the card set which might be mistakenly substituted for its members. Thus a dialogue with a number of similar items will be easily confusable, and will show an apparently weak sequence even though it may have been subject to strong sequential constraints during its production.

Since this experiment deals with type-written transcripts of dialogue it points to effects within the verbal aspects of the interaction. In the face-to-face situation, where there is an interplay of verbal and non-verbal information, the scope for examining complex sequences is still greater.

It seems that there is a sequential structure in conversation, which is hardly surprising. Unless our normal view of interaction were grossly distorted by some post hoc rationalisation, it could hardly be otherwise. What is more interesting, however, is the strength of the sequence effect. In this experiment, most of the factors which are thought to regulate social interaction, were omitted, and yet the subjects realised what was going on, and were able to recreate an accurate representation of a conversation they had never seen before. Clearly the effect of verbal context on future verbalisation is very strong. Why then, is it not stronger still? The subjects did make a number of errors. This testifies to the very principle of entropy which is the essence of communication. If the course of a sentence, message, or interaction were perfectly predictable from the outset, it would carry no information. The structural perspective suggests, not perfect predictability, but bounded uncertainty: a range of alternatives whose selection carries information.

It should also be noted that the pattern which emerges in this experiment is not necessarily the product of a syntax. We have simply observed that some patterns of use are more common, and known to be more common than others. That is true of most things whether rule-governed or not.

The question of a syntax of conversation will arise if rules of semiotic competence emerge, which show that only some of the possible sequences of speech-acts are meanginful.

An utterance is a thing of many parts, and it has many levels of description. As yet it is impossible to say which of these is moulded by conversation structure, and which cues the experimental subject recognises in performing this kind of task. This issue will be investigated in the next experiment.

## 3.2 EXPERIMENT 2

### 3.2.1 INTRODUCTION

The kind of conversation structure which is of interest governs what people say under given circumstances, not how they say it. It has been pointed out (Treisman, personal communication) that the results of experiment one, could arise from the effect of conversation structure on the syntactic form of utterances, without there being any effect on the other levels of description. In that case the present investigation would cease to be feasible. There is some evidence that utterance form is modified by conversation structure, and a simple example may be found in the transcripts (E.1, E.2, E.3 and E.4). There is a tendency for utterances to get longer as the conversations progress -- a cue to sequence which could be employed even by non-speakers of the language.

Fries (1952) documented three utterance forms which are dependent on conversation structure. The 'situation sentences which can begin an exchange; the 'sequence sentences' with which the same speaker might continue; and the 'response sentences' with which a new speaker may reply, vary

considerably in the degree to which ellipsis ( an incomplete or abbreviated construction) is allowed. For example:-

1A: I shall be in town this afternoon( Situation sentence)

2A: Got to get some shopping(Sequence sentence)

3B: Suppose so (Response sentence)

Osgood (1971) found the linguistic presuppositions implied by certain question forms, led subjects to formulate their replies differently. This kind of phenomenon could account for the findings of experiment one, if subjects are only sensitive to syntactic variations, or if the material only contained syntactic variations.

If on the other hand, there is a systematic effect of conversation structure on utterance content, then speakers who are obliged to use a very monotonous syntactic form, should nevertheless invest their utterances with sufficient semantic variation as to make the conversation suitable for the procedure of experiment one.

The hypothesis for this experiment was that subjects can reassemble with greater than chance accuracy, the original sequence of a passage of unfamiliar dialogue generated from a grammar devoid of syntactic cues to the sequence of utterances.

### 3.2.2 METHOD

In many respects this experiment was similar to experiment one. The procedure will only be described in detail where the two techniques differ. Again the experiment was in two parts: to generate a set of dialogues; and to assess their structure by the reassembly of sequences.

3.2.2.1 Dialogue generation

Four pairs of student subjects(7 female, 1 male, aged 18-25) were asked to generate a twenty-line dialogue, each writing alternate lines on a script which was passed back and forth. They were asked to comply with the following rules in the formulation of each utterance. Each utterance should:-

1) consist of one or more complete, grammatical, 'well-formed' sentences (except that articles may be omitted -- rule 5 --).
2) contain no pronouns except first and second person, to refer to yourself and the other speaker.
3) be in the present tense.
4) be in the active voice.
5) contain no articles 'a', 'an', 'the'(just omit them)
6) be comprehensible in itself without reference to other utterances in the dialogue.
7) be in the form of a question or statement.
8) not start with 'Yes', 'No', 'Well', 'And' or 'But'.
9) make reference to previously mentioned items only in the terms of their first introduction.
10) contain no relative clauses such as 'the A which is B', if the subordinate clause was the predicate of a sentence in a previous utterance, for example 'The A is B'.

Rules 1 - 8 were followed closely; rules 9 and 10 were not always possible to keep, but were included and referred to during the experiment to eliminate the more obvious cues to sequence arising from this source. The meaning of the rules was conveyed to subjects, and their use enforced in the following way. After each utterance was added to the

script it was checked by the experimenter before being passed on. If a breach of the rules was detected, the script was returned to the last author, with an indication of which rule or rules had been broken.

These ten rules were chosen so as to eliminate the more obvious cues to sequence, arising particularly from the progressive use of ellipsis, pronominalisation, relegation of attributes to subordinate clauses, and so on.

The dialogues were then transferred to 6" x 4" file cards, as in experiment one.

3.2.2.2 Resequencing

Ten subjects performed the resequencing task, of whom 7 were Oxford undergraduates (in subjects other than psychology), one was a research assistant, one a post-graduate management student, and one a retired biochemist. (There were 3 females and 7 males, 9 subjects were aged 18-25, and 1 aged 66). The same instructions were used as in experiment one, except for the paragraph Interruptions which did not apply in this case. In its place the following was inserted:-

> The Utterances
>
> As a necessary part of this experiment, the form of the utterances has been modified. Consequently the grammar of the individual sentences may seem unusual. Try not to be put off by this. Your approach to the job of reconstituting the original sequence should be unaffected by this.

In all other respects the procedure was just as in experiment one.

3.2.3 RESULTS

Transcripts of the four dialogues are provided in APPENDIX F. Table 3.6. summarises the number of items

recognised by various numbers of subjects, as a function of score type and dialogue number. Histograms are not presented as there is little point in trying to parse or look for particular structures in these artificial, and very unusual dialogues.

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Table 3.6

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The results are similar to those of the first experiment On the slot scores 17 out of 80 items(21%) were placed correctly by 4 or more subjects($p < 0.01$). The reactive scores showed 49 out of 76 items (64%) correctly paired by 4 or more subjects($p < 0.01$), and on the proactive scores 39 out of 72 pairs (54%) were identified by 3 or more subjects($p < 0.01$). Nine reactive pairs were correctly identified by all 10 subjects($p < 10^{-11}$), and 3 proactive pairs were recognised by all 10 subjects ($p < 10^{-12}$)

### 3.2.4 DISCUSSION

The hypothesis is supported. The great reduction in syntactic variation brought about by the grammatical constraints used in this experiment did not result in any reduction in subjects' performance. On the contrary, performance on all indices was improved, so the ability to recognise sequential structure in dialogue does not seem to depend on syntactic information alone. There must be other properties of the utterances which vary systematically with verbal context. Perhaps semantic content is the crucial factor, or the performative quality of the utterances. Experiment three will be concerned with the attempt to distinguish these two possibilities.

TABLE 3.6.

Number of utterances assigned to correct slot by m out of 10 subjects, total = 20.

| | m and probabilities of occurrence under null hypthesis | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | ns | ns | ns | 0.05 | 0.01 | $10^{-4}$ | $10^{-5}$ | $10^{-7}$ | $10^{-8}$ | $10^{-10}$ | $10^{-11}$ |
| Dialogue 1 | 11 | 4 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Dialogue 2 | 0 | 2 | 6 | 9 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| Dialogue 3 | 8 | 5 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dialogue 4 | 4 | 3 | 0 | 0 | 1 | 10 | 1 | 0 | 1 | 0 | 0 |

Number of reactive pairs correctly identified by m out of 10 subjects, total = 19

| | m and probabilities of occurrence under null hypothesis | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | ns | ns | ns | 0.05 | 0.01 | $10^{-4}$ | $10^{-5}$ | $10^{-7}$ | $10^{-8}$ | $10^{-10}$ | $10^{-11}$ |
| Dialogue 1 | 5 | 1 | 0 | 2 | 3 | 1 | 2 | 1 | 1 | 1 | 2 |
| Dialogue 2 | 0 | 3 | 2 | 2 | 4 | 0 | 0 | 1 | 0 | 6 | 1 |
| Dialogue 3 | 0 | 2 | 2 | 1 | 0 | 0 | 3 | 1 | 1 | 5 | 4 |
| Dialogue 4 | 1 | 1 | 3 | 2 | 0 | 0 | 1 | 2 | 3 | 4 | 2 |

Number of proactive pairs correctly identified by m out of 10 subjects, total = 18

| | m and probabilities of occurrence under null hypothesis | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | ns | ns | ns | 0.01 | $10^{-3}$ | $10^{-4}$ | $10^{-5}$ | $10^{-7}$ | $10^{-8}$ | $10^{-10}$ | $10^{-12}$ |
| Dialogue 1 | 8 | 0 | 1 | 3 | 3 | 0 | 1 | 1 | 0 | 1 | 0 |
| Dialogue 2 | 0 | 2 | 6 | 4 | 1 | 0 | 0 | 0 | 3 | 2 | 0 |
| Dialogue 3 | 1 | 1 | 5 | 1 | 1 | 0 | 3 | 1 | 0 | 4 | 1 |
| Dialogue 4 | 2 | 4 | 3 | 0 | 0 | 0 | 2 | 1 | 2 | 2 | 2 |

Experiments one and two are reported in Clarke(in press, a). The utterance resequencing technique developed for these experiments has since been used by Shapiro(in press) in a study of empathy in psychotherapy dyads.

## 3.3. EXPERIMENT 3

### 3.3.1 INTRODUCTION

The structure of discourse may affect all levels of description in the hierarchy of language. Successive utterances are liable to have related syntactic forms, as was seen in section 3.2.1. They are also likely to have related semantic content, but even this is not the level at which the pattern of social behaviour emerges. It should be possible to show that there are patterns and regular sequences in the structure of conversation even when the information conveyed by variations in syntax and semantics has been removed. These would be patterns of utterance use, having to do with the related functions of successive utterances in requesting and supplying information, expressing emotions, issuing instructions, and so on. In later chapters the idea of the the 'social function' of utterances will be elaborated, and identified with Austin's (1962) theory of performative utterances, or, as they are often called, speech acts. For the time being suffice it to say that the utterance properties of greatest interest in this study lie at an even higher level of abstraction than the semantic representation, and are therefore inadequately demonstrated in experiment 2, which could conceivably have drawn upon semantics alone, in the absence of any syntactic cues. It would be possible, for example, for a dialogue to contain only two references

to a particular person, place, object or topic. Any subject who assumed correctly that these two utterances should be conti guous would have a 0.5 probability of making the correct reactive pair instead of the 0.05 specified in the null hypothesis. In this way high scores could be achieved even under those circumstances in which the performative structure of the dialogue played no part. Unequivocal demonstration of a performative structure can only come from an experiment in which syntactic and semantic information has been removed from the component utterances.

This raises the methodological problem of conveying to a group of subjects the properties of a set of utterances whose syntactic form and semantic content are to remain unknown. Some scheme of functional categories has to be used, together with a description of the way these categories occur in sequences. The Bales (1953) 12 category system, and table of reactive tendencies were used for this purpose.

The principle is similar to those of experiments one and two. Again there are three postulates to be tested, which must all be true if the predicted outcome is to occur. The structure of conversation as represented by transitional probabilities between utterance classes must be non-random; subjects must be able to give some account of their beliefs about its non-randomness; and their judgements must be accurate, in that they are seen to correspond to the objective data on conversation structures. These three necessary conditions were tested by asking subjects to judge accurately the relative cell values in the Bales matrix of reactive tendencies.

Bales data plays the role in this experiment of the transcribed dialogues in experiments 1 and 2. Similarly the attempts by the subjects to reproduce an observed pattern by supplying cell values for a transitional probability matrix, are equivalent to their card sorting task in the earlier experiments.

Hypothesis: subjects can provide estimated cell values for a transitional probability matrix of utterance types, which correlate with observed values.

### 3.2.2 METHOD

#### 3.3.2.1 Subjects

Eight female subjects took part in the experiment. They were all students of occupational therapy, aged 18-25.

#### 3.3.2.2 Procedure

The subjects met as a group in the laboratory, and were briefed on the nature and purpose of the experiment. Each subject was given a response sheet showing a 12 x 12 celled blank matrix, with a brief description of Bales' 12 categories labelling the rows and columns. The subjects were asked to attend first to column 1, treating the description at its head 'shows solidarity, raises other's status, gives help, reward' as an event in a hypothetical interaction. They were to indicate the relative probability of the 12 possible sequiturs by placing the 12 cells of that column in rank order, entering the rank as an integer in each cell. So, for example, a subject who thought the most likely response to category 1, was category 7, would enter a 1 in column 1 row 7, and so on. The subjects were spaced throughout the room and each worked independently, ranking the cells in column 1, from 1 to 12, and then going

on to treat each of the subsequent columns as a separate interaction event, receiving a new set of ranks from 1 to 12. The subjects were told that they should consider only those occasions on which the first utterance came from one speaker, and the second from another, in other words the reactive contingencies. They were also asked to provide the judgements which they thought would correspond most accurately to the structure of conversation in groups of the following kind:-

> Experimental groups containing 3 - 6 members, who were usually unknown to each other before the first meeting. Each group met 4 times to discuss a 'human relations case'. The group members, who were male Harvard undergraduates, were given a 5 page summary of facts about someone in an administrative setting, having difficulty with the men under him, and a supervisor pressing him to get a certain job done. Each subject had a separate case summary, and was left uncertain as to whether the others had the same information. The summary was removed before discussion began. The subjects were asked to regard themselves as members of the administrative staff of the central character, meeting to decide why the people in the case were behaving in that way, and the best course of action. Each discussion lasted 40 minutes, and had no appointed leader. The experimenter left the room before the start of the discussion, which was tape recorded and observed through a one way screen.

The above is a brief description of the circumstances under which Bales' data were obtained, so that my subjects could base their judgements on an accurate conception of the setting for the behaviour sequences they were to reproduce.

### 3.3.3 RESULTS

#### 3.3.3.1 Concordance between subjects

If the subjects have an accuracy conception of the transition probabilities they were to reproduce, they could be expected to agree with each other on the way in which the 12 ranks were to be allocated in each of the 12 columns of the matrix. The data for each column(showing one antecedent utterance class, and the relative probability of the 12 possible sequiturs) were treated separately. The coefficient of concordance (Kendall's W, Siegel, 1956) between the 8 subjects was calculated together with $r_{s_{av}}$ (the mean rank order correlation between pairs of subjects), the corresponding value of $\chi^2$, and $\alpha$ the level of significance. These results appear in table 3.7.

Table 3.7

The data were then pooled over subjects by summing the cells across subjects and entering in each column the rank order of the summed ranks. This procedure is advocated by Kendall (1948: 101) for giving the best estimate of the true order of items from a number of concordant rank orderings. The resulting data formed a 12 x 12 celled matrix, still having antecedent utterance types characterising the columns, and rank orders of perceived transitional probability in the rows.

Table 3.7

Experiment 3 Concordance among subjects

| Column Number | Kendall's W. | $r_{s_{av}}$ | $\chi^2$ | $\alpha$ |
|---|---|---|---|---|
| 1 | 0.45 | 0.37 | 39.41[1] | 0.001 |
| 2 | 0.27 | 0.17 | 24.02 | 0.02 |
| 3 | 0.20 | 0.08 | 17.36 | 0.1 |
| 4 | 0.12 | 0.00 | 10.63 | n.s. |
| 5 | 0.24 | 0.13 | 21.30 | 0.05 |
| 6 | 0.17 | 0.05 | 15.15 | n.s. |
| 7 | 0.44 | 0.36 | 38.56 | 0.001 |
| 8 | 0.33 | 0.24 | 29.30 | 0.01 |
| 9 | 0.47 | 0.39 | 40.92 | 0.001 |
| 10 | 0.12 | -0.01 | 10.19 | n.s. |
| 11 | 0.17 | 0.05 | 15.14 | n.s. |
| 12 | 0.22 | 0.11 | 19.42 | 0.1 |

1 df = 11 in all cases

In processing the data from the 8 individual subjects it was found that on 9 out of 96 possible occasions the instructions had been misapplied in that a column of ranks contained one value twice, while another value was missing. This is an easy mistake to make in a task of this kind and did not seem to indicate a gross misunderstanding of the experiment by the subjects concerned. It was however a distortion of the data, which would have caused column totals in the matrix to assume unequal values. It was not the subjects' intention to use tied ranks, so the repeated values were not given equal values in the corrected data. Nor could the two items receiving the same rank be given that rank and the missing one by random allocation, as one of the items would have received a very different value from that entered by the subject. In fact the following correction was applied. All ranks between the repeated value and the missing value were displaced one rank towards the missing value, thus removing the omission. The two items which had been given the same rank were then randomly assigned to that rank or the adjacent rank which was now vacant. For example the ranking

3 6 12 4 5 7 9 2 1 8 7 10

(with two items at rank 7 and none at 11) would become

3 6 12 4 5 8 10 2 1 9 7 11

or 3 6 12 4 5 7 10 2 1 9 8 11

at random. This correction was applied to the data from individual subjects before applying tests of concordance, and subsequent statistical treatments. The correction produces a perfect rank ordering, similar to the imperfect ranking provided by the subject, but containing a slight and random distortion. This can only have the effect of

militating against the hypothesis of regular and accurate perception.

3.3.3.2 Response bias

The subjects can respond to the task in two ways so as to produce an accurate correspondence between their judgements and the objective Bales data. On the one hand they can attend simply to the properties of the second utterance in each pair, since some utterances are more commonly used than others and are therefore more likely to follow an antecedent whatever the antecedent is. In Bales' data, for example, category 12 (shows antagonism, deflates other's status, defends or asserts self) very rarely occurs. Consequently any subject who gave category 12 the rank 12 in all cases would produce an accurate performance without demonstrating any sensitivity to the differing probabilities of finding that response after the different classes of antecedent. This effect will be called the response bias, and is a source of variance in the data matrix which gives rise to differences between rows but not differences between cell values along each row. (The terms row and column refer throughout to the organisation of my data matrix, in which, for the convenience of subjects, the antecedent classes defined the columns, and the sequitur classes the rows. This convention is also used of the Bales matrix although in its original form the function of rows and columns was reversed. Account was taken of this fact in tabulating and comparing the two matrices.)

The effect of this response bias may be seen by calculating the concordance between columns of the matrix. That is the extent to which subjects gave the same rank ordering to each column, in spite of the differences in

preceding utterance type. The following results were obtained: Kendall's W = 0.20; $r_{s_{av}} = 0.12$; $\chi^2 = 26.00$; df = 11; $p < 0.01$.

The tendency to give consistent responses across columns is not necessarily a source of error, as the objective data also has the property that some rows contain higher mean values than others. That is the objective data is also partly a product of the tendency for some utterances to occur more frequently than others, regardless of the nature of the antecedent. Bales' matrix converted to ranks has a concordance of 0.63 between columns ($r_{s_{av}} = 0.59$; $\chi^2 = 82.5$; df = 11; $p < 0.001$). The ability of subjects to reproduce this feature of the Bales data may be assessed by calculating the rank order correlation between the row means from the two matrices. $R_s = 0.30$; $t = 0.978$; df = 10, n.s. one-tailed(Kendall, 1948; Siegel, 1956).

3.3.3.3 Reactive contingency

The second, and for our purpose more interesting, way in which the judgemental data from the subjects can correspond to the objective data matrix is by reproducing the variations in probability of a given utterance occuring as a function of its different possible antecedents. This may be regarded as a residual source of systematic variance in the matrix which emerges when the effect of response bias is removed. To remove the response bias or between row variance the matrices of subjective and objective data were recalculated, replacing each cell value with the difference between previous cell value and row mean. Thus $x_{ij}$ was replaced by $x_{ij} - \frac{\sum_{i=1}^{12} x_{ij}}{12}$, for all values of i and j. Now each cell of the matrices shows how much more or

less probable than usual (the mean) a particular sequitur becomes, by virtue of its following a particular antecedent. This is in contrast to the previous form of the matrices in which each cell showed how much more or less probable a particular sequitur is than the other possible sequiturs, given that particular antecedent. There should now be a cell by cell correlation between the new version of the subjects' matrix and the new version of Bales' matrix, if subjects were accurate on this aspect of the task. The corresponding cells from the two matrices were treated as paired items, and correlated using the Pearson product-moment correlation coefficient. $r = 0.32$; $z = 3.51$. $p < 0.00025$, one-tailed,(Brunig and Kintz,1968). This procedure is applicable even though one of the matrices is derived from a set of ordinal data (Bulmer, personal communication). The unequivocal result could not arise from the relatively small distortion introduced by treating ordinal data to product-moment correlation. In calculating the significance of this result , it must be remembered that both matrices now have rows and columns summing to zero, so the 144 pairs of observations only have 120 degrees of freedom instead of the 143 which might otherwise be expected.

### 3.3.4 DISCUSSION

The concordance between subjects was significant ($p < 0.001$) for three out of twelve utterance classes, ($p < 0.02$) for one class, ($p < 0.05$) for another and a trend ($p < 0.1$) for two more. There can be little doubt from these results that significant agreement existed between subjects on the task as a whole. However, these

levels of significance cannot be combined as independent results to give a summary value for the whole task, as the twelve sub-tasks are not entirely independent. Insofar as the subjects were describing the 'response bias' in the conversation sequences, they were producing twelve judgements of the same order of probability, not judgements of twelve completely different orders. Therefore the combination of results as if they were independent would only be a false inflation of their true significance. One of the results having $p < 0.001$ would in itself be sufficiently unlikely in twelve trials to suggest that significant concordance exists over a task as a whole.

The level of concordance is very variable, which may be a reflection of the properties of different utterance types. Categories 4 (gives suggestion...); 6 (gives orientation...); 10 (disagrees...) and 11 (shows tension...) were those which failed to produce concordant responses at even the 0.1 level.

The concordance between columns of the 12 x 12 matrix, summated across subjects, indicates that they are indeed giving similar judgements of sequitur probability in spite of differences in antecedent type. The correspondence between the overall response probabilities for the subject and objective data was indicated by a rank order correlation (Spearman's $r_s$ of 0.30; Siegel, 1956). This is insignificant with only 12 pairs of observations available, but it is interesting to note that the correlation is approximately equal to that obtained for the revised matrices of reactive contingency (which is very significant because of the large number of observations). This result in no way proves, but it quite consistent with the idea that subjects

can express accurately the differences in absolute likelihood of occurence between utterances of different types.

The issue of greatest interest as part of a scheme of sequence analysis, is the subjects ability to express the effect of antecedent type on sequitur probabilities. This appears in the revised matrices of cell value minus row mean, and their correlation. This was significant ($p < 0.00025$) suggesting that subjects can give accurate accounts of different transitional probabilities as a function of differences in antecedent type, even when working with abstract utterance classes. This supports the belief that a sequence analysis of the use of speech acts in conversation is feasible, since the result is only likely to occur if the production of conversation (performance) has a predictable temporal structure which is accurately reflected in the beliefs (descriptive competence) of the native actor.

The task was made particular difficult for the subjects by the requirement that they reproduce a conversation pattern from another speech community, in another culture, recorded approximately 25 years ago. Furthermore they were subject to the limitations of an imperfect category scheme, and a Markov model of sequential structure, which may have obscured their real capacity to give complex veridical judgements, of the pattern of discourse. It is to be hoped that refined category schemes and structural models will give us access to areas of communicative competence at least as rich and possibly more accurate than those achieved in this experiment.

The correspondence between subjective and objective data in these studies, and the great advantages of flexibility and semantic sensitivty offered by emic methodology, suggest that we should look for the pattern of conversation first in communicative competence, before examining its counterpart in the more difficult realm of observed performance.

## 3.4 EXPERIMENT 4

### 3.4.1 INTRODUCTION

It seems from experiment 3, that the judgements of individual subjects may be pooled to give an accurate picture of certain aspects of conversation structure, and therefore that such behavioural 'accounts' might serve as a legitimate source of data in future experiments. The final overview of the subjects' beliefs which constitute the data, may be obtained from their individual beliefs in different ways. In experiment 3, each subject reported independently, and the the experimenter produced a mathematical summary statement, from their individual responses. Harré and Secord (1972) propose that accounts be arrived at by negotiation between actors and judgements be made on the basis of group discussion.

Experiment 4 used much the same paradigm as experiment 3, except that judgements were made after discussion in a group of judges, who had not taken part in the interactions but who were required to negotiate a common report on the basis of their shared knowledge of the social world. The purpose was not to make a controlled comparison between the two approaches, but rather to establish the viability of each, in case other methodological considerations should

make it the more desirable alternative for particular studies. Consequently no attempt was made to match the two groups. On the contrary this experiment provided an opportunity to explore the generality of the effect by using a different and more heterogeneous subject group. In many respects the procedure was exactly as for experiment 3. These aspects of the experiment will not be described again in detail.

Hypothesis: subjects in group discussion can provide cell values for a transitional probability matrix of utterance types, which correlate with observed values.

### 3.4.2 METHOD

#### 3.4.2.1 Subjects

Eight subjects took part in the experiment, 5 males and 3 females. Six were students reading subjects other than psychology, one was a photographer and one a retired biochemist. Five were in the age range 18 -25, one was 27, one 32 and one 66.

#### 3.4.2.2 Procedure

The procedure was the same as experiment 3, except that the blank matrix was presented to the subjects on a large 'white-board' at the front of the group, and the experimenter filled in a single rank for each cell after suggestions and discussion from the group had given rise to a consensus of opinion. Care was taken by the experimenter not to reinforce suggested values by the use of verbal or non-verbal cues, and the experiment was conducted blind, in that the experimenter was unaware of the cell values in the Bales matrix at the time, as a further precaution

against the unwittingly accurate direction of subjects' responses by the experiment's behaviour.

### 3.4.3 RESULTS

#### 3.4.3.1 Concordance between subjects

Because of the way the experiment was conducted this issue does not arise as it did in experiment 3. In all other respects the two experiments received identical statistical treatment.

No formal measures were taken of the degree to which each group member participated in discussion. However the contributions from all members appeared to be approximately equal, with most cell values finding unanimous support after very brief discussion.

#### 3.4.3.2 Response bias

The concordance between the 12 columns of ranks in the results table was calculated using Kendall's W. This indicates the extent to which the subjects gave similar ranks to the probability of an utterance type occuring, regardless of the nature of its antecedent.. W = 0.084, which corresponds to a mean rank order correlation $r_{s_{av}}$ between pairs of columns of 0.00, which is of course insignificant.

The rank order of row totals was again compared with its counterpart from the Bales matrix to see if subjects had accurately represented the different frequencies with which the 12 categories are used. $r_s = 0.30$, $t = 0.99$; $df = 10$. The correlation between the two sets of ranks was not significant(one-tailed test).

3.4.3.3 Reactive contingency

The subjective and objective data matrices were transformed as in experiment 3, to give two 12 x 12 matrices whose cell values represented the increases and decreases in sequitur probability which resulted from variations in antecedent type. Values of the corresponding cells in the two matrices were used to calculate Pearson's product-moment correlation coefficient (r).

$r = 0.26$, $z = 2.86$, $p < 0.0025$, one-tailed

The value of r obtained by this procedure is given as positive in both experiments 3 and 4, to indicate that the underlying variables were directly rather than inversely related. Those utterance transitions which were found to be most common in the objective data, were believed to be most common in the subjective case. However, as one data matrix is derived from percentage frequencies using high numbers to represent the more frequent events; and the other is derived from ranks in which low numbers represent the most frequent events, the arithmetic value of the correlations as calculated was negative.

3.4.4 DISCUSSION

The effect of 'response bias' is completely absent, with zero correlation occuring among the different columns of ranks. The subjects in this experiment underestimated the similarity of the columns even more than the subjects in experiment 3, who produced 12 columns of ranks which were significantly concordant ($W = 0.20$; $r_{s_{av}} = 0.12$; $df = 11$; $p < 0.01$). The concordance between columns in the objective data matrix which Bales provides was found to be 0.63; $\chi^2 = 82.5$; $r_{s_{av}} = 0.59$; $df = 11$; $p < 0.001$), when

each column was converted to a set of 12 ranks.

Interestingly experiments 3 and 4 gave rise to data matrices both of which had correlations of 0.30 between the rank order of their row totals and the rank order of row totals from the Bales matrix, although in experiment 3 there was concordance between columns which was significant ($p < 0.01$) and in experiment 4 there was no concordance at all. It seems as if one experiment produced 12 similar sets of ranks, whose summary values resembled the objective criterion to a certain degree; while the other experiment produced 12 quite dissimilar sets of ranks whose summary values resembled the objective criterion to the same degree. The obvious explanation is that the correlation of 0.30 is not significant in either case. However it is consistent with the correlations of 0.32 and 0.26 which exist between the transformed data matrices in experiment 3 and 4 and their counterparts in the Bales data. If the subjects' performance in such tasks result in a correlation of about 0.3, and the insignificance of this result for response bias is simply due to the small value of N, then the data in experiment 4 is indeed a set of unrelated rank orderings whose summary value has some interesting resemblence to an objective criterion. A similar effect has been reported in cases where a number of subjects express their judgements on some matter as a set of ranks. The ranks when summed across subjects may correlate highly with the true rank ordering even though the correlations produced by individual subjects is low (Gordon, 1924).

Experiment 4 gives further evidence that subjects can accurately reproduce the transitional probabilities

of a conversation sequence. The data matrix when transformed to show changes in the probability of a sequitur occuring as a function of the different possible antecedent types, correlated significantly with the equivalent transform of Bales data. It also correlates with the equivalent matrix in experiment 3, $r = 0.31$; $z = 3.35$; $p < 0.00025$, one-tailed from which one may calculate that the difference between the correlations obtained in experiments 3 and 4 is insignificant ($t = 0.59$; $df = 118$; n.s. two-tailed; Bruning & Kintz, 1968).

A comparison of experiments 3 and 4 does not suggest that either technique is superior, but rather that essentially similar and significant results may be obtained under different circumstances and with different kinds of subjects. This supports the idea put forward in section 1.3 that the native actor has a descriptive competence which enables him to give an accurate account of the social world, and which is a legitimate source of data for the behavioural scientist.

The accuracy of subjects judgements is sufficient to produce highly significant correlations with the objective criterion, but when viewed in other ways it is not all that striking. The correlations involved are after all only of the order of 0.3, leaving 91% of the variance unaccounted for. This may seem like a hopelessly noisy source of data to use in future studies, unless the following favourable factors are taken into account:-

1) A discrepancy between subjective and objective accounts does not necessarily mean that the fault lies entirely with the subjective data. A number of factors were operating to reduce the correlations which reflect

no discredit upon the subjects' ability to judge contemporary scenarios. They were trying to reproduce behaviour patterns from another time and another culture. The Bales category scheme is an imperfect representation of our perception of utterance types; and the use of transitional probabilities an oversimplification of interaction structures. All these limitations can be reduced in future studies by the use of judgemental data.

2) Interaction structure is an abstraction from observed reality. It may only be studied if information is available on such things as the functional equivalence of dissimilar utterances; meaning; and the relations between utterances. None of these are directly observable, so judgemental data becomes a necessity for at least a part of the analysis.

3) Part of the interest in interaction structure centres on competence rather than performance. The limits of possible or permissible interaction should be studied as well as the limits on what is observed to occur. Again judgemental data is a necessity.

4) The results of different kinds of judgement may be cross checked, so as to discriminate between ubiquitous beliefs and random errors of judgement. Systematic errors of judgement, of course, cannot be detected in this way, but they may be discovered when the model of descriptive competence is compared with performance.

It is just possible that results like those of experiments 3 and 4 could be derived from a discourse system which had no sequential patterns in its production, but strong sequence effects on its perception. For

example if utterance type B were no more or less common than usual when following utterance of type A, but the judgement that an utterance was of type B was more readily given after a type A, then experiments 3 and 4 could be explained away as an artefact of the way in which Bales' coders interpreted the original conversations. It does not seem likely that the effect would be entirely due to a strange quirk of Bales judges, and even if this were part of the explanation the experiments would still provide an account of social reality as we perceive it. We all believe that answers (amongst other things) follow questions, but whether this is because special kinds of utterances called answers are produced after special kinds of utterances called questions; or whether any utterance is more likely to be seen as an answer after another has been seen as a question, it is difficult, and perhaps unnecessary, to decide. The implications of this problem will become apparent when utterance typologies are discussed in chapter 6.

## 3.5 SUMMARY

People produce their conversations according to a sequential pattern. The syntactic form, semantic content and functional type of the utterance are influenced by the history of the interaction. This may be detected, although not described, by asking subjects to reproduce the temporal structure of unfamiliar dialogues, whose elements are presented in such a way as to exclude certain aspects of syntactic or semantic variation. They can do this with greater accuracy than one would expect by chance

alone, suggesting that some regularity of structure is present in the dialogues and common knowledge in the speech community. This common knowledge among social actors, their communicative and social competence, will be used in the next chapter to investigate the nature of the interaction pattern.

At this stage the data all relate to probabilities rather than proprieties. It seems that interactions are conducted in such a way as to make some sequences of events more probable than others. There is no indication as yet that a set of rules exists which distinguishes between permissible and impermissible behaviour strings.

oOo

# CHAPTER 4 THE NATURE OF THE SEQUENCE

4.1 and 4.2 Statistical orders of approximations are seen to be more realistic the higher the order of approximation. At about the fifth order, the approximations become indistinguishable from control samples of genuine dialogue.

4.3 Linear and nested configurations of utterances are seen as equally realistic, but a cross-nested construction is viewed as less plausible than both. Variance due to structure is considerably greater than variance due to topic.

4.4 Subjects asked to make judgements of non-linear (nested) discourse structures provide structural maps which accord with the experimental predictions, in that they are sensitive to both the non-linearity of illocutionary structure, and the linear constative structure. They rate such dialogues as no less plausible than a control group of spontaneous exchanges.

4.5 Subjects' judgements indicate no relation between the spontaneous or solicited apologies of the remedial cycle, and the likelihood of the cycle terminating with the full elaboration of appreciation and minimisation.

4.6 Subjects expect that reciprocal concession, or reciprocal escalation of verbal conflict will ensue when one party chooses to concede or escalate the dispute.

4.7 Subjects believe that in confrontation between an accuser and accused, a direct accusation is more likely to lead to confession, and a neutral enquiry as to the accused's guilt more likely to lead to denial or evasion.

## 4.1 EXPERIMENT 5

### 4.1.1 INTRODUCTION

The results presented in chapter 3 indicate that speech acts are produced in a regular predictable sequence, so that the recent history of an interaction may be used in making inferences about its likely future course or, conversely each item in the sequence may be explained and understood by reference to the recent past. The next step of this analysis is to attempt a description of the various relations which may exist between a speech act and its predecessors, by focussing attention on particular speech acts and the predecessors which influenced them. This immediately raises the question of the number of past speech acts which are likely to be involved, or the amount of historical context to be reviewed before there is no further detectable direct influence on the present. That is the subject of this experiment. The concept of direct influence is worth elaborating. In any temporally structured system the present is influenced by past events, arguably by all past events, since if the past had been different in any respect, the present would probably have been different as well. For a system which progressed with perfect predictability from state A to state B, and from state B to state C, any passage into state A would give rise to the sequence ABC. So one could argue A influences C in that C has occured by virtue of the passage of the system into state A. However A influences C only by taking the system into the intervening state B, and any other state which led to B would have exactly the same effect is A. Therefore state B has the same prospect as

the history AB, and the knowledge of A is redundant. One would say in this case that the direct influence of C extended back to B, but no further. Of course there may be systems in which AB has one outcome and XB another, in which case the direct influence on events may be said to encompass two items from the historical record.

Most studies of interaction sequences have examined strings of events which were short, and whose length was not varied as part of the investigation. Bales related each act to the preceding act of the same (proactive tendency) or another (reactive tendency) actor. Jones and Gerard (1967) elaborated this classification, adding asymmetrical contingency and mutual contingency. In asymmetrical contingency one actor behaves reactively and the other proactively. Examples of this arise in formal interviews if the candidate reacts to each of the interviewer's questions, but the interviewer follows a rigidly preordained plan. In mutual contingency each item of behaviour by each actor is related simultaneously to his own ongoing behaviour stream, and to the last act of the other. The Jones and Gerard scheme retains reactive and proactive tendencies under the names of reactive and pseudo-contingency, giving four kinds of behavioural structure in all. This exhausts the possible relations between an item of dyadic behaviour and the preceding act of each party (with the exception of 'non-contingency'), but it takes no account of the more complex structures which could exist in longer strings of behaviour. Nor does it tell us whether the previous acts of self and other are all the sources of direct influence on the current act which need to be

considered.

There have been a large number of studies using essentially Markovian analysis. Sacks' (e.g. n.d.b.) adjacency pair is a form of reactive structure as is Schegloff's (1968) summons-answer sequence. Even van Hooff's (1973) elaborate flow chart of 'within-animal transitions' (in other words proactive tendencies), during chimpanzee social behaviour has to be interpreted as an essentially Markovian analysis as it provides no indication of the effects of events two items ago in the behaviour stream. For instance the flow chart shows that both crouch and flight are commonly followed by bared-teeth scream, and that bared-teeth scream is often followed by bared-teeth yelp. However it does not indicate whether exit from the state bared-teeth scream into bared-teeth yelp is more common when entry was from crouch or from flight.

Other authors have described longer behaviour sequences, for the most part assuming rather than demonstrating that this was desirable (e.g. Goffman, 1971; Laffal, 1965). Labov has employed both forms of analysis on different occasions. His diagram of the structure of dialogue(fig. 1.4; Labov, 1970: 81) relating actions to each other and to the utterances which embody them looks like a perfect Markov chain. However, in another paper (Labov, 1972) he considers longer passages of discourse and assigns to them a much more language-like structure. Altman(1965) compared zero, first, second, third and fourth order models of the communicative behaviour of rhesus monkeys, and found an increasing accuracy of prediction up to the fourth order.

So which approach is correct? Should the study of

conversation sequences allow for long and complex structures, and if so how long need they be to capture the most important influences of speech acts upon speech acts, and meanings upon meanings? In order to answer this question an experiment was performed on a number of statistical approximations to English dialogue. The idea was that a number of artificial dialogues constructed so as to allow each utterance to relate to different numbers of their antecedents should resemble genuine spontaneous dialogue only when a sufficient amount of history has been considered in their construction. The technique was a modification of that used by Miller and Selfridge (1950) for the investigation of sentence structures. They wanted to know whether the greater memorability of sentences than random word strings was due to the meaning of the sentence, or to its use of words in likely, although not necessarily meaningful sequences. They produced a series of word strings, which they called statistical approximations to English, in which each word was chosen so as to form a plausible part of a unit of varying size. In the ' zero order approximation' each word was chosen with no unit in mind, that is completely at random. In the 'first order approximation' each word was chosen so as to form part of a likely one word unit. So, words were chosen in proportion to their likelihood of occuring in an English sentence, but were deployed in random order. In the 'second order approximation' each word was chosen so as to form part of a common two word unit (hence second order), which meant that each word was chosen for its likelihood of following the one immediately preceding it. In the case of the 'third order approximation' each word was chosen for its

probability of following the previous two, thus forming a three word unit and so on. Such statistical approximations may be formed by studying large passages of English and tabulating the transitional probabilities between word strings and their sequiturs. This is extremely tedious for the higher order approximations, and Miller and Selfridge used a simpler method. To construct an approximation of the nth order, they showed (n-1) words to a subject and asked for a likely sequitur, to give a string n words long. The first word was then deleted and the most recent (n-1) shown to a new subject to obtain another sequitur and so on. In this way long strings of words may be obtained, each of which was chosen in the knowledge of the previous (n-1). The results of such an exercise look like this:-

Zero Order

Combat callous irritability migrates depraved temporal prolix alas pillory nautical.

First Order

Days to is for they have proposed I the it material of are its go studies the our of the following not over situation if the greater.

Second Order

Goes down here is not large feet are the happy days and so what is dead weight that many were constructed the channel was.

Fourth Order

We are going to see him is not correct to chuckly loudly and depart for home.

This principle was scaled up by using whole utterances in place of words to produce approximations to

dialogue instead of sentences. The resemblance of each approximation to genuine dialogue was assessed by means of a 'Turing-like' criterion, making use of subjects' ability to distinguish poor simulations of dialogue from the real thing, but not good ones (Turing, 1950).

Hypotheses - (a) subjects will form concordant estimates of the realism of various approximations.

(b) Higher orders of approximation will be seen as more realistic.

(c) At some value of n, to be determined, the nth order of approximation will cease to be distinguishable from a control sample of genuine dialogues.

### 4.1.2 METHOD

The experiment was conducted in two parts: the first to generate a series of 10 transcribed dialogues, each 20 lines long, and the second to assess their similarity to 'genuine' conversation.

#### 4.1.2.1 Dialogue generation

Genuine dialogue. Four of the ten dialogues were spontaneous natural conversations recorded in a waiting-room situation, while pairs of subjects awaited the arrival of a fictitious third group member. The subjects were all students, research assistants or technicians in the University of Oxford, aged 18 -25. There were 2 males and 6 females, two pairs were previously acquainted, and two were strangers. The subjects had been invited to the laboratory to take part in a social psychological experiment, whose nature was not disclosed. On arrival they were told that a third person was needed who had not yet

arrived. They were shown to a small room to wait, which had a window overlooking the street. There was a one-way observation screen in the room and two concealed microphones. Those subjects who asked about the one-way screen were told that such screens were standard fittings in all the test rooms, and that they need pay it no attention. All subject pairs carried on a conversation while waiting, and this was recorded on tape in an adjacent room. All subjects gave their subsequent consent to the transcription and use of the recorded material.

A 20 line passage from each conversation was used, beginning with the introduction of a new topic after steady state had been reached (after subjects had exchanged greetings, account of how they came to be subjects, disparaging remarks about psychological experiments, etc.). The friends discussed a forthcoming party, and animal communication, and the strangers discussed experiments and careers.

Artifical dialogues. The remaining 6 dialogues were all artificial using the scaled up version of Miller's scheme for producing statistical approximations to English sentences. The zero order approximation consisted of 20 utterances drawn at random from 20 works of contemporary fiction and assembled in random order. (This procedure was used as there is no 'dictionary of utterances' from which to draw items representative of modern usage.) The higher orders of approximation were produced by a panel of 20 subjects, all of whom were students or recent graduates of the Universities of Oxford or Cambridge. There were 12 men and 8 women, aged 18-25. All but one were from disciplines other than psychology. For the first order

approximation each subject was asked to provide several of the utterances which would be most likely to occur in conversation. Some of the possibilities which came to mind, like 'Hello', 'How are you', 'Goodbye', and so on, were so obvious as to be chosen, by a number of the subjects. The 20 utterances which were used in forming the first order approximation had to be unique. Consequently the selection of 20 different utterances from the pooled suggestions of 20 subjects did not necessarily allow the use of one utterance from each subject.

For the second, third, fourth and fifth order approximations, one utterance was taken from each of the 20 subjects, who knew what the preceding 1, 2, 3 or 4 lines were, depending on the order of approximation being generated. The following instructions were read to each of the 20 subjects at the beginning of the experiment:-

> In order to standardise the conditions of the experiment I will read through twice, the instructions that are given to all subjects. You may ask any questions you wish if there is something you don't understand.
>
> I will read you extracts from 12[1] pieces of dialogue, or supposed dialogue. Your task is to predict as accurately as you can the next 'line' in the sequence. This need not be what you would say personally, but rather what you would expect to hear next if you happened to overhear this piece of conversation.
>
> There is no catch in this, and your answers need be no more original and inventive than you would expect to hear from someone else.
>
> You may find that some of the extracts you are given are rather brief, nevertheless please do your best

---

1. The figure 12 appears in the instructions as subjects were required to produce 8 special approximations in addition to the 4 used in this experiment. This will be

n section 4.1.4.

> Please give a specific instance in each case, rather than for example 'Some remark about the weather, I expect.'
>
> This is not a test of your own use of language, or your intelligence. Your individual performance is not being rated.
>
> Any questions?

In cases where the first few subjects had to respond to an excerpt which was longer than the dialogue generated by the experiment so far, the appropriate lines from the following 'leader' were used:-

1A: Hello.

2B: Hello, how are you?

3A: I'm fine thanks, and you?

4B: Fine, how nice to see you like this.

So for example the second subject generating the fourth order approximation would be given:-

A: I'm fine thanks, and you?

B: Fine how nice to see you like this.

A: (Contribution of the first subject.)

#### 4.1.2.2 Dialogue Assessment

The 10 transcribed dialogues formed the primary data, and an inspection of their structure clearly demonstrates the effect of verbal context on utterance selection.

A secondary assessment employed a panel of 10 judges who were asked to rank order the dialogues according to their likelihood of being genuine conversations. The judges were 5 students (of subjects other than psychology), 2 housewives, a librarian, an engineer and a schoolboy. There were 6 females and 4 males. 7 were aged 18 - 25, one 16, one 57 and one 64. Their instructions were:-

> You will be shown 18 scripts taken from various kinds of conversation or supposed conversation. Each one is 20 lines long, and represents a conversation between 2 people who are simply called 'A' and 'B' on the scripts. Some of the scripts were taken from tape-recordings of real conversation, others were made up using artificial rules. Your task is to sort the pile of scripts into order, so that the one on the top of the pile is the one you think is most like real conversation; the one on the bottom the one you think is least like real conversation, and so on, with all the intermediate scripts placed in their order of similarity to real conversation. You may take as long as you like. On the back of each script is a code letter to enable me to identify it. These letters were assigned to the scripts at random, and any attempt to use the letters to place the scripts in correct order will hinder rather than help you. If you want to ask any questions either now or while you are sorting the pages, please do so. Please do not write on the pages.

(The instructions refer to 18 scripts because the judges were asked to assess the 10 dialogues under consideration here and the 8 special approximations mentioned in footnote 1.)

The summed rank orders were used as an index of the pooled opinions of the judging panel as Kendall(1948) suggested. In this way the quality of simulation achieved by each of the artificial dialogues was estimated by comparison with the four genuine dialogues.

### 4.1.3 RESULTS

#### 4.1.3.1. Transcriptions

The artificial and genuine dialogues used in this experiment are shown in Appendix G. The effect on dialogue structure of varying the order of approximation used in their generation, is clearly visible in the transcripts.

4.1.3.2 Judge's Assessment

The rank ordering of the 10 dialogues by the individual judges was tested for inter-judge concordance using Kendall's W (Siegel, 1956; Kendall, 1948). $W = 0.56$, $r_{s_{av}} = 0.51$, $\chi^2 = 50.4$, $df = 9$, $p < 0.001$.

The overall rank order of the ten dialogues and the sum of the ranks given to each by the 10 judges is shown in table 4.1. The same information is presented graphically in fig. 4.2.

Table 4.1

Experiment 5: Summed ranks for dialogues, produced by extracting sub-set ranks from each subject's responses for the super-set and then summating.

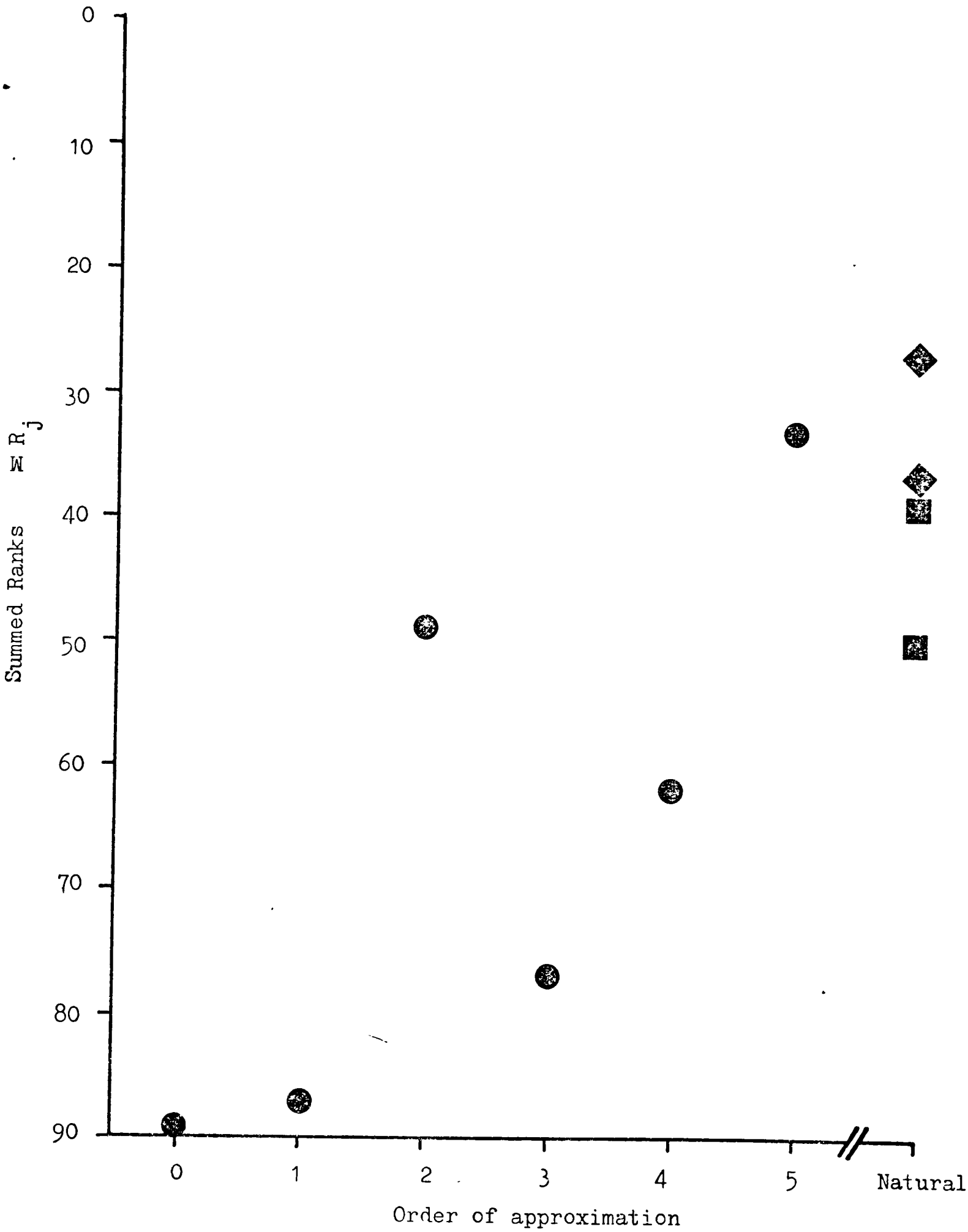
| Over-all rank | Ranks summed across subjects | Dialogue type |
|---|---|---|
| 1 | 27 | Natural dialogue -strangers |
| 2 | 33 | 5th Order approximation |
| 3 | 37 | Natural dialogue - strangers |
| 4 | 39 | Natural dialogue - friends |
| 5 | 49 | 2nd. Order approximation |
| 6 | 50 | Natural dialogue - friends |
| 7 | 62 | 4th. Order approximation |
| 8 | 77 | 3rd. Order approximation |
| 9 | 87 | 1st. Order approximation |
| 10 | 89 | O Order approximation |

Figure 4.2

Figure 4.2 Experiment 5 Summed Ranks for Dialogues

Produced by extracting sub-set ranks from each subject's responses for the super-set and then summating.

● represents an artificial dialogue, ■ a natural dialogue between friends and ◆ a natural dialogue between strangers.



The Spearman rank order correlation between order of approximation and perceived similarity to real dialogue was calculated for the artificial dialogues, (Siegel, 1956). $r_s = 0.8285$, $n = 6$. The critical value of $r_s$ with 6 pairs of values is 0.829, which the observed result just equals when corrected to 3 decimal places. Therefore the correlation could be said to be just significant($p < 0.05$), one-tailed.

If the mean of summed ranks for the 4 natural dialogues is used as an estimate of their perceived realism as a group, they may be treated as the highest order of approximation, giving 7 orders to correlate with perceived realism. The mean value for natural dialogues places them in the second rank of perceived realism, after the fifth order approximation and before the second order. Now $r_s = 0.86$, $N = 7$, $p < 0.05$, one-tailed. The significance of this results is less equivocal than the previous 6 item correlation for artificial dialogues alone.

### 4.1.4 DISCUSSION

The results suggest a number of conclusions. They show yet again that subjects have a conception of what is likely and what is not in the sequential structure of conversation, that they agree with each other in such matters, and their judgements are accurate (insofar as the orders of approximation of the artificial dialogues can be taken as a measure of their 'true' resemblance to real conversation.)

Conversations become more or less realistic as the amount of history influencing each utterance choice is

varied. There is a tendency for higher orders of approximation to be more realistic, culminating in the result that a fifth order approximation can seem more like real dialogue than real dialogue itself. Perhaps the study of dialogue structure should take account of longer sequences than the conventional item pairs. If so, an examination of 10 item sequences would appear from these results to be more than adequate, and that is the convention which will be adopted in some of the later experiments.

It may seem that this experiment can only provide a very crude estimate of the number of utterances which have to be considered in accounting for the structure of discourse, but then the issue itself is rather vague. To ask how far the influence of an utterance extends is like investigating the length of pieces of string. It is not in the nature of the question that its answer should be a precise quantity, or even a mean and standard deviation. It can take any value from no span to a lifetime. However experiments such as this suggest that as a matter of research policy, the search for structure somewhere in a ten unit span should be fruitful, and sufficient to encompass most commonly found constructions. The structure of a sentence does not present the same sort of problems. Here there is a definite delimitation of the span of influence by the boundaries of the sentence. Any syntactic influences which extend over larger spans, are usually omitted from linguistic studies and are likely to be different in nature to the intra-sentence influences. In the analysis of discourse, where no such sentence-like units are evident, the analysis of structure must be

guided by experiments like this, which direct attention to units of a particular size as being the most likely to embody the structural characteristics of the string.

It was said in footnote 1 that the 10 dialogues used in this experiment came from a larger original set of 18. The 8 special approximations which were not described here, consisted of second and third order approximations with information added about the motives of the speakers. These dialogues were included as a pilot study of a control-theory model of interaction, in which the actors' goals were formulated as output states, input states or transfer functions. The results were inconclusive and the theory has ceased to be of interest, but this part of the experiment has to be mentioned as the procedure for extracting a set of ranks for the 10 dialogues of interest from the super-set of 18 rank ordered scripts affects the interpretation of the results. The figures presented in the results section 4.1.3.2, were obtained by taking the ranks for 18 items provided by each judge, and re-ranking the 10 items of interest from 1 - 10 according to the order in which they came in the set of 18 ranks. This gave 10 sets of 10 ranks which could be used to calculate concordance, and correlation with the orders of approximation. Paradoxically the overall order of items does not necessarily stay the same if the other obvious procedure is used, of taking summed ranks across subjects for the 10 items directly from the list of 18 items. This procedure was rejected as it does not allow concordance to be calculated for the 10 item set.

The difference in result which may occur when a sub-set of items is reranked may be illustrated as follows:-

Suppose three judges gave the following ranks to five items A - E.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| Judge 1 | 1 | 2 | 3 | 4 | 5 |
| Judge 2 | 2 | 3 | 4 | 5 | 1 |
| Judge 3 | 2 | 3 | 4 | 5 | 1 |
| Sum | 5 | 8 | 11 | 14 | 7 |

If the only items of subsequent interest were A and E, we should conclude that A has a higher rank than E (that is a lower numbered rank). But if items A and E are re-ranked alone according to their places in the five point ranking provided by each subject, the data now look like this:-

| | A | E |
|---|---|---|
| Judge 1 | 1 | 2 |
| Judge 2 | 2 | 1 |
| Judge 3 | 2 | 1 |
| Sum | 5 | 4 |

from which we deduce that E has a higher rank than A, a reversal of the previous finding. This property of rank ordered data has only a small effect on the result of this experiment. The ranking of items which is obtained by taking the ten ranks of interest directly from the set of 18 without re-ranking is almost identical to the outcome of the chosen procedure, and equally compatible with the conclusions drawn here. The ranks of the 10 items and their graphical representation derived directly from the 18 item super-set are given in table 4.3 and figure 4.4.

Table 4.3

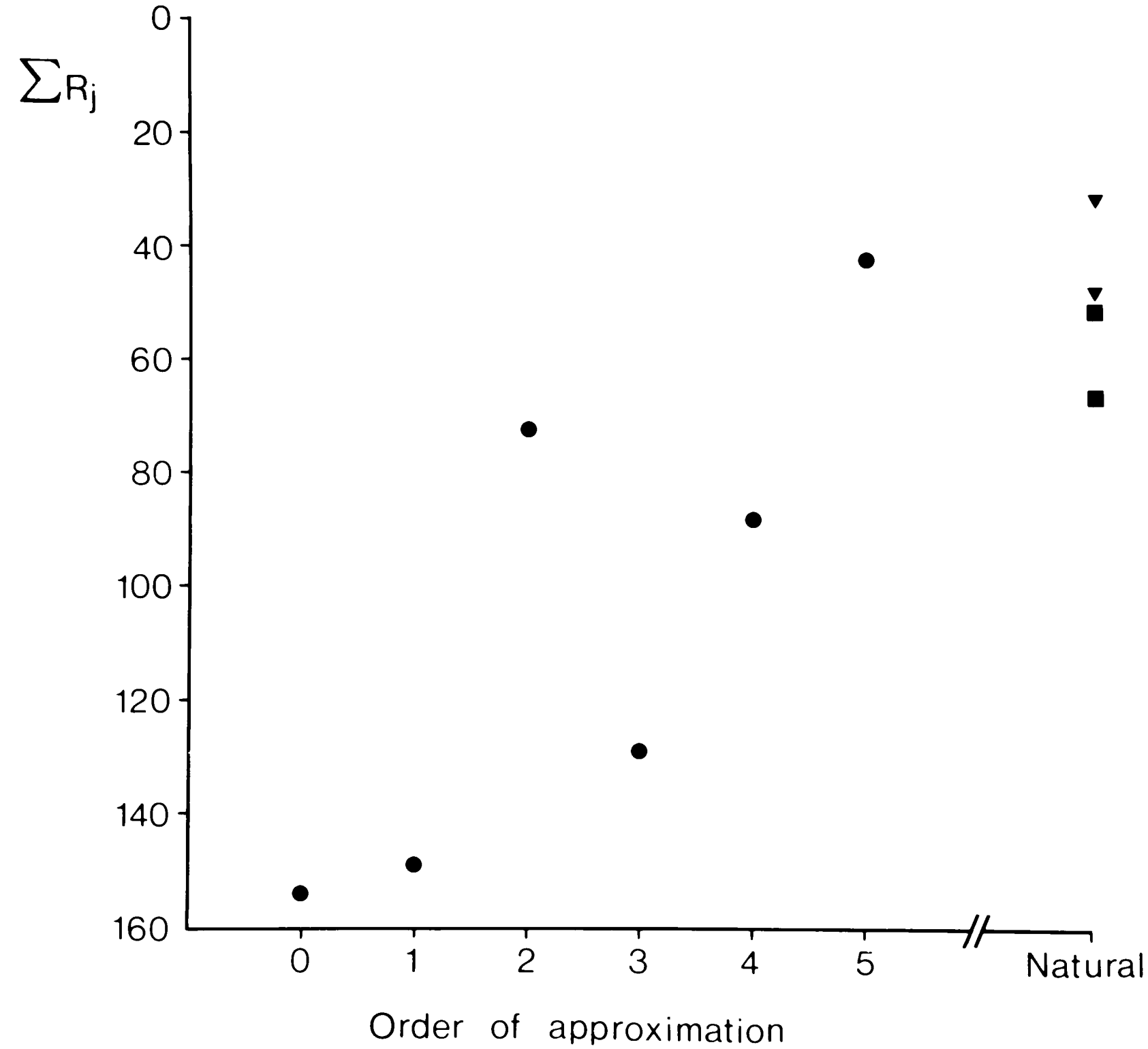
Experiment 5: Summed ranks for dialogues, produced by taking the summed ranks for the sub-set directly from the super-set.

| Over-all rank | Ranks summed across subjects | Dialogue type |
|---|---|---|
| 1 | 31 | Natural dialogue -strangers |
| 2 | 42 | 5th. Order approximation |
| 3 | 49 | Natural dialogue - strangers |
| 4 | 50 | Natural dialogue - friends |
| 5 | 66 | Natural dialogue - friends |
| 6 | 72 | 2nd. Order approximation |
| 7 | 88 | 4th. Order approximation |
| 8 | 129 | 3rd. Order approximation |
| 9 | 149 | 1st. Order approximation |
| 10 | 154 | O Order approximation |

Figure 4.4

The concordance of judges over the 18 items was 0.49, $r_{s_{av}} = 0.43$, $\chi^2 = 82.58$, df = 17, $p < 0.001$. The relative order of the artificial dialogues is unchanged so their correlation with order of approximation remains 0.829, N = 6, $p < 0.05$, one-tailed. The only difference in order resulting from the change in procedure is that the second order approximation, and the worst of the natural dialogue, which are adjacent in both sets of ranks, change places. The correlation between the rankings achieved by the two procedures is 0.988, t = 18.09, df = 8, $p < 0.0005$, one-tailed.

Figure 4.4 Experiment 5 Summed ranks of sub-set extracted directly from super-set. Circles represent artificial dialogues, squares dialogues between friends and triangles dialogues between strangers.



Certain conclusions are not in order. The success of the fifth order approximation does not mean that all dialogue has the properties of a fifth order series. Nor does this experiment imply that the structure is linear, since other forms of structure, like for example, a sentence-like tree could also be captured by a simulation of this kind if the order of approximation were high enough to encompass the limits of the tree for the examples used. The second order approximation was placed in unexpectedly high rank by the judges. This does not mean necessarily that second order approximations are particularly accurate. This result is better interpreted cautiously as an indication of the imperfect positive correlation between order of approximation and perceived realism, which is bound to arise from sources of variation between dialogues other than order of approximation. Topics and the contents of individual utterances must be allowed to vary in an uncontrolled fashion from one dialogue to another, by the very nature of the experiment, which adds an unavoidable measure of noise to the data. The possibility that the second order approximation (alias Markov chain, or reactive contingency) is in some way special will be considered in the next experiment.

In evaluating the results, it must be realised that this experiment is methodologically imperfect. Chronologically it was the first experiment of the series to be carried out, and its subject matter is not amenable to precise treatment. Two criticisms are worth noting. There was only one example of each kind of dialogue, albeit the product of 20 different subjects in each case, so each order of approximation is represented by only one

example, which may be more or less representative of its type. This has the compensatory advantage of reducing the demand on the judges' memory. The rank ordering of a set of 20 line dialogues is no mean feat, and the memory load is large. To increase that load by a factor of four or five would very probably be to the detriment of the experiment.

The second criticism of note is that the 20 subjects generating the artificial dialogues all went through the various conditions in the same order, and that was the order of increasing approximations. Perhaps the results are due to a practice effect in these subjects. This is unlikely for two reasons: the provision of a next line for an incomplete dialogue is such an overlearned skill for the normal subject, that an extra few trials is hardly likely to produce a radical improvement in performance. Secondly the correlation between order of generation and perceived realism for the set of 12 transcripts generated as orders of approximation, was 0.28 which is far from significant. (The critical value of $r_s$ for a one-tailed significance of 0.05, with N = 12 is 0.51. For this test the sub-set ranks were drawn directly from the order of items in the super-set.)

Since the experiment was carried out, a similar study has been published by Pease and Arnold (1973). Their conclusions are also compatible with the policy of looking for structures in strings of more than two items in length, and with an upper limit of five to ten items. They used much the same procedure, also inspired by the work of Miller and Selfridge, but a few important differences of technique should be mentioned. They generated zero, first,

second and 'text' orders of approximation, but misapplied Miller's nomenclature by treating as second order those dialogues generated from a two unit context(which should be called third order) and so on. To avoid confusion I shall describe their experiment in their terms with the numbering used by Miller and myself in parentheses. The 'text' order of approximation was generated by allowing subjects to see the whole of the dialogue thus far. Subjects were given a description of the situation, roles of speakers, and topics in each case. Two different situations were used and one example of each order of approximation produced for each situation. The zero and text orders for the two situations were produced by two groups of subjects, and the first (second) and second(third) orders by two others. As a result of this part of the experiment, yet another group of subjects was used to produce third (fourth) order approximation. The dialogues were 10 lines long, and produced in written form by the subjects.

A group of judges rank ordered approximations of zero, first(second), second(third), and text orders, and another group of judges ranked the third(fourth) order with the text order. As all the dialogues were artificial there was no measure of 'absolute plausibility' for any of them. An attempt was made to rectify this by having the dialogues rated as well on the assumption that a high plausibility rating would provide this absolute standard. The mean result for each subject's contribution at each level of approximation was calculated and sign tests performed between all possible pairs of orders of approximation. The only significant difference between

adjacent orders of approximation was between first(second) and second(third), although there was a general tendency for perceived plausibility to increase with order of approximation throughout the series. The second(third) order approximation was not significantly worse than text order, and the third (fourth) order was better than the text order but not significantly so. Subjects were given detailed descriptions of the situations.

In general the outcome of this experiment was very similar to my experiment 5. The fact that Pease and Arnold find that approximations get no better after the second (third) or third (fourth) order, rather than at the fifth order may be due to the extra information their subjects had from the description of the situations. In evaluating their results certain criticisms should be borne in mind.

1) The dialogue was generated in writing which makes the experiment less plausible as an investigation of natural dialogue production. Pease and Arnold admit this.

2) There was only one example of each combination of situation and order of approximation.

3) There were no natural dialogues against which to calibrate the judgements of plausibility. The argument that a five point rating of plausibility will do instead is unconvincing.

4) The provision of information about the situation, speakers' roles and topics is a confounding factor,since a lot of this information would normally come from the dialogue itself, extending the span of influence of the utterances.

5) Different subjects were used to generate zero and text orders; first (second) and second(third) orders;

and third (fourth) order of approximation, confounding inter-condition differences with inter-subject differences.

6) Different judges were used for the comparison of zero, first(second), second(third) and text orders of approximation; and third (fourth) and text orders of approximation.

Experiment 5 and the study by Pease and Arnold both have methodological flaws. Experiment 6 will use a modification of the same procedure, to re-examine the difference between various orders of approximation to English dialogue.

## 4.2 EXPERIMENT 6

### 4.2.1 INTRODUCTION

The purpose of the last experiment was to show that subjects agree about the relative plausibility of a set of dialogues;that they tend to see as more plausible those dialogues which relate each utterance to larger numbers of antecedents (higher orders of approximation); and that at the fifth order of approximation, or thereabouts, artificial and real dialogues become indistinguishable.

The outcome was unsatisfactory in several respects because of faults in the experimental design. The most serious problem was an order effect. The subjects who contributed to the artificial approximations to dialogue all received the approximations in the same order, and that was the order of increasingly sophisticated approximations. Therefore the finding that higher orders of approximation were seen as more plausible by the judges may have come about because of the genuine differences between experimental conditions, or because the subjects had had more

practice at the task by that time. There was also the problem of extracting the rank ordered data on 10 dialogues from the ranking of 18 obtained in the experiment. The rank-ordered data restricted the analysis to non-parametric techniques, and there was only one example of each order of approximation. Consequently the unexpectedly high rank given to the second order approximation could not be checked.

These problems were not entirely resolved in the study by Pease and Arnold as that was also faulty in its design. They only used one example of each dialogue type, and included no real dialogue as a control. The dialogues were generated by five different groups of subjects and assessed by three more. The dialogues were produced in written form by the subjects, and topic information was given in addition to the previous 'lines' required for a particular order of approximation.

Experiment 5 was repeated with modifications (as experiment 6 ) to correct the design faults of the previous version. The examples of dialogue to which the 'generating' subjects were to contribute, were presented to each subject in a different random order. There were four examples of each type, and the judgements of the second group of subjects were expressed as ratings instead of rankings, allowing for parametric analysis. All the dialogues which were presented for judgement formed part of this experiment so there was no problem of extracting a data sub-set from a larger data matrix. Both real and 'text order' dialogues were included for comparison, and the range of statistical approximations was extended to include the sixth order.

Hypotheses 1) Subjects agree on the relative plausibility of conversation sequences.

2) Higher orders of approximation to discourse are seen as more plausible.

3) At about 5th order, approximations approach a maximum standard.

### 4.2.2 METHOD

The experiment was in two parts: the first was to generate a series of 36 transcribed dialogues, each 10 lines long, and the second to assess their similarity to 'genuine' conversation.

#### 4.2.2.1 Dialogue generation

Genuine dialogues. The same four genuine dialogues were used as in experiment 5, but the subjects were only shown the first ten lines of each. This experiment uses more extracts of dialogue than the last, so they were each reduced from 20 to 10 lines in length, to make the subjects' tasks more reasonable.

Artificial dialogues. Lines 1 - 10 of the zero order approximation used in experiment 5 were used as one 10-line extract in experiment 6, and lines 11 - 20 were used as another. 20 new lines of dialogue were selected from 20 different works of contemporary fiction and arranged in two randomly ordered sequences of 10 lines length, to give a third and fourth example of the zero order of approximation.

The remaining artificial dialogue (four of each 1st., 2nd., 3rd., 4th., 5th., 6th., and text orders of approximation) were produced by ten subjects, each of whom contributed one line to each of the 28 extracts. There were 7 female subjects and 3 males aged 18 - 26. Six were students in subjects other than psychology, one was unemployed, one an art student with a psychology degree, one a research

assistant in psychology (but with no formal qualifications in psychology), and one an undergraduate psychologist.

The subjects were asked to read the following instructions:-

> To ensure that all subjects receive the same information about this experiment, the instructions are presented in writing. If, however, there is anything you are unclear about, please ask at any stage.
>
> A number of brief extracts of dialogue or supposed dialogue will be read out to you, and your task is to provide a sensible continuation for the conversation. You should provide the whole of the next speaker's utterance, from the time he starts to speak until he relinquishes 'the floor'. This can be a few words, phrases or sentences -- whatever you think is most appropriate. It need not be what you would say personally, or even the thing which would seem most likely to be said by someone else. The utterance you provide should the the most sensible continuation you can think of, and the one which fits best into the context you are given.
>
> There is no catch in this, and you should not be trying to produce particularly unusual or inventive responses.
>
> You may find that the extracts you are asked to continue are rather short in some cases, nevertheless please do your best.
>
> Please give a specific instance in each case, rather than for example 'Some remark about the weather, I expect.'
>
> This is not a test of your own use of language, or your intelligence. Your individual performance is not being rated.
>
> If you have any questions please feel free to ask them.

In each case the experimenter read the appropriate number of lines from the incomplete transcript, which the subject could not see, and then recorded the next line suggested by the subject. The bundle of transcripts was thoroughly shuffled after each subject had completed the task, thus ensuring that each subject contributed to the 28 dialogues in a different order and eradicating the order effect which

marred experiment 5.

In cases where the first few subjects needed a longer leader than the experimental part of the dialogue, the appropriate lines from the following greeting were used:-

1A: Hello.

2B: Hi.

3A: How are you?

4B: I'm fine thanks, and you?

5A: Fine, how nice to see you like this.

4.2.2.2 Dialogue assessment

Again, the transcribed dialogues are a kind of 'data' in themselves, and they demonstrate clearly the effect on discourse structure of increasing order of approximation (see Appendix H).

Additional assessment was provided by a panel of 10 judges of whom 6 were female and 4 male. All were in the age range 18 - 26. There were 6 students of subjects other than psychology, 2 psychology students, a librarian and a photographer. Their instructions were:-

> To ensure that all subjects receive the same information about this experiment, the instructions are presented in writing. If, however, there is anything you are unclear about, please ask at any stage.
>
> You will be shown a number of type-written extracts of dialogue. Your task is to assess each one separately and mark your assessment, as a rating, on the response sheet provided.
>
> Please judge each piece of dialogue according to the way the individual utterances, or 'lines', or 'turns-at-talking' follow on from the earlier part of the conversation. That is to say, you should assess how well each utterance fits its context, and the extent to which the dialogue as a whole forms a sensible sequence of events. This is the only aspect of the transcripts which should affect your judgement.

Each transcript carries a code number. These were allocated at random, so they will give no guidance as to how you should evaluate each passage. On the response sheet these same code numbers are repeated, with a space beside each for your assessment.

Please enter in every space a number from 1 to 7 to indicate how well you think each dialogue runs from utterance to utterance, using 1 for the worst examples and 7 for the best. You might find it helpful to consider this task as one of placing items on a measuring scale or dimension,

Very bad ___ ___ ___ ___ X ___ ___ Very good

except that you give your answer in numerical form. So a dialogue which seemed to come at the point marked X (above) on a scale from very bad to very good would be represented by the rating 5, and so on.

Before you fill in any ratings please read through all the dialogues once to see the overall standard, but keep them in order. Then go back to the beginning and rate them one at a time, in the order they were given to you.

In judging how well each utterance fits its context, you should try to see how it relates to all those which went before it in the same dialogue, not just the immediately preceding one.

Each dialogue is completely separate. There is not supposed to be any sequence formed between them.

If you have any questions please feel free to ask them.

The judges filled in their ratings on a response sheet, on which each dialogue was identified by a code number. These had been allocated to the different transcripts at random, and bore no systematic relation to the nature of the transcripts. The transcipts were shuffled before presentation to each new judge.

## 4.2.3 RESULTS

### 4.2.3.1 Transcriptions

The dialogues used in this experiment are shown in Appendix H. The effect of varying the order of approximation on the structure of the dialogues is clearly apparent.

4.3.3.2 Judges' assessment

The 7 point ratings of the 36 dialogues by 10 judges were subjected to a factorial analysis of variance, using the computer program BMD 8V, (Dixon, 1973: 693-704). There were three factors C(onditions), the various orders of approximation; E(xamples), the four different examples in each condition; and S(ubjects). C was specified as a fixed effect having 9 levels, E as a random effect with 4 levels, nested in C, and S as a random effect with 10 levels crossed with C and E. The results of this analysis are shown in table 4.5.

Table 4.5 Experiment 6 Analysis of variance

| Source | ss | df | MS |
|---|---|---|---|
| Mean | 6342 | 1 | 6342 |
| S | 30.58 | 9 | 3.398 |
| C | 1067 | 8 | 133.3 |
| E(C)[1] | 119.8 | 27 | 4.43 8 |
| S x C | 77.49 | 72 | 1.076 |
| S x E(C) | 226.4 | 243 | .9318 |

1. Parentheses indicate nesting relations. E(C)means E is nested in C. F ratios and levels of significance are not shown in this table as the peculiarities of the experiment design make an F ratio inappropriate. F' or F" ratios may be used (Winer, 1962: 184 & 199).

The specification of E as a random effect, means that the F ratio for C is depressed insofar as E and C interact. A variance estimate for the interaction of E x C is added into the error term for C. Therefore any significant main effect of C which is found is more likely to have general validity.

An experiment design of this kind requires that the variance due to source C, be evaluated by comparison with an error term that does not correspond to any single mean square value produced by the experiment. So a simple F ratio of two mean squares will not suffice. The variance due to C may be tested by using one of two F-prime ratios usually represented as F' and F'' respectively. For the main effect C

$$F' = \frac{MS_C}{MS_{E(C)} + MS_{SxC} - MS_{SxE(C)}}$$

If the degrees of freedom of variance source C are $f_C$, degrees of freedom for E(C) are $f_{E(C)}$ etc. then the numerator of the above F' ratio has $f_C$ degress of freedom, and the denominator has

$$\frac{(MS_{E(C)} + MS_{SxC} - MS_{SxE(C)})^2}{(MS_{E(C)}{}^2/f_{E(C)}) + (MS_{SxC}{}^2/f_{SxC}) + (MS_{SxE(C)}{}^2/f_{SxE(C)})}$$

This is an F' ratio of 29.10 distributed approximately as F with 8 and 28 degress of freedom. The critical value of F for df = 8,28 $\alpha$ = 0.001 is 4.69, so the main effect of C (the 9 different orders of approximation) is significant at well beyond the 0.001 level. The alternative expression

$$F'' = \frac{MS_C + MS_{SxE(C)}}{MS_{E(C)} + MS_{SxC}}$$

has

$$\frac{(MS_C + MS_{SxE(C)})^2}{(MS_C{}^2/f_C)+(MS_{SxE(C)}{}^2/f_{SxE(C)})}$$

degrees of freedom for the numerator, and

$$\frac{(MS_{E(C)} + MS_{SxC})^2}{(MS_{E(C)}{}^2/f_{E(C)})+(MS_{SxC}{}^2/f_{SxC})}$$

degrees of freedom for the denominator.

So F" = 24.35 distributed approximately as F with df = 8,41. The critical value of F for df = 8,41 $\alpha$ = 0.001 is 4.21, so again we can say that the main effect due to C is significant at well beyond the 0.001 level.

The only other effect to emerge from this analysis is the main effect E(C). (There is no interaction term for E and C as E is nested in C.) The effect of E(C), the difference between the four different examples of each dialogue type used in the experiment, may be evaluated using the simple F ratio.

$$F = \frac{MS_{E(C)}}{MS_{SxE(C)}}$$

with $f_{E(C)}$ and $f_{SxE(C)}$ degrees of freedom.

This gives an F value of 4.76, df = 27, 243, $p < 0.001$.

(Winer, 1962: 184 & 199)

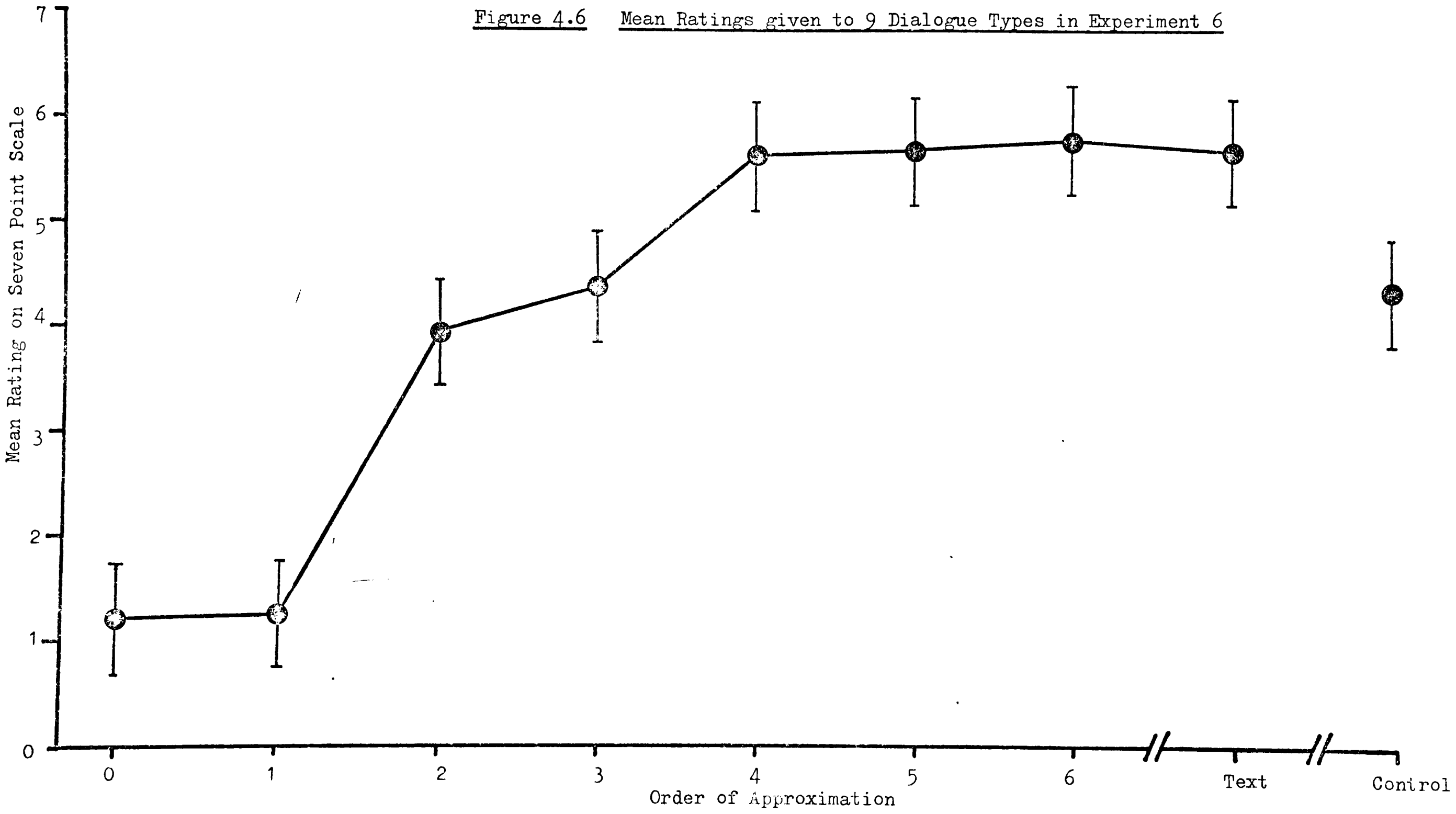
The mean ratings given to each of the 9 dialogue types are plotted in figure 4.6. The confidence interval of 0.98 shown for pairwise comparisons, is the value of Fischer's LSD (least significant difference) multiple comparison test(Kirk, 1968: 87). In other words any pair of mean ratings which differ by more than 0.98 are significantly different($p < 0.05$, two-tailed)

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Figure 4.6

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Figure 4.6 Mean Ratings given to 9 Dialogue Types in Experiment 6



### 4.2.4 DISCUSSION

The hypotheses are supported by the experiment. Subjects do agree on the plausibility of different passages of dialogue. The variance due to the 9 different dialogue types, and due to the four examples of each type, are both large in comparison with their variation between subjects. This is shown by the significant values of the variance ratios. Increased orders of approximation are seen as more realistic, which shows again the importance of sequential influences in the generation of discourse, and the ratings approach an asymptotic maximum after about the fourth order of approximation.

The curve in figure 4. has some interesting features. The zero and first order approximations are nearly identical. This may have been because of an aspect of the experimental procedure which was not part of experiment 5. In experiment 6, the first order approximation was presented to the subjects as a limiting case of the higher orders. They were asked to provide an utterance which would fit well into an ongoing conversation, although they did not know what had preceded it. They were not told to produce the most common utterances they could think of as they were in experiment 5. Therefore in experiment 6, the first order approximation consisted of utterances like

> Yes you can most certainly borrow it. I don't play it anymore. Though when Christopher becomes a little more proficient he will want to buy his own, and no doubt a better instrument than this.

which is very specific and perhaps a little implausible, when compared with the more obvious

> Hello.
>
> That's nice.
>
> Oh dear.

which formed the first order approximation in experiment 5.

In this respect the nature of the first and zero orders are more similar in experiment 6 than in experiment 5 so it is not surprising that they are given similar ratings.

The control dialogues were given a relatively low rating. They do not appear to be 'as good as' the text order of approximation for example. The reason for this is almost certainly the disfluency and situational specificity which is found in spontaneous dialogue and which confounds the comparison with the idealised artificial scripts.

It was suggested at the end of experiment 5 that future experiments should work with 10 utterance spans. This might seem excessive in the light of this second experiment showing again that adequate simulation is achieved by fourth and fifth order approximations. However, the 10 item span will be used later on as a safeguard. The dialogues produced by this experiment are rather stilted and without clear motivation or ongoing themes. They do poor justice to the complexities which can emerge in conversation, and the finding that fourth order approximations are as good as text order, would probably be modified if the greater complexities of the real-life situation had influenced the subjects' performance in generating the text order approximations.

It is tempting to speculate further about the shape of the curve in 4.6. It is roughly 'exponential' in form which is as one would expect. It departs from the shape of a perfectly smooth curve in having two abrupt increases in rating between first and second, and third and fourth orders of approximation. These are the points at which the last and penultimate contributions of <u>the other speaker</u> become known. The increments in rating between second and third, and fourth and fifth orders of approximation are much smaller. These

are the points at which the last and penultimate contributions of the same speaker become known. This suggests that reactive structures are much more important for the production of realistic dialogue than proactive ones in this kind of conversation, although the reactive contingencies may span more than two items in the sequence.

The conclusions, then, are much the same as those drawn from experiment 5, but made all the more convincing by increased attention which was given to the experimental design.

If, as these experiments suggest, the essence of dialogue structure is to be found in strings of a few utterances, the next issue will be to find the form of that structure. The results to date are all compatible with either a linear stochastic series or a structure which allows the greatest influence to be exerted between events which are far from contiguous in the observed order of events, such as the strings of morphemes which are produced by tree-like rule schemes. In the next experiment three kinds of structure will be compared, to see which of them should be included in a model of conversation.

## 4.3 EXPERIMENT 7

### 4.3.1 INTRODUCTION

The related items of behaviour which make up a predictable sequence or structure may be arranged in various ways. Some arrangements, called linear stochastic series, are relatively simple to describe, since the influence on each item of its antecedents operates in a linear fashion. Each element in the behaviour stream is influenced most strongly by its immediate predecessors. Once the influence has been traced back a few items into the history of the behaviour stream

the bulk of the variance is accounted for, and the pattern may be adequately described by the matrix of transitional probabilities from each possible arrangement of the relevant number of preceding items to each possible class of sequitur. In the simplest case the transitional probability matrix gives a perfect description of the sequence, when only one item of history is used - the defining property of the Markov chain.

However not all patterned sequences are necessarily stochastic and linear. Some may have the property that the chain of related events may be interrupted and resumed, without destroying its structure, a possibility which has led to the present interest in non-linear or non-stochastic models. (For a definition of terms linear and stochastic as used here see Glossary, Appendix D).

The linear stochastic models have a number of advocates, partly because they may be treated by mathematical techniques which are simpler and better developed, than those for the non-stochastic series, and a number of authors have found or assumed them to be quite adequate for the description of a variety of behaviour sequences. One source of the belief in stochastic or more specifically Markov models has been the application of control theory to behaviour. The central concept of the feedback loop suggests that each item of behaviour produces a change in the physical or social environment, which the organism perceives and uses to formulate or modify its next act, (Leavitt & Mueller, 1951; Annett, 1969), giving the behaviour a stochastic structure. Bales (1953), Jones and Gerard (1967), and Shannon and Guerney (1973) all base their analyses of sequences on stochastic models of reactive and/or proactive structure. Jaffe (1967) analysed

the alternating pattern of speech and silence by speakers in a dialogue and found the Markov model suitable for the description of his data. The behaviour stream was found to be most predictable when segmented into 300m.sec.units. The possibility of speech occuring in a given interval could be predicted from the four possible states in the preceding interval of actor speaks, alter speaks, both speak or neither speak; and the accuracy of prediction was not increased by considering more than one previous interval.

The advocates of non-stochastic models often base their argument on the ubiquity of non-stochastic sequences in human natural language, and the probability that the temporal patterns of speech and action are similar. For example Lashley (1951) wrote:-

> 'I have devoted so much time to discussion of the problem of syntax not only because language is one of the most important products of human cerebral action, but also because the problem raised by the organisation of language seems to me to be characteristic of almost all other cerebral activity ... Not only speech, but all skilled acts seem to involve the same problems of serial ordering, even down to the temporal co-ordination of muscular contractions in such a movement as reaching and grasping.'
>
> (Lashley, 1951: 121)

More recent authors have based their descriptions of the similarly non-stochastic patterns in language and behaviour on the model of syntax advanced by Chomsky (1957). Miller, Galanter and Pribram (1960), Barker (1963), Marshall (1965), Ervin-Tripp(1969) and Martin (1972) cover between them a variety of behaviours -- human and animal; individual and social -- all in the light of the tree-like temporal structure of English syntax. Schlesinger (1974) used an 'R matrix' to describe the complex forms of structure which may exist within a dialogue. Numbers referring to the utterances appear along both margins of a lower-half diagonal

matrix, while cell values of 1 or 0 are used to indicate related or unrelated item pairs. His paper is theoretical and assumes rather than shows that notations are required which can represent non-linear structures with greater ease than can the obvious move-move digraph.

A number of articles have appeared, analysing the arguments for and against linear stochastic models in some detail, and all concluding that the non-linear models are superior, if only because they are sufficiently flexible to describe either sort of behaviour sequence if the need should arise. The outline of the argument as presented by Chomsky (1957), Farrell (1970) and Hutt and Hutt (1970) is much the same. The simple markov and higher order stochastic theories are introduced, shown to be inadequate because of some kind of nesting (also called embedding, side sequences, insertion sequences etc.) and replaced by a more flexible generative device based on the tree rules, or perhaps feed-back loops with added 'meta-organising feedforward' facilities as suggested by McKay (1972). The fact that sentences are not linear stochastic morpheme strings does not imply that they cannot be produced by a device with a finite number of states as Chomsky (1957) supposed. The distinction between tree and finite state generators has to do with parallel and serial processing. The chapter in Hutt and Hutt on sequence analysis ends with the following evaluation of the 'phrase structure grammar model'.

> The strength of the model lies in its ability to deal with a considerably greater behavioural repertoire and much longer sequences than can be treated by Markovian processes alone. An evaluation of the various models presented in this chapter awaits a study in which all three types are applied to the same behavioural data.'
>
> Hutt and Hutt, 1970: 184.

The purpose of the present experiment is to provide such an empirical comparison between models, for one aspect of discourse structure, namely the arrangement of related pairs of question and answer. These were chosen as the simplest units to identify and relate, so that the difficult problems of speech act taxonomy and sequence analysis could be left until a later stage. The question answer pairs Q1 - A1 and Q2 - A2 were used in the following structures:-

| | | | | | |
|---|---|---|---|---|---|
| 1) | Linear | Q1 | A1 | Q2 | A2 |
| 2) | Nested | Q1 | Q2 | A2 | A1 |
| 3) | Cross-nested('Crossed' for short) | Q1 | Q2 | A1 | A2 |

whose structure may be represented diagrammatically as in figure 4.7.

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Figure 4.7

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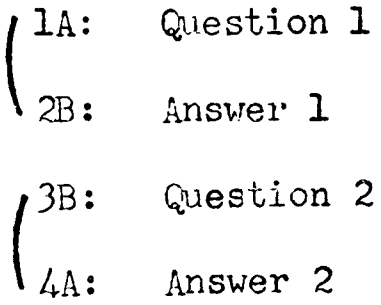
Two hypotheses were tested

1) Linear and nested structures will seem equally acceptable to judges, but crossed structures will be perceived as significantly less likely to occur. This is in keeping with the predictions of the syntactic model, which does not generate cross-nested structures. Interestingly the structure of many computer languages (eg. FORTRAN) allows the nesting of sub-routines in routines in a similar way, but forbids the use of cross-nesting (exit from and re-entry to a 'do loop' after an incomplete number of iterations), as this cannot be accomplished by 'push-down storage' devices.

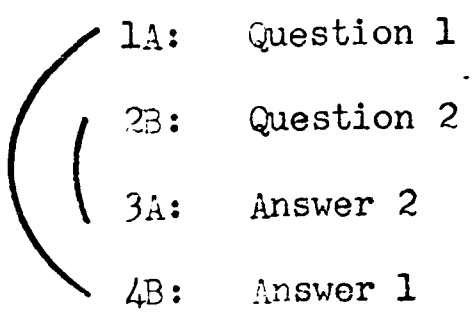
2) Most of the variance will occur as a function of the experimental variation of structure, rather than as a function

Figure 4.7 Experiment 7 Dialogue Structures

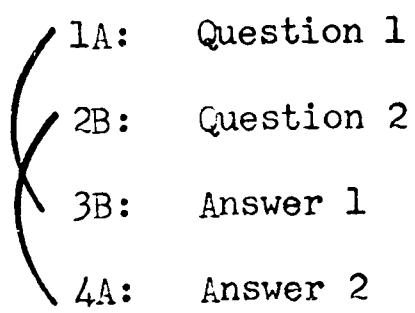
1) Linear structure




2) Nested structure




3) Cross nested structure



of the different topics presented as examples of each structure, or of the interaction of topic and structure. This is by way of a general vindication of the structuralist perspective, which requires that a particular structure have invariant effects despite the variety of different contents which it may contain.

### 4.3.2 METHOD

#### 4.3.2.1 The questionnaire

This experiment and the four that follow it were all carried out by means of the same questionnaire. Those aspects of the procedure which are common to all five experiments, such as the choice of subjects, will be described here; the peculiar features of each experiment will be described in the section devoted to the individual experimental methods. A complete copy of the questionnaire may be found in appendix A.

29 subjects completed the questionnaire: 19 females and 10 males. 26 were aged 18 - 25, 1 was 26, 1 was 28 and 1 32. There were 21 students (of subjects other than psychology), 2 psychology students, 2 photographers, 1 secretary, 1 research fellow(in zoology), 1 research assistant(in psychology) and 1 laboratory technician(in haematology).

Each questionnaire was self explanatory and given to the subject to complete in his own time in the laboratory or at home. Each copy began with the following general instructions:-

> The experiment
>
> The aim of this study is to investigate the ways in which people use language in everyday situations. It makes use of the idea that people not only regulate their speech in accordance with a number of basic

'rules', but also have an extensive and largely accurate knowledge of the sort of regularities the rules produce.

This questionnaire is designed to test a number of theories about the patterns of language usage by recording the reactions of people like yourself: the skilled users of the language.

The items of the questionnaire all concern commonplace fragments of dialogue. It is only because of their apparent familiarity that we are able to use your judgements about them. This does NOT make them any the less complex or important as an object of study. In other words, please treat this seriously and try to express accurate judgements rather than witty or unusual replies.

The procedure

The questionnaire is in two parts. The first is a question booklet, and should not be marked in any way. The second is a form on which you can fill in your answers. Please return BOTH parts to:-

David Clarke
Department of Experimental Psychology
South Parks Road.
OXFORD

In order to make certain comparisons possible, you will find that some of the items on the questionnaire recur in various forms. You should pay no special attention to this, but rather treat each item separately as a unique situation.

Many thanks for your help.

### 4.3.2.2 Features of the questionnaire peculiar to experiment seven

Experiment 7 used section 1 of the questionnaire which began with the following specific instructions:-

> Below you will find 15 numbered extracts from possible conversations. We are interested in the likelihood of each extract occuring with its component sentences happening in the order shown. You should indicate how probable you think each sentence by finding its number in the answer booklet and writing next to it a number from 1 to 7. Please use the number 1 to indicate the least likely items and 7 to indicate the most plausible.
>
> Example
>
> Item No 'x'
>
> A Second left after the traffic lights.
>
> B Where's the post-office?

If you thought that a likely order of occurence for those two utterances your answer would be ...

X 6

... and if you thought it unlikely, it would be, say...

X 1

The letters A and B are used like names to indicate the two speakers.

Instructions were provided in this very explicit form, as subjects were to fill in the questionnaire at their own convenience, without the opportunity to ask questions.

The instructions call for a judgement of probability of occurence, so this is a test of descriptive not semiotic competence. The following pieces of dialogue were used in this experiment.

1) A Do you have the time?
B It's three o'clock.
B Why do you want to know?
A I have a bus to catch.

2) A Where are you off to?
B I'm going in to town
B Didn't I tell you this morning?
A No.

3) A Did you forget Mike's Birthday?
B I suppose I must have done.
B When was it?
A Three weeks ago tomorrow.

4) A Where did you spring from?
B I was behind there.
B Did I make you jump?
A Nearly out of my skin.

5) A Do you want to buy a second-hand camera?

B I'll think about it.

B How much do you want?

A Twenty-five quid.

Each of the five sets of sentences (henceforth called examples) appeared on the questionnaire in each of the three arrangements shown in figure 4.7.(henceforth called conditions) Thus the experimental design became one of treatment-by-treatment-by- / subjects or completely crossed factors, giving 5(examples) x 3 (conditions) x 29 (subjects) = 435 data points. The order of presentation of items was derived by cycling both treatment dimensions simultaneously, starting:-

Example 1, Condition, 1
" 2 " 2
" 3 " 3
" 4 " 1
" 5 " 2
" 1 " 3 ... and so on.

In this way the experiment was controlled for order effects, and for differences arising from the properties of individual utterances rather than the structure in which they occured.

### 4.3.3 RESULTS

The subjects' ratings were subjected to a 3-way analysis of variance, using the program BMD 08V (Dixon, 1973: 693). The results are given in table 4.8.

Table 4.8 Experiment 7 Analysis of variance

| Source of variance | ss | df | MS |
|---|---|---|---|
| Mean | 9699 | 1 | 9699 |
| Conditions | 342.6 | 2 | 171.3 |
| Examples | 29.14 | 4 | 7.284 |
| Subjects | 129.9 | 28 | 4.638 |
| Conditions x Examples | 107.6 | 8 | 13.45 |
| Conditions x Subjects | 159.6 | 56 | 2.850 |
| Examples x Subjects | 231.0 | 112 | 2.062 |
| Conditions x Examples x Subjects | 453.4 | 224 | 2.024 |

Examples and subjects are treated as random effects, as in experiment 6, so F' or F" ratios have to be used for the main effect of conditions. Examples are not nested in conditions in experiment 7, however, so there is a value for the variance due to the interaction between examples and conditions. Otherwise the calculation of F' and F" is similar to that used for the nested design in experiment 6,(Winer, 1962: 199).

$$F'_{Conditions} = 12.00,\ df = 2,9;\quad p < 0.005$$

$$F''_{Conditions} = 10.63;\ df = 2,12;\ p < 0.005$$

$$F_{Examples} = 3.53,\ df = 4,112\ p < 0.01$$

$$F_{Conditions\ x\ Examples} = 6.645;\ df = 8,224;\ p < 0.001$$

In addition two post hoc tests were done on the data. Fisher's multiple comparison procedure, the LSD (Least Significant Difference) test (Kirk, 1968) was used to find which, if any,

of the pairwise comparisons of the treatment means on the dimension conditions were significant. The least significant difference between means for conditions was found to be 1.44 points on the 7 point rating scale, $p < 0.01$, two-tailed. This is shown as a confidence interval on a graph of rating against dialogue structure (figure 4.9).

Figure 4.9

The variance component due to each factor was also calculated using the expected mean square - E(MS) -- equations for this experimental design (Winer, 1962):

$$E(MS_C) = \sigma_r^2 + \sigma_{ces}^2 + 5\sigma_{cs}^2 + 29\sigma_{ce}^2 + 145\sigma_c^2$$

$$E(MS_E) = \sigma_r^2 + 3\sigma_{es}^2 + 87\sigma_e^2$$

$$E(MS_S) = \sigma_r^2 + 3\sigma_{es}^2 + 15\sigma_s^2$$

$$E(MS_{CxE}) = \sigma_r^2 + \sigma_{ces}^2 + 29\sigma_{ce}^2$$

$$E(MS_{CxS}) = \sigma_r^2 + \sigma_{ces}^2 + 5\sigma_{cs}^2$$

$$E(MS_{ExS}) = \sigma_r^2 + 3\sigma_{es}^2$$

$$E(MS_{CxExS}) = \sigma_r^2 + \sigma_{ces}^2$$

where subscripts C, E, and S refer to variance components due to conditions, examples and subjects, and r refers to within cell variance

Hence $\sigma_c^2 = 1.08$

$\sigma_e^2 = 0.060$

$\sigma_{ce}^2 = 0.394$

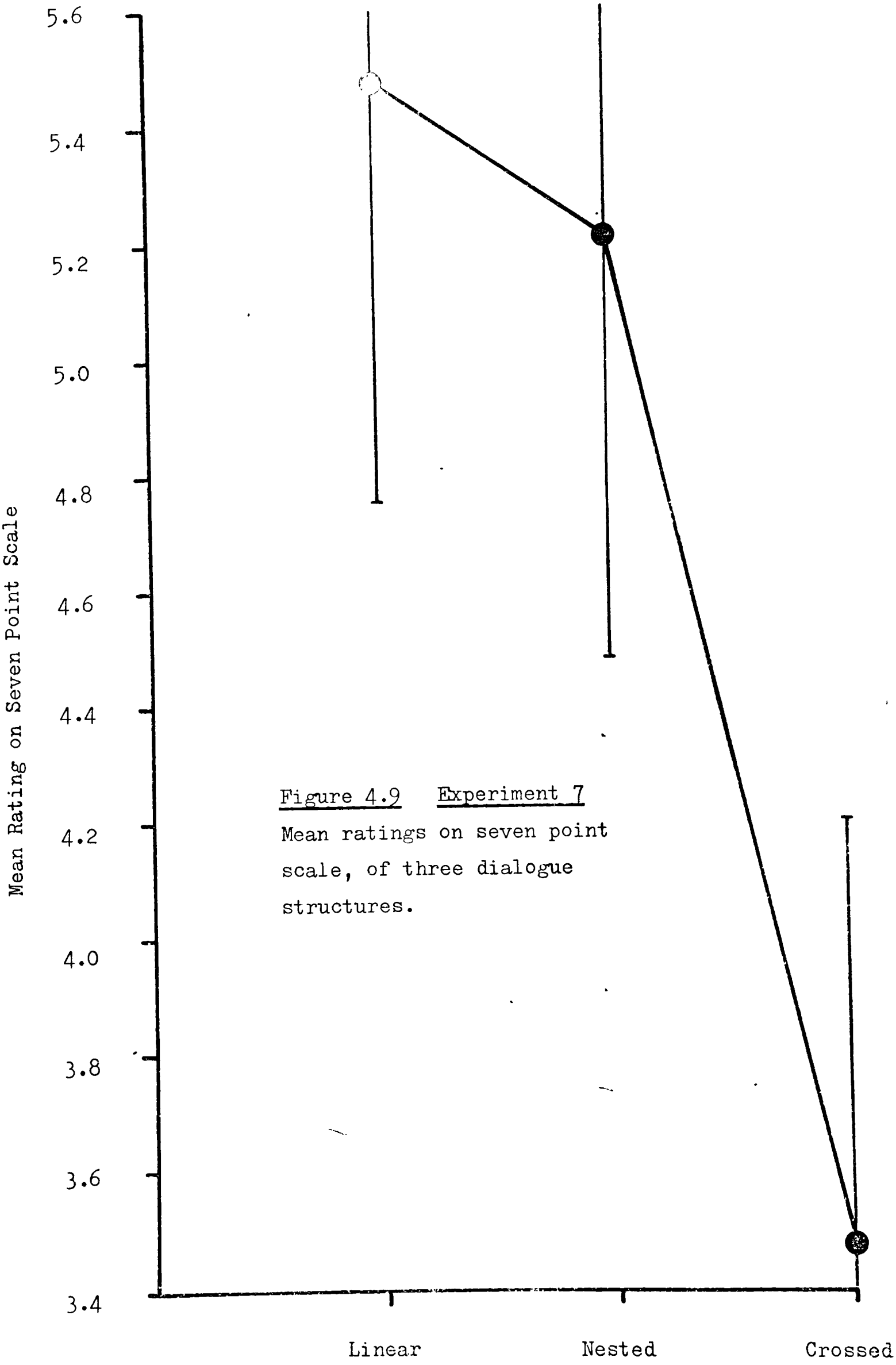



Figure 4.9 Experiment 7
Mean ratings on seven point scale, of three dialogue structures.

So the variance due to differences in condition (dialogue structure) accounts for approximately 18 times as much of the variance as the examples, and 3 times as much as the condition x example interaction.

### 4.3.4 DISCUSSION

Both hypotheses are supported by the data. The experimental variation of structure gives rise to a significant main effect in the analysis of variance ($F' = 12.00$, $p < 0.005$), and this is shown by Fisher's LSD test to be due to the low ratings given to the cross nested structure. If the criterion level of significance is set at 0.01, this test shows that the ratings given to linear and nested structures are not significantly different, but that the ratings for cross-nested structures are significantly worse than both.

The estimate of the variance component due to each of the main effects shows that the structure dimension accounts for many times (approximately 18) more variance than the topic dimension. Arguably this was because topics were selected which were all of similar plausibility, and a different sample of topics would have led to greater topic variance. The original hypothesis is of the kind which may be falsified but not verified, so we can never be certain it is true, but the data for this particular set of examples at least fit the experimental prediction.

Looking at the unacceptable cross-nested structure, an obvious explanation for its unacceptability comes to mind. We see that from speaker B's view point the dialogue offers two binary choices.

1) After A has asked Q1, B may reply with A1 giving rise to the linear structure, or with Q2.

2) If he decides to counter Q1 with Q2 he has a further choice of waiting for it to be answered with A2 before providing A1, so producing the nested structure, or he may go straight on from Q2 to supply A1 giving the cross-nested structure.

If we now start attributing motives to B the issue becomes clear. He presumably wants (or needs) the information from A2 to consider in giving A1, or alternatively does not. If he does he poses Q2 and waits for A2 before giving A1; and if he does not he provides A1 in response to Q1, before going on to explore his further interests in the matter with Q2. Both very plausible alternatives, but what could possibly lead B to pose Q2, and then supply A1 without waiting for A2? This may well have been the kind of puzzle which led subjects to give a low rating to the cross-nested structures, and it provides an example of the way in which motives, attitudes and beliefs may have to be attributed to the speakers, which are not an explicit part of the behaviour stream, before the occurence of certain items of behaviour in certain orders may be understood. The attributions made to speakers, on the basis of their speech will be considered as part of the deep structure of conversation which is discussed in chapter 7.

## 4.4 EXPERIMENT 8

### 4.4.1 INTRODUCTION

In the last experiment the nested version of the two pairs of question and answer Q1 Q2 A2 A1, became the hinge-pin of the argument against linear-stochastic models of

dialogue structure. It has a number of interesting properties as a construction, quite apart from its non-linear nature, which should be explored before passing on. The last utterance A1 has an ambiguous role: at the performative level of description it is an answer to Q1 and is related to the first utterance. This is how the structure comes to be one of nested relations. However it also relates to the third utterance A2 at the constative or propositional level of description, insofar as the content of A1 is dependent on the content of A2. So when both levels of description are considered simultaneously, the utterances are seen to be linked by a chain of influence which splits and rejoins, passing through Q1 to A1 and through Q1 to Q2 and A2 at the performative level; and through Q1 to Q2, A2 and A1 at the propositional level in such a way as to produce a closed ring of linkages. For this reason the structure will be referred to as a loop when both levels of description are included in the analysis. The loop structure is illustrated in figure 4.12.

The aim of this experiment was to justify the complex analysis given above as a legitimate part of the structure of discourse. Two aspects of the analysis seemed questionable: that the four line extracts of dialogue used really had (or really appeared to subjects to have) the loop structure; and that they were acceptable as examples of realistic dialogue.

Hypothesis 1. Subjects asked to make judgements of the structure of 'loop' transcripts will take account of performative and constative levels of description, producing a structural description which shows the ring of inter-utterance relations.

Hypothesis 2. Subjects will give ratings of plausibility to examples of the loop structure which are not significantly worse than those given to commonplace constructions from real dialogue.

## 4.4.2 METHOD

4.4.2.1 Subjects The experiment was conducted on the same questionnaire as experiments 7, 9, 10 and 11, so the subjects are as described in section 4.3.2.1.

4.4.2.2 Procedure

Sections 3 and 4 of the questionnaire were devoted to this experiment. Section 3 began with these instructions:-

> Your task in this section is the same as in section 1. You should decide how likely each of the following items would be, to occur as shown below. Indicate on the answer sheet by using a number from 1 to 7. (1 for the least likely, 7 for the most).

There followed five items which were four-line loop dialogues and five which were four-line exchanges from real conversations between pairs of students, as a control. These latter items came from unpublished transcripts obtained by Lalljee and Cook on non-verbal behaviour in newly introduced dyads. The ten items were assigned at random to item numbers 46 to 55 on the questionnaire. The loop items were:-

47 1A What are you having?
2B Do they have the new lager here?
3A No.
4B Pint of bitter then, please.

48 1A Are you going to the match?
2B Who's playing?
3A City and Spurs.
4B No, I don't think I'll bother.

| | | |
|---|---|---|
| 50 | 1A | Who is that man over there? |
| | 2B | Which one? |
| | 3A | In the blue jacket. |
| | 4B | That's Simon, the one who won the scholarship. |
| 53 | 1A | Where's Jake? |
| | 2B | I don't think I know him. |
| | 3A | You do -- tall with gingery hair. |
| | 4B | Oh yes, he just went through there. |
| 54 | 1A | Excuse me, could you tell me how I get to the station? |
| | 2B | Central or Northern? |
| | 3A | Central. |
| | 4B | It's down there, second right and then straight ahead. |

The control items were:-

| | | |
|---|---|---|
| 46 | 1A | What are you reading? |
| | 2B | I'm doing English, what are you doing? |
| | 3A | Medicine, what college? |
| | 4B | I'm at Exeter. |
| 49 | 1A | Where've you been, you were...you got here last night? |
| | 2B | I've been...yes, I've been in London working. |
| | A3 | Sorry, you've been where? |
| | 4B | I've been in London working. |
| 51 | 1A | Do you belong to the film club? |
| | 2B | Yes. |
| | 3A | You have good stuff, don't you there? |
| | 4B | Yes. |

52 1A Have you travelled a lot round Europe?

2B Europe - not much. I never went abroad 'till last year, I went to Greece last year. You?

3A I've travelled a bit, went to Russia about three years ago.

4B I'd like to go there.

55 1A Where were you before you came to Oxford?

2B Well, in a school in Kent.

3A Yes, you come from Kent do you?

4B No, Canada originally.

When subjects had provided plausibility ratings for these items they then turned to section 4 of the questionnaire which read:-

> This section uses the ten items from section 3 again. (Numbers 46-55) This time you should try to decide for each line or utterance which of the previous lines it is related to. For example you may think B2 is an answer to a question posed in A1, or that A3 is the continuation of some point made in A1. On the answer sheet you will find the number B2, A3 & B4 under each item number. You can indicate for each of these utterance numbers, which it is derived from by writing the number of its antecedent in the space provided.
>
> Example If you think B2 derives from A1 your answer should look like this:
>
> B2 A1
>
> nb. It is important that you get this the right way round. That is the number you write in should refer to the antecedent of the typed number, NOT to its sequitur. To check this make sure that each number you write in is LOWER than the typed number it appears beside.
>
> If you think any line unrelated to what has gone before, please enter a 0. If you think any line derives from more than one of the previous ones, please write ALL their numbers in the answer space.
>
> In those cases where a number of successive utterances produce a continuous elaboration of a single theme each should be related to the one before, rather than to the first introduction of that theme.

When you have finished this section the questionnaire is complete.

Thank you again for your help.

### 4.4.3 RESULTS

The results are presented in table 4.10 and fig. 4.11

---

Table 4.10

Figure 4.11

---

The table shows the lower diagonal matrix formed from the results of each item, by tabulating the number of subjects identifying a link between each pair of antecedent and sequitur This is similar to the technique since described by Schlesinger (1974, see my section 4.3.1) except that in this version various degrees of relation between items are represented in the matrix, in place of the zeros and ones which Schlesinger uses to represent relatedness or unrelatedness.

The figure presents the same results as a set of 'molecules'. Each circle represents a turn at talking, and the lines between them represent the number of subjects who judged them to be related. Where

| | | | |
|---|---|---|---|
| 1 - 4 | subjects recognised the relation, | 1 | line is used, where |
| 5 - 9 | " | 2 | are " |
| 10-14 | " | 3 | " |
| 15-19 | " | 4 | " |
| 20-24 | " | 5 | " |
| 25-29 | " | 6 | " |

The seven point ratings given by subjects to the different items were subjected to the analysis of variance procedure used in experiment 6, (Dixon, 1973: 693). There were 2 C(onditions) of loop and control dialogues, 5 E(xamples)

Table 4.10

Showing the numbers of subjects (N = 29) who identified relations between pairs of utterances in experiment 7. Columns show antecedents.

Experimental (Loop) Items

47

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | 16 | | |
| A3 | 0 | 29 | |
| B4 | 18 | 7 | 14 |

48

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | 18 | | |
| A3 | 0 | 29 | |
| B4 | 23 | 2 | 13 |

50

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | 24 | | |
| A3 | 7 | 22 | |
| B4 | 26 | 0 | 12 |

53

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | 22 | | |
| A3 | 4 | 26 | |
| B4 | 22 | 1 | 16 |

54

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | 24 | | |
| A3 | 2 | 29 | |
| B4 | 23 | 1 | 18 |

Control Items

46

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | 29 | | |
| A3 | 3 | 27 | |
| B4 | 1 | 1 | 29 |

49

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | 29 | | |
| A3 | 6 | 17 | |
| B4 | 12 | 0 | 26 |

51

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | 29 | | |
| A3 | 15 | 10 | |
| B4 | 2 | 0 | 27 |

52

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | 29 | | |
| A3 | 5 | 27 | |
| B4 | 0 | 0 | 25 |

55

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | 29 | | |
| A3 | 1 | 22 | |
| B4 | 1 | 0 | 29 |

Key In the following idealised examples the typical structure is represented by an X in the cells which have high entries.

Linear

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | X | | |
| A3 | | X | |
| B4 | | | X |

Pure Nested

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | X | | |
| A3 | | X | |
| B4 | X | | |

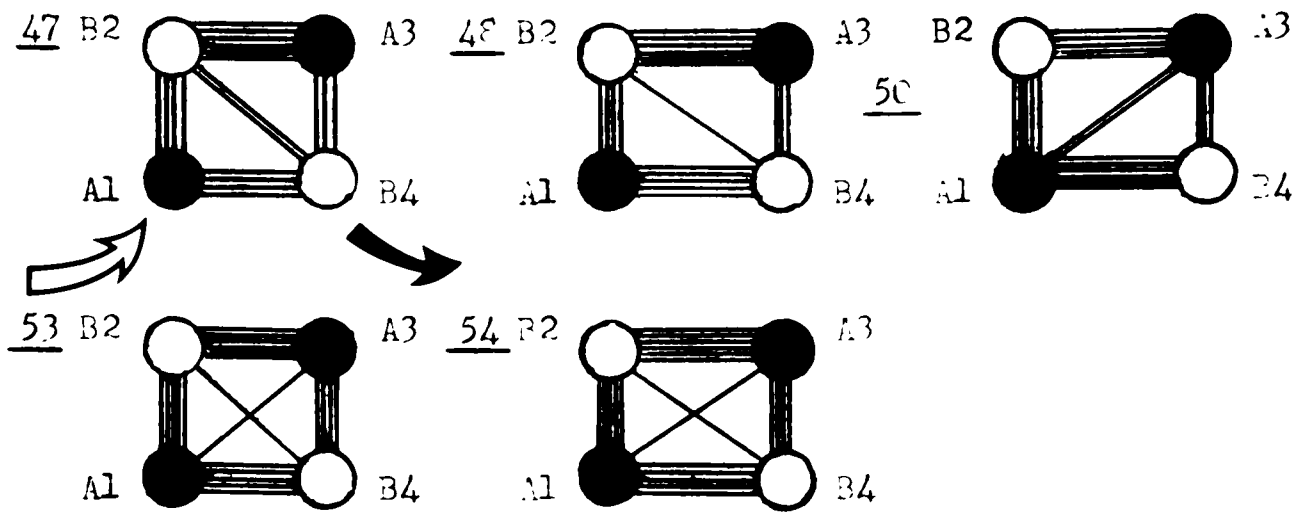
Loop

| | A1 | B2 | A3 |
|---|---|---|---|
| B2 | X | | |
| A3 | | X | |
| B4 | X | | X |

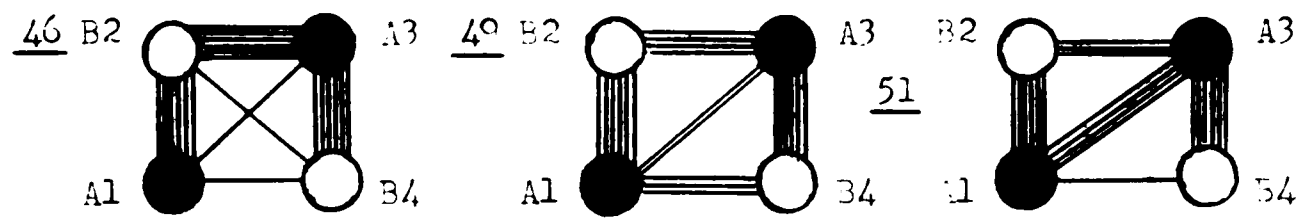
Figure 4.11

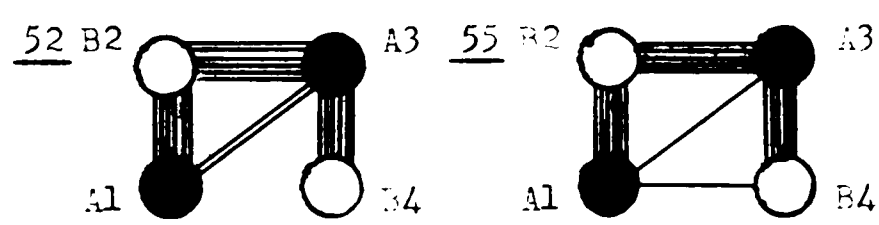
Showing the numbers of subjects who identified relations between pairs of utterances in experiment 7.

Experimental (Loop) Items



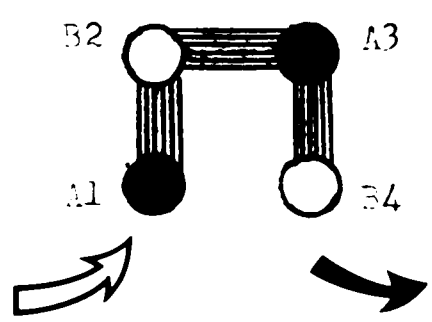

Control Items



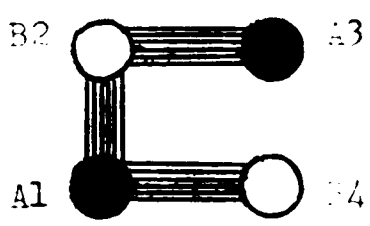




Key

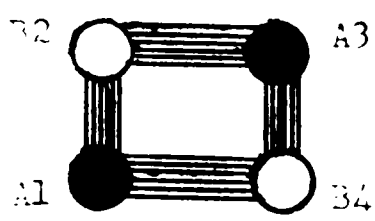
Linear




Pure nested




Loop






of each and 29 S(ubjects). C was treated a a fixed effect; E as a random effect nested in C, and S as a random effect fully crossed with C and E. The results are given in table 4.12.

Table 4.12 Experiment 8 Analysis of variance

| Source of variance | ss | df | MS |
|---|---|---|---|
| Mean | 8861 | 1 | 8861 |
| C | 103.2 | 1 | 103.2 |
| E(C) | 74.87 | 8 | 9.359 |
| S | 177.0 | 28 | 6.321 |
| C x S | 58.50 | 28 | 2.089 |
| E(C) x S | 328.7 | 224 | 1.468 |

The mean rating for loop dialogues was 6.12, and for controls was 4.93.

$F'_C = 10.34$; df = 1,9; $p < 0.025$

$F''_C = 9.143$; df = 1,12; $p < 0.025$

$F_{E(C)} = 6.375$; df = 8,224; $p < 0.001$

### 4.4.4 DISCUSSION

Both hypotheses find support in the data. It is clear from the tabulated judgements of structure that subjects' opinions confirm the loop or ring hypothesis for the experimental items but not for the control items which are predominantly linear in their structure. This detection of complex structures in agreement with the hypothesis is even more apparent in the molecular diagrams in figure 4.11.

The analysis of variance shows that the experimental items were not given significantly lower ratings than the control items, on the contrary, the loop dialogues were seen as more plausible than the controls, $p < 0.025$. This could have been due to a number of factors: the experimental items were idealised, in that they contained no disfluencies, they covered a wider range of topics, and were not produced under the constraints (albeit minimal) of an experimental interaction. The issue is really one of sampling, which is difficult when dealing with corpora of discourse. The diversity of styles and functions represented in natural discourse cannot be adequately represented by a few excerpts. However, the comparison between these two sets of artificial loop structures, and natural dialogue extracts favours the loops to such a degree that we may conclude with some confidence that this particular artifical construction is not one which strikes the native actor as completely unrecognisable, and alien to the discourse system as he understands it.

It is reassuring to find that subjects presented with this task of structural judgement agree to a large extent on the nature of the structure. In the R-matrices for items 47, 48, 49, 51, 52, and 55 there are cell entries of 0 and 29, showing that subjects agreed unanimously that there was a relation between some pairs of items, and none between others. Furthermore the subjects agree, not only with each other, but with the judgements of the investigator and the predictions of the theory of discourse structures, such as it is. This suggests that discourse structures of this kind have some psychological reality, and are not a mere technical convenience embodying judgements which are only apparent to

the professional analyst. Perhaps the time will come when the procedures for identifying structure are sufficiently well established and validated against the judgements of the native actor, that they may be used on novel situations without the feeling that they may be misrepresenting the actor's view. There have been attempts by psycholinguists to show that in a similar way, the structures which appear in the grammarians' theories of language may be recovered from the judgements of the native actor, but with limited success. Johnson (1965) suggested that subjects' parsing of surface structure agrees with the parsing produced by a Chomskian tree. He found that transitional error probabilities (the likelihood of being wrong on one word, given that the previous word was correct) in sentence recall, were greatest at phrase boundaries. However in Martin's (1970) study of subjective phrase structure, a discrepancy appeared between the judgements of the subjects and the dictates of the grammar. Subjects' estimates of the intimacy of relation between the components of sentences were cluster analysed to give a dendrogram equivalent to the tree structure of the sentence. This showed that in the subjects' estimation the two main components of the sentence were often a composite of subject and verb, and the object; whereas the usual linguistic analysis would make subject one of the main units, and a verb-object composite (predicate) the other.

In judging the loop structure subjects had to attend to two levels of description. The relation between items A1 and B4 is at the performative level, while that between A3 and B4 is constative. Both levels were taken into account, but more subjects identified the performative link than the constative one in all cases. This observation supports the

conclusion drawn from experiments 3 and 4, that structural analysis is feasible at that level of abstraction which has to do with the illocutionary force of speech acts, rather than their propositional content.

## 4.5 EXPERIMENT 9

### 4.5.1 INTRODUCTION

The time has come to turn from the general issues of whether or not there is a temporal pattern in dialogue, the level at which it might operate, the size of the structural units and the merits of linear and non-linear models, to the specific questions of which types of utterances are inter-related and in what way.

There are three experiments which tackle this problem using the same technique. All were conducted using the questionnaire from experiments 6 and 7, and all have the form of a 'verbal T-maze'. A brief extract of dialogue, one or more lines of transcription, is presented to the subject with a choice of two possible sequiturs. Elsewhere in the questionnaire, the same two sequiturs are provided as alternatives to follow a different antecedent. In this way the relative appeal of the two sequiturs is controlled, just as the 'response bias' estimates controlled for unconditional response preferences in experiments 3 and 4. If either sequitur dominates the other enough to be chosen as the preferable response to both antecedents, it ceases to be of interest and does not contribute to the data. The informative outcomes are those in which one sequitur is chosen in response to one antecedent, and the other sequitur in response to the other antecedent. This corresponds to the increases and

decreases in probability of occurence from the mean, which came about in experiments 3 and 4 as a result of sequiturs following particular antecedents, and which were described under the name of reactive contingencies.

The particular items which were used, and the hypotheses tested are not of particular importance in themselves. They are interesting structures to work with since they all bear upon problems of conflict resolution. However the aim at this stage is not to make substantial contributions to the understanding of conflict and its resolution, but rather to use the topic as a vehicle for further exploration of discourse structures. Consequently the relation between these studies and the previous work on conflict and bargaining will not be examined in detail.

The first hypothesis arises from Goffman's studies of the rituals of face saving and remedial work, (1955 & 1971). In the latter he described a multi-stage 'remedial sequence' by which an offender and offended party may heal a breach in the structure of social propriety, by re-establishing that the offender knows and accepts the usual rules of conduct. This is an interesting contrast to the legal remedy for more serious offences, in which the offender is required to do penance or make amends or both. The first two stages of the remedial sequence (remedy and relief) produce a preliminary solution after which there are two optional moves (appreciation and minimisation) in which the offender thanks the offended party for accepting the remedy, and is told that it is all quite alright. Goffman points out that the second exchange of appreciation and minimisation may well be omitted.

> If each succeeding move were not attenuated quickly, ritual would come to take all of everyone's time. Each occasion on which a remedy was provided would lock the provider and the recipient into an interminable

> 'After you, Alphonse' routine. Understandably then, remedial interchanges often terminate after the second move, that is after relief is given...
>
> (Goffman, 1972: 177)

However he does not describe the circumstances which make the last two stages more or less likely. One possible factor was investigated in this experiment using an Anglicised form of remedial sequence running:-

1A Offence

2B Accusation

3A Apology

4B Acceptance

5A Appreciation

6B Minimisation

It seemed likely that the spontaneity of the apology (3A) would affect the likelihood of the remedial cycle running its full course. This was manipulated by leaving in the accusation (2B), in which case the apology is solicited and unspontaneous; or replacing the accusation with a neutral enquiry, in which case (3A) now takes on the character of a spontaneous apology. The effect of this manouevre on the final exchange of appreciation and minimisation may be viewed in two ways. On the one hand one might suppose that the man who offers spontaneous apologies for the offences he commits is a contrite individual, anxious to restore his social standing with the full elaboration of ritual work. If this argument is valid then the full cycle is more likely when 2B is a neutral enquiry than when it is an accusation. On the other hand one could argue that the offence is aggravated by the fact that an apology has to be solicited, in which case the full form of the remedial cycle would seem more likely when 2B is in the form of an accusation. Because

the postulated direction of the influence on appreciation probability is equivocal the hypothesis is framed in a two-tailed form.

Hypothesis Subjects will judge the full elaboration of the remedial cycle to be more or less probable depending on whether apology is spontaneous or solicited.

## 4.5.2 METHOD

### 4.5.2.1 Subjects

The experiment was carried out on the same questionnaire as experiment 7, so the subjects are as described in section 4.3.2.1.

### 4.5.2.2 Procedure

This experiment together with experiments 10 and 11 were carried out in section 2 of the questionnaire. Experiments 7 and 8 were described together as they dealt with similar hypotheses about the interpretation of nested and loop dialogues. For that same reason they were separated on the questionnaire and conducted in sections 1, and 3 and 4 respectively.

Section 2 began with the instructions

> In this section there are thirty numbered items. Each one has a beginning and two endings. Your job is to indicate on the answer sheet which ending you think more likely for each beginning. Each alternative is marked either X or Y, so you can indicate your answer by writing the appropriate letter beside the number of that item on the reply sheet.
>
> Example
>
> A Where is the Post Office?
>
> | X | Y |
> |---|---|
> | B Half past three | B Further along this street, on the left. |
>
> If you think the second answer the more likely of the two, then you would write Y by the number of that item on the answer sheet.

There followed the 30 numbered items including 5 different remedial sequences, each in its two forms(containing accusation at 2B, or neutral enquiry) 5 items each in two forms to test the hypothesis of experiment 10; and 5 items each in two forms to test the hypothesis of experiment 11. These were systematically cycled on the questionnaire so that the pairs of similar items were as far apart as possible. The order started

Experiment 8, item 1, version A

| | | |
|---|---|---|
| 9 | 1 | B |
| 10 | 1 | A...After fifteen items came |
| 10 | 5 | A, and the comparison items began |
| 8 | 1 | B |
| 9 | 1 | A |
| 10 | 1 | B |
| 8 | 2 | A, and so on. |

In addition to separating similar items by 15 places for recurrences of the same sequitur pair, and 3 places for recurrent tests of the same hypothesis, this choice of order also controlled for order effects in the presentation of antecedent forms. For example the five remedial sequences were placed so that the first had an accusation at 2B, the second a neutral enquiry, the third an accusation and so on. This was to minimise the effect of a subject who, for example, favoured one class of sequitur in the early part of the questionnaire, and then had second thoughts and favoured the other.

Each version of the antecedent sequence presented the subject with a choice between the same two sequiturs, on the same sides of the page, and labelled with the same symbol. This controlled for absolute preferences between

the two sequiturs, between the two sides of the page or between the two response letters X and Y. The five remedial sequences are shown below, each with its two versions separated by the symbol /.

16/31

A (Bumps into B on the street.)

B Watch where you're going, you nearly knocked me over!

/

What's the hurry.

A I'm very sorry

B That's O.K.

| X | Y |
|---|---|
| A Thanks | A Could you tell me the time? |
| B Forget it. | B Just after two thirty. |

19/34

A Your work has not had a very good response lately

B How do you mean?

/

That's a nasty thing to say.

A I didn't mean it to be insulting

B Sure.

| X | Y |
|---|---|
| A It's good of you to realise that | A I suppose you've just been unlucky. |
| B It's nothing. | B I suppose so |

22/37

A Your casserole tastes of burnt potato.

B You always complain.

/

Is it very strong

A It's not that I mind, I just thought you'd like to know.

B Well it is a help to know how you like it.

| X | Y |
|---|---|
| A That's very fair. | A The sprouts are great. |
| B Don't mention it. | B That's good. |

25/40 A I think that move is against the rules.

B Really?

/

You've got a cheek.

A I'm not accusing you of cheating.

B Of course not.

| X | Y |
|---|---|
| A I'm glad you see that. | A Play it again |
| B That's O.K. | B Alright. |

28/43 A I see your boy failed his exams again.

B Mind your own business.

/

How did you know that?

A I didn't mean to pry.

B No, I understand.

| X | Y |
|---|---|
| A Thanks for taking it like that | A Did he get in the cricket team? |
| B It's nothing. | B Yes, he was vice-captain. |

In each case the subject is offered sequitur Y, new-topic offer and acceptance, as an alternative to the third and fourth stages of the remedial cycle.

4.5.3 RESULTS

The results were pooled across subjects and items, taking account of the alternative order of presentation for the antecedent conditions. A 2 x 2 contingency table was formed showing the number of subjects who had chosen appreciation-minimisation as the most likely sequitur in both conditions, the number choosing new-topic offer-acceptance, as the most likely sequitur in both conditions, the number of subjects who chose appreciation-minimisation as sequitur to accusation but new-topic offer-acceptance as sequitur to neutral enquiry; and the number of subjects who chose appreciation-minimisation as sequitur to neutral enquiry,but new-topic offer-acceptance as sequitur to accusation. This is not the usual form of 2 x 2 table which would table the two responses against the two conditions. This table shows the two response given in one condition against the two responses given in the other. It was used because the experiment employs a related samples design in which one particular response under condition A is to be compared with its unique counterpart under conditon B. The data were subjected to McNemar's Test for the Significance of Changes (Seigel, 1956). This test ignores those occasions when a subject gives responses X & X or Y & Y to the two conditions, to evaluate the data the trials resulting in X & Y or Y & X, against the null hypothesis that p(X,Y) = p(Y,X). If the number of trials resulting in X & Y is f1, and the number resulting in Y & X f2, then

$$\chi^2 = \frac{(\,|f1 - f2| - 1)^2}{f1 + f2}$$

In this experiment f1 = 16, f2 = 27, $\chi^2$ = 2.33, df = 1, n.s. (two-tailed). The value of f1 (27) refers to those trials on which the subject chose new topic offer-acceptance as the sequitur to neutral enquiry, and appreciation-minimisation as sequitur to accusation. The results of experiments 9, 10 and 11 are analysed item by item in appendix J.

### 4.5.4 DISCUSSION

The hypothesis is not supported by the data. Perhaps this is not surprising when both the mutually exclusive directions of change in the probability of appreciation-minimisation occuring are both so plausible. The study is one of descriptive competence, and it assesses the perceived probability of occurence of two equally permissible sequences, a task whose subtlety is beyond the scope of very crude experiments. Questionnaire reports have been used with great success to investigate some aspects of verbal performance (e.g. Brown & Gilman, 1960; Brown & Ford, 1961), but the technique is best suited to studies of semiotic competence, in which judgemental data have to be used.

## 4.6. EXPERIMENT 10

### 4.6.1 INTRODUCTION

This experiment also deals with an aspect of remedial work, namely the apportionment and acknowledgement of guilt. A bargaining process is involved in which the parties trade accusations and concessions, to arrive at their places on the dimension of respect and contempt, in much the way that they might trade commodities in an economic bargain in order to arrive at mutually acceptable places on the dimension of

wealth and poverty. In studies of bargaining in this economic sense the law of 'reciprocal concession' is often built into the experimental situation. In some of the bargaining studies reviewed by Kelley and Schenitzki (1972), for example, subjects were instructed a) to adopt initial positions which favoured them, and be prepared to make concessions; b) to make all offers in 'good faith', which is to say they could not be withdrawn even if they met with initial rejection; and c) to make a new offer with each turn of the negotiations, or accept some extant offer from the other party. These three conditions conspire to produce a situation in which agreement is necessarily reached by a process of reciprocal concession. When such constraints are not imposed on the system, the two protagonists are faced with a dilemma. Each has the option of making a limited concession in the hope that it will be reciprocated and a satisfactory solution brought that much nearer. The danger is that the concession will be taken to indicate, or perhaps even produce, a weakness of that party's position which the other can exploit.

If one party <u>does</u> decide to makes some concession he then poses a further dilemma for the other, who can reciprocate and increase the chance of a moderately desirable solution, or he can press his case with renewed vigour in the hope of achieving his initial objective, but at the risk of further escalation.

This dilemma was presented to subjects in the form of 5 brief transcripts in which they had to choose between reciprocal concession or attack, given that the previous speaker representing the opposition had either conceded some

measure of responsibility for some mysterious misdemeanour, or had reasserted his absolute innocence. Again the direction of the influence exerted by antecedent on sequitur is equivocal as one could argue that concession increases the likelihood of reciprocal concession, or that it increases the likelihood of further recrimination. Consequently the hypothesis is framed and tested in two-tailed form.

Hypothesis Subjects will view the probability of a protagonist's conceding or attacking to be a function of the concession or attack of the previous speaker.

## 4.6.2 METHOD

### 4.6.2.1 Subjects

This experiment was conducted on the same questionnaire as experiment 7, so the subjects are as described in section 4.3.2.1.

### 4.6.2.2 Procedure

The experiment was conducted in section 2 of the questionnaire under the instructions described in section 4.5.2.2. In that same section is an account of the order of items, and the various experimental controls which were achieved by the use of that order.

The items were:-

17/32 A I think you acted very foolishly.

/

I suppose it was partly my fault.

| X | | Y | |
|---|---|---|---|
| B | I think I was partly to blame. | B | You were the cause of all the trouble. |

20/35 A I think we should settle this, let me pay for half the damage.

/

I don't see why I should pay out, it was not my fault.

| X | Y |
|---|---|
| B I would be willing to pay half, in order to finish the argument. | B You should pay for everything in my opinion. |

23/38 A I will not say I'm sorry when I'm not.

/

Let's shake hands and be friends.

| X | Y |
|---|---|
| B I'm prepared to shake and make up. | B To hell with you. |

26/41 A I'm sorry I've been so pig-headed over all this.

/

You always dig your heels in, in an argument, and never budge an inch.

| X | Y |
|---|---|
| B I suppose my obstinacy is part of the trouble. | B You always were the stubborn one. |

29/44 A You should try to make amends

/

I think I owe you an apology

| X | Y |
|---|---|
| B Let's forget the whole thing. | B You have quite a bit to make up for. |

4.6.3 RESULTS

The data were pooled over items and subjects, and subjected to McNemar's test for the Significance of Changes. On 62 trials the subject chose concession as the more likely response to concession, and attack as the more likely response to attack. On 19 trials subjects chose attack as the more likely response to concession; and concession as the more likely response to attack.

$$\chi^2 = \frac{(|62 - 19| - 1)^2}{62 + 19}$$

$$= 21.78,\ df = 1,\ p < 0.001,\ \text{two-tailed.}$$

4.6.4 DISCUSSION

The hypothesis finds support in the data. Of these subjects who gave different responses to the two different situations, significantly more gave reciprocal concessions as the more likely response to concession, and reciprocal attack or accusation as the more likely response to attack. This was the more frequent prediction for all five pairs of items, accounting for 87, 69, 89, 55, and 87% of changes respectively. The direction of the effect is the same as that used in the studies of economic bargaining but this finding must be interpreted with great caution. As with so many experiments in social psychology, the effects of context and situation were minimised, and many important factors which would influence the choice of response in a real argument were missing. One might conclude that ceteris paribus, there is a tendency for subjects to believe that reciprocal concession is the common practice, and that the belief has some effect on their behaviour when faced with such situations. It does not necessarily indicate that

their belief is entirely correct, and that reciprocation is the norm.

## 4.7 EXPERIMENT 11

### 4.7.1 INTRODUCTION

Again the topic of this study is the verbal ritual work done in support of the moral order, In this case the procedures of accusation and confession. The situation differs from the last one in that it concerns the effect of accusation on confession or denial, rather than the effect of confession or denial on reciprocal concession or recrimination. The basic scenario for this experiment was one in which the injured party to a dispute put his complaint to the culprit in one of two ways: by direct accusation implying knowledge of the other's guilt; or by means of an open question in which guilt was not presupposed. The subjects had to choose the more likely of two responses: confession or evasion-denial.

Hypothesis Subject will judge confession or evasion-denial to be more likely depending on whether the preceding utterance is an accusation or question.

### 4.7.2 METHOD

#### 4.7.2.1 Subjects

This experiment was conducted on the same questionniare as experiment 7, so that subjects are as described in section 4.3.2.1.

#### 4.7.2.2 Procedure

The experiment was conducted in section 2 of the questionnaire under the instructions described in section 4.5.2.2. The same section contains a description of the

order of items, and experimental controls.

The items were:-

18/33 A I am told you were caught shop-lifting.

/

Have you been in trouble with the law?

| X | Y |
|---|---|
| B That's right | B Who says so? |

21/36 A Do you want to tell me what happened to your school report?

/

How come your school report got 'lost' when I found it hidden behind the bookcase?

| X | Y |
|---|---|
| B I put it out of sight so you wouldn't see it. | B Do we have to have an inquisition over it? |

24/39 A Your work record shows a large number of days missing. Why is that?

/

Have you had to miss any work through illness?

| X | Y |
|---|---|
| B I had some time off with the flu. | B. I try to come in as regularly as I can. |

27/42 A Have you been going through my letters?

/

What were you doing looking through my letters just then?

| X | Y |
|---|---|
| B I'm sorry. | B I just came in to get some things I left here. |

30/45 A The test showed you had more than the legal limit of alcohol in your blood.

/

Were you driving when drunk?

| X | Y |
|---|---|
| B It was just one little lapse. | B I had hardly drunk a thing. |

4.7.3 RESULTS

The data were pooled over items and subjects and subjected to McNemar's test for the Significance of Changes. On 31 trials the subjects chose confession as the more likely response to accusation, and denial as the more likely response to neutral enquiry; on 14 trials subjects chose confession as the more likely response to neutral enquiry, and denial as the more likely response to accusation.

$$\chi^2 = \frac{(|31 - 14| - 1)^2}{31 + 14}$$

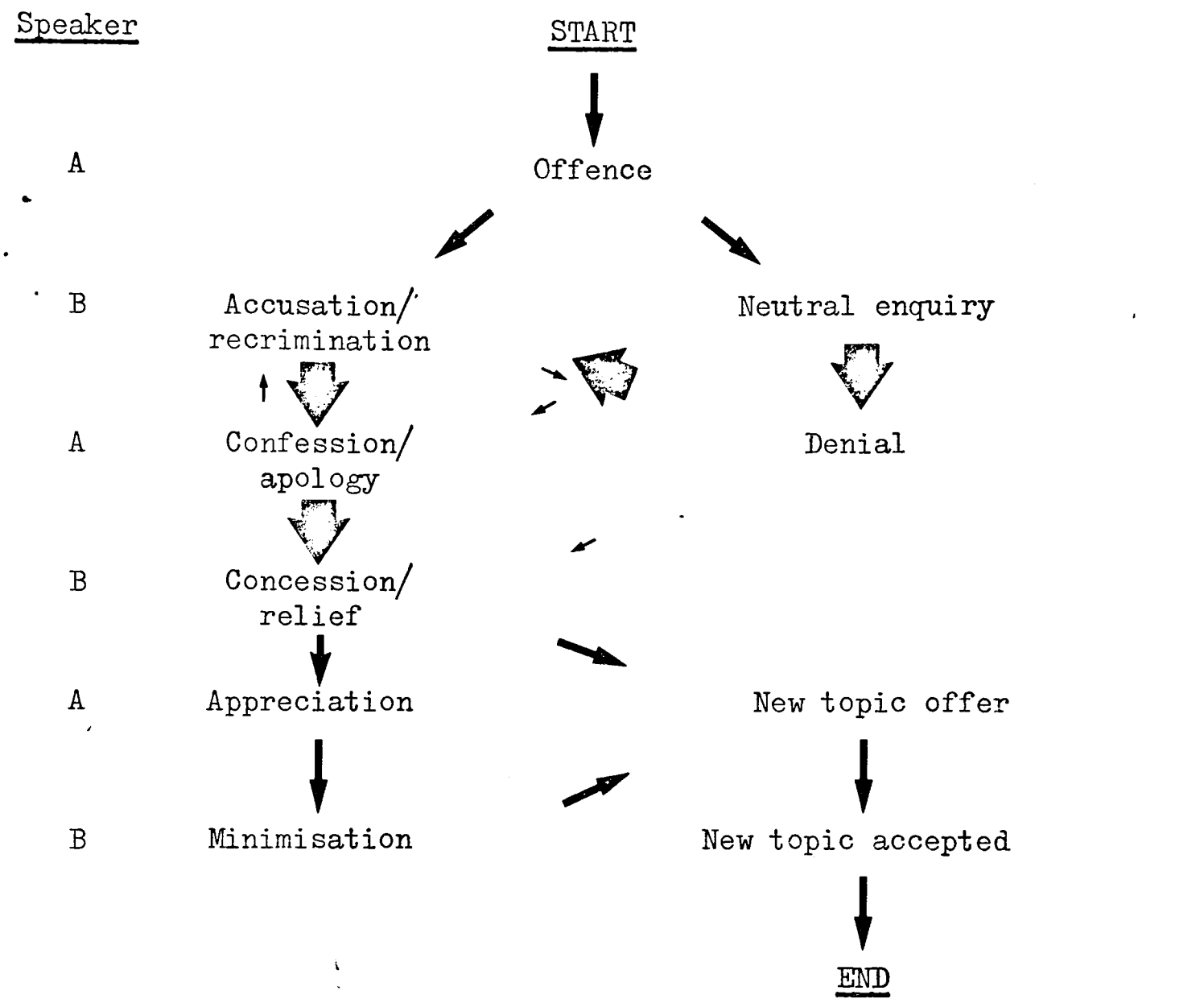
$$= 5.69,\ df = 1,\ p < 0.02,\ \text{two-tailed.}$$

4.7.4 DISCUSSION

The hypothesis finds support in the data. Of the subjects who gave different response to the two antecedent conditions, significantly more indicated that accusation leads to confession, and neutral enquiry to denial, than the reverse. This was only true for 3 out of 5 items, with 22, 87, 0, 92, 67% of changes in this direction. It is tempting to take this result, together with those of experiments 9 and 10 to imply that an elaborated remedial cycle exists of the kind shown in figure 4.13.

Figure 4.13

Figure 4.13 A possible elaboration of the remedial cycle




Key

Found or assumed to be possible

Found to be thought the significantly more likely of two alternatives

Found to be thought the significantly less likely of two alternatives

This has a feedback loop or recursive sequence in it which would cause the remedial activity to recycle until successful remedy was achieved. This would be a useful property to build into any remedial system, but there are dangers in assuming it to be the case on the basis of data such as these. It has already been pointed out that a transition from X to Y and from Y to Z, does not necessarily imply that transition XYZ is likely or even possible. The relevant transition rule could well be KY leads to Z unless K = X.

Furthermore this was a study of descriptive competence, a domain in which structures can exist which are not necessarily the isomorph of their counterparts in performance.

There is another complication which should be mentioned here, and will be discussed in greater detail in chapter 6. It has been assumed that constitutive rules are context free: that an utterance which performs act A in the context of B1, will also perform A in the context of B2, B3...Bn. If this is true we may infer that the use of the same <u>form of words</u> as alternative responses to the two antecedent situations in an experiment such as this, ensures that the same two <u>speech acts</u> are being offered as alternatives. If that is not the case and the constitutive rules are context dependent, then the mapping of verbal forms onto speech acts will not be invariant, raising the possibility that the two experimental conditions had different pairs of speech acts as their response alternatives.

Again it should be stressed that the value of these three studies lies in the light they shed on discovery procedures for the meta-syntax of discourse, rather than in the particular conclusions they suggest about the sequential structure of the remedial cycle.

## 4.8 SUMMARY

A number of properties of the discourse system emerge from the experimental data. It has a sequential structure which is apparent to the native actor, and on which he can reach agreement with his fellows. The few preceding utterances provide necessary, and perhaps sufficient information for the speaker to select an appropriate response. The relations between elements in acceptable discourse strings are not necessarily linear and stochastic, so the use of transitional probability models to reproduce the acceptable forms of discourse seems to be an impossibility. Not all configurations are equally acceptable, and the 'cross-nested' structure which is often forbidden in natural and computer language, is given low plausibility ratings as a sample of English discourse.

The structuralist perspective is supported by the finding that variance due to structure outweighs that due to change in topic or structure-topic interaction. This suggests that structural rules exist whose applicability is independent of content, as one would expect in a structurally organised system.

Subjects whose judgements of inter-utterance relations are used as the basis of structural models, show an awareness of performative and constative links between utterances. The structures they produce are identical to those suggested by the experimenter, suggesting that the particular structures which emerge from theoretical analysis, have a psychological reality for the actor.

Artificial dialogues constructed to test the effect of particular structural variations, were not perceived as any

less representative of spontaneous conversation than a control sample of genuine extracts. The judgements of subjects concerning the plausibility of particular responses to particular situations show significant differences in the subjective probabilities of different transitions. The discovery procedure used for this study of descriptive competence would also be suitable for the investigation of semiotic competence.

If these observations are ever to become the basis for a unified theory of discourse and interaction structures, they must be converted from an inventory of potential system properties into an integrated conceptual model of rules, categories , axioms and so on. In the next chapter the literature will be consulted again, to find a theoretical skeleton around which such a model might be built.

oOo

# CHAPTER 5 THE LINGUISTIC MODEL

5.1 The analysis of temporal structure in interaction can be modelled on generative linguistics. The linguistic and interactive systems are similar in three ways: they serve similar functions; they have similar characteristics; and there are similar methodological pitfalls to avoid when studying them.

5.2 The units of analysis are provided by linguistic philosophy. They are the performative utterances or speech acts described by Austin and Searle.

## 5.1 GENERATIVE SYNTAX

### 5.1.1 THE SYNTACTIC ANALOGY

so far the discussion of behaviour sequences has been open to various interpretations. It could be seen as an exercise in social psychology, human ethology or linguistics. However the discussion of methodological alternatives in chapter 1, and the increasing need for concepts like competence and performance, and deep and surface structure indicate that the linguistic analogy will be useful in studies of the detailed structure of conversation. Henceforth the problem will be redefined so that the various sub-goals of the analysis are stated in linguistic terms. The object is now to write a generative grammar of social interaction (especially conversation), which describes the surface (and if need be) deep structures of the behaviour stream and its syntactic and semantic properties.

This analogy may be viewed in two ways: firstly as a symmetrical double analogy, suggesting that language, discourse and interaction exist in separate domains, related by certain isomorphisms. Social interaction is like discourse and discourse is like language. More precisely the rules which will generate all and only the speech act sequences which are sensible conversations are so like the rules which will generate all and only the morpheme strings which are well-formed sentences, that the study of the former may be assisted by the techniques for investigating the latter. Furthermore, the rules which will generate all and only the speech act sequences which are sensible conversations are so like the rules which will generate all and only the sequences of social action which are acceptable, comprehensible episodes that the study of the former may reasonably be motivated by a desire to shed light upon the latter. So the analysis of discourse takes its methods from a lower level of description, and its purpose from a higher-level, and demonstrates the isomorphism between all three.

The second way of viewing the analogy is to regard sentence structure, and discourse structure as forming different levels in the hierarchy of the language itself. In this view the combination of speech acts to form a new kind of object, having new dimensions of meaning, is simply another instance of the phenomenon of linguistic multiple articulation. This means that at several levels of the linguistic hierarchy, the combination of sub-units calls into being a new kind of meaning, which is rather more than the sum of the semantic markers in those sub-units. Those linguists whose interests extend no further than the

sentence unit, speak of double articulation, referring to the combination of phonemes, which do not carry referential meaning, to form morphemes which do; and the combination of morphemes, which do not carry propositional meaning, to form sentences which do. The present analogy suggests that there is a tertiary articulation in which speech acts which do not carry interaction meaning may combine to form conversations which do. The nature and representation of this 'interaction meaning' for want of a better term, will be discussed in chapter 7.

The idea that behaviour sequences could be studied by use of the grammarians' tools is certainly not new. Many eminent authors have made this suggestion, two of whom are cited below:-

> The significance of Chomsky's work for disciplines other than linguistics derives primarily, then, from the acknowledged importance of language in all areas of human activity and from the peculiarly intimate relationship that is said to hold between the structure of language and the innate properties or operations of the mind. But language is not the only kind of complex 'behaviour' that human beings engage in; and there is at least a possibility that other forms of typically human activity (including perhaps certain aspects of what we call 'artistic creation') will also prove amenable to description within the framework of specially constructed mathematical systems analogous to, or even based upon, transformational grammar. There are many scholars working now in the social sciences who believe that this is so. For them, Chomsky's formalisation of grammatical theory serves as a model and a standard.
>
> Lyons (1970: 12)

> It is probably no accident that a theory of grammatical structure can be so readily and naturally generalized as a scheme for theories of other kinds of complicated human behaviour. An organism that is intricate and highly structured enough to perform the operations that we have seen to be involved in linguistic communication does not suddenly lose its intricacy and structure when it turns to nonlinguistic activities. In particular, such an organism can form verbal plans to guide many of its nonverbal acts. The verbal machinery turns out sentences -- and, for civilised men, sentences have a compelling power to control both thought and action.
>
> (Miller & Chomsky 1963: 488)

The particular points of resemblance between the grammar of natural language and the structure of other forms of behaviour, which makes this analogy so attractive are described below. Many of these points are clearly applicable to all symbolic aspects of interaction -- language, NVC, ritual, and so on -- but not to non-symbolic behaviours whose effects are determined by gross biological processes. That is to say that the many varieties of signalling and communicating should fall within the scope of the analogy, but the varieties of killing, curing, feeding, giving birth, working with or working on another individual will probably require a different descriptive scheme to illuminate some, if not all of their properties.

5.1.1.1 Structure

In social behaviour, just as in language, an orderly sequence of sounds or marks or gestures is used to convey information, between the skilled users of that signalling system. In both cases, the signalling system is constructed in such a way that an enormous (potentially infinite) number of messages may be conveyed and acts performed, by the use of a finite repertoire of signals. This is made possible by the use of particular symbol combinations to convey information rather than the use of particular symbols. The importance of combinations to convey meaning is illustrated by the observation that the same set of symbols presented in a different order may convey a different meaning, whereas the substitution of symbol for symbol within the same structure can often leave the meaning unchanged.

Consider the sentences:-

a) Tom chased Mary

b) Mary chased Tom.

c) Tom chased his sister.

(a) cannot mean the same as (b), although the same words are used; but (a) can mean the same as (c) although different words are used in similar constructions.

This is no rarity, but a commonplace feature of sentence construction, and as such a grave problem for anyone who would seek to identify meaning with the presence or absence of symbols in a message. The importance of sequences or structures or patterns, whatever they are to be called, for the understanding of interaction, must result in a shift of attention from those studies which observe and count events, to those which study the nature of the events and the relations between them.

In language the patterns are diachronic: the sounds or marks which convey the message are produced and interpreted as a series of events in time. In social interaction some of the patterns are diachronic, while others like the arrangement of the facial features in a particular expression or the roles and relationships in an institution are synchronic. The diachronic patterns, including the structure of discourse are those which fit the linguistic analogy best, although it has also been applied with some success to synchronic structures.

Since social meanings, like linguistic meanings, are conveyed largely by the way events are arranged in time, two obvious issues arise. Firstly one would like to know whether all the possible arrangements of symbols can be used in a message or an interaction, and if not the distinctive

properties of those which can. This might be termed the issue of syntax, or in the case of the 'grammar' of social behaviour, meta-syntax. Secondly there is the relation between observable features of the symbol or event sequences and their meanings. This is the problem of semantics (or meta-semantics). In the early days of transformational linguistics the two issues were assumed to be separable. However the claim by generative semanticists (e.g. Fillmore, 1968; Lakoff, 1968; McCawley, 1968) that the surface form of a sentence is inextricably bound up with its derivation from a semantic deep structure or logical form, has led recent workers to integrate syntactic and semantic considerations. One of the interesting features of Winograd's (1972) widely acclaimed natural language program, was the use of inter-related syntactic and semantic components.

It may turn out to be the case that meta-syntax and meta-semantics have to be regarded as one in the analysis of discourse. However, that is an empirical issue which cannot be resolved until later. The assumption of separability is so convenient in the early stages of structural analysis it will be made for the time being.

The nature of the diachronic patterns in language or interaction may be investigated according to two separate, although not wholly independent criteria. On one hand patterns may be described according to their probability of occurence. This is a straightforward empirical approach as used in experimental social psychology. On the other hand the patterns may be specified in such a way as to include all and only those sequences which the skilled users of the system regard as 'well-formed', (acceptable, meaningful, possessed of structural integrity, or some similar criterion).

This definition tends to generate a larger set of possible strings, as it includes all those which would be acceptable if they were to occur, rather than just the ones which have been observed to occur. It also suggests the existence of some enduring quality of the language or the speakers which may be invoked to explain the observed patterns, and from which new but lawful strings may be derived to meet the demands of novel situations. Hence the latter approach leads to a system having synthetic as well as analytic powers, a feature which will be discussed further in chapter 8 as it gives rise to some practical applications.

The distinction between linguistic analyses which depend on some postulated linguistic system which transcends the sum of observed usages, and those which do not, has become familiar in slightly different forms and under a variety of different names. Saussure (1916) distinguished langue -- the abstract language system, and parole -- observed language use. This is very similar to Chomsky's competence/performance distinction, and is reflected to some extent in the way one applies Pike's (1967) methodological alternatives of emic and etic study.

The same choice is offered to the analyst of discourse. His analysis could be modelled on parole or performance, using etic methods; or by postulating some kind of discourse system(called DCS to distinguish it from the abbreviation DS which is usefully reserved for deep structure) which forms part of the actor's communicative competence, he could employ emic methods to study the equivalent of langue. One can either investigate the effects of structure on the probability of occurence or the propriety of sequences. The next part of this thesis will deal with the latter since

it provides a preferable starting point in many ways. Competence is regarded as only one of several resources and limitations which shape performance,so it is simpler to study. It is also richer in that the competence model can encompass information about the equivalence and meaning of utterances or behaviours and the relations between them. It is assumed to be the same for all competent members, so a study of competence makes a simple binary distinction between permissible and impermissible strings which is useful, if only as an approximation; performance has to be described in terms of probability. Furthermore the study of competence employs the notion of formal causality to explain the form of an observably structured object (a particular sequence of events) as a transformational product of some hidden structured object (the actor's knowledge of the DCS).

Miller and McNeil advance three arguments in support of the distinction between langue and parole. (Miller & McNeil, 1968: 670)

> 'a) Language is a social norm, a part of culture, whereas speaking is an individual act that takes on significance only insofar as it conforms to the social practices of the language community.
>
> b) Language is the cognitive component that a language user must know, as opposed to speaking, which is the behavioural component of a verbal communication event.
>
> c) The description of a language is a hypothetical construct created by the theorist in order to account for empirical evidence provided by his observations of the speaking individual.'

Argyle (1975) gives extensive discussion to alternative approaches to social psychology, with special reference to the problem of accounting for PxS interactions. He reviews the following models. There is the predictive model in which

behaviour is seen as a mathematical function of personal and situational variables. This is criticised for taking insufficient account of the effect of actors on each other, and of the tendency for actors to select their situations to suit personal characteristics. The stimulus-response model is criticised for taking no account of proaction or embedding routines; and the social skill model for making schematic general predictions only, for paying too little attention to the effect of other actors, and for ignoring specific rules of situation. A system of descriptions is advocated which is based on the generative rules of language, with particular rules of situation included.

The study of social competence by the use of techniques, similar to those found in linguistics also uses another of Chomsky's (1965) concepts, that of adequacy. A grammar is said to be observationally adequate when it will generate all and only the well formed sentences of the language. It is descriptively adequate when it can also assign the correct structural descriptions to the strings it generates; and it is explanatorily adequate when it assigns structural descriptions which accord with the theory of linguistic universals.

The distinction between competence and performance is not universally accepted, particularly as applied to social behaviour. There seem to be two criticisms, both raised by those who believe that a psychological theory must ultimately describe performance if it is to have any value. (Clearly those who regard the description of competence as an end in itself, are satisfied with the idea of competence.) Competence is sometimes said to be an insufficient condition

for the understanding of performance. That seems reasonable, and quite compatible with the argument here. It does not seem reasonable, however, to make the second criticism that studies of competence are unnecessary for the understanding of performance. As has been argued above, the speaker has a knowledge of his language which influences the way he speaks, which is easily accessible and illuminating, and which allows for categorical, semantic and relational judgements which cannot be replaced by observations of performance, even when an understanding of performance is the ultimate goal.

5.1.1.2 Syntagmatic and Paradigmatic relations

A second linguistic concept which is usefully applied to the study of social interaction is another Saussurian dichotomy,that between syntagmatic and paradigmatic relations (the latter term is now used in place of Saussure's original word 'associative'). According to Saussure these two relations are two principle defining properties or axes of the linguistic system. Syntagmatic relations exist between the elements of a string, and paradigmatic relations between an element and the equivalents for which it might be substituted, or the other similar words with which it might be associated. For example in the sentences

a) The cat sat on the mat.

b) The dog stood on the table.

syntagmatic relations exist between cat, sat and mat; whereas paradigmatic relations exist between cat and dog, sat and stood, and mat and table. Since they were first distinguished by Saussure it has been assumed that syntagmatic and paradigmatic relations are interdependent, and the likelihood

of the same proving true of relations in the DCS is a matter of very great importance. Students of interaction sequences have usually treated the assignment of utterances to equivalence classes, and the study of the sequences formed by successions of classified events, as independent issues. Consequently they classified the events according to characteristics which may have had no effect on their use in sequences, and then looked for sequential patterns existing between the elements so defined. Consequently the study of behaviour seuqences has met with little success. A solution to this problem, also borrowed from linguistics, will be described in chapter 6, as part of the study of surface structure of discourse. As with the langue/parole dichotomy, the distinction between syntagmatic and paradigmatic relations occurs in a number of different guises and under differnt names. Searle's (1965) distinction between the constitutive rules (which call into being new forms of social object) and regulative rules (which describe the proper use of such objects) is very similar. The idea of an act/action structure in social behaviour (Harré & Secord , 1972)is again drawing attention to the composition of meaningful signals from their sub-components, the kind of paradigmatic structure that might be embodied in constitutive rules.

In addition to the very significant observation by Saussure that syntagmatic and paradigmatic relations (or regulative and constitutive rules) are interdependent at any level of description, there is a tautological inter-dependence between the regulation of items at one level of description, and the constitution of those at the level above. It must surely be true of any hierarchical structure

that the regulation of sub-units is the constitution of units.

Again the relevance for discourse and interaction analysis should be clear. Events in the behaviour stream have to be classified before their combinations can be studied, and the classification must be based on those properties which determine which combinations can occur. This principle is not confined to symbolic structures, but may be illustrated equally well by the analogy with structural chemistry, which was introduced in chapter 1. Mendeleev's (1879) periodic classification of the chemical elements is based on assumptions similar to the interdependence of 'syntagmatic' and 'paradigmatic' relations. He categorised elements according to their chemical properties, such as their ability to substitute in crystal lattices without gross alterations of the structure, thus establishing families or groups of elements with similar combinatorial properties. His use of the property (which later turned out to be atomic number) which controlled the formation of inter-atomic bonds, facilitated the study of molecular structures to a degree which would have been impossible if he had chosen a property which is independently detectable, such as colour, melting point, solubility or density. And yet that is just the equivalent of the current practice in psychology: behavioural taxonomies are derived in isolation from any conception of sequential structure, and then applied(often unsuccessfully)to the study of behaviour sequences.

5.1.1.3 Types of sequence

The sequence of events in an interaction carries information just as it does in language, but in neither case is it always true that each element is bound to its immediate antecedents. This was demonstrated by Chomsky (1957) as part of his argument against finite states (or linear stochastic) models of language structure. Experiment 6 suggests that the linear stochastic model is also unsuitable for the analysis of discourse, and in both cases the rejection of the linear stochastic hypothesis poses something of a problem. Chomsky's answer was the re-writing rule grammar, which might be called a linear non-stochastic model, but there are other alternatives (Segal & Stacy, 1975). Clearly any model of discourse structure must account for the presence of each speech act in a conversation by relating it to something else, from which it could have arisen or been derived. In the simplest case each speech act is related to the one before it. This is the Markov chain. Like a number of these models the Markov chain is a kind of stochastic process. It is a sequence of events governed by transitional probabilities. In this discussion of different structural forms it is useful to enlarge that definition to include the limiting cases where probabilities are 0 or 1, and even cases where the transition is governed by a rule which says it is permissible, instead of a number which indicates whether is is probable. The term Markov chain will be used here for any sequence of events in which each item may be explained by reference to the one before. Similarly the term stochastic is used of any process governed by transitions between overt behavioural events, whether probabilistic or not.

If the Markov chain does not describe a particular structure adequately, the next recourse is to a linear stochastic model. That is any model in which each event may be accounted for by its relation with the few preceding events. The term linear is used to indicate that the only relevant transitions are those between adjacent events, or strings.

The kind of problematic strings found in both language and social behaviour where a sequence of activity is diverted and then resumed cannot be explained by either the Markov model or the higher orders of linear stochastic model. Such a case would be the sentence

> The book which I bought last Tuesday, after taking the exams which marked the end of my first year at university, and which proved to be so difficult for some of my friends, especially those who had interrupted their revision to spend their time in the sunshine, was by Chomsky.

This kind of sequence could be generated by a device which worked on the transitions between items which are not adjacent events, which one might call a non-linear stochastic model. Alternatively it could be the product of a series of operations in which a number of elements, some of which are events appearing in the output (terminal elements) and others are not (non-terminal elements) are involved. By moving from one non-terminal element to one(or several) more and eventually to a string of terminal elements, sequences like the above sentence can be produced. This could be called a linear non-stochastic process: linear because each non-terminal is derived from the one before it (by rules which are either context free or context sensitive); and non-stochastic because the final output string of events are not produced by transition from one to another. This is the form of a tree-like grammar as used

in Chomsky's language types 2, 1 and 0. (These are distinguished by context free, context sensitive and transformational rules respectively.)

One could also conceive of structures which are non-linear and non-stochastic, in which non-terminals are derived from other non-terminals some way back in the generative history.

These different structural types are represented diagrammatically in figure 5.1. Terminal items are in lower case, non-terminals in upper case.

---

Figure 5.1

---

One point should be noted in passing. Chomsky (1957) used the term finite state for those forms which are referred to here as linear stochastic series. This is misleading, since Chomsky's statement that the more elaborate languages cannot be produced by a finite state device is only true if the device is confined to the use of terminal elements. The elaborate strings may be produced by a looping finite state device which only exists in one state at a time, or only stores one node of its structure at a time; or they can be produced by tree-like operations in which several nodes are stored simultaneously, provided non-terminal elements are employed. The distinction is really between serial and parallel processing devices. At present, however, we are not concerned with the generative device, but only with a general characterisation of the output strings it produces. Consequently terms like stochastic and linear are used of the behaviour stream and not the generative device in vivo.

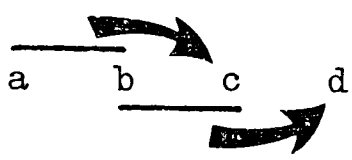
Different classes of generative operation will be

Figure 5.1 Different kinds of structure

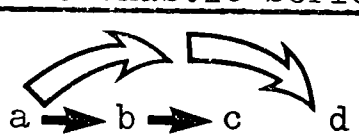
Markov Chain



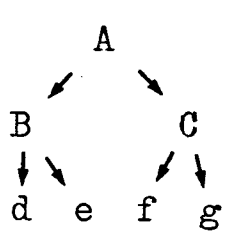

Linear Stochastic Series



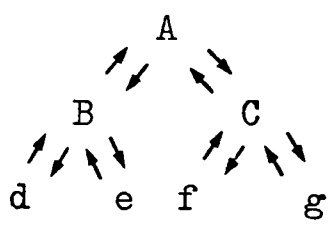

Non-linear Stochastic Series




Linear Non-stochastic Series (Parallel Processing Device)




Linear Non-Stochastic Series (Serial Processing Device)




Terminal items are in lower case, non-terminals in upper case.

➡ Temporal sequence of output.

considered again under the heading of sequence analysis (section 6.3).

5.1.1.4 Rules

Social interactions are very varied. The number of behaviour sequences which would be acceptable as an interaction is potentially infinite, so the obvious way of representing it by listing all the strings of speech acts which could occur in the DCS would be rather impractical. Infinitely large books would be required to record the representations, and actors with infinitely large heads would be the only ones whose brain had sufficient capacity to use the system. Of course the same is true of language. It contains an infinite number of sentences, so the sentence structure which is common to the members of that infinite set must be represented by a finite set of rules, capable of storage and execution in a machine of finite capacity. This is achieved in a generative grammar by the use of recursive rules. They give the grammar a generative power in that they may be employed to produce all and only the sentences of the language as opposed to testing the grammaticality of pre-formed strings. That does not imply that they represent in any way the processes of sentence production and comprehension in the speaker/hearer. They are recursive in that they allow the same stage or node-type in the generative process to be revisited. Thus while there are rules which rewrite sentences to strings of sub components, and noun phrases to strings of their sub-components, there are also rules which rewrite a sentence to another sentence plus additional items, or rewrite a noun phrase to another noun phrase plus additional items. These rules can be used an unlimited number of times, so

a rule

$$S \rightarrow S + X$$

could be used once to create the theorem SX from the axiom S, and then again to produce SXX, SXXX, SXXXX and so on. In fact that rule alone will produce an infinite set of strings of the form $S(X)^n$, for $n \geq 1$. It is also possible to organise non-recursive rules into recursive sets such as:-

$$S \rightarrow A + B$$

$$A \rightarrow S + C$$

These are recursive rules from a linear non-stochastic system, like a generative grammar, but they could also be modified to fit a stochastic model, without loss of their recursive properties.

5.1.1.5 Meanings

The meaning of a sentence or the meaning of an interaction is related to the symbols which articulate it in a complex way. There is no one-to-one mapping from symbol to meaning, because, as we have already seen, different combinations of the same symbols can carry different meanings. Nor is the meaning of any combination deducible from its form. Semantic relations are essentially arbitrary, arbitrary enough at least to necessitate some knowledge of subjective interpretation or response, before the meaning of an act may be determined. Again the basic methodology of generative linguistics offers a solution. Judgemental data from the native speaker are used to establish the similarities and differences in meaning between different signs or strings, from which the 'fundamental particles' of meaning or semantic markers may be inferred. This would appear to be a viable technique for the study of behavioural semantics, and particularly valuable if the

system embodies categorical perception effects. In phonology, for example, it has been found that continuous variations in the physical nature of the accoustic object presented to subjects (phonetic units) produce a discontinuous or categorical distribution of subjective judgements (phonemic units), for speech and speech-like sounds (Liberman, et al. 1957). A set of artificial speech-like sounds, generated on a computer in such a way as to have physical properties ranging from those of a realistic /d/ to a realistic /g/, through a number of intervening mixtures of pitch and intensity, is heard by subjects as a set of perfect /d/'s and a set of perfect /g/'s, with a sharp discriminating boundary which has no complementary discontinuity in the physical attributes of the stimuli. The implication, of course, is that a discrimination between two phonemes, of great importance for the understanding of the language, is being determined by some cognitive procedure which can be inferred from judgemental data, but not from direct measurement of the speech sounds. In the analysis of social behaviour the problem is even more severe. The objective physical parameters of an item like a speech act are too complex to use as the basis of a semantic representation. The 'objective' nature of the stimulus is so much more elaborate than a phoneme, that any suggestion of mapping it directly onto the illocutionary markers as a means of classifying utterances would seem impractical.

There is just a possibility that the complexities of the high frequency signal could be ignored to give a simple mapping from <u>prosodic contour</u> to illocutionary status (Gunter, 1966). Even then some degree of subjectivity would be introduced by the need to validate categories of illo-

cution. It seems much more feasible to use judgemental data throughout, extending the widespread policy of using the competent speaker to judge what is said by the noises that are made, so as to include his judgements of the acts performed by the things that are said.

5.1.1.6 Structure and Meaning

This last point is a reiteration of a language property that was touched upon in the introduction of point 5.1.1.1. Language and social behaviour sequences do not just convey meanings they convey structural meanings. Saussure's dichotomy of substance and form draws attention to the importance of structure rather than simply content in the analysis of language. For Saussure, the notion of form was a simple matter of the succession of linguistic elements, but this has been elaborated considerably with the advent of the transformational schools, To a large extent, then, the parsimony and power of the structural method resides in its ability to discard the details of substance (content) in order to clarify those relations between sentences, or interaction sequences, or molecules which depend on their form (structure).

To avoid confusion the list of similarities between the structural features of language and those of social behaviour should be supplemented by a list of probable dissimilarities. These are features of the linguistic system which should not be assumed, for the time being at least, to have their counterparts in the DCS. They include many of the points from Chomsky's analysis which have been most severely criticised. Perhaps by discarding these features, explicitly, the criticism can be pre-empted that the model of discourse proposed here is based on an outmoded linguistic theory,

which is no longer viable even in its own realm.

Of course the analogy with linguistics is not supposed to imply that the units of discourse analysis will correspond to morphemes, except in the role they play in the scheme as a whole. Nor is there any particular reason to suppose that the structural model which best describes language will be the best for discourse. In that respect the study of the DCS is not modelled on the pecularities of Chomsky's theory, but on those general principles which are common to Chomsky, his successors, and the students of other structural systems. The structure of discourse is not thought to be innate, and the possible universality of its features will be a matter for later empirical enquiry.

Opponents of the linguistic model have four main criticisms. Firstly, they see it as an unnecessary compli-

cation of a simple science. If the dependence of behaviour upon environement can be discovered by changing the environment and watching behaviour, then an elaborate methodology is unnecessary. The existence of complicated interactions between events, and the fact that response depends more on the meaning given to stimuli by the actor, than on their physical properties, make this view untenable.

The second objection is that it is unscientific. Linguistic analysis is identified with introspection and mentalism, while the true course of scientific knowledge is thought to be served by positivistic methods. This too is untenable. The older sciences upon which psychology is supposed to be modelled abound with hypothetical constructs, imaginary particles, and forces which are an essential part of their descriptive system. No science can be successful for long if it confines it s attention solely to observed

patterns in the data. If we are to postulate some process to account for verbal behaviour, then what could be more scientifically respectable than something like a computer program which stores and processes information according to a set of formal operations, and whose nature can be discovered by testing hypotheses against observed patterns of judgement, or performance? This is the controversial use of competence as a potential model of performance.

The third criticism is that the linguistic model does not explain the minutiae of gaze shifts, pupil dilatation etc. but then it does not claim to, being concerned with another level of description.

Fourthly it is criticised for over-simplifying the problem. A number of different speech practices are represented as a single language or DCS. It is an idealisation of the data of course but then so is the 'anatomy of the dog' or 'the life-cycle of the sea-gull'. An idealised model, from which real cases vary slightly has proved a useful construct in a number of sciences.

The suggestion that behaviour sequences, like languages, might have a syntax, is not yet supported by the data. Experiments 1 - 4, showed that certain sequences of events occurred more frequently, and were thought to be more probable than others. As such they were investigations of performance and descriptive competence and the complementarity of the two. The existence of a syntax will be investigated when the analysis turns to the subject of semiotic competence. Only then will it become clear whether the strings of events which are acceptable as valid instances of interaction form a sub-set of the universe of possible combinations.

## 5.1.2 METHODOLOGICAL IMPLICATIONS

### 5.1.2.1 Parametric and structural models

In the past the methods of social psychology have been modelled on the parametric sciences, and often rightly so. The quasi-linguistic properties of the DCS, however, suggest that the techniques of structural science are going to be more useful for this study. The parametric models used in physics, social psychology and econometrics for example imply that objects or systems have a number of continuously distributed properties which stand in lawful relation to one another (as in the relation between the temperature, pressure and volume of a fixed mass of gas, expressed by the gas laws). These qualities and their inter-relations may be described by a regression equation, or the similar procedures of correlation, factor analysis and analysis of variance. The structural models of linguistics, cognitive anthropology and chemistry, describe a world made of discrete particles which form certain combinations having known properties, and capable of synthesis to form any structures with predictable properties. For this/the mathematics of discontinuity is used: numerical taxonomy, group and set theory and mathematical logic. The parametric model provides a rich description of the infinite number of levels of each variable, but a relatively poor one of intervariable relations, and works best when the various influences operating on some quality of the object are additive or non-interactive. In the structural model the reverse is true, Qualities are crudely defined as one of a finite number of classes, regardless of intra-class variations, but greater analytical resources are then freed for the complexities of class combinations. It is generally true to say that

holistic analysis of relativistic systems is more feasible using structural than parametic models.

Joos (1950: 702) made this distinction very forcefully:

> 'Ordinary mathematical techniques fall mostly into two classes, the continuous (e.g. the infinitesimal calculus) and the discrete or discontinuous (e.g. finite group theory). Now it will turn out that the mathematics called 'linguistics' belongs in the second class. It does not even make any compromise with continuity, as does statistics or infinite group theory. All continuity, all possibilities of infinitesimal gradation- are shoved outside of linguistics in one direction or the other.'

One test of the suitability of a topic for structural or parametric analysis has to do with the way in which elements or qualities mix. Those attributes which would be subjected to parametric analysis are usually those which will blend. A hot gas mixes with a cold one to produce a like-warm blend; a dense fluid and a light one form a moderately dense mixture. Both processes would be studied by parametric methods. (The term parametric is not being used here to distinguish parametric and non-parametric statistics.) Some things do not work like this, however. Red and white flowers do not cross to produce pink, but a set proportion of red and white (3:1 for the case where the parents are pure breeding with simple Mendelian characters). The word carpet in no sense combines the meanings of car and pet to produce an intermediate sense, like a domestic animal on wheels. Some aspects of interaction would seem to be miscible, aspects of personality or attitude for example, while others combine configuratively such as the elements of languages, games, rituals, episodes, and institutional structures. Furthermore the inter-relations of each combination of classes is peculiar to that combination, and does not represent a simple invariant of the system.

5.1.2.2 Competence and rules

The introduction of a competence/performance distinction to the study of the DCS, and the preliminary investigation of competence are helpful steps even if the real goal is a picture of performance. The findings of a competence study may be used as a heuristic to guide work on performance. Suppose, for example that a study of performance were undertaken directly on a signalling system which employed 50 different signals in 5-item strings, (both figures are plausible estimates for the analysis of discourse). Each of the 50 items would have to be studied in relation to its $50^4$ (6¼ million) antecedent strings, giving a data matrix of 312½ million cells to be filled! This is an example of the combinatorial explosion which has been forcing workers in the field of artificial intelligence to turn from algorithmic to heuristic devices. The problem is reduced in a competence study, by the use of judgemental data. The judgement, for example that two adjacent items were incompatible under all circumstances would remove from the matrix their 125,000 possible sequitur triads 'at a stroke'.

The notion of a rule is fundamental in generative linguistics, and gaining popularity in social psychology, although most articles leave unclear just what a social rule could be. Suppose, for example that a corpus of dialogue between two speakers A and B, recorded under condition Z, contained regular occurences of the sequence:-

A: x

B: y

where x denotes any member of the set of utterances having attribute X, or conforming to definition X, and similarly for y. We might postulate the existence of a sequencing (regulative) rule of the form x should be followed by y if Z obtains. That could be taken to mean a number of things. It might mean

A: x

B: y

occurs, whereas

A: x

B: $\bar{y}$ (a non member of the set Y)

does not. This would produce an acute inductive problem and in most cases would prove untrue. It could mean that y is a more common sequitur to x than is $\bar{y}$. That is

$$p(y|x) > P(\bar{y}|x)$$

That might be true of a lot of things without indicating anything very profound. If a particular criterion level of probability is to be inferred from the notion of a rule, then we must know how the levels of P in different rules are to be combined, and how they are to be set. According to some authors, such a rule would mean that a sanction S is invoked when the rule is broken, so

A: x

B: y

A: $\bar{S}$

and

A: x

B: $\bar{y}$

A: S

are observed, but

A: x

B: y

A: S

and

A: x

B: $\bar{y}$

A: $\bar{S}$

are never observed. Again there is the inductive problem. It also suggests that y is subject to misuse whereas S is not. This seems to be a groundless assumption although the rule eliciting procedure of breaching seems to employ it. (Garfinkel, 1967). Perhaps we should be more cautious and say that the rule x should be followed by y implies the rules x followed by y should be followed by $\bar{S}$ and x followed by $\bar{y}$ should be followed by S. This would suggest an empirical validation in such sequences as

A: x

B: $\bar{y}$

A: S

B: $\bar{S}$

and

A: x

B: $\bar{y}$

A: $\bar{S}$

B: S

Now things are becoming very awkward. The problem of checking a rule has been made into an infinite regressional series, with the onus of responsibility for initiating sanctions falling on the shoulders of the original miscreant, in some cases, in that B could be required to reprimand A

for not reprimanding B for his error in uttering $\bar{y}$. This can happen, but it is not the acid test for a rule. The real problem is already familiar. Competence (as embodied by a set of rules) is only one resource upon which the actor draws in shaping his performance. Therefore the nature of competence is not uniquely specified by the nature of performance and cannot be inferred from it. When rules are returned to their rightful domain of competence and investigated by the use of judgemental tasks, the matter becomes relatively unproblematic. The rules may now be considered as summary statement of the beliefs of the members about the formal properties of those sequences of events which are sensible interactions, expressed in a form which either generates or tests strings. Therefore our rule x should be followed by y comes to mean that

A: x

B: y

will be seen as part of a legitimate conversational exchange, by the native actor, whereas

A: x

B: $\bar{y}$

will not. There may be disagreements, of course as to what is or is not a legitimate exchange, and it is at that point that statistical techniques provide a valuable way of summarising the extent and significance of the observed concensus.

Some rules may be elicited more directly than others as they are more explicitly transmitted and referred to, in the generation of behaviour. Taking the most conservative approach, the investigator would ask the actor only whether a given example was permissible or impermissible

In theory this is the linguists' approach, but since in practice investigator and informant are often two roles played by the same individual, it is often hard to decide how much of the analysis was present in the raw data provided by the informant and how much was inferred by the analyst. An alternative technique is the negotiation of accounts. In this case the informant may be called upon to provide an explicit report of a number of the rules which govern behaviour, as well as the distinction between valid and invalid instances. The analyst of discourse would be best advised to take a middle course between these extremes, using judgements which can be related directly to the acceptability of specific instances, while at the same time employing enough abstraction to provide the heuristic quality mentioned above.

Another methodological distinction may be drawn by referring to the agonistic or game model of chapter 1. Certain consistent features of play (performance) are derived from the rules (competence), and others from the goals and strategies of the players (a performance variable). These should be separated, and they can be if the subjects' judgements are considered. They are difficult to tell apart from the observed features of play. Consider the example of a stranger to the game of chess trying to learn the rules by observation. He might be struck by two regularities. Each turn consisted of one move, and each game began pawn to king four. The fact that one is governed by rule and the other by tacticsis not apparent to the observer. The ethnomethodologists' solution of entering the game so as to start pawn to queen four, and take several moves per turn, in the hope of eliciting sanctions

when rules were broken is inappropriate. Needless to say, the difference may be gleaned from the players reports of the rules, when questioned. The fact that a newcomer to the game would almost certainly learn the rules, before proceeding to the niceties of strategy, and would find the latter that much easier to comprehend within the framework of the former, is another illustration of the earlier point that competence makes an excellent heuristic for the study of performance. (The arguments of section 5.1.2 are elaborated in Clarke, in press, b.)

### 5.1.3 RELATED APPROACHES

These were mentioned briefly in chapter 1, and can only be given the most superficial of summaries here, but they do deserve at least some mention in this context. A full examination of the relevance of linguistics for research in social and behavioural science has provided adequate material for theses in itself, (e.g. Cooke, 1974).

In likening the problems of discourse analysis to those encountered in linguistics, it should be borne in mind that the structuralist movement is interdisciplinary, and very similar assumptions are now to be found in many branches of social, behavioural and physical science.

The common principles of the structuralist method have been modified to suit the needs of a number of facets of behavioural science: social anthropology (e.g. Frake, 1964; Levi-Strauss, 1968), developmental psychology (e.g. Piaget, 1971; Bruner, 1974), and social psychology (e.g. Barker, 1963; Harré & Secord, 1972; Cicourel, 1973). The relationship between linguistic structuralism and mathematics was pointed out by Gandy (1973), giving as examples the use

in mathematics of isomorphism, and the 'GÜdel-numbering' technique in which a simple numerical morphism may be used as a structural model of a system.

## 5.1. 4 A PROGRAM OF RESEARCH

From the common features of all these structural models it is possible to infer the stages of analysis which would be required to produce a structural model of discourse.

### 5.1.4.1 The meta-syntax of surface structure

This may be studied in three stages.

1) Unitising the behaviour stream.

Behaviours which are produced as a continuous stream of movements and sounds, are perceived as discrete events. The process of categorical perception or analogue to digital conversion produces conceptual particles, which in many respects elicit, the responses due to an indivisible entity. It is important therefore to include in the formal analysis some means of re-expressing the behaviour stream as such a series of particles, and, furthermore to place the interparticular boundaries in those places the native actor would choose in making his interpretation. This is not entirely unproblematic, as a stream of behaviour, like an acoustic object may be partitioned in an infinite number of mutually exclusive ways, of which only some, maybe only one, has any psychological validity.

2) The particles, units or elements formed in this way must then be classified. The importance of this stage cannot be over-emphasised. It is absolutely crucial, and has usually been the failing of previous attempts at structural and ethological analysis. The detection of temporal patterns

depends on the recurrence of sequences of events. But in social interaction the events themselves never recur, much less the sequences. A meaningful event is a composite of the actor, his role, his action, situation and time. Some of these are unlikely to recur, others like time, by definition, cannot. So the whole analysis rests on an assertion of the kind 'XYZ has been observed to occur n times', which can only have the force of an assertion like 'n unique sequences of events have been assigned to the classification XYZ, because of similarities which seemed to be important, and in spite of differences which did not'. It is obviously vital therefore that the similarities which are noted, and the dissimilarities which are ignored when the equivalence classes (paradigmatic relations, or constitutive rules) are drawn up are those which are recognised by the system. In other words Saussure's doctrine of the interdependence of paradigmatic and syntagmatic relations must be incorporated at this stage. A fact which a number of sequence analysts (e.g. Bales, 1953; Sacks, n.d.b) have failed to recognise.

3) Sequence analysis.

Now a set of rules may be devised to express the regularities of relations which are found, not between the events, but between the classes of event generated in stage (2). A generative syntax for example, does not have regulative rules relating morphemes like table and chair. Rather the items NP and N are used in conjunction with other rules (constitutive of the class N) which say

N → {table, chair,...}

This is known as constitution by instantiation. The technique by which noun can be identified as a part of

speech, and table, and chair its tokens, will be discussed and used in the next chapter.

5.1.4.2 The semantic representation'

A description of surface structure would provide a definition of the set of behaviour sequences which were social interactions. The next issue would be the nature of the mapping between the surface structures of the strings in that set, and the meanings, action implcations and interpersonal judgements formed from them by the actor. If that should turn out to be an isomorph of surface structure then all well and good. If not, as in the case of the one-to-many, and many-to-one mappings found between English sentences and their meanings, then it may be necessary to postulate the existence of a behavioural deep structure, which is distinct from the surface structure.

5.1.4.3 The model of performance

It has been said that the structures which are elicited in studies of competence may not be the same as those found in performance. On the other hand, though, they need not be very different. It will be an empirical matter to determine how closely the observed performance of the actor follows the picture of competence, and the extra operations which are needed to encompass both, particularly those embodying tactical considerations. Some attention will be given in chapter 8 to the practical applications of a model of performance.

5.1.4.4 The generative device

The competence model will contain generative rules, only in the sense that they may be used as a mathematical abstraction capable of deriving all and only the event

strings which are interactions. As such they must represent some of the functional characteristics of any device which produced only the same set of outputs, but they do not ncessarily embody the operations which it uses. Therefore the further characterisations of the generative process should be regarded as another phase of analysis,dealing with the nature of stores and recoding processes, information flow rates and the like.

This outline specification of a structural analysis will form the plan for the remainder of the thesis. Chapter 6 will deal in three separate sections with the unitising, categorising and sequence-analytic aspects of the surface structure model. Chapter 7 will include arguments for an interaction deep structure and chapter 8 will include a discussion of the practical applications of performance models. The characteristics of the generative device cannot really be studied successfully, until the other stages of the analysis have progressed much further.

It must be stressed yet again that the DCS is a holistic, structurally integrated system, which must be described as a series of increasingly accurate overviews, rather than a definitive map of one area, leading on to the next. In moving from unitisation to categorisation, and from categorisation to sequence analysis, we shall not be exhausting each topic so as to pass on to the next, but rather jumping ahead in search of even the crudest picture of the later stages to use in writing improved versions of the early ones. There will only be one investigation of each stage here, although they will all need to be re-examined many times before a satisfactory understanding of conversation structure is achieved.

The problem is that discourse is a relativistic phenomenon and can only be described by a succession of global models of increasing specificity and accuracy. Any attempt to analyse it piece by piece would be foiled by the incalculable complexity of the relations between its parts.

Before beginning the analysis proper, there is one more piece of theory that needs to be described: the basic unit of analysis, the speech act which will be to this grammar of discourse as the morpheme is to the grammar of a sentence.

## 5.2 SPEECH ACTS

In his William James lectures at Harvard in 1955, the late John Austin proposed an extension of the traditional view of semantics. (His lecture notes were edited after his death by Urmson, and later published: Austin, 1962). Austin suggested that the idea of the sentence as a vehicle for propositional meaning, a constative utterance, asserting that certain states of nature exist, evaluated in terms of its truth or falsity, was incomplete. In addition to this aspect of semantics there is also the use of speech as action, exemplified by those utterances which do not so much report things as do them, such as promises, bets, threats, demands and so on. These he called performative utterances. At first they were put forward as a different class of utterance, so that a given sentence might be performative, if it paraphrased to an explicit performative formula such as 'I promise that...' or 'I threaten to...'; or constative, if it did not. In the later part of the argument, however, the distinction broke down as it became apparent that even the most constative of utterances

had a performative aspect, as represented by the formula 'I assert that...', or 'I declare that...'. Furthermore, most truly performative utterances have a constative aspect since 'I promise that p' requires p to be a proposition as does 'I bet that p' or 'I envisage that p'. So in the end each utterance was agreed to have a constative content and a performative force. The performative aspects of the utterance were to be evaluated according to their felicity or infelicity, that is to say their success or failure in achieving the speaker's intentions. Those conditions which had to be fulfilled before a performative was felicitious were called its felicity conditions. Since some of the felicity conditions for an utterance may be fulfilled by previous utterances in the sequence, it is easy to see how chain reactions of performatives may be formed, with each contributing to the felicity of those which follow.

Austin imposed two classifications upon the universe of performative utterances. The first, and best known was a dichotomy between those utterances (illocutions) whose purpose was achieved inevitably in the saying of the utterance; and those (perlocutions)whose purpose might or might not be achieved by the saying of the utterance. A famous example is found in the distinction between urging and persuading. If A recommends to B that he do X, then by saying what he did A has urged B to do X. For B to be persuaded to do X, however, he has to hear, understand, agree and manage to do X, which may or may not happen The necessity that the hearer recognise a performative for what the speaker intends it to be has led to the concept of illocutionary uptake.

Austin's second classification concerned the five performative classes of

Verdictives, by which judgement is given, e.g. to estimate, reckon or appraise.

Exercitives, using powers e.g. voting, appointing, ordering and advising.

Commissives, which commit the speaker, e.g. promising, vowing and undertaking.

Behabitives, incorporating items of social behaviour, congratulating, apologising and condoling.

Expositives, which are meta-communicative, explaining the nature of ones action, e.g. 'I contend', 'I concede'.

It will be clear from these examples that the level of behavioural abstraction which they represent is rather like that used in the layman's description of behaviour, and most unlike an ethological or social psychological study of movements and noises. It places the analysis on the upper rather than the lower levels of the cognitive hierarchy of movements, actions and acts.

Searle (1965, 1969) elaborated the notion of the speech performative, under the name of speech acts. He considered rules (constitutive and regulative) for the use of speech acts in particular relation to the act of promising (see 2.1.2). Searle used the term constitutive of those rules which call into being and define units of the social or linguistic world which have no independent existence. If this conception is enlarged to include all rules of definition by constitution, then the earlier identification of constitutive rules with paradigmatic relations becomes more accurate. The term regulative referred to those rules which provide for the correct use

of acts. Thus a constitutive rule might have the form X counts as Y, whereas a regulative rule would be represented as If X do Y.

Since the concept of a speech act arose from the idea of speech as social action, it should require little argument to see that the counterpart of the speech act in the social world at large, where ends are achieved by verbal and non-verbal means acting in concert, is the social act. There is an equivalence between the speech act and the social act which arises in one obvious, and another less obvious way. The obvious equivalence is exemplified by the speech act of agreeing as performed by the words 'Yes' or 'I agree' and the social act of agreeing as performed by nodding the head. Similarly the act of bidding farewell is in many respects unaltered by the substitution of 'Goodbye' for a wave of the hand.

The second kind of equivalence stems from the interdependence of syntagmatic and paradigmatic relations. If the reply

It's three o'clock

to the demand

Tell me the time.

is placed in the response class obeys or complies by virtue of its relation with the demand, then the act of sitting down in response to the instruction

Sit down.

must stand in a certain paradigmatic relation to the utterance

It's three o'clock.

In fact they must be members of the same equivalence class, (at least as they are used in that context). Thus non-verbal

activities will be subject to description as rejoinders, refusals, protests etc. even though their physical action characteristics when seen out of context, give no clue to the nature of their verbal counterparts.

For the remainder of this analysis it will be assumed unless stated otherwise, that the elements of structure are speech or social acts, defined by constitutive rules, and deployed in well-formed strings governed by regulative rules.

## 5.3 SUMMARY

Language and social behaviour are related phenomena. Speech is, in a sense, a part of the social world, and subject to the influences affecting other social behaviours, such as age, sex, race, class and so on. More interestingly though, for our present purpose, social behaviour and particularly conversation is part of the world of language and language-like communication systems. Like a language it uses the order of events to carry a huge diversity of meanings, while the meanings and the events stand in complex though largely artbitrary relationship. Only some combinations of signals are meaningful at all, and the description of this sub-set provides, at the very least, a useful heuristic for the study of performance, and semantics.

There is probably a shared system of operations and elements which members of the speech community may draw upon in shaping individual performances. This system may be used as a kind of explanation for the existence of patterns of performance, in terms of the enduring characteristics of the individual, and his cognitive map of the

world.

As with most structural schemata, the elements and the relations are mutually defining, and this must be recognised if any invariant description of structure is to be achieved.

The nature of morpheme sequences and social behaviour sequences are both unsuitable for treatment as linear stochastic processes, since both systems are creative, recursive, and non-linear.

These and other more detailed similarities between the langue and the DCS suggest that the best techniques for studying the latter will be similar to those developed for the former.

The analysis of discourse as a quasi-linguistic structure, requires us to follow a four stage plan

1. Surface structure-analysis -- Chapter 6
   a. Partitioning the behaviour stream to form units.
   b. Classifying the units
   c. Describing the sequential deployment of unit-classes.
2. Semantic analysis(the search for a 'deep structure') -- Chapter 7.
3. Development and use of performance models -- Chapter 8.
4. Studying the generative device in the real social actor.

The units of analysis may be based on the concept of the performative utterance or speech act developed by Austin and Searle.

oOo

# CHAPTER 6 SURFACE STRUCTURE

6.1. The unitisation of non-verbal behaviour sequences is difficult. With verbal material the problem is less severe so special techniques for the delimitation of speech acts are not required for the time being.

6.2 Utterance classification is problematic, and a number of possible taxonomies are considered in this section.

6.3 Previous structural models in ethology and linguistics have used linear stochastic or linear non-stochastic models. Other kinds of structure may be needed to describe conversation. In this section a simple generative grammar of dyadic conversation will be described and tested.

In accordance with the plan proposed in chapter 5, this chapter will deal with surface structure under three headings of unitisation, categorisation and sequence analysis.

## 6.1 UNITISATION

> 'The search for the units of behaviour, their organisation and their empirical validation, thus constitutes the central problem of behavioural analysis.'
>
> Condon & Ogston, 1967: 221

The growing interest in the 'stream of behaviour' in recent years has prompted a number of authors to consider the problems of dividing that stream into units suitable for further analysis. The suitability of the units is the key issue,, since a behaviour stream may be partitioned easily enough, giving reproducable segments of many different sorts and sizes, without necessarily capturing the 'natural' units

of behaviour whose recurrence in different circumstances and combinations is the essence of a structured system. Barker (1963) warns of the dangers of employing artificial behaviour 'tesserae' in place of the natural behaviour units.

> 'Behavior units are natural units in the sense that they occur without intervention by the investigator; they are self generated parts of the stream of behavior. Behavior tesserae, on the other hand, are alien parts of the behavior stream in the sense that they are formed when an investigator, ignoring or dismantling the existing stream of behavior, imposes or chooses parts of it according to his own pre-conceptions and intentions.'
>
> (Barker, 1963: 2)

In a way this is over-stating the case. It makes the natural unit of behaviour sound like an object in the physical world, which one would find, without any effort of subjective interpretation, while the tesserae alone depend on cognitive activity. The distinction is not really clear. All attempts to partition the behaviour stream involve a large measure of subjective judgement and theoretical prejudice. At best one can only make careful and critical use of the necessarily judgemental data.

It is useful to consider just what is implied by the use, in other contexts, of the term unit. What is it to say of a thing that it is composed of certain units? One defining criterion has to do with planes of cleavage or weak points. A structure is expected to break under stress in such a way as to preserve the units but to yield at the joins between them. Such a criterion would support the view that bricks are units in the construction of a wall, or that atoms are the units of molecular structure. In what sense, then, can one break a behaviour stream to see where the gaps appear? Interruptions or extraneous stimuli

have been used for this purpose, and are found to be perceived differently when presented at a boundary point in the behaviour stream. This principle has been particularly popular in studies of the psychological reality of linguistic structures. Fodor and Bever (1965) found that clicks played to subjects in the vicinity of a sentence phrase-boundary, were recalled as being closer to the boundary. There is a tendency to perceive and process extraneous material as if it occupied spaces between natural behavioural or perceptual units. Argyle (n.d.b) found interruptions by a second speaker were viewed as most appropriate when falling at the end of a sentence, less so at the end of a clause, and least appropriate in mid-clause. Another way of stressing the behaviour stream to see where it breaks is by making it a recall item in a memory task. Johnson's (1965) study of the psychological reality of phrase structure may be viewed in this light. His subjects were asked to recall sentences, and the transitional error probabilities in recall(the probabilities of recalling a word wrongly, given that the previous word was correct) were found to correspond to the phrase boundaries of the grammarian's descriptive tree structure. This experiment corresponds to the idea of unitisation by fragmentation. Yngve (1973) distracted subjects in mid-sentence by turning on a cue light which they had to cancel. Typically they carried on speaking by going back to the beginning of the clause or phrase, completing it and then finding they had forgotten what was to have come next. This suggests that the clause unit had been placed in a different store from the remainder of the sentence prior to the interruption, so the experiment provides a means of

identifying the units in which verbal material is transferred from one store to another.

The other criterion which comes to mind, in considering the application of the term unit in other contexts is that the various structures which are observed, should use the same units in different combinations. Returning to the example of bricks as units of the wall, it is clear that the many styles of brickwork which are found, use(or could use) essentially the same bricks in different configurations. A comparison of two different styles would show that the internal relations of each brick were invariant, and quite unaffected by the 'context' in which they occured. Morphological relations between each brick and its neighbours would account for the variance in building techniques. To employ this criterion, one would need to split the behaviour stream into very fine units, and then assess their contiguous occurence in larger scale fragments. This might be possible by the use of a cluster analysis technique, in which the raw data was a matrix of temporal intervals between items rather than dissimilarities. Or again, the log-survivor curve, which is usually used to identify single activities which occur in bouts, at random or in over-spaced series, might be used to look at the distribution of time intervals between items of different sorts. The relativistic nature of such analyses becomes apparent in that criteria of sequential order are now being fed back into the detection of unit boundaries, hence the observation in chapter 5, that the analysis must proceed by repeated revisions of each stage in the light of the others, rather than by a linear process in which each is

completed before the next may begin.

To summarise them, one might justify the conclusion that a sequence of events /a/b/c/d/ consisted of two units X (/a/b/) and Y (/c/d/) on two grounds. The sequence when disrupted might be found to break at the b/c interface, more readily than the a/b and c/d; and /a/b/ or /c/d/ might be found together in a variety of contexts, while /a/b/c/d/ were not.

With the exception of the investigations of phrase structure in sentences, these principles have not been used in unitising studies. Instead, subjects have been asked directly to identify activity boundaries in particular sequences of action; or experimenters have laid down their own explicit procedures. In either case it is assumed that a unit is self-evident to someone, and that the things which appear to the observer as units, really are units in the technical sense.

The investigators who have developed their own unitising procedure include Auld and White (1956), Scheflen (1964) and Condon and Ogston (1967). Auld and White were studying interviews, and found reliable unitising to be the first major problem. They used verbal criteria such as dependent and independent clauses; elliptical sentences; anacolonthon (false starts); aposiopeses (incomplete utterances); affirmations; denials with explanation; and five-second periods of silence. Units defined in such terms have the advantage of being identifiable on audio-recording, or even in transcripts (with the possible exception of the silences). They claim that the method is independent of intonation, pauses, punctuation and capitalisation, and it was found to yield a 97% reliability between two judges.

Scheflen reported larger units of social interaction which were hierarchically organised and punctuated by postural shifts of different magnitudes. Points each consist of several sentences, and are marked by different head positions; positions involve a series of points lasting some five minutes or so, and terminated by a gross postural shift involving at least half the body; presentations last for an entire interaction of minutes or hours, and are delimited by changes in bodily location.

In Condon and Ogston's study, slow motion films of interaction were scrutinised. The activity of participants was found to be highly structured, appearing on the films and in transcript as a series of 'waves within waves' (perhaps a reference to the mathematics of Joseph Fourier). Each interactor was found to display 'self synchrony' as his body 'dances in time with speech'. There was also a synchrony between actors, and between the visible and bioelectric activities of each individual.

The studies of Scheflen, and Condon and Ogston point to an interaction structure which is hierarchically organised. At any one level of description one event succeeds the next, while each is composed of smaller units, and contributes to larger ones. That in itself is hardly surprising. It is difficult to think of anything which is not hierarchically organised in that sense, and the interdependent processes of constitution and regulation in hierarchical structures have already been discussed . The emphasis on hierarchy does, however, point to a danger which may otherwise be missed. In talking of the units, and the sequence of events in social interaction, it would be quite misleading to assume that such regularities only exist at one level of description, or that different observers are necessarily

reporting on the same level of the hierarchy.

The hierarchical structure of social behaviour, and its attendant complications, appear again in those studies of unitisation which have used the judgement of subjects as the index of discontinuity. Several other aspects of his judgement may be affected by the level of description to which a subject attends, and conversely, other aspects of his judgement may also change the level of description at which he operates. Newtson (1973) investigated both these effects in a study of attribution and unitisation. In the first experiment subjects viewed a video-taped social interaction, and marked its unit boundaries by activating an event recorder. The subjects were assigned to one of two conditions in which they were told to observe the fine or coarse segmentation of the behaviour stream. The subsequent attributions made by the two groups were then compared, and found to show the following differences. Subjects who had been marking fine unit boundaries

1) were more confident of their impressions
2) made more dispositional attributions
3) had more differentiated impressions.

In a second experiment, the reverse process was studied making the level of the subjects' analysis the dependent variable. Subjects viewed a video-tape of a man building a 'molecular'model, again marking unit boundaries by activating an event recorder. The control subjects saw the uninterrupted construction procedure, whereas the tape played to the experimental group included an unexpected event (the actor removed one shoe, and rolled up his trouser leg). After this rather bizarre occurence subjects were found to record more behavioural units per minute. In

other words they had been 'switched' to a finer grained analytical mode.

Dickman (1963) also investigated subjects' judgements of behavioural units, and again the hierarchical pattern emerged. Filmed sequences of activity were shown to subjects, and then represented as a sequence of cards each corresponding to a very small segment of the behaviour. The subjects then sorted the cards into groups of consecutive cards, so that each group corresponded to a behavioural unit in the judgement of that subject. Different subjects elected to attend to very different levels of description. The results were presented as a 'broken histogram'. Each vertical bar on the page represented one subject's interpretation of the behaviour stream. The time axis was marked on the ordinate. The bars had gaps at the points which subjects identified as transitions from one behavioural unit to the next. The overall pattern appears to be hierarchically organised in that the event boundaries recognised by subjects using coarse units are also used by the fine unitisers, in addition to their own fine distinctions. So a few boundaries are recognised by all subjects from the coarsest to the finest unitisers, a few more by all but the very coarsest unitisers, and so on. This need not have been the case, and one can imagine the results for a non-hierarchical system where the gross boundaries are not members of the set of fine boundaries.

Those disciplines which have shown greatest interest in behaviour sequences -- linguistics and animal ethology -- have paid relatively little attention to the problems of unitisation, and reasonably so. They deal with classes of behaviour like morphemes or fixed action patterns, whose

boundaries are not particularly equivocal. The problem becomes much more severe when the analysis turns to human NVC which is both continuous and creative. Then elaborate unitisation studies become necessary (Argyle, Collett and Clarke, 1974). In the analysis of discourse, with speech acts as the chosen units, there should not be too much difficulty. For the time being, then, we can turn to the much harder problems of categorisation and sequence analysis on the assumption that a boundary between speech acts is a thing which the trained observer, or the native actor can recognise easily, reliably and accurately.

Before leaving the topic of unitisation altogether, it is worth recalling that there is a different approach, for which no units would be required. Some behaviours might be regarded as continuous. NVC, for example might be more appropriately represented by a continuously changing relation between space, time and body-loci, than as a series of state to state transitions. This could be represented by equations, as discussed in 5.1.2.

## 6.2 CATEGORISATION

### 6.2.1 EXISTING CLASSIFICATIONS

There are so many studies in the literature which use or suggest event taxonomies, that they can only really be compared with reference to a meta-classification, or classification of classifications. The following features will serve to distinguish the different kinds of taxonomy:

1) Some reports describe particular classifications, whereas others describe the methods by which novel schemes may be produced for novel situations.

2) Human behaviour may be classified (often using

linguistically based methods) or animal behaviour may be classified (usually using ethological techniques).

3) Syntagmatic and paradigmatic structures may be related or not.

4) Acts or activities may be classified.

5) The taxonomy may apply to social behaviour in general, or only to its verbal aspects.

6) Verbal classifications may treat the constative (propositional), illocutionary, functional, stylistic, or prosodic features of the utterances.

7) Distinctions may be represented as dimensions, features or categories.

8) The classification may be a general one, or restricted to particular activities and situations.

The next 8 sections 6.2.1 -- 6.2.8 will deal with each of these features in turn using them to evaluate and criticise examples of each kind of classification. Section 6.2.9 will be devoted to the remaining taxonomies with something special to offer this particular study.

The 8 features of the meta-classification are interrelated in various ways. Some like (1) and (2) are independent: all four combinations of methods/findings with animal/human behaviour are sensible. Others are in nested relations, such as (5) and (6): the distinction between constative/illocutionary/functional/stylistic/prosodic analyses is only relevant if one is studying speech. Some distinctions like (1) methods/findings are unrelated to the usefulness of the study for the purpose in hand (which is not to say the distinction is redundant). Others, like (4) acts/activities are clearly polarised, with only one possibility suiting the present need.

6.2.1.1 Methods/findings

Both sorts of study are potentially valuable, and neither may be discarded at this stage.

6.2.1.2 Human/Animal behaviour

Again both sorts of study are potentially useful, but in different ways. A study of human behaviour may be used to provide a classification of speech acts or social acts directly, or it may be used to inspire discovery procedures leading to a novel taxonomy. Clearly, the animal studies are only likely to fulfill the latter role.

6.2.1.3 Related/Unrelated syntagmatic and paradigmatic relations

This is probably the most important single aspect of the classification schemes, and the one on which most taxonomies fail. The discussion of sytagmatic and paradigmatic structures by Saussure (1916), of regulative and constitutive rules be Searle (1965 & 1969), and of alternation and sequencing rules by Ervin-Tripp (1969) all describe these two vital and necessarily related aspects of linguistic structure. Barker's (1963) plea for the use of natural units rather than artificial tesserae, is also answered in some measure by a taxonomy in which syntagmatic and paradigmatic structures are related. The failure to follow this doctrine is so nearly universal, that the various classification schemes will be discussed in the light of their other distinguishing features, since most are at fault in this respect. Only one classification (that of van Hooff, 1973 -- to be described in section 6.2.9) seems to escape this criticism.

6.2.1.4 Activities/Acts

Insofar as the behaviour stream consists of a number of discrete behavioural events or acts, which occur in larger groups or episodes, it should be possible to devise a taxonomy for either the acts which make up an episode, or the functions which the episodes serve. The latter might be called activities. So, for example, the individual acts of stating, questioning, refuting, denying and explaining, might all be part of the episode or activity of arguing. The study by Bjerg (1968) suggests an intriguing breakdown of the behaviour stream into a series of agons, which are classified as explicit, implicational and meta-agons; and further sub-divided to form such categories as the agons of power, esteem, love, distributive justice, responsibility, aid-advice, pity-consolation, and so on. These would appear to be types of activity rather than types of act, which limits their usefulness in this study. One does not 'do' power, love or esteem, in quite the instantaneous way that one might insult, reproach or question. Similarly a paper by Ferrara (1973), which suggested four classes of social behaviour: positive, negative, raises problem, solves problem, could be said to deal in activities rather than acts. The point of this study was to demonstrate a recording method rather than a classification scheme, so the weakness of the taxonomy might be excused. The constraints of Ferrara's circular chart showing who did what to whom and when, would however militate against a more elaborate classification.

6.2.1. 5 Speech/Social Acts

Both kinds of act should be considered in a discussion of event taxonomies. While the present concern is mainly with speech acts, the ultimate goal is to include verbal

and non-verbal social behaviours. The distinction has a particular importance at present in that some of the levels of description which have been documented for verbal behaviour have no obvious non-verbal counterparts, for example the distinction made in the next section between constative, illocutionary, functional, stylistic, and prosodic classifications.

### 6.2.1.6 Constative/Illocutionary/Functional/Stylistic/Prosodic classifications.

A number of utterance typologies in recent years, particularly those which have originated in developmental, linguistics, have concentrated on the propositional or constative aspects of the utterances, while neglecting the performative aspects. Inspired by the case grammars (e.g. that of Fillmore, 1968), Wells (n.d.) and Shields (n.d.) divide the child's utterances into those dealing with changes of state as opposed to static relations, those referring to agents, objects, instruments or locations and so on, but have little to say of the performative repertoire of the child.

Classifications which take account of illocutionary forces appear to be the most promising at present. None of these can be discarded for the time being.

Functional classifications of language have been relatively commonplace over the years, presenting a bewildering diversity of categories, united by such common themes as the distinction between the transmission of information, the regulation of social encounters, and the expression of self as a spontaneous activity. Miller and McNeil (1968) describe a number of functional schemata which authors have used in the past, employing terms like expression,

persuasion, description, identify, objectivity, standardise and so on. Some but not all of these functional descriptions could be identified with particular speech acts. It seems to be the case with a number of functional schemes that the categories are not mutually exclusive, but they do cover all utterance types between them. The same could be said of Robinson's (1972) 14 functional categories, namely: avoidance of worse activity, conforming to norms, aesthetics, encounter regulation, performatives, regulation of self, regulation of others, expression of affect, marking of emitter, marking of role relationships, reference to the non-linguistic world, instruction, enquiry and meta-language. The study of spontaneous talk carried out by Soskin and John (1963) employed the six-category scheme of expressive utterances, excogitative utterances (an interesting class which most authors omit), signones (which report the speaker's present state), metrones(which express values and obligations), regnones (which regulate the others behaviour by request, instruction or permission), and structones (which convey information). Halliday (1970) discussed language use in the light of three aspects of function which all utterances serve to some degree; ideational(the expression of propositional content), interpersonal, and textual (concerning the relation of language to itself and its situation).

A number of speech or behaviour classifications have dealt with features of performance which might be regarded as stylistic variations rather than event classes. For example Leary (1957) used a circular chart with 8 segments, to represent an individual's personality as shown in his social interaction style. The 8 segments were labelled

managerial-autocratic, responsible-hypernormal, cooperative-overconventional, docile-dependent, self-effacing-masochistic, rebellious-distrustful, aggressive-sadistic, and competitive-narcisistic. Each segment bore a double label denoting the virtue of that style in moderation, and its fault when practised to excess. Mehrabian (1972) distinguished between utterance styles on the bases of immediacy and denotative specificity. Utterances such as

They enjoyed themselves. and

I think they enjoyed themselves.

would be distinguished by their differences in immediacy, whereas

I smoke because I enjoy it. and

One smokes because one enjoys it.

would differ in denotative specificity. Fielding and Fraser (1975) studied the effect of an addressee's role on the verbal style of the speaker. Addressees were chosen for whom the speakers had different liking, familiarity and respect to produce a 2 x 2 x 2 experimental design. The monologues intended for these different classes of addressees were found to differ on four dimensions: productivity, nominal/verbal style, qualification and disfluency.

Finally in this section there is the prosodic level of description. Gunter (1966) used the possible prosodic variations in utterances as an index of their relevance to their context, arguing that such usages as recapitulation, replacement and addition each have their own characteristic prosodic contour.

### 6.2.1.7 Dimensions/Features/Categories

Since so many considerations in the theory of structures, point to categorical rather than dimensional descriptions,

it is a pity that many authors regard any taxonomic study as necessarily dimensional. This may be because of the temptation of using factor analytic techniques whose scope and flexibility have no equal among the categorical techniques. A particular interesting study by Benjamin (1974), is spoiled for our present purpose by the use of a dimensional model. This may seem like an easily surmountable criticism, since dimensions may be used to characterise a space, in which clusters represent categories, In practice, however, the information which is selected and emphasised in the construction of a dimensional model is often the wrong basis for the sort of categorisation proposed here. Benjamin's paper is nevertheless worth describing in some detail. Called "Structural analysis of social behaviour" it explores the paradigmatic rather than the syntagmatic structure of interaction. It deal with the similarities and differences of behavioural types and styles rather than their combination into larger units of activity. Benjamin produced a three dimensional model of interaction styles. The three dimensions were activity, affiliation and inter-dependence. Behavioural opposites, antidotes and complements were found to occupy similar positions in the semantic space relative to one another. Autocorrelation studies, inter-subject correlations and factor analyses all supported this structure. When used with clinical material the model was a source of insight for patients, evoking such comments as 'I'm treating my son just as my father treated me' or 'I choose boyfriends who are mean to me in the same way my mother was'.

Different kinds of classification used in social anthropology are discussed in Collett(n.d.) The main kinds are the

taxonomy, paradigm, key and tree. The relation between such schemata and the way they would handle objects Q,R,S,A,B,C,D, distinguished by features $a_1$, $a_2$, $b_1$, $b_2$, $c_1$, $c_2$ is represented in figure 6.1.

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Figure 6.1

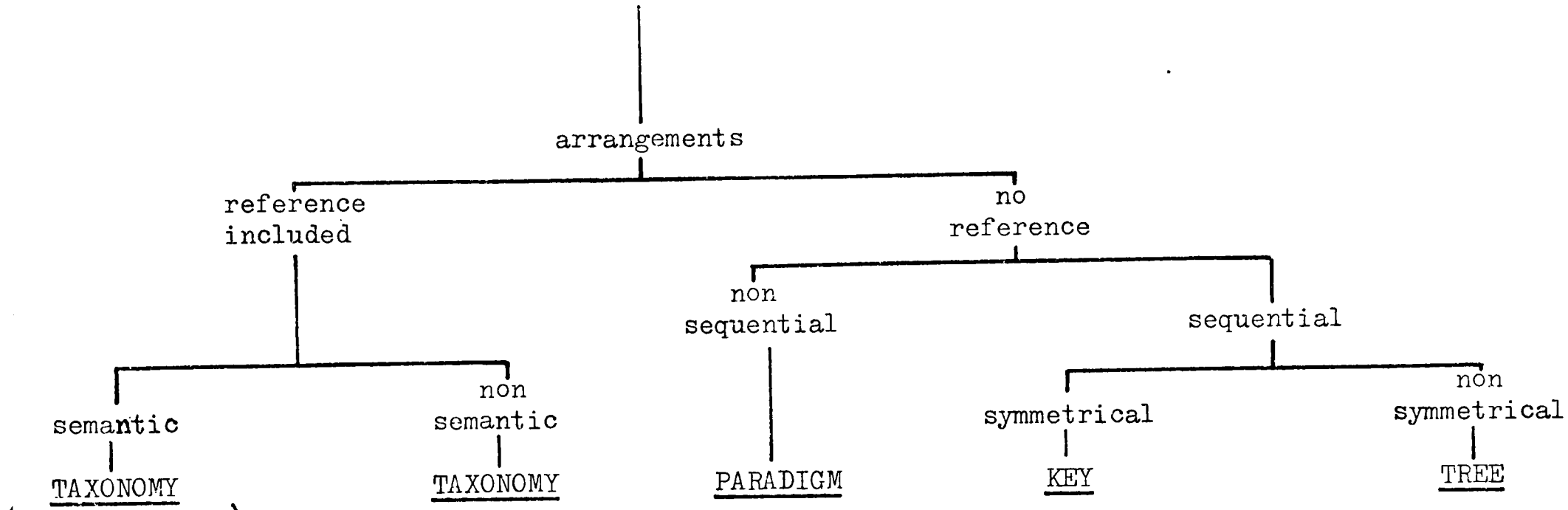
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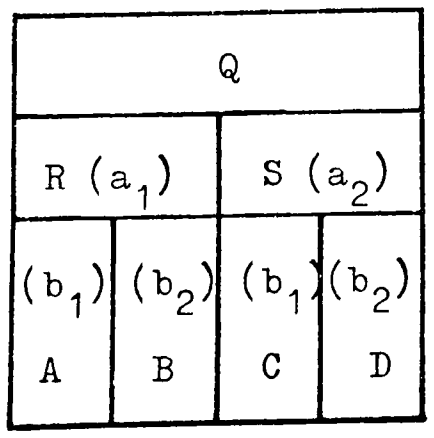
Let us assume for the time being that in rejecting the dimensional model we can accept categorical rather than feature-analytic alternatives. These are in many respects similar, the main differences being that categories are mutually exclusive and features are not. If the search for a category scheme leads to system which has one and only one category for each speech act, then all well and good. If that is not possible, those same 'categories' can be treated as features and allowed to combine. In either case the outcome is much the same. A category scheme is, after all, only like a feature matrix in which each possible feature combination has been reified.

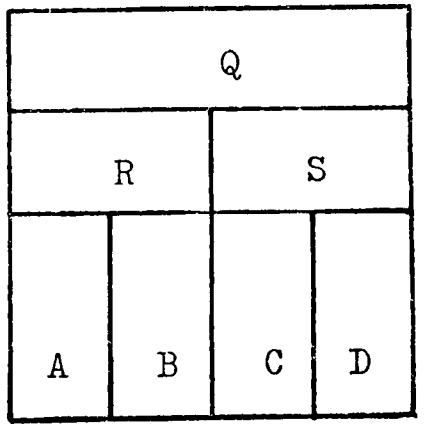
6.2.1.8 Special/general classifications

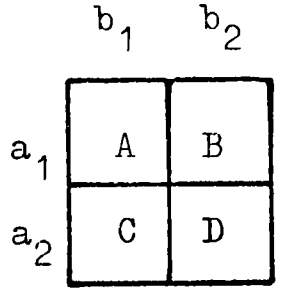
A large number of speech act and social act classifications are rendered unsuitable for the task by their restriction to particular behavioural settings or types. Best known of the special classifications is that devised by Bales et al. for use on problem solving groups.(Bales & Gerbrands, 1948; Bales, 1953). In the more competitive situation of arguing or bargaining a slightly different repertoire of responses and tactics are observed. These are assigned to 99 classes by Carter (1951); to the four dichotomies of indirect/direct, deceptive/undeceptive,

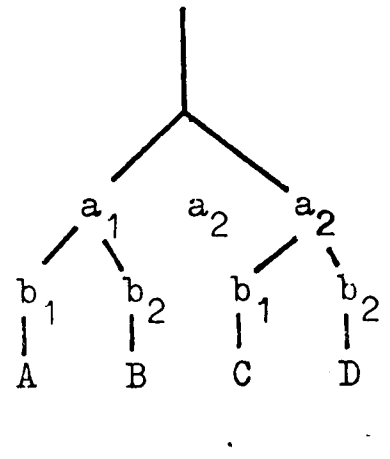
Figure 6.1 The Meta-structure of Classifications After Collett (n.d.)

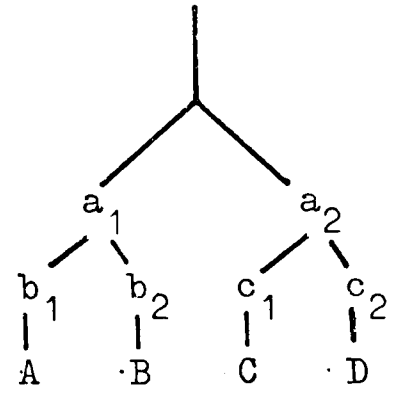


offensive/defensive and inductive/non-inductive by Krause (1972); and three sets of features by Morley and Stephenson (Stephenson, personal communication). Their three feature sets are mode(such as offer, accept, reject, seek), resource (praise, information, suggestion), and referent(self, other, both etc.). Thus each utterance might be expected to have one mode, one resource and one referent.

Again with the countless studies of therapeutic interviews using content analytic techniques (reviewed by Marsden, 1965) the particular categories, features or dimensions used are too restricted for a general theory. The classroom is another popular setting for specialised content-analytic studies (e.g. Coulthard, 1973; Flanders, 1970; Sinclair,1975).

Other authors have presented classifications which were specially geared to certain segments of the behaviour stream, rather than particular behavioural settings. Ervin-Tripp (1964) and Schegloff (1968) classify the means and stages by which conversations are initiated. Schegloff and Sacks (1973) discuss pre-closing and closing sequences, Churchill (n.d.) deals with questioning and answering. Most of Sack's (n.d.b.) 'adjacency pairs' function as specialised sub-taxonomies in their own right, and are very hard to relate to any generalised system.

Many classification schemes fail by discarding too much relevant information. There is no point in identifying each behavioural type with a point in a three dimensional space, for example, if one cannot infer from its position all the factors relevant to the use of that behavioural item.

6.2.1.9 Exemplary taxonomies

Those classifications which remain after the above screening have something special to offer this kind of study, although none of them presents the definitive classification which can be adopted as it stands.

The first one to deserve special mention (albeit briefly as it was described in some detail in section 5.2) is the classification of performative utterances offered by Austin (1962). The concept of a performative utterance is, of course, central to the model of discourse structure proposed here, but that is not to say that the particular types or examples used by Austin have any special psychological relevance. His five fold classification into verdictives, exercitives, commissives, behabitives, and expositives does not seem particularly persuasive. It was not constructed with any view to its use in a sequence analysis, and therefore (quite reasonably) took no account of the 'syntagmatic structure' of discourse. Furthermore, by Austin's own admission the list is not exhaustive and possibly not even representative. The singular usefulness of Austin's work at this stage of analysis is not to provide a ready-made typology of speech acts but to remind us of the rich diversity of verbal events, and the subtlety of the distinction which are apparent to the skilled language user. All too often this subtlety is lost in such coding dichotomies as positive/negative, or ego-centric/alter-centric. It should be a goal of the utterance taxonomist to preserve something of the subtlety and richness of Austin's scheme, if not the particular categories he used. If it should turn out that such subtlety is not altogether necessary at some later stage, the classification can be simplified much more easily

than an over-simplistic scheme could be elaborated.

The second work of particular note is that by van Hooff (1973). This was an anaylsis of chimpanzees behaviour, so it is interesting here for its methods rather than its findings. Van Hooff warns of the dangers of incautious segmentation:-

> 'The great problem was what subdivision of movements and postures should be regarded as behavioural elements. Behaviour, is a continuous stream of movement which can be split up in a number of more of less stereotyped recurring elements. The question is, however, how far does one split up and where does one lump? Most students of primate behaviour have not worried too much about this and have presented catalogues in a matter-of-fact manner. Especially in experimental studies, the catalogues are relatively small so that a great deal of lumping and/or selection must have been done.'
>
> (van Hooff, 1973: 80)

Behavioural categories for the chimps were, naturally, based on the physical similarities between patterns of movement and posture. Associations between behavioural elements were then studied by various means. The frequency of occurrence of different behaviours in the same time period was correlated, to establish a picture of their possible similarities. Some behaviours were found to be involved in predictable transitions as antedecents more often than sequiturs, or vice versa. This suggests a dichotomous distinction between items which initiate activity or commitment to act, and those which continue or terminate the activity. This is an idea which is also suggested by Sack's (op.cit.) work, and which will be considered again later. Flow diagrams are given depicting the most common behavioural transitions, in something like a finite-state grammar. The particularly striking technique used in this paper, however, is the elicitation of higher order behavioural

elements from the pattern of transitional frequencies between the primary elements. This is Saussure's doctrine of related syntagmatic and paradigmatic structures, presented (independently) in another discipline and under a new rhetoric. The matrix of transitional frequencies between elements was transformed into a correlation matrix showing for each pair of items the extent to which their transitional frequencies onto other items correlated. This correlation matrix was then subjected to multivariate analysis. A principle components analysis suggested the existence of 7 behavioural dimensions or systems labelled affinitive, play, aggressive, submissive, excitement, show and comfort. A cluster analysis of the data, produced a hierarchical dendrogram in which much the same behavioural classes emerged.

Finally two papers by Osgood (1968, 1970) dealt with the semantic relations between interpersonal verbs (IPV's), on the assumption that our language structures the verbal representation of social behaviour in much the way that the actor structures the behaviour itself. Some 200 or so IPV's were selected from Roget's Thesaurus (1959) and subjected to an intensive semantic analysis. The initial sample of 210 IPV's represented the most familiar examples of the 210 categories in the Thesaurus which contained verbs of interpersonal intention (e.g. to punish; but not to strike with a whip, which is a concrete behaviour). All the verbs were acceptable in the linguistic frame $PERSON_1$.....$PERSON_2$. The verbs were then classified on the six a priori features of (A) associative/dissociative, (B) initiating/reacting, (C) directive/non-directive, (D) tension-increasing/tension-decreasing,

(E)ego-oriented/alter-oriented, and (F) supraordinate/ subordinate. The validity of verb coding on the six features was then checked by asking (1) Are the clusters of words having identical feature code-strips closely synonymous in meaning? and (2) Are words with opposed coding on only one feature and identical on all others, minimally contrastive and on the appropriate feature? Test (1) was sometimes successful (e.g. forgive, pardon and excuse were all coded +A -B -C -D -E +F), and sometimes unsuccessful(punish, condemn and ridicule were all coded -A -B +C +D -E +F). Test (2) was also partially successful (e.g. impress/ inform differed on ego-oriented/alter-oriented), while there were failures with such items as confuse/shame which are distinguished only on ego-oriented/alter-oriented and court/retard which differ only on the associative/dissociative feature. The contingencies between features were examined, and additional features added to improve the apparent validity of the system on criteria (1) and (2) above. Thus a list of ten features was produced (A) moral/immoral, (B) potent/impotent, (C) active/passive, (D)associative/ dissociative, (E) initiating/reacting, (F)ego-oriented/ alter-oriented, (G) supraordinate/subordinate, (H) terminal/ interminal, (I)future/past, and (J) deliberate/impulsive. A theory of semantic interaction was then introduced, in which small linguistic frames were used to test for the opposition of binary features. The frame'.....prayed', for example would distinguish between human and inhuman nouns, while 'he.....successfully' might be used to detect the feature of goal-achievement. This technique was then used to draw up a 'target matrix' of IPV's x adverbs, (AV)

> 'In the sense of linguistic distributional analysis, each IPV appears in a set of AV contexts, and each AV appears in a set of IPV contexts; we are thus using context-sensitivity as a means of inferring semantic features.'
>
> (Osgood, 1968: 54)

The cells of the target matrix were then coded for anomaly (-1), permissibility (0), and appositeness (1). The target matrix was used as a basis for factor and cluster analyses of underlying dimensions and features, for comparison with the empirical data from groups of subjects who were asked to perform the same judgemental task on the target matrix, and for cross cultural comparisons. No single, unequivocal category scheme emerged from this study, and the elements being classified (IPV's) were somewhat different from the speech acts which are used in our analysis, so there is no need to consider in great detail the various factor and cluster solutions which were obtained, or their detailed comparison or evaluation. Suffice it to say that, as with other studies described in this section the methods used in Osgood's work are of more immediate use to us than his findings.

By now the immense problems facing the utterance taxonomist should be apparent. No solution exists in the literature to date, but several authors have pointed the way to a workable classification. It seems that a synthesis is required, which employs the notion of related syntagmatic and paradigmatic structures from Saussure, the context-sensitive discovery procedures of van Hooff or Osgood, and the speech act concept and subtlety of classification suggested by Austin. Such a synthesis will be attempted in the next two sections.

## 6.2.2 EXPERIMENT 12

### 6.2.2.1 Introduction

The taxonomic problems raised by this project, have similar counterparts in linguistics, where formal methods exist for classifying the constituents of a language. One such method, the procedure of test-frame analysis is described in detail in Fries (1952), where it is used to show that the conventional school-grammar distinction between nouns, verbs, adverbs etc. is not perfectly suited to the structure of modern English.

The test frame procedure is a simple means of deriving a paradigmatic structure of equivalence classes defined on the set of morphemes in a language, which reflects the syntagmatic structure of sentences. The test frame itself is a well-formed sentence from which a single morpheme has been deleted. Other morphemes are then inserted in its place and the new sentence judged to be well- or ill-formed. All morphemes which lead a particular test frame to be well-formed are (in that respect) equivalent. When the procedure is repeated with a number of test frames and a number of morphemes, it is found that the equivalence relations which are established between morphemes form a partition of the set, with something like 8 morpheme classes in the quotient set.

So for example, the frame

The..... was on the table.

would be a well-formed sentence when completed with book, lamp, jar, candle, pen, paper and so on; but not with blue, hard, heavy, extravagent, noisy; run, walk, sit, congratulate, prevent; or shamefully, graciously, ponderously or reluctantly. Thus a class like NCUN is crudely characterised

by instantiation, and distinguished from ADJECTIVE, VERB and ADVERB. Two aspects of this procedure should be noted. First, the test frame technique as used here, is for detecting syntactic rather than semantic equivalence (insofar as the two are really separable), so the substitutions in the test frame are only required to preserve the well-formedness of the string. The criterion of salve veritate which would be used in a semantic analysis does not apply. Therefore in the example above, 'The unicorn is on the table', or even 'The prospect is on the table' could be seen as acceptable. Secondly, it is true for the most part, for a language like English, that the constitutive rules are context free. Therefore morphemes which are equivalent in one context are equivalent in all. A perfect partition is formed on the morpheme set, with each morpheme realising one and only one part of speech. There are some exceptions but they are rare enough to pose very little problem. These are cases where the same morpheme appears in two categories depending on its context, showing equivalence relations in one context which it does not show in another. For instance the word smile in the sentences

'Wipe that smile off your face,' and

'She felt she could smile.'

act as a noun and a verb respectively. In the first case but not the second it is equivalent to tear, and expression; and in the second case but not the first it is equivalent to cry, and succeed.

In this experiment the test frame procedure is adapted to the needs of discourse analysis, in rather the way that Harris (1952) suggested (see section 1.4.1.2). The test frames are scaled up, becoming well-formed dialogues in

place of well-formed sentences, and the interchangeable units become speech acts in place of morphemes.

6.2.2.2 Method

The experiment was conducted in two parts: the first to produce a preliminary set of utterance classes by test frame analysis; and the second to reduce that set by the detection of further equivalence relations. The second stage employed a single-linkage cluster analysis.

1) Test frame analysis. 20 subjects took part in this stage of the experiment, all of whom were female students of occupational therapy, between the ages of 18 and 25.

Each subject was given a response form as shown in figure 6.2,

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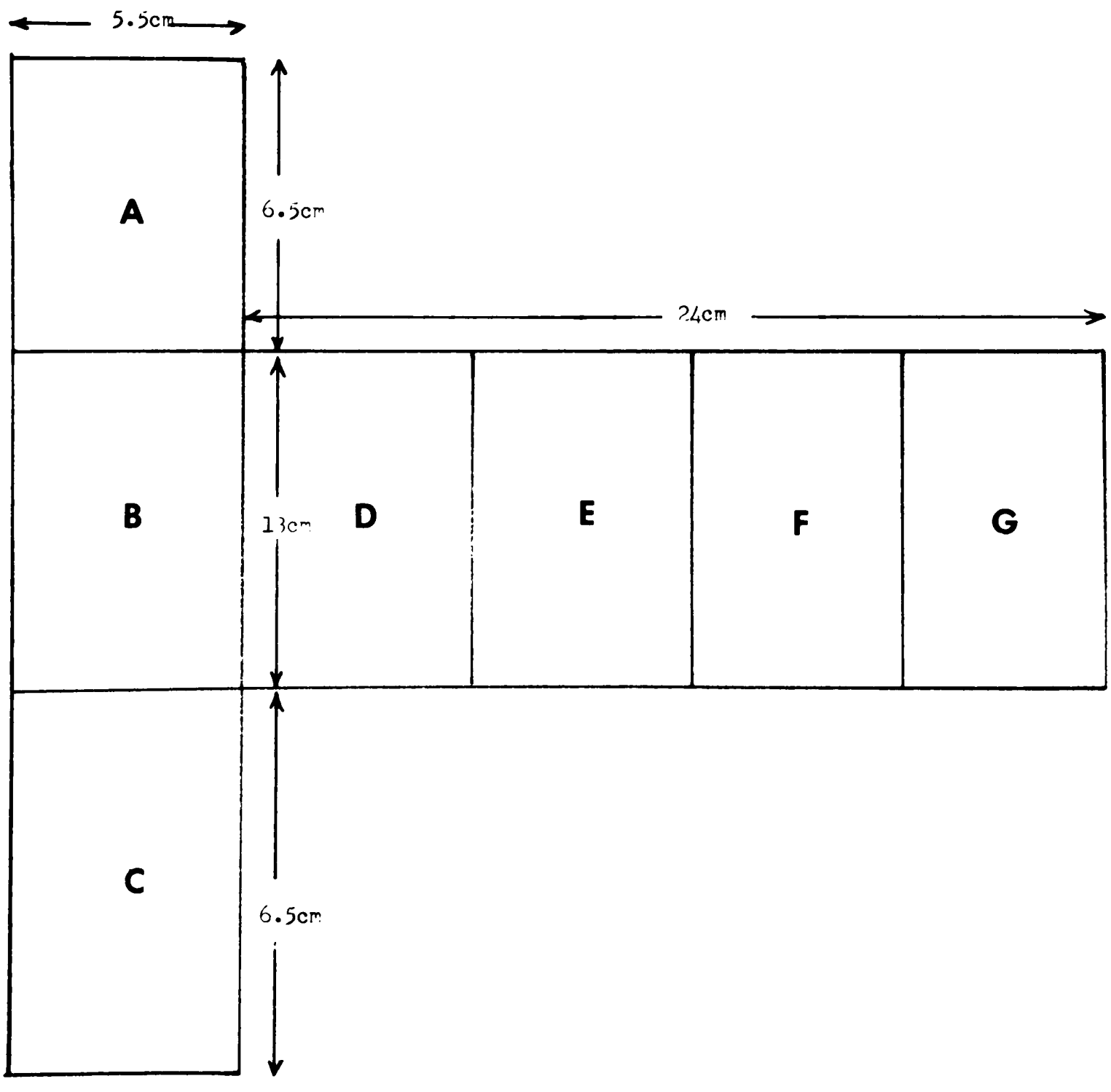
Figure 6.2

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divided by faint horizontal lines into 120 spaces the size of a short handwritten utterance. Sections A and B contained 10 spaces each, and sections B, D, E, F and G 20 spaces each. The subjects were told that the experiment was designed to tap their expertise on a matter of common knowledge to them. They were assured that it was not a test of individual ability, and that there was no single correct answer against which their responses were to be evaluated. They were also assured that their individual contributions would be treated confidentially.

The subjects were asked to write their name, age, address and occupation in the space above section D, E, F and G, and were invited to take any notes they wished on the experimental instructions in the space below D, E, F and G.

Figure 6.2 Experiment 11 -- Response form.



They were then asked to write 40 lines of realistic dialogue in the spaces in sections A, B and C, taking care to keep the two speakers 'in register' so that every odd-numbered space, counting from the top of the page, would contain an utterance by speaker X, and every even-numbered space an utterance by speaker Y. This hypothetical, but well-formed dialogue invented by each subject was to function as the test frame in the next part of the experiment. In producing the dialogues subjects were asked to bear in mind the diversity of roles and settings which contribute to dyadic encounters, and to try between them to encompass a variety of normal dialogue types. They were told that each utterance or line of dialogue should consist of one 'move' and only one move. The implications of this instruction were explained to the subjects. They were told that 15 - 20 minutes had been set aside for this stage of the task, and were asked to write in a small but clearly legible hand.

When all subjects had finished that part of the task, filling parts A, B and C of the response form with dialogue, the next phase of the experiment was explained. Sections A and C of the dialogue were to remain as an invariant context, while plausible substitutions were produced for all the 20 utterances in section B. Each utterance was to be given four alternatives, written on the corresponding line of sections D, E, F and G. Subjects were told that they should choose their alternative utterances so that their insertion in the original transcript would produce another well-formed and meaningful dialogue, although its meaning need not be that of the original. Thus the criterion was one of meta-syntactic well-formedness, without introduction of semantic anomaly, but the subjects were not asked

to preserve the same meaning. Each utterance was still to consist of a single move.

The subjects' most difficult instruction was as follows. They were to construct the matrix of interchangeable utterances in such a way that any combination of columns gave a well-formed dialogue. So their task on reaching line 12, say, was not simply to restore line 11 to its original, single utterance state, and produce 5 versions of line 12 which were compatible with the single line 11; rather the task was to produce 5 versions of line twelve which would fit any of the 5 versions of line 11, and then 5 versions of line 13 which would fit any of 125 combinations of lines 11 with 12, and so on. This was difficult since the entire substitution matrix of 5 x 20 utterances was equivalent to $5^{20}$ (95,367,431,640,625 or $9.5 \times 10^{13}$) dialogues, each of which was required to be well-formed. The task would have been inconceivable, had the subjects not had among their resources a conception of dialogue as a set of response types, each with a multiplicity of realisations. It is one matter to produce a string of 20 event classes with 5 examples of each class, and a very different matter to produce 95 million million event strings, in accordance with specified constraints.

18 of the 20 subjects finished the task within the allotted time of 45 minutes giving 360 sets of five interchangeable utterances from their sections B, D, E, F and G. The two subjects who were unable to finish in the available time contributed a further 14 sets of 5 utterances between them, giving 374 potential utterance categories in all, each with 5 examples.

2) Cluster analysis. There was no reason to suppose that each category, formed in phase (1) was unique. The experiment could just as well have given many more or many less categories,,depending on the number of times the procedure was carried out. The same is true with a sentence test frame: morpheme classes may be produced ad infinitum, but there are only 8 (approximately) which are unique and mutually exclusive. The problem then was to assess the redundancy in the set of 374 categories, and represent them as members of larger classes of utterances forming a true partition of the set of speech acts. A second stage of the experiment was carried out for this purpose.

The 374 groups of 5 utterances were presented on 374 3 x 5" file cards to 12 subjects who were asked to sort them into piles of functional equivalents. These subjects were all aged 18 - 25, and included 6 males and 6 females. 3 were undergraduate psychologists, 3 were postgraduate psychologists, 1 a research assistant in psychology, 2 photographers, 2 botanists and a theoretical chemist. More subjects with a knowledge of psychology were used for this task, than in the earlier experiments. It was felt that some familiarity with similar abstract tasks of behavioural taxonomy might be an advantage, while the experiment was sufficiently novel that subjects were unlikely to be influenced by their knowledge of particular psychological findings.

The following instuctions were given to all subjects:-

> The purpose of this experiment is to find out more about the basic 'building blocks' of social behaviour. It will help answer questions such as:-
> How many different types of behaviour are there?
> What are the different types?
> What are the examples of each type like?
> The items of behaviour in question are the individual utterances which go to make up a conversation.

Your part in the experiment is to take the cards you will be given, and sort them into piles. Each card has five utterances typed on it, which were drawn from a series of conversations. All five utterances on any one card were judged by another group of people to be equivalent, in that they could be exchanged for one another IN THEIR ORIGINAL CONTEXT, and the whole thing would still make sense. That is not to say that they mean the same thing necessarily or that the conversations as a whole would mean the same thing after such an exchange had been made, but it would still mean SOMETHING SENSIBLE.

You should use this same principle in sorting the cards into piles. Try to get each pile to consist of a group of cards whose utterances would all exchange sensibly for each other, but not for the members of any other pile.

You can use as many or as few piles as you like.

The cards in each pile should all fit each other's possible contexts. In other words, for any occasion on which it would be sensible to say one of the utterances in the pile, it should also be sensible to say any of the others, AND the replies and subsequent events which could sensibly follow any utterance in the pile should also be suitable for all the other utterances which you put in the same pile.

YOU ONLY NEED TO CONSIDER the 'social force' or function of each utterance -- the job it is doing in the conversation. For example whether you think each utterance is a THREAT, a PROMISE, an INVITATION, a RETALIATION or whatever types you think are relevant. You do not need to think of names for the types you use, but you should concentrate on the FUNCTION of the utterances rather than their grammar or content.

So, if two utterances have the same function, or functions that would sensibly interchange with each other, always put them in the SAME PILE, even if they do not match for the particular places, or people, or objects mentioned, or for the tenses of their verbs.

If two utterances have functions which would NOT interchange sensibly put them in DIFFERENT piles even if they are similar in other respects -- mentioning the same people, places and objects.

++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Here is an analogy which might help you -- if it does not you can ignore it, it is not essential.

The experiment is like the technique which linguists use to find out the grammar of a strange language, and how many 'parts of speech' it has. They ask people which groups of words can be exchanged for each other within sentences, so as to leave a grammatical sentence. The words which are exchanged and the sentence which are formed do not have to preserve the same meaning.

> From this the groups of words which all serve the same function in the grammar of the language can be worked out.
>
> ++++++++++++++++++++++++++++++++++++++++++++++++++++
>
> If there are any questions now or later, please do not hesitate to ask. When you have fully understood these instructions, you will be given a quick test to check that you have the most important parts right, and then you can keep the instructions to refer to during the experiment.

The instructions were given in this explicit and rather redundant form because of the abstract nature of the task, and the necessity for complete understanding on the part of the subjects. When subjects had studied the instructions thoroughly they were asked the following questions:-

1) What do you have to do with the cards?

2) How many piles should you use?

3) What should all the cards in one pile have in common?

4) Do the cards in any one pile have to be interchangeable so as to fit in with the things that might have come before them in the conversation, or with the things that might come after them?

5) The cards have to be sorted according to the 'function' of the utterances, what is meant by function?

6) Suppose you had two cards which meant different things, had different functions, and referred to different people and places, but whose functions would always exchange sensibly for each other in any context. Would you put them in the same or different piles?

7) Suppose you had two cards which discussed the same topic and mentioned the same people but whose functions would not sensibly exchange for each other in all likely contexts. Would you put them in the same or different piles?

The questions were arranged in roughly increasing order of difficulty, and the subjects' replies to each were discussed before proceeding to the next. When all questions had been satisfactorily answered, the subjects were then

given their final information and instructions, to the effect that:-

1) There were over 300 cards on which to perform the task.

2) The table space provided would take as many piles as necessary, up to and including the 374 pile maximum.

3) There was unlimited time allowed for the task, but for the subject's convenience a clock was provided. Subjects were told that they could estimate their use of time knowing that one card allocated to a pile every 9½ seconds, or 6¼ cards sorted per minute would complete the task in one hour.

4) There were code numbers on the backs of the cards which were to be ignored.

5) The experimenter should be called if any problems arose.

6) The spelling and punctuation were transcribed verbatim, and subject to the subjects' own re-interpretation.

7) No cards must be lost or omitted.

8) Difficult cards could be left until the end when categories were well established.

9) They could ask any further questions if they wished.

Subjects were then left to carry out the task at their own pace.

6.2.2.3 Results

The outcome of the first stage of the experiment was a set of 374 groups of 5 equivalent utterances. These are presented as a 'dictionary' in appendix B. Each is labelled with the code number which it bore in subsequent stages of analysis. The code numbers run in sequence, so the dialogue provided by the first of 20 subjects consisted of utterance groups 1 - 20 in that order, and so on.

In the second stage of the experiment all 12 subjects

completed the sorting task on the 374 5-utterance groups in 1 - 4 hours. The number of piles used varied considerably with a mean of 45.5 and a range of 167 (from 7 - 174). The distribution is too skewed to have any meaningful standard deviation.

The data from these twelve assortments was then subjected to a single-linkage cluster analysis(Jardine & Sibson, 1971) on an ICL 1906A computer. Because of the unusual size of the data matrix, special programs had to be written, using the following procedure. The data from the 12 subjects were recorded as twelve lists of 374 items. Each subject's data consisted of a number of sub-lists showing the groups of items that subject had identified. Sub-lists were separated by 0's which the program read as group delimiters. The elements in each sub-list, the sub-lists in each subject list, and the subject lists in the data corpus were in random order. The data were fed to the computer in that form. A first program MATRIX then read these lists, and converted them to a 374 x 374 item matrix in filestore, showing for any pair of items the number of subjects who put both in the same pile. Since the relation of 'being in the same pile as...' is reflexive and symmetric, the communalities of the matrix were all 12, and cell ij contained the same value as cell ji for all i and j.

The 374 x 374 item matrix was too cumbersome to print or interpret in full, so a second program SHORTHAND was used to scan the matrix for high values, printing out in the following format

$X_1$ $I_1$ $J_1$

$X_2$ $I_2$ $J_2$

where x is a specified number of subjects relating two items, and I and J are item numbers. The program was constructed so as to print each pair once only, thus avoiding the listing of

$X_1$ m n

and

$X_1$ n m,

from the raw matrix which contained both. The programs MATRIX and SHORTHAND are given in appendix C.

From these results a dendrogram could be constructed directly, as shown in figure 6.3.

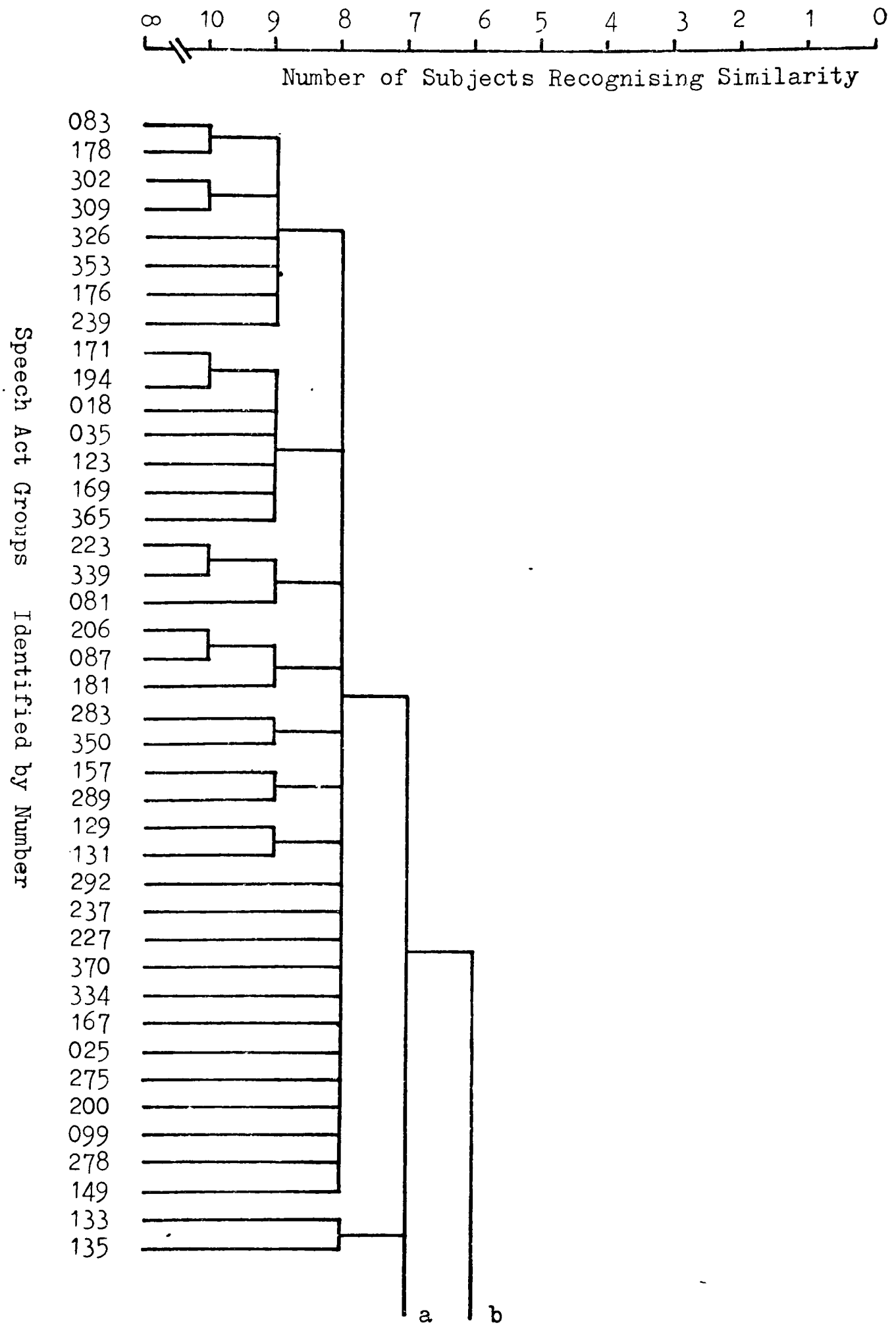
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Figure 6.3

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If the results are to be interpreted correctly, it must be emphasised that this is a single-linkage cluster analysis. That is to say that an item is viewed as having a dissimilarity or distance from a pre-formed cluster equal to its distance from the nearest member of that cluster. This is the simplest analysis computationally, an overriding consideration with a data matrix of this size. However, it has the disadvantage that under conditions of intransitive similarity (where A is like B is like C is like D; but A and D are very dissimilar) a single linkage program represents as perfect clusters, structures which are really chains or clines (rings). In this way it shows more clusters than say a centroid linkage analysis, which unites clusters when their centroids fall within the criterion distance. Consequently, centroid analysis tends only to produce ball clusters where everything is similar to everything else, as opposed to the possible chain clusters where everything is similar to something (but not everything) else.

Figure 6.3 Dendrogram of Speech Act Types Experiment 12




Continued on next page

Figure 6.3 (Continued, 2)

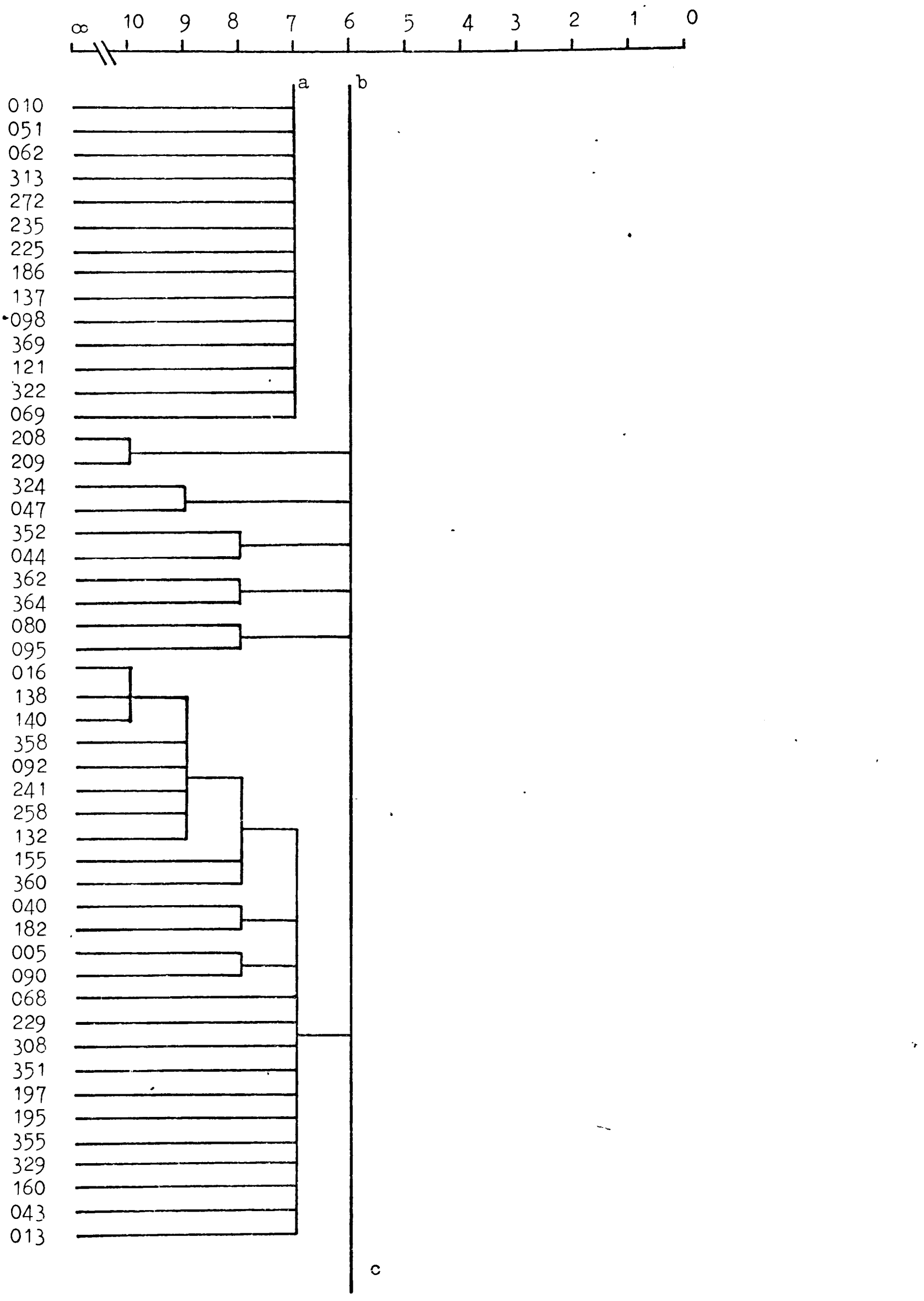


Figure 6.3 (Continued. 3)

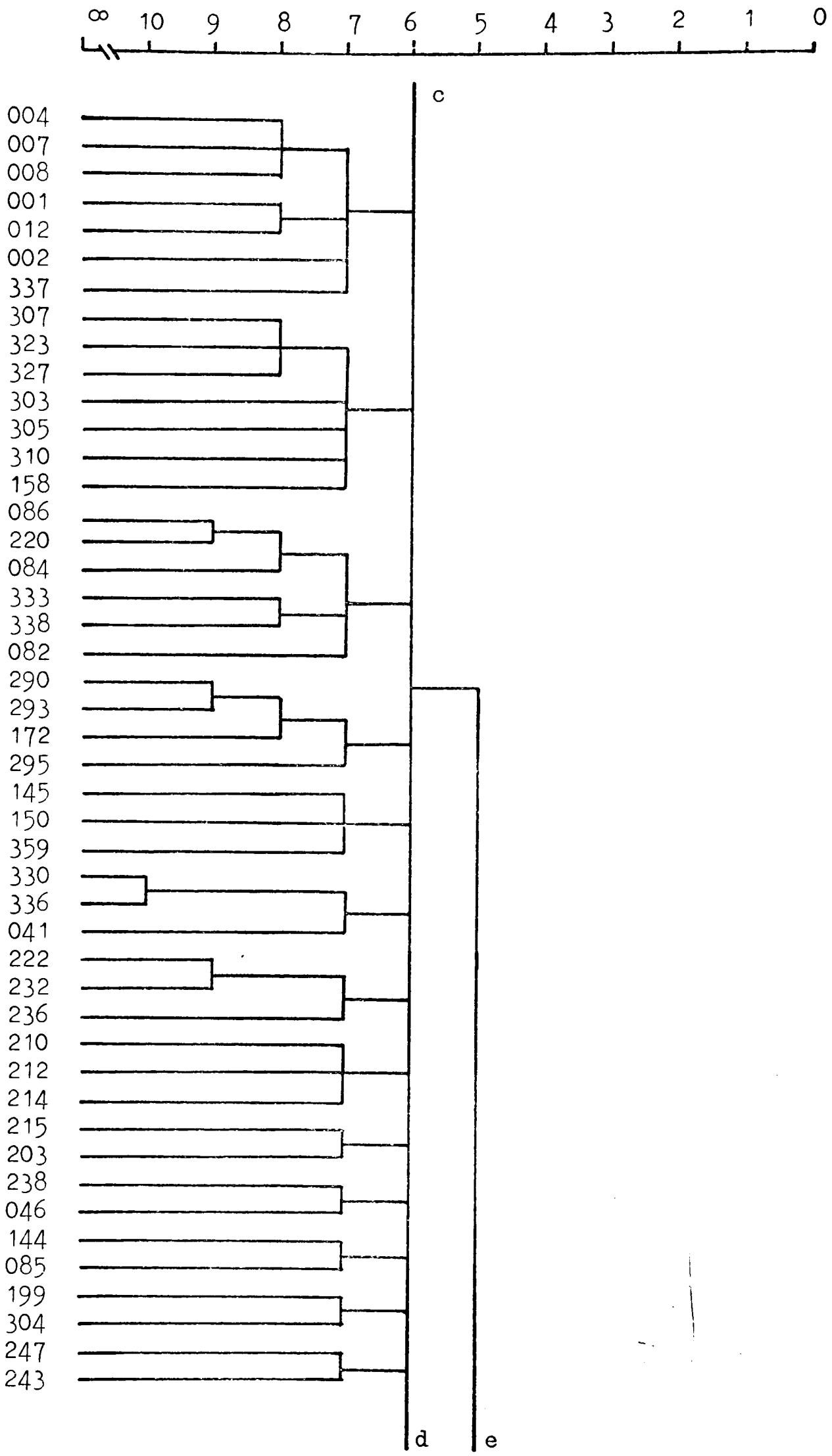


Figure 6.3 (Continued, 4)

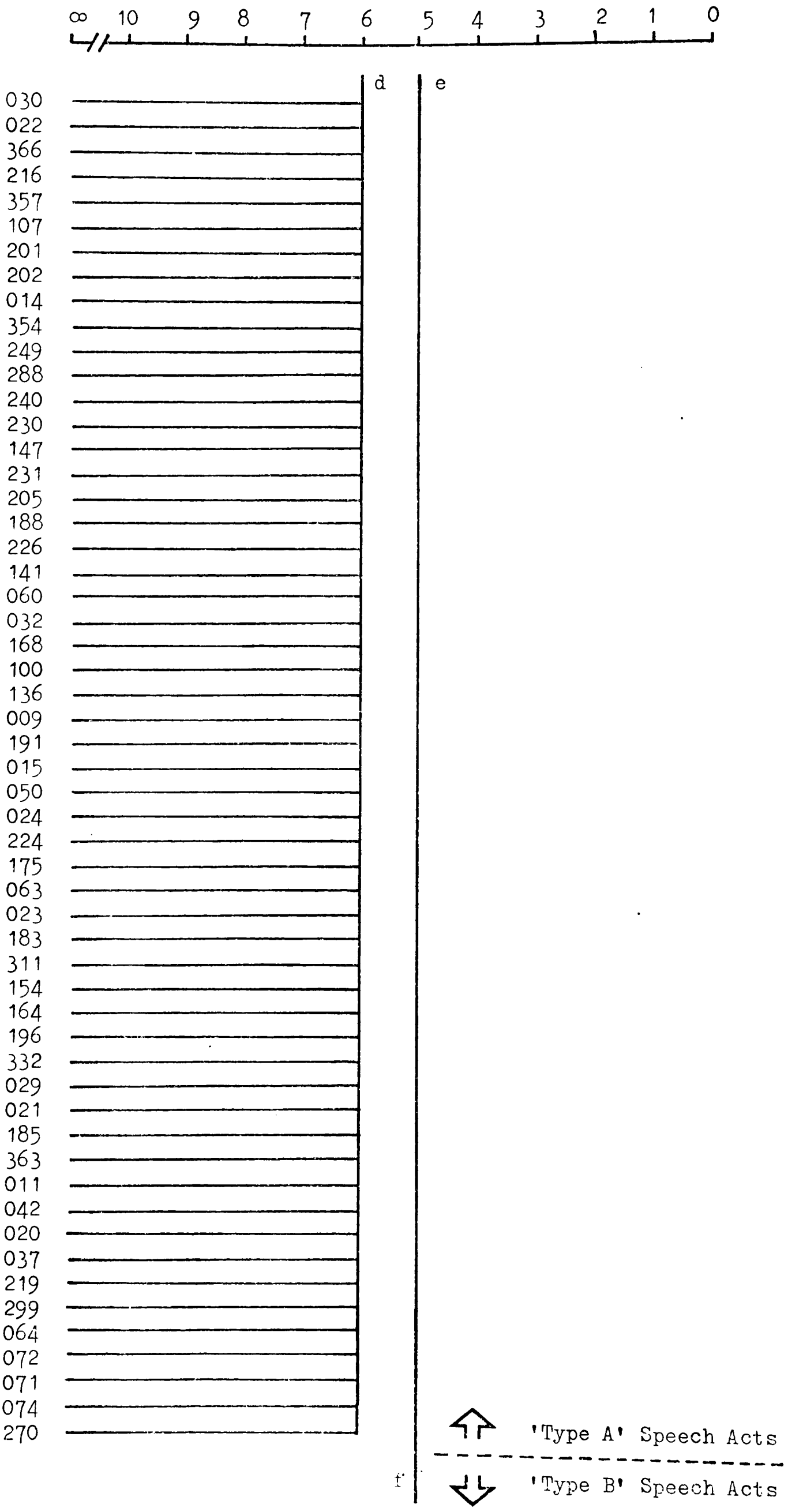


Figure 6.3 (Continued, 5)

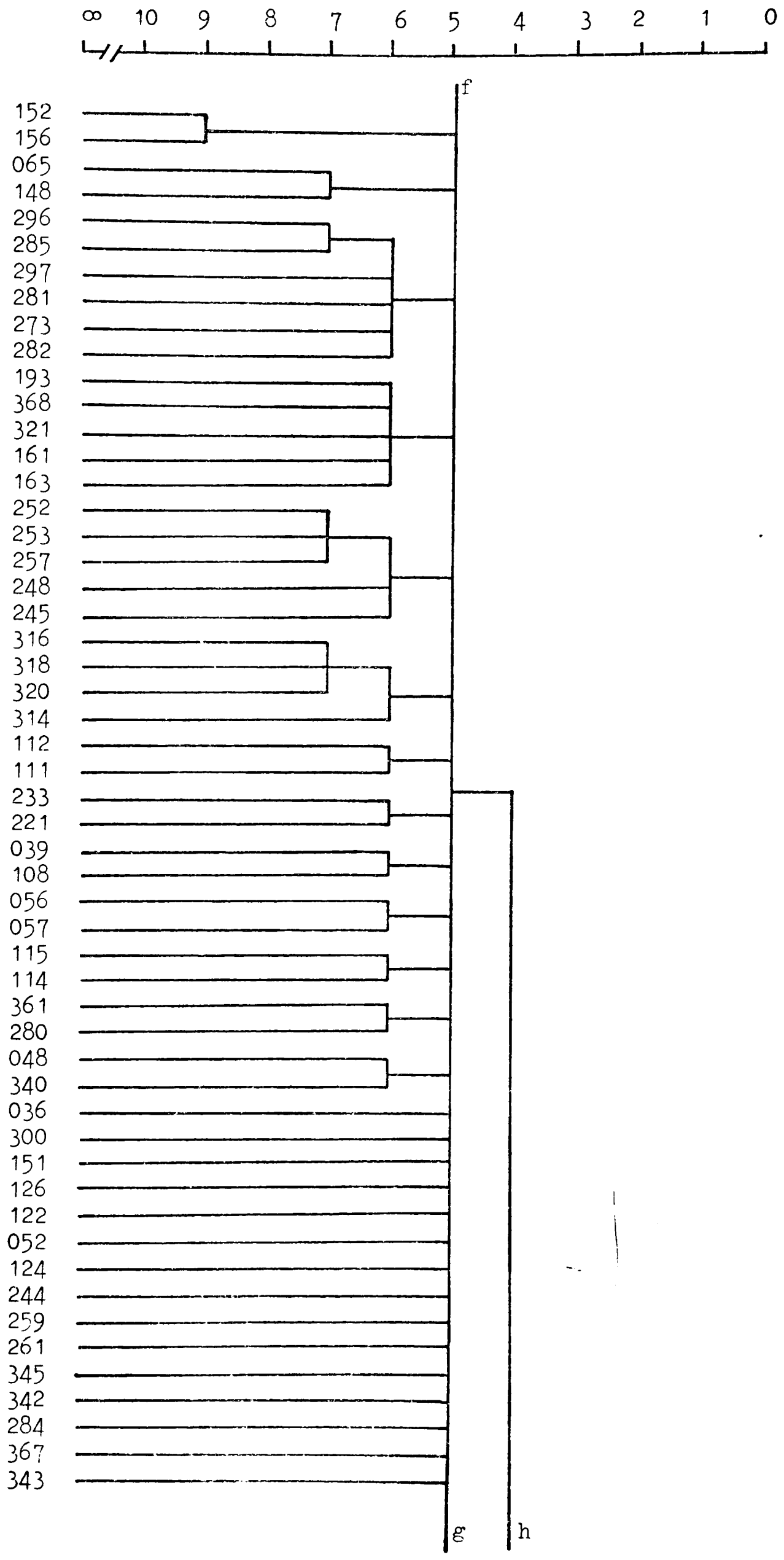


Figure 6.3 (Continued, 6)

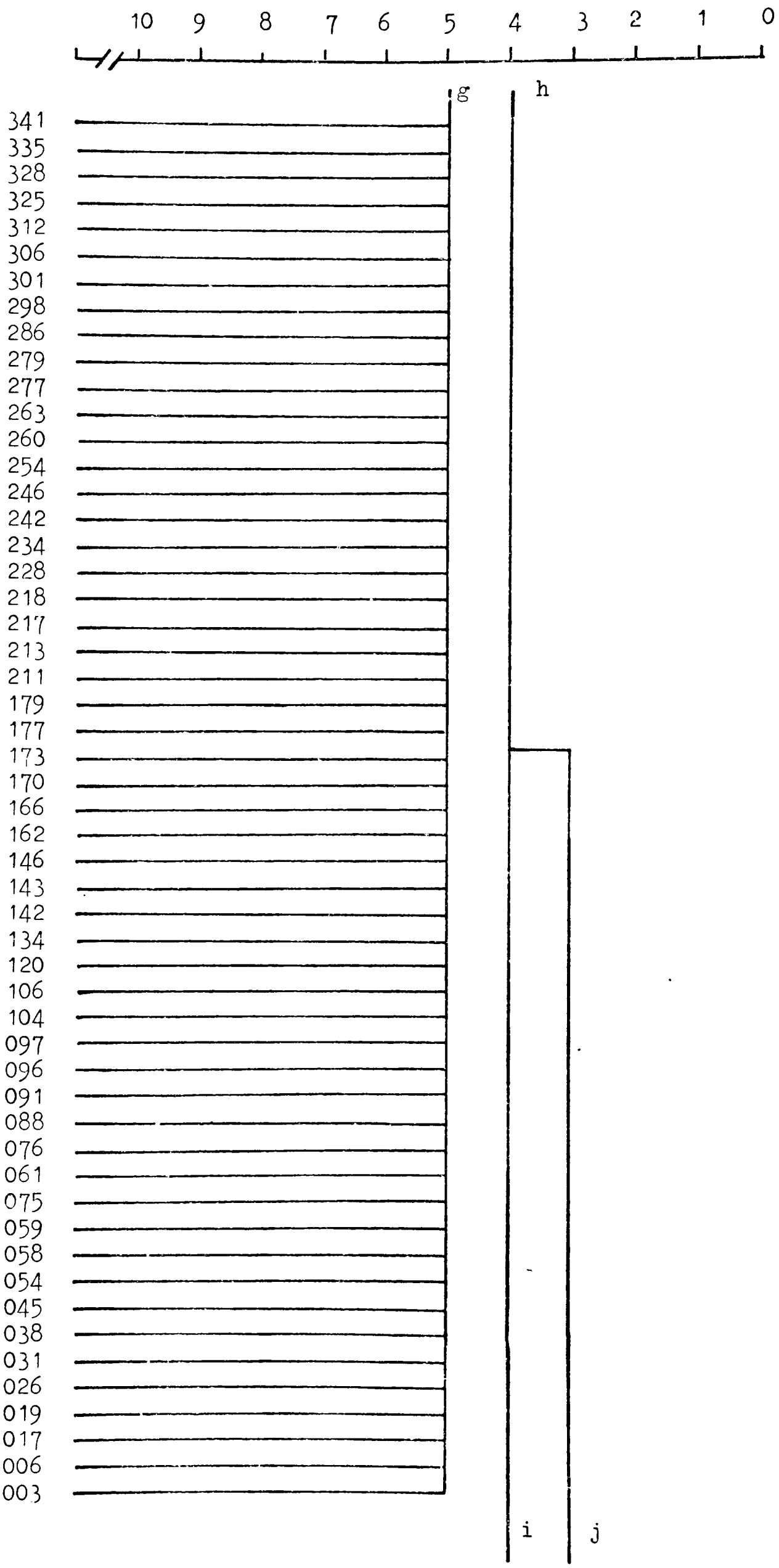


Figure 6.3 (Continued, 7)

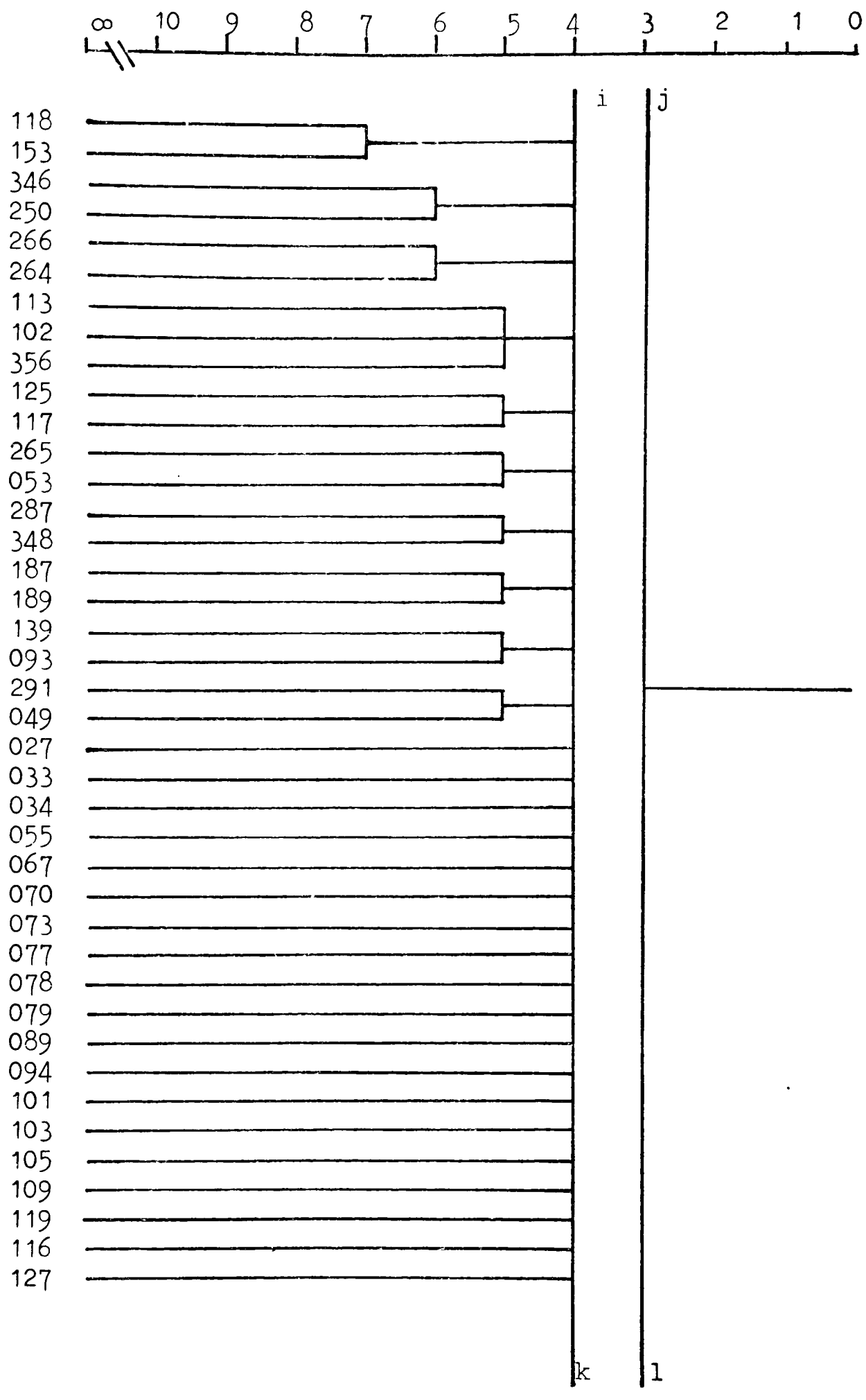
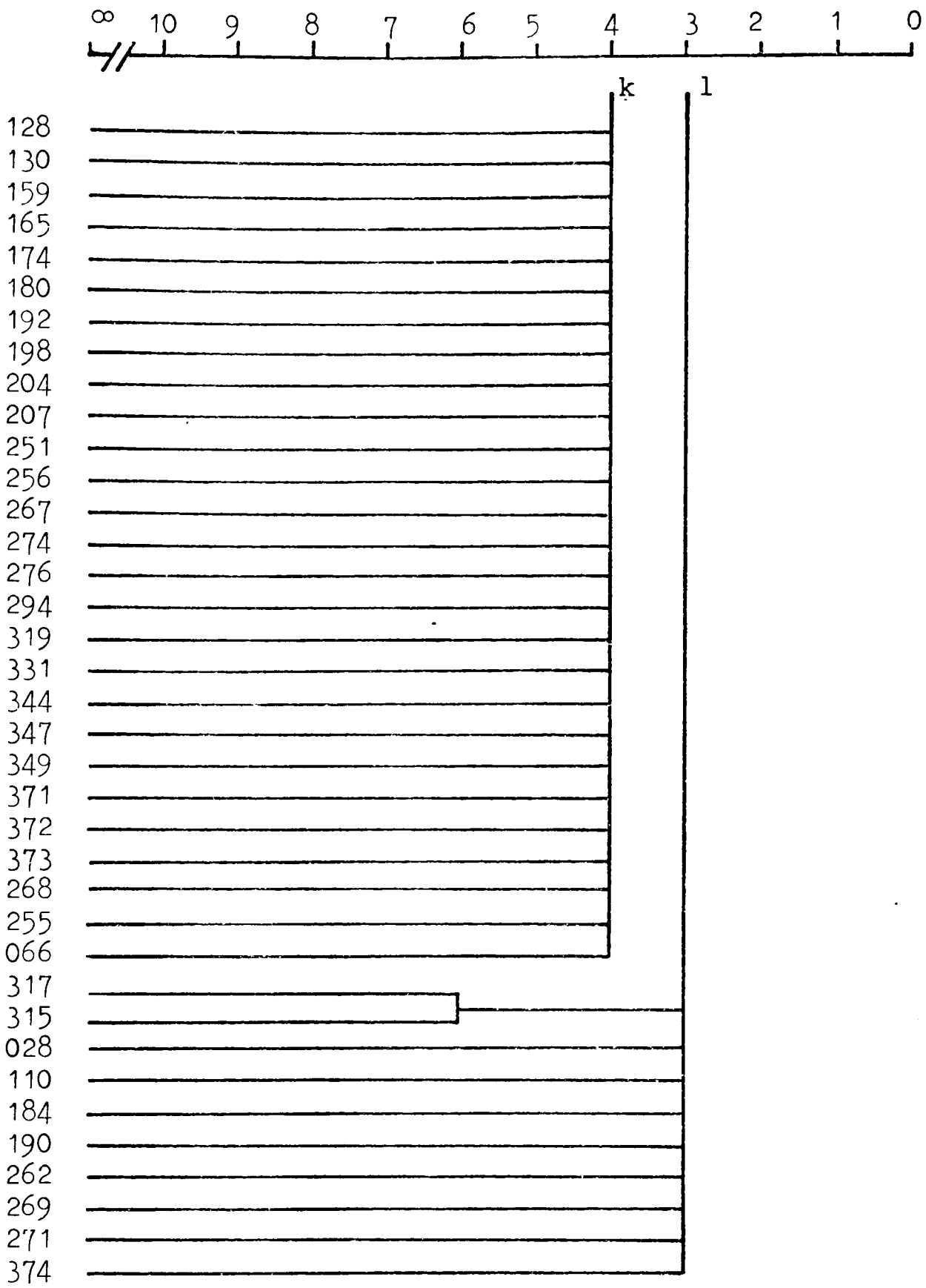


Figure 6.3 (Continued, 8)



Since the large matrices were held in store as a long list, there was a danger of rows and columns going out of register at some stage of the operation. Had this happened the dense clusters, which the program identified would have had no intuitive validity. This did not occur, and the 8 small clusters formed by the agreement of 10 out of 12 subjects contained the following groups:-

16 Yes doesn't he.
Oh yes.
I think so too.
That's true I think.
I agree with you there.

138 Yes
Indeed
Of course
Affirmative
Yes

140 I agree
Yes
I agree with you
Affirmative
So do I

++++++++++++++++++++++++++++++++++

83 What about your daughter.
Is your daughter married
Your daughter.
Has your daughter any plans.
Is your daughter settling down yet.

178 Does your brother know what he wants to do?
What about your brother?
And how's your brother getting on?
And your brother?
How about your brother?

++++++++++++++++++++++++++++++++++

All too often the 5 alternative utterances given by the original 20 subjects are near paraphrases of each other, but there are a number of interesting instances of dissimilar utterances being used as (legitimate) alternatives in a given context, for example the inclusion of 'Yes' with 'No" in group 5.

6.2.2.4 Discussion

The result was in some respects disappointing. The dendrogram does not show a neat hierarchy of clusters, and no definitive utterance classes emerge. Consequently the plan to replace each utterance in the original transcripts by the class in which it was placed by the cluster analysis, and then do a sequence analysis on equivalence classes, had to be abandoned. As the dendrogram was constructed it became apparent that one cluster was present, to which more and more single items accrued as the similarity criterion was relaxed. In the case of something like half the items, they form no sub-clusters, and only join the main system when the similarity criterion drops to 3, 4 or 5 out of 12 subjects in agreement.

The shortcomings of this analysis do, however, suggest a number of interesting properties of the discourse system. The paradigmatic structure, or constitutive rules of the system appear to be context dependent, to a very large extent. It is quite clear that a number of the five utterance groups have no clearly visible function when viewed out of context. This implies that it is not the particular utterances which need to be classified, so much as the utterances as used in particular contexts. This is in marked contrast to the case of sentence grammars, which (as shown in section 6.2.2.1) are based on constitutive rules which are largely context free. This might be counted as a major difference between the syntax of the language, and the 'meta-syntax' of discourse, and a great complication for the future of this kind of resarch. As Sacks (n.d.a, II,39) put it:-

> That turns out to be important in another way, in that for some sorts of things, the very recognition of what the item is turns on its placement. That is to say, for example, for the category 'answers', that something is an answer turns on its placing after a recognizable question; where answers do not have, by and large, the sorts of form that permit their de-contexted recognition. Various sorts of things, like 'I went to the movies' are seeable as answers via their placement.

This could explain the division in the dendrogram between those items which are part of the main cluster and those which are not. It could be a reflection of the difference between the 'first pair part' and 'second pair part' of Sack's 'adjacency pairs'. The first item, like a question for example, is usually couched in a form of words which would be recognisable in isolation from any context, whereas its sequitur (e.g. 'answer') is only recognisable as such when it is seen in its context. If this were so, the first member of each adjacency pair in the transcripts would be part of the main cluster structure and the second member one of the isolates. Conversely, the main cluster (which may be arbitrarily defined as the group formed by half the items aggregating at similarity level 6) would contain a high proportion of first pair parts, and the remainder of the dendrogram would contain a high proportion of second pair parts. Thus if the two types of utterance are called A and B respectively, we would expect the original transcripts to contain alternating A's and B's significantly more often than strings of A's or strings of B's. This may be tested by examination of the four-celled transitional frequency table showing the number of AA, AB, BA and BB transitions. The cell values are 10, 74, 72 and 95 respectively. $\chi^2 = 6.72$, df = 1, $p < 0.01$, two-tailed(Siegel, 1956). This suggests that, contrary to the hypothesis, the tendency is for A's and B's to group together more often than they

alternate. This could be due to the atypical dialogues produced by a small number of the 18 subjects who contributed 19 inter-utterance transitions each to the contingency table of 342 transitions. The 19-item contingency tables of the 18 subjects to complete the dialogue generation task, when considered individually, show that 10 subjects produced dialogues with more transitions in cells AA & BB than AB & BA, whereas 8 subjects produced dialogues having more AB & BA transitions than AA & BB transitions. The pattern does not seem particularly clear. Suffice it to say that the hypothesis that types A and B occur in alternation finds no support in these data.

The number of utterances represented in the dendrogram is so great, that a summary statement of the types of utterance represented by each part of the diagram is hard to derive. A sample of ten five-utterance groups of type A showed four questions, two affirmations, one request for confirmation, one agreement, one suggestion and one opinion, while ten-groups of type B showed four statements,three opinions, one question,one affirmation, and one evaluation. There is perhaps some tendency for the group B to contain a higher proportion of statements (which would be hard to classify out of context as say answers, denials, proofs, etc.), while group A contains a number of identifiable performatives. It also seem very likely that, given the complexity of the task, the second group of 12 judging subjects failed to work at the correct level of abstraction, so that items bearing a superficial similarity were classified and the more idiosyncratic ones treated as stragglers. If the various conversations from which the utterance groups were drawn passed through phases of commonplace social talk,

and unique topic talk, then we should expect to find AA strings and BB strings rather than an alternationa of A's and B's.

The type A and B utterances do not seem to be the peculiar contribution of two distinct subject groups. The frequency distribution of number of type A utterances used, over subjects is unimodal. The number of subjects using 1 or 2, 3 or 4, 5 or 6 type A utterances out of a possible 20, and so on, were 1, 1, 1, 1, 5, 3, 4, 2, 0, 0 respectively. These results are presented graphically in figure 6.4.

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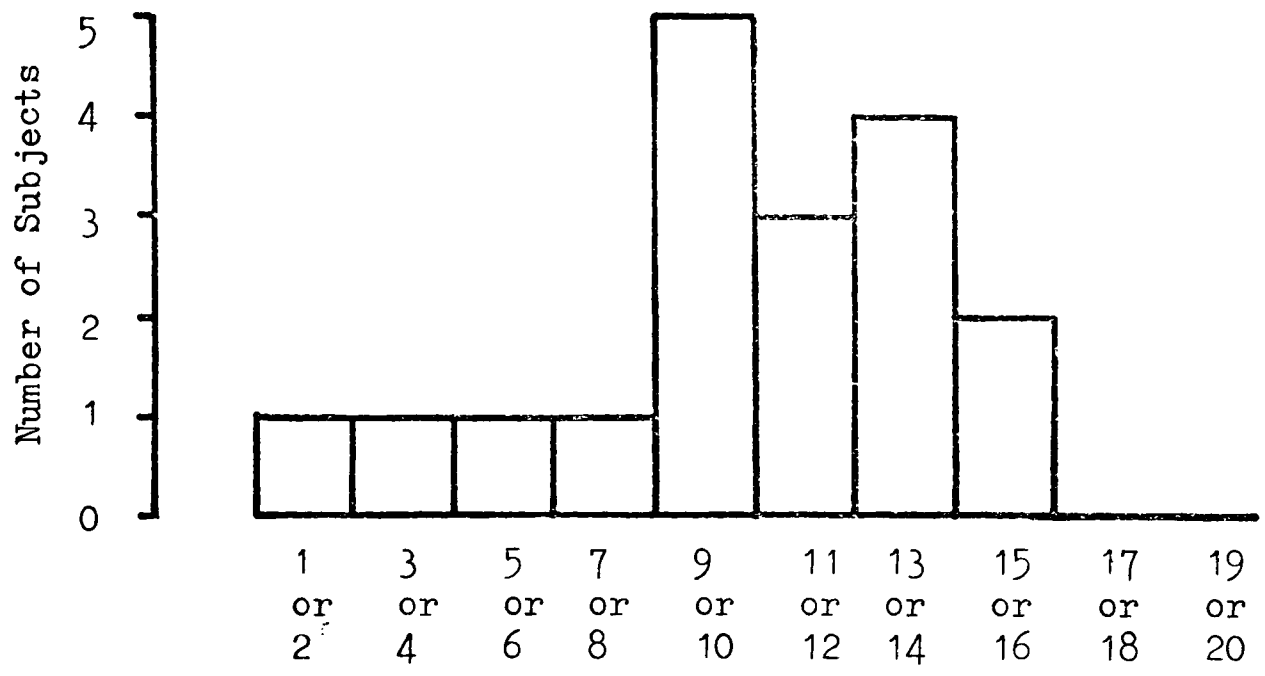
Figure 6.4

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There can be little point in delving further into the possible interpretations of the dendrogram, when the one thing it is known not to represent is the all important utterance taxonomy, for use in the next stage of analysis. Future attempts to produce such a taxonomy must take greater account of subjects' limited powers of abstraction, the degree to which the constitutive rules of DCS are context dependent, and the consequent impossibility of representing type classes by instantiation, or listing.

Some of these difficulties might have been overcome if the present experiment had used a cluster analysis of single utterances, each with a representation of its context, in place of the five-utterance groups. The problem of the subjects' limitations, and the difficulty of representing context-dependent categories would, however, still have remained. In the next section a new taxonomy will be described which was written so as to minimise such problems.

Figure 6.4 Experiment 12 Frequency Distribution of 'Type A' utterances used by subjects



### 6.2.3 A THEORETICAL TAXONOMY

It seems clear from experiment 11, that the units or speech-act classes which would figure in a 'grammar of conversation' are not quite like the familar morpheme classes used in the study of syntax. The categories of speech act are context dependent. A given form of words will be seen as a member of one category if it occurs in one context, and a member of another category if it occurs in another. This means that the categories cannot be derived from a simple test-frame procedure, and they cannot be represented by instantiation (or listing of constituent elements). Furthermore it means that the two stages of analysis categorisation, and sequence analysis) can no longer be treated as independent operations. Any workable taxonomy will have to relate closely to studies of syntagms, in order to capture the relations of categories to contexts.

As a particular category scheme cannot be elicited or tested except in conjunction with a study of sequences, the new taxonomy, which is described below, was worked out from theoretical principles rather than by observations of the behaviour stream. The categories were then used in a formal description of sequential patterns, so that the categories and the sequencing rules could be tested together in a single experiment. Furthermore, as the categories cannot be represented by instantiaion, category names were used like those which Austin used for his performative utterances, e.g. Threat, Promise, Invitation, etc. In a way this allows us to by-pass the issue of constitution, because the names do not specify exactly what is to count as a threat or a promise. If sufficiently unambiguous definitions are given for the category names, then the onus may be placed on the subjects,

to identify each category when it occurs, or to see how a given abstract category could be represented in a particular form of words, making reference to the context if need be. Clearly, this must lead to some falsifiable proposition about the categories if they are to have any use, and it does. Predictions made about sequences will fail unless the subjects use the categories consistently. When investigating sentences, one assumes subjects can recognise words, otherwise they could hardly perform consistently on a task involving sentences. Here we shall be investigating speech act sequences in the assumption that clear regularities will only appear if subjects are consistent in their recognition of the speech act types themselves.

When one considers the everyday vocabulary that describes speech acts, several things are apparent. It is a very rich and subtle lexicon, which suggests that people find it useful to label their social world in this way and to make fine distinctions between its various forms. Since each speech act name describes a form of activity, each has its counterpart in the form of a verb. Threat becomes to threaten, a promise becomes to promise and so on, and it is in the verbal form that an interesting distinction appears. When used in a sentence, describing some piece of conversation, these verbs take direct or indirect objects, which are sometimes previous speech acts and sometimes not. It seems to be the case that when the verb describing a speech act takes as an object a previous speech act, then it is describing a quality which attaches not so much to the utterance as to the relation between utterances, and that is something that can only be identified in context. When the verb describing a speech act takes objects which are not previous

speech acts, it seems to be describing intrinsic properties of the utterance which could be detected without reference to the context. For example verbs like answer, deny, disagree comply all take as their objects previous questions, statements or commands. (He answered the question. She disagreed with the statement. They obeyed the command.) Whereas verbs like state, recommend, promise do not have this property, and all are recognisable without reference to their context. The distinction is not perfect since some speech acts seem to belong in either group. Questioning seems at first like a context-free activity: one questions a person on a particular matter, and no reference need be made to previous utterances. On the other hand one may also question a statement, and use the term to indicate the relation of 'calling into question' another utterance or passage of talk. This distinction does not form an integral part of the utterance taxomony, but it should be borne in mind as an indicator that there are apparently two facets to the way we describe items of discourse. Both sorts of category are used in the following taxomony in much the same way, although it may prove useful at some later date to make a much clearer distinction between the way we label items, and the way we label the relations between items.

The starting point for the construction of the taxonomy itself was the belief that the essence of the social use of language is the direction of behaviour and attention in the group. Therefore the first categories to come to mind were the various modes of instruction Command, Request, Advise, Permit, adding Prohibit (as the negative version of Command), and Warn (as the negative form of Advise). Question was viewed as similar to request, except that it invites verbal

rather than non-verbal responses. The information carrying categories (those whose function is predominantly constative) then came in as a secondary consideration, because of their use as responses to the directive categories. This is in the spirit of Jakobson's (1972:80) remark that 'efforts to interpret imperatives as transforms of declarative propositions falsely overturn the natural hierarchy of linguistic structure. In addition to those acts which initiate and complete sequences of task oriented activity, categories were included to allow for socio-emotional processes such as Praise, Thank, Blame and Confess. Categories were inserted where they seemed to represent alternative courses of action having different occasions of use and different consequences, and deleted when they would fit all the contexts of other categories. In this way the taxonomy was designed around the principle of paradigms in relation to syntagms, and was checked against the criterion of meta-syntactic rather than meta-semantic structure(categories were not treated as unique simply because they carried a unique 'meaning', but only if they had unique occasions of use). The taxonomy was regarded as complete when all the commonplace sequences of events which came to mind could be represented simply and accurately, and when all relevant acts from the lists by Osgood, 1968; Austin, 1962; and Bjerg 1968 could be represented. A number of checks were made on the internal consistency of the system, but they rely upon the sequencing rules described in the next section. In a few cases the categories did not appear to be mutually exclusive as they stood, so their definitions were modified so that one class should only include those items which could not be accommodated in the other (more specific class) e.g. Assert is only used where Answer does not apply.

The final list of 45 categories was

| | | | |
|---|---|---|---|
| 1 | # ( a symbol used for the boundaries between connected episodes of talk.) | | |
| 2 | Command | 24 | Greet |
| 3 | Prohibit | 25 | Thank |
| 4 | Request | 26 | Blame |
| 5 | Question | 27 | Accuse |
| 6 | Advise | 28 | Confess |
| 7 | Warn | 29 | Offend |
| 8 | Permit | 30 | Sympathise |
| 9 | Offer | 31 | Challenge |
| 10 | Promise | 32 | Boast |
| 11 | Threaten | 33 | Apologise |
| 12 | Assert | 34 | Pardon |
| 13 | Justify | 35 | Bid Farewell |
| 14 | Accept | 36 | Pacify |
| 15 | Reject | 37 | Fulfill |
| 16 | Comply | 38 | Joke |
| 17 | Refuse | 39 | Laugh |
| 18 | Answer | 40 | Terminate |
| 19 | Agree | 41 | Attend |
| 20 | Deny | 42 | Cheer |
| 21 | Continue | 43 | Minimise |
| 22 | Praise | 44 | Complain |
| 23 | Defer | 45 | / (speaker change symbol) |

In section 6.3.2 this set of categories will be used as the basis of an experiment on sequencing rules. The rules of sequence will be processed to provide further information on the relations between the categories, as they are used in the experiment.

## 6.3. THE ANALYSIS OF SEQUENCES

### 6.3.1 STANDARD METHODS.

In mathematics the analysis of temporal processes is commonplace, but is usually concerned with the changing magnitude of a continuous variable with time, as in the analysis of waveforms. Our problem is rather different. We have to trace the order in which a system progresses from one to another of a set of discrete events or states. The methods for doing this are usually described as a series of possibilities ranging from the simple convenient and often implausible models such as the Markov chain, to the complex, plausible and difficult methods, such as linguistic analysis. This range of possibilities is reviewed in Hutt & Hutt (1970). Slater (1973) describes a number of ethological techniques for the analysis of sequences. Farrell (1970) also considers the same series of sequence types, not as methods of analysis but as models of conscious devices. Several different models of sequential structure are described in section 5.1.1.(3) but for the sake of clarity their most important features and distinctions will be repeated here.

The simplest model, and one of the most widely used in Ethology is the Markov chain. This relates each event to its immediate antecedent, on the assumption that the occurence of that event in a given interval of time, or at a given point in the sequence, depends only on the nature of the previous event. The information for such an analysis is conveniently represented as a matrix whose rows correspond to the different events as they occur as antecedents,and the columns correspond to the events occuring as sequiturs. Any event in a real sequence is, of course, the sequitur to the one before it and the antecedent to the one which follows, so the matrix represents an ongoing process and not just a number of

isolated transitional frequencies. The $\chi^2$ statistic is often used to detect significant variations in transitional frequency in such a matrix. Raush (1972) discusses the use of transition matrices as a representation of the sequential structure of human social behaviour, pointing out that even the simplest matrix can be used to show up some interesting properties of the behaviour stream as a whole. Some matrices clearly represent 'absorbing chains' of behaviour, in which certain states may be entered readily, but cannot be left. In these cases the system tends to be drawn towards such states over a period of time and is captured with no chance of escape. A 'regular chain' is one in which every state can follow every other with some probability, so that no transition is absolutely impossible. 'Cyclic chains' can arise in which a succession of states is likely to occur over and over again in the same order. It is an interesting feature of such matrices that they allow long term predictions to be made from observations of short term relations between events, provided the assumptions of the Markov model hold. For example, one can work out from a simple transition matrix the likelihood that the system will visit any given state in n moves after a particular starting point, or the probability that n moves hence the system will be in a particular state. Jaffe, Feldstein and Cassotta (1967) found that a Markov model of the alternation of speakers in a dialogue gave a satisfactory account of their data.

Markov models are not acceptable for the more complex aspects of interaction as experiments 5, 6, and 7 have shown. They may still be used as a useful first approximation to more complicated kinds of sequential pattern, but more precise analyses will lead inevitably to the use of non-Markovian descriptions. The idea that the brain functions as a Markov

device ceased to be acceptable many years ago. Lashley (1951) wrote that associative chain theories of mental functioning, in which each element of a chain of central processes served to arouse the next by direct association was untenable, and went on to suggest that the orgnisation of human activity should be regarded as essentially language-like.

One obvious refinement of the Markov model is to relate each event not just to one antecedent, but to several, creating different orders of linear stochastic process. Altman (1965)compared zero, first, second, third and fourth order models of the social behviour sequences of his Rhesus monkeys, finding the fourth to be the best. Chomsky (1957, 1959) considered such processes as models of English syntax, under the names of finite state or type 3 grammars. He concluded that they were very unsatisfactory because of the existence of 'nested' structures. Sequences of the form A()B where the propriety of B derives from the presence of A regardless of the length or content of the string(), are impossible to represent in a transitional matrix of finite order. It can be argued that a matrix of finite order will still provide an adequate approximation to a system which can generate outputs of the form A()B, but objections still exist. The amount of data required becomes prohibitive. A fourth order transition matrix for a system having 50 states, would have over 300 million cells. It would probably be an inappropriate model to describe the generative processes of such a system even if it could approximate to the output, and because frequencies are usually obtained by direct observation, they could not be used in studies of propriety, unless the procedure were modified to include

subjects estimations of transitional propriety in place of probability.

Isolated pieces of information about the sequential structure of the behaviour stream can be obtained without recourse to more complex models. The frequency of occurence of pairs of items in the same time intervals can be correlated, van Hooff (1973), and the correlations used in factor and cluster analyses. This shows up any class or dimension of activity which may be used to label subsets of the behavioural repertoire which occur contiguously. The distribution of time intervals between successive occurences of the same behaviour may be recorded to see if the behaviour is randomly distributed in time, overspaced or produced in bouts. In the log-survivor technique for example each possible time interval between successive occurences of the relevant events is plotted against the log of its frequency of occurence (Odum, 1971). This gives a straight line for randomly spaced events, one which is bowed towards the origin for events which occur in bouts and one which bows away from the origin for over-spaced events. The reason for this is simple. An event with a probability of occurence in any time interval of p, regard-less of how long ago it last occurred, will occur immediately after its last occurence on the proportion p of occasions. Let us call the probability of its not happening q, that is $q = 1-p$. On the remaining q occasions it will occur in the second time interval on the proportion p of occasions, an overall proportion of qp. So the sequence of events will get as far as the third interval on $q^2$ occasions and will terminate at that point on $q^2p$ occasions. So in general the interval between successive occurences of the event will be found to be n on a proportion $q^{(n-1)}p$ of occasions. This is an

exponential function which appears as a straight line in a semi-log plot.

Interesting though this sort of information can be, it still leaves us far short of a grammar of conversation, in the form of a system of interrelated rules which will produce all and only the strings of sensible discourse. For that, one must turn from the kinds of analysis described above, which are ethological techniques, to the procedures of linguistic analysis as used by the generative grammarians. The latter approach differs from the former in two striking ways. It is not corpus based. The complexity of the sequences is such that one cannot record strings and then apply some routine procedure to unravel their grammar, although that is sometimes possible for sequences of animal behaviour(Marshall,1965). Instead the investigator has to postulate some kind of underlying regularity of the generative rule system, from which predictions may be made about the observed forms of behaviour. This is familiar hypothetico-deductive methodology. Usually it has been the case that linguists used the rules to predict what would and would not count as a well-formed string, thus embarking on a kind of analysis by synthesis (Neisser, 1967); while psycholinguists insofar as they could interpret the rules as descriptions of the generative mechanims in vivo, used them to predict response latency and accuracy on a variety of verbal tasks. It is not the current practice in either discipline to collect large samples of spontaneous talk for analysis.

The second distinctive feature of 'linguistic analysis' is that it deals not only with the observed items of behaviour known as terminal elements as their production marks the termination of their generative history, but also with non-

terminal elements. These are hypothetical units like noun phrase, and sentence which feature in the rules for producing well-formed strings, but not in the strings themselves. Such a system can generate a hierarchical structure with embedded sub-units.

Let us adopt the policy of attempting to synthesise rather than analyse the discourse system, and ask what kind of rules or processes we could imagine in a generative system and how they could be represented? The representation is easy using an extended version of Chomsky's rewriting rule system, which will enable us to compare the rules of a number of different kinds. Any generative process has to turn something into something else. It must have an initial state and a terminal state. The process serves to replace the former with the latter. Hence the archetype for all generative rules is one showing the replacement of one state of affairs with another, one string re-written to form a second. If the symbol ::= is used in place of the rare character →, we can write the generative rules in the form

$$A ::= B$$

meaning A re-writes to, or is replaced by B. Clearly the basic generative processes must be addition.

$$A ::= A + B$$

deletion

$$A ::= \emptyset$$

($\emptyset$ being the usual symbol for a null event, or empty set)

substitution

$$A ::= B$$

and transposition

$$A + B ::= B + A$$

The addition rule as it stands is ambiguous

$$A ::= A + B$$

could mean that the rule is to be used recursively producing A, A + B, A + B + B, A + B + B + B,... which is the way such rules appear in Chomsky(1957), or as part of a Markov process in which A and B represent a succession of terminal elements, in which case any further rewriting must use rules beginning

B ::=

or

A + B ::=

To make this quite clear it is necessary to use an additional symbol & to represent the 'growing point' of those strings which can only be rewritten at one locus. So for example the rule

A + & ::= A + B + &

is quite unambiguous and cannot be used recursively. Indeed the symbol & need not have any 'meaning' at all to work in this way, provided is it used correctly.

We can now represent a variety of different rules and processes in the same form for comparison. A simple Markov chain would be generated thus:

A + & ::= A + B + &

B + & ::= B + C + & and so on.

More commonly the rules would provide for a variety of different rewritings so one would see

A + & ::= A + B + &

::= A + C + & and so on.

Such a Markov process could be allowed to terminate at any point by the rules

& ::= # (# is the symbol for a string delimiter)

# ::= ∅

or it could be made to terminate only after some suitable event D by the rule

$$D + \& ::= D + \#$$

$$\# ::= \emptyset$$

A higher order linear stochastic process producing a type 3 language would use the rules such as

$$A + B + \& ::= A + B + C + \&$$

The more elaborate languages all use some kind of tree structure or nesting system. These can be generated by recursive

$$A ::= A + B$$

or non-recursive rules.

$$A ::= B + C$$

Furthermore the rules can be context free

$$A ::= B$$

or context dependent

$$P + A + Q ::= P + B + Q$$

$$R + A + S ::= R + C + S$$

Context free rules characterise the type 2 language, and context dependent rules characterise the type 1.

Finally in the type 0 language, or transformational grammar a system of base rules working by divergent substitution.

$$A ::= B + C$$

produce a deep structure, which is transformed to surface structure by complex rules combining the operations of addition, deletion, substitution, and transposition:

$$A + B + C ::= C + D + A$$

One could also imagine a grammar containing rules of convergent substitution

$$A + B ::= C$$

Two other general classes of rule are worth considering here: rules which operate from left to right but allow for

nesting

A + ( ) + & ::= A + ( ) + B + &

and rules which work from left to right erecting non-terminal items from terminals. These are of particular interest to the student of interaction, because they allow one to produce nested structures without their having the paradoxical quality of being derived by two people from non-terminal antecedents which are never communicated. For example, if q and a are terminal items question and answer, and X and Y are non-terminals of some kind, then the rules

q + & ::= q + X + &

X ::= a

::= a + Y

::= Y + a

Y ::= q + a

::= q + Y + a

will generate all the permissible question-answer sequences of experiment 7, and none of the cross-nested sequences. They will also produce an indeterminite number of plausible, novel question-answer sequences, and assign the correct structural description to each. Such rules may easily be used in computer simulations, where the machine has only to detect the presence of a left half rule in an incomplete character string, and replace it with the corresponding right half. Furthermore the rules may be different for each actor or persona; may have probabilities attached to their use; and use different behaviour categories for different roles, if need be.

In the experiment which follows, the proactive sequences are governed by simple Markovian rules of the kind

A + & ::= A + B + &

while reactive sequences, involving a speaker change (/), are second order:

A + / + & ::= A + / + B + &

The speaker changes themselves are inserted by first order rules in the proactive system.

A + & ::= A + / + &

## 6.3.2 EXPERIMENT 13

### 6.3.2.1 Introduction

The purpose of this experiment is to bring together the category scheme presented in section 6.2.3 and the procedures for sequence analysis discussed in 6.3.1, to test both together in a single experiment on the syntax of conversation. The experiment worked by synthesising strings rather than by analysing them. Three sets of utterance strings were made up, a set of artificial sequences derived from the grammar under test which was called Backchat, and a second set from a random procedure using the same categories. This procedure was called Joker. The strings produced by Joker were to function as a lower limit control, so that the ordering of items produced by the grammar could be compared with a random series. The third group were made up by subjects from the category list according to the instructions in section 6.3.2.2, to represent ideal, perfectly acceptable conversations. This was the upper limit control.

There were two hypotheses. The first was that the Control strings would be rated as significantly better than those produced by Joker. This was an important aspect of the experiment as the strings were all presented to the subjects

as sequences of abstract categories in the form

A Invite

B Accept Question

A Answer

which was unfamiliar to the subjects, and could have been the wrong way to elicit judgements about sequencing rules. To establish then, that subjects can use information in this form to assess how meaningful a general class of conversations would be, without being given any complete examples, one must first be sure that they can detect the gross distinction between random and 'perfect' strings with ease.

The second hypothesis was that the rule governed strings produced by Backchat would be rated as significantly better than those produced by Joker. In a way this was an easy test. The least one might expect of a rule system is that it represents the world more accurately than a random string does. In practice the result is only of use if it is very significant. Once a first attempt at a grammar(like Backchat) has been tested against a random control, it can serve as a control for testing improved versions and so on. In this way a succession of more and more sophisticated grammars could be produced each tested against it predecessor, so that as the grammars themselves became more refined, the tests to which they were subjected would also become more stringent.

The representation of the strings to the judges was a problem. Backchat, Joker and Control were all produced in the form shown above. The original plan was to give those strings to an intermediate group of subjects who would see them one item at a time and turn them into specific transcripts. They might be shown

A Question

B Answer

for example, and realise those as

A Do you have change for a pound?

B Yes, I have some silver right here.

This procedure was followed in a pilot study in which the intermediate subject group (the translators of categories to sentences) worked blindly, not knowing which strings were supposed to be sensible and which were random. They were asked to rate the difficulty they had in thinking of a sensible example of each. The examples were then passed to a 'blind' group of judges. The judges ratings showed no clear difference between Backchat and Joker, but there was a very clear pattern in the translator's ratings of difficulty. They had found it much harder to realise the random strings sensibly, although with effort, and often at the expense of the exact category definitions, they had succeeded. In so doing they had 'filtered out' precisely those differences between Backchat and Joker which the experiment was supposed to detect. So utterance category strings were presented to judges directly in the final version of the experiment.

It must be remembered that an experiment of this kind is made more or less convincing by the specificity of its predictions. It is no great feat to find a perfect correspondence between artificial and natural strings if the coding categories are few enough and simple enough. To take an extreme case a system with only two categories such as <u>speak</u> and <u>reply</u> let us say, would be simple to use in a grammar, but the predictions would be so general as to be worthless. Hypothesis 1 is a safeguard against this to

some extent, since a category system which is grossly oversimplified cannot even express the distinction between extremes of sense and nonsense.

The grammar itself, Backchat, is very primitive. It is a Markov system with a few elaborations. It produces dialogue consisting of 43 speech act categories, together with the symbols # (the string delimiter) and / (the speaker change). The use of a separate symbol for / allows each speaker to use more than one speech act per turn-at-talking. The rules are all of the form

A + & ::= A + B + &(rules of proaction) or

A + / + & ::= A + / + B + &(rules of reaction)

The reactive rules are the only departure from a simple Markov model. The rules are presented here in the form of a matrix to save space. The proactive matrix represents the rule

A + & ::= A + B + &

as a 1 in the cell where row A and column B intersect. All the matrices presented in conjunction with this experiment follow the convention of using rows for antecedents and columns for sequiturs. In the proactive matrix column 45 shows that the speaker change / can occur after certain speech acts. In some cases the symbol 1+ occurs in the cell showing that whenever that row is entered the speaker change will be selected with a probability of 0.5. Had this provision not been made, the strings would have consisted mainly of long monologues. If when working from the proactive matrix the generator encountered the symbol / it then transferred control to the reactive matrix to find which sequiturs were available reactively for the antecedent labelling that row. In this way rules of the form

A + / + & ::= A + / + B + &

were used to control reactive contingencies. The matrices of proactive and reactive rules which made up Backchat are shown in figures 6.5 and 6.6.

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Figure 6.5. and 6.6.

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6.3.2.2 Method

Three groups of strings were produced for comparison and ratings by judges. One group was derived from the grammar (Backchat), one group contained random strings(Joker) and one group was produced by subjects (Control). There were 10 examples of each dialogue type, each ten items in length, not counting episode boundaries # .

10 subjects produced 1 string each for the control group. 7 of these subjects were female, and 3 male. All were aged 18 - 26. 6 were students in subjects other than psychology, one was unemployed, one an art student with a psychology degree, one a research assistant in psychology (but with no formal qualification in psychology) and one an undergraduate psychologist. (The same group of subjects was used in part 1 of experiment 6.) Each subject was shown the following instructions and list of categories:

To ensure that all subjects receive the same information about this experiment, the instructions are presented in writing. If, however, there is anything you are unclear about, please ask at any stage.

On the accompanying sheets you will find definitions of 45 words and symbols which may be used to describe a conversation. Your task is to use those terms and symbols, as defined here, to produce and record a short dialogue.

The two speakers should be labelled A and B. You may allow each speaker one or more 'speech acts' for each turn

Figure 6.5 Experiment 13 Matrix of Proactive Rules

| ANTECEDENT NUMBERS | | SEQUITUR NUMBERS |
|---|---|---|
| | | 0000000001111111111222222222233333333334444444<br>1234567890123456789012345678901234567890123456 |
| 1 | # | 01111110100000000000001000000010010000000011 + |
| 2 | Command | 00000000011010000000000000000000000000000001 + |
| 3 | Prohibit | 00000001011010000000000000000000000000000001 + |
| 4 | Request | 00000000010010000000000000000000000000000001 + |
| 5 | Question | 00000000000000000000000000000000000000000001 |
| 6 | Advise | 00000000000010000000000000000000000000000001 + |
| 7 | Warn | 00000000000010000000000000000000000000000001 + |
| 8 | Permit | 00110110000000000000000000000000000000000001 + |
| 9 | Offer | 00000000000000000000000000000000000000000001 |
| 10 | Promise | 00000000000000000001000000000000000000000001 + |
| 11 | Threaten | 00000000001310000000000000000000000010000001 + |
| 12 | Assert | 00001000000000000001000000000000000000000001 + |
| 13 | Justify | 00000000000000000000000000000000000000000001 |
| 14 | Accept | 00000000000000000001001000000000000000000001 + |
| 15 | Reject | 00000000000010000000001000000010000000000001 |
| 16 | Comply | 10001000000000000000000000000000000000100001 + |
| 17 | Refuse | 00000000000010000000000000000000010000000001 |
| 18 | Answer | 00001000000000000001000000000000000010000001 + |
| 19 | Agree | 00000000000000000001000000000000000000000001 + |
| 20 | Deny | 00000000300011000000000000000000013000010001 |
| 21 | Continue | 00000000000000000001000000000000000000000001 + |
| 22 | Praise | 00000000000000000000000000000000000000000001 |
| 23 | Defer | 00000000000010000000000000000001000100000001 |
| 24 | Greet | 10000000000000000000000000000000000000000001 |
| 25 | Thank | 10000000010000000001000000000000000000000001 + |
| 26 | Blame | 00000000000010000000000000000010000000000100001 + |
| 27 | Accuse | 00000010000010000000000000100000000000000001 + |
| 28 | Confess | 00000000010010000000000000000000010010000001 |
| 29 | Offend | 01000000001000000000000001013000000000000001 + |
| 30 | Sympathise | 00000000110000000010000000000000001000010001 + |
| 31 | Challenge | 00000000000000000000000000000000000000000001 |
| 32 | Boast | 00000000000010000000100000000000100000000001 + |
| 33 | Apologise | 00000000110010000000000000000000000000000001 + |
| 34 | Pardon | 00001100000000000000000000000010000000010001 + |
| 35 | Bid farewell | 10000000000000000000000000000000000000000001 + |
| 36 | Pacify | 01000110000010000000000000000010000000000001 + |
| 37 | Fulfill | 10000000000000000000000000000000000000000000 |
| 38 | Joke | 00000000000000000000000000000000000000010001 + |
| 39 | Laugh | 00000000000000000000000000000000000000111001 + |
| 40 | Terminate | 10000000000000000000000000000000000000000000 |
| 41 | Attend | 00000000000000000000000000000000000000000001 |
| 42 | Cheer | 00000100110000000000000000000000000000000001 + |
| 43 | Minimise | 00000000000000000000000000000000000000000001 |
| 44 | Complain | 00000000000000000001000000000000000000000011 + |
| 45 | / | 00000000000000000000000000000000000000000000 |

Figure 6.6 Experiment 13 Matrix of Reactive Rules

SEQUITUR NUMBERS

ANTECEDENT NUMBERS

```
                    000000000011111111112222222223333333333444444
                    123456789012345678901234567890123456789012345
                    .............................................
 1  #               011111111000000000000000000000001000000010
 2  Command         011010101110000110000010000000000000000000000
 3  Prohibit        011010101110000011000000000000000000000000000
 4  Request         000010000110000011000001000000000000000000000
 5  Question        000010000000000011000000000000000000000000000
 6  Advise          000010000000011000000000010000000000000000000
 7  Warn            000010000000011000000000010000000000000000000
 8  Permit          000000000000011000000000010000000000000000000
 9  Offer           000010000000011000000000010000000000000000000
10  Promise         000010100000011000000000010000000000000000000
11  Threaten        001010100010000000000000010000000001000000000
12  Assert          000010000000000000111000000000000000010000
13  Justify         000010000000011000000000000000010000000000
14  Accept          100000000000000000001000000000000000100000
15  Reject          010011100000000000000001000000000000000000
16  Comply          100000000000000000010010000000000100000
17  Refuse          010111100010000000000001000000000000100010
18  Answer          000010000000000001110000000000000000110000
19  Agree           100000000000000000010000000000000000100000
20  Deny            000010000000100000011000010000000000000000
21  Continue        000010000000000000111000000000000000000000
22  Praise          000000000000000000000010000000000000100
23  Defer           000010000000011000000000000000000000000000
24  Greet           100000000000000000001000000000000000000
25  Thank           100000000000000000000000000000000000100
26  Blame           000000000000100000110000000000010000000000
27  Accuse          000010000000000000100000001000000000000000
28  Confess         000010000000000000000011000000010000000000
29  Offend          001010100010000000000000011010000001000000000
30  Sympathise      000000000000000000001001000000000000000000
31  Challenge       000010000000011000000000000000010000000000
32  Boast           000010100000000000000000110001100000000000
33  Apologise       000000000000011000000000000000000100001000000
34  Pardon          100000000000000000000010000000000000000000
35  Bid farewell    100000000000000000000000000000000010000000000
36  Pacify          000000001000000000000011001000000000000000
37  Fulfill         000000000000000000000000000000000000000000
38  Joke            000000000000000000000000000000000011000000
39  Laugh           100000000000000000000000000000000111000000
40  Terminate       000000000000000000000000000000000000000000
41  Attend          000000000000000000100000000000000000000000
42  Cheer           000000000000000000000010000000000011000000
43  Minimise        100000000000000000000000000000000100000
44  Complain        000011001100000000000001000100000100000001000
45  /               000000000000000000000000000000000000000000
```

in the conversation. For example you might want each individual to make one remark per turn, which you would write as

A Deny

B Pacify

A Answer[1]

(1 All sequences used in these examples are random, so they may be used to illustrate the notation which is used, but they will not help you to decide on the best order for the items.)

An exchange in which one speaker uses several distinct categories of remark, one after another, in the same turn would be represented as

A Permit Defer

B Warn Offer

A Question Pardon Complain.

You may use the same category of remark as many times as you wish.

The conversation you invent should start from the beginning of a new topic, which you can represent as

#

A ...

You may have boundaries between topics within the conversation, if you wish, again indicated by the symbol # .

Please write clearly.

Each category you use counts as an item in the sequence, even if it is only one part of a longer turn by the same speaker. So the second example (above) would count as 7 items long, and would only require three more to be complete.

The conversation you produce need not have a neat ending, it will be interpreted as a ten item extract from a longer piece, and so an abrupt ending after ten items is quite in order -- just stop writing.

The most important instruction is this: you should make the sequence of categories you use as sensible as possible. It will be used in a later stage of the experiment as an 'ideal sequence' in comparison with a number of other artificial sequences. Please ensure that each item follows on from those which have preceded it in a perfectly logical and acceptable manner.

Since the notation makes no provision for you to identify which of the previous utterances a particular item is respond-

ing to or continuing, you should produce dialogue which has a linear structure. That is to say that each item should relate to those immediately before it, rather than to items from a long way back in the sequence.

Each item will be interpreted as relating to those immediately before it, unless there is an intervening # .

Each category should be used in its straightforward sincere sense, and not as an instance of sarcasm, irony, etc.

If you have any questions please ask them at any time.

Speech act classes, in alphabetical order.

| | |
|---|---|
| # | 'string delimiter'. This symbol marks the beginning and ending of conversations, and the boundaries between topics, or related passages of talk. In effect it means that no particular relations should be expected between utterances preceding the # sign and those which follow it. It also implies that speech acts coming before # should be suitable ways of closing a topic or conversation, and speech acts following # should be suitable ways of starting a new passage of talk, or new conversations. |
| A | |
| Accept | choose. take some course of action made available by the other speaker, but which one is not obliged to take. |
| Accuse | Imply guilt on the part of the other. |
| Advise | suggest, recommend, propose, urge. To advocate that the other take some course of action which would be to his own advantage. |
| Agree | side with, concede, recognise, acknowledge, confirm, acquiesce, concur. |
| Answer | supply requisite information |
| Apologise | show penitence, compunction, penitence, remorse. |
| Assert | state, assess, reckon, report, suggest (it to be the case that...), inform, mention, tell, postulate, confide, describe. This category should only be used when more specific ones like answer or deny do not apply. |
| Attend | 'back-channel communication' showing |

| | |
|---|---|
| | attention, understanding, and a willingness to go on listening, e.g. 'I see', 'Uh-huh', 'Mmm', etc. |
| B | |
| Bid farewell | take leave, say 'goodbye', part. |
| Blame | reproach, recriminate, criticise, grumble, punish, shame, expose, degrade, deprecate, scold, ridicule |
| Boast | claim, describe one's own virtues. |
| C | |
| Challenge | taunt, dare, tempt, provoke. |
| Cheer | encourage, reassure, boost morale. |
| Command | direct, instruct, require to, compel, force, oblige, order. Used particularly when the speaker requires the listener to engage in activities for the speaker's benefit. |
| Complain | moan, report on misfortunes which are not due to the listener's activities (cp. blame). |
| Comply | execute, perform, enact, obey. Carry out some obligation to respond, arising from the other person's speech or behaviour. (cp. fulfill). |
| Confess | admit to, accept the responsibility for (some misdemeanour) |
| Continue | elaborate, interpret, infer, illustrate, conclude, prove, demonstrate, analyse, deduce. Supply the logical or chronological continuation of some narrative, argument or theme. |
| D | |
| Defer | postpone. Arrange or offer to carry out some response obligation at a later time. |
| Deny | refute, dispute, argue, repudiate, contradict, correct, revise. |

F

| | |
|---|---|
| Fulfill | carry out obligation (arising from the speech or behaviour of the present speaker himself), honour commitments. |

G

| | |
|---|---|
| Greet | welcome. |

J

| | |
|---|---|
| Joke | tease, make humorous remarks or word-play. |
| Justify | warrant, explain (behaviour or speech), account for, legitimise. |

L

| | |
|---|---|
| Laugh | express amusement |

M

| | |
|---|---|
| Minimise | make light of one's own achievements or sacrifices. (e.g. 'It was nothing' or 'Think nothing of it'.). |

O

| | |
|---|---|
| Offend | humiliate, curse, attack, insult, abuse, embarrass, annoy, harass. |
| Offer | invite, make some course of action available to the other at some cost to oneself. cp. Permit. |

P

| | |
|---|---|
| Pacify | sooth, comfort, appease. |
| Pardon | forgive, excuse, let off. |
| Permit | allow, condone. |
| Praise | congratulate, applaud, commend, approve, exalt. |
| Prohibit | forbid, prevent, quosh. |
| Promise | commit(oneself to...), undertake, vow that, contract, guarantee. |

Q

| | |
|---|---|
| Question | enquire,ask about, express doubt about |

| | |
|---|---|
| R | |
| Refuse | (to carry out some response obligation arising from the speech or behaviour of the other person.) |
| Reject | decline. Turn down some course of action made possible by the other, but which did not constitute an obligation. |
| Request | ask to, plead, entreat, beg. Used when the speaker asks for some course of action on the part of the listener, which is for the speaker's benefit. |
| S | |
| Sympathise | condole, reflect, commiserate. |
| T | |
| Terminate | bring a topic or passage of talk explicitly to a close (.e.g 'That settles than, then.') |
| Thank | express gratitude, reward. |
| Threaten | announce that the speaker may do harm to the hearer, in some way. |
| W | |
| Warn | urge restraint, caution, advocate that the hearer refrain from some course of action for his own(the hearer's) benefit. |

The 10 backchat strings were produced in the following way. Each started from an episode boundary # . The proactive matrix showed which items could follow # . One of these was selected at random, (using a table of random numbers in Fisher & Yates, 1963) to become the first item in the string. There was a probability of 0.5 (again introduced by the random number tables) that a / would follow # and the first item would be drawn from the reactive table. This first item was then used to locate a row of the proactive

table in which its sequiturs were recorded. One of these was selected at random to become the second item, and so on until 10 separate strings of 10 items in length had been produced.

The 10 Joker strings were produced by selecting items at random from the 44 possibilities (excluding /) to make up 10 item strings. So as to avoid long monologues which would have results if / had only had a probability of 1/45 of occuring at any point, it was given a probability of 0.5 of occurrence after every speech act. The total of 30 strings used in the experiment are shown in the transcripts in Appendix I.

An important failing of first order rule systems can be seen in the output strings from Backchat. Question was specified as a legitimate sequitur to Question in accordance with the results of experiment 7. But for a first order rule system, such an association is recursive, so long sequences of unanswered questions can form as in example 19. This difficulty can be overcome with more elaborate rule schemes.

The 30 examples were typed on 6" x 4" file cards, each with a randomly assigned code number, by which subjects could identify it on their response sheet. 10 subjects rated all 30 examples without knowing about the three different types. The subjects were 6 females and 4 males aged 18 - 26. 6 were students of subjects other than psychology, 2 were psychology students, one was a librarian and one a photographer, (these were the subjects used in experiment 6, part 2). Their instructions were:

To ensure that all subjects receive the same information about this experiment, the instructions are presented in writing. If, however, there is anything you are unclear about, please ask at any stage.

You will be shown a number of short extracts of dailogue, represented as a sequence of utterance-categories and symbols. There is also a dictionary giving definitions of these categories and symbols as they are used in the experiment.

Your task is to assess each extract separately and mark your assessment, as a rating, on the response sheet provided.

You should base your judgement on the way that each item follows from the immediately preceding ones by the same or other speaker. That is to say, you should assess how well each item fits its context, and the extent to which the dialogue as a whole forms a sensible sequence of events. Each item should interpreted as relating to the immediately preceding items, except when the symbol # appears, representing a topic boundary, across which no particular links should be expected.

Each transcript carries a code number. These were allocated at random, so they will give no guidance as to how you should evaluate each passage. On the response sheet these same code numbers are repeated, with a space beside each for your assessment.

Please enter in <u>every</u> space a number from 1 to 7 to indicate how well you think each dialogue runs from utterance to utterance, using 1 for the <u>worst</u> examples and 7 for the <u>best</u>. You might find it helpful to consider this task as one of placing dialogues on a measuring scale or dimension.

Very bad ___ ___ ___ ___ X ___ ___ Very good

except that you give your answer in numerical form. So a dialogue which seemd to come at the point marked X (above) on a scale from <u>very bad</u> to <u>very good</u> would be represented by the rating 5, and so on.

Before you fill in any rating please read through all the dialogues once to see the overall standard, but keep them in order. Then go back to the beginning and rate them one at a time, <u>in the order they were given to you</u>.

Each dialogue is completely separate. There is not supposed to by any sequence formed between them.

Each item in the dialogue should be interpreted as having its usual face value, and not any secondary interpretation, sarcastic use etc.

If you have any questions please feel free to ask them.

The set of 30 examples was rated by each subject in a different order.

6.3.2.3 Results

The experiment was treated as a three factor design: 3 dialogue types or C(onditions) x 10 E(xamples) x 10 S(ubjects). C was a fixed effect, E was a random effect nested in C and therefore represented as E(C), and S was a random effect fully crossed with C and E(C). This is the design that was used in experiment 6, and a description of its analysis may be found in section 4.2.3.2. The data were analysed using the statistical program for analysis of variance BMD 8V (Dixon, 1973: 693-704). The results of the analysis are shown in table 6.7.

Table 6.7 Experiment 13 Analysis of variance

| Source | SS | df | MS |
|---|---|---|---|
| Mean | 5729 | 1 | 5729 |
| S | 74.56 | 9 | 8.285 |
| C | 488.5 | 2 | 244.3 |
| E(C) | 235.9 | 27 | 8.737 |
| SxC | 17.73 | 18 | .9848 |
| SxE(C) | 317.2 | 243 | 1.306 |

F' for the main effect C (the three dialogue types) = 29.02, df = 2,25, $p < 0.001$. (The critical value of F for df = 2,25; $\alpha = 0.001$ is 9.22)

$F''_C = 25.26$, df = 2,33, $p < 0.001$ (Critical value for df = 2,30; $\alpha = 0.001$ is 8.77).

The other main effect, that of examples gives an F ratio of $F_{E(C)} = 6.69$, df = 27,243, $p < 0.001$ (Critical value for df = 24,120; $\alpha = 0.001$ is 2.40).

The mean ratings for the three dialogue types are plotted in figure 6.8.

---

Figure 6.8

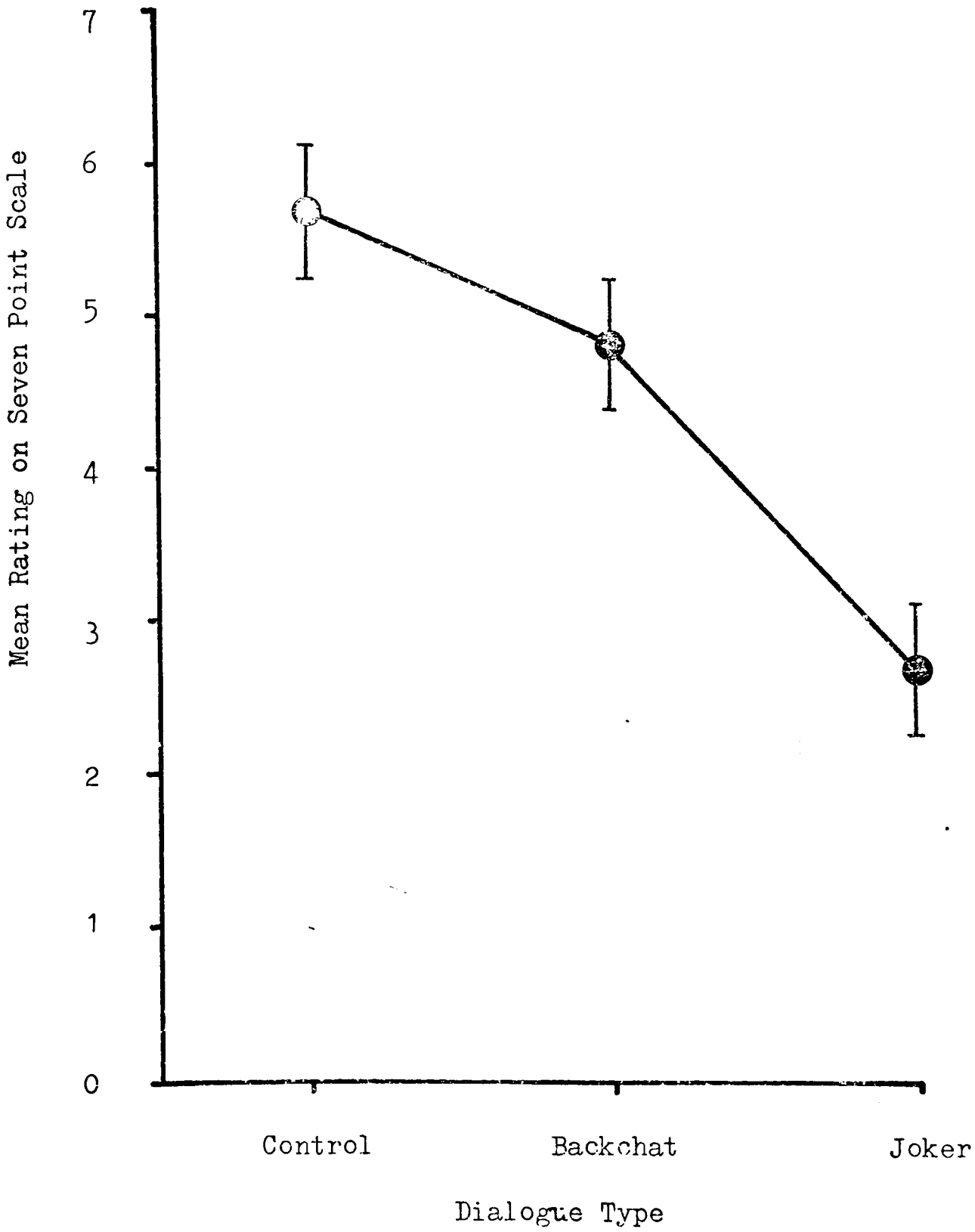
---

The confidence interval of 0.84 shown is the least significant difference interval for $p < 0.05$(two-tailed) from Fisher's LSD multiple comparison test(Kirk, 1968: 87).

Two further calculations were done on the matrices of O's and 1's making up the grammar Backchat itself. These both describe systematic properties of the grammar and make it easier to summarise its overall form.

The first calculations was a cluster analysis. The paradigmatic structure of the grammar, the way in which items may exchange for each other in particular contexts is related to the syntagmatic structure, the way in which items combine to form strings. The proactive and reactive rule matrices summarise the syntagmatic structure of Backchat. The paradigmatic structure may be represented in the following way. Any pair of items will share some of their permissible occasions of use and not others. (In the extreme cases they may share all or none of each other's occasions of use.) So the similarity between items in the way they form combinations may be measured by counting the number of occasions of use they share. An occasion of use includes both the sequiturs two items may share and the antecedents they may share. For example if AB and AC are permissible sequences then one occasion of use is shared by B and C, also if XZ and YZ are

Figure 6.8 Experiment 13 Mean Rating of Three Dialogue Types on Seven Point Scale



permissible sequences then X and Y share an occasion of use. Such a similarity measure could be misleading if two quite dissimiliar items were represented as similar because of all the occasions of use which apply to neither. So the natrix of O's and 1's cannot be processed simply by counting the number of times that a 1 corresponds to a 1, and a 0 to a 0, for any two pairs of items. Instead the following expression was used. If the set of occasions of use appropriate to an item A is a, the set of occasions of use appropriate to B is b, the set of occasions of use appropriate to both A and B is ab, then

$$\frac{100ab}{a + b - ab}$$

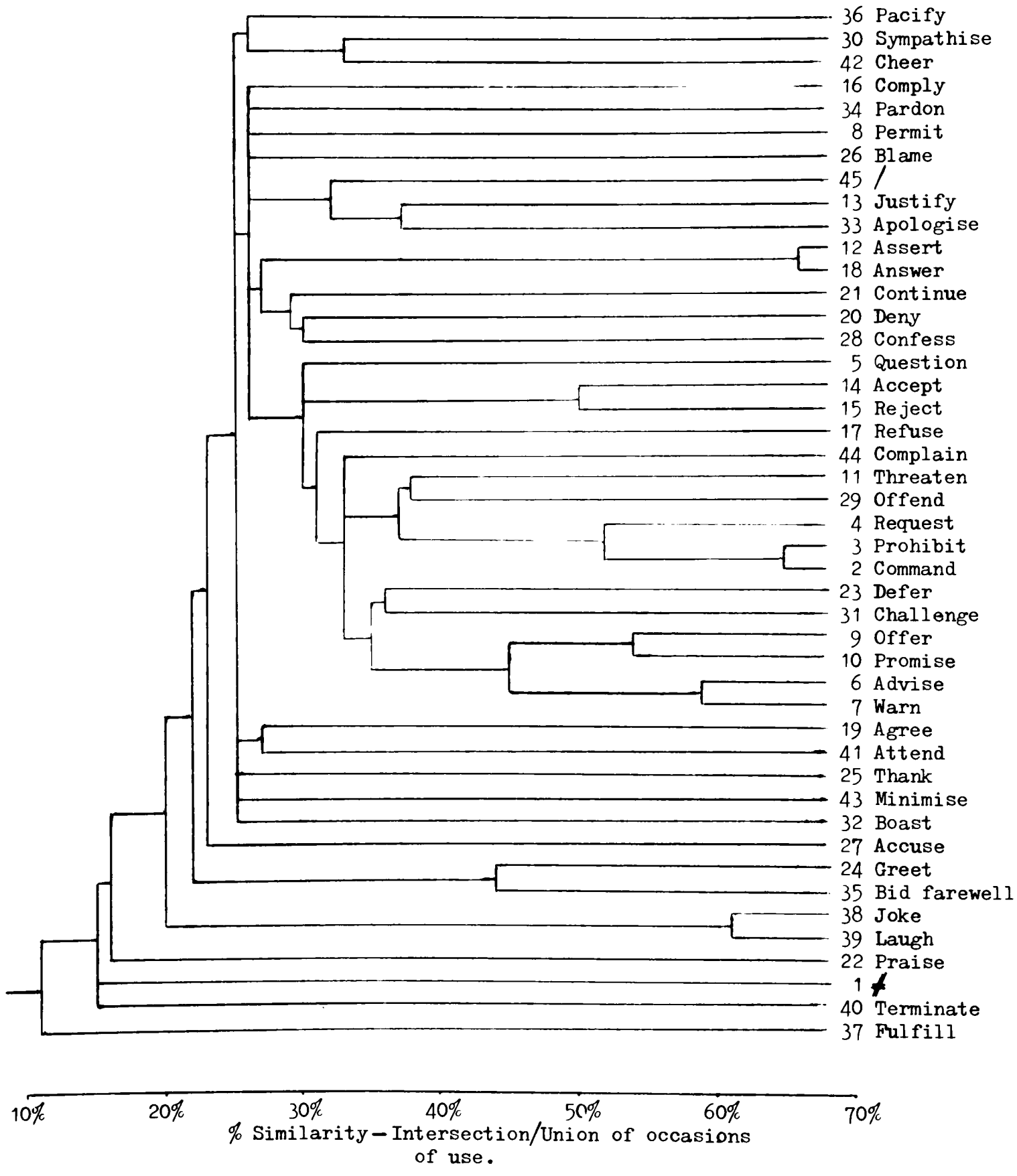
is the percentage of occasions of use applying to A or B which applies to both A and B. In other words it is the intersection of the two sets expressed as a percentage of their union. The program CLUSPROG (in Appendix C) was written to process the matrices of proactive and reactive rules, and print a similarity matrix for every pair of items. The results of this program were used in a single linkage cluster analysis performed by hand, and summarised in the dendrogram figure 6.9.

Figure 6.9

The other calculation was a critical path analysis. The rule matrices of Backchat were constructed in such a way that every item or state of the system could be reached from every other. This is not always the case and it would be quite possible to devise similar matrices in which discrete 'islands' of activity could each be toured internally, but none could be reached from any other. In this

Figure 6.9

Experiment 12 Cluster Analysis




% Similarity – Intersection/Union of occasions of use.

case, while every state can be reached from every other state, the least number of transitions required differs from one pair of states to another. The program PATHPROG (in Appendix C) was written to examine the proactive and reactive rule matrices and print out for every pair of items the shortest path length between then. This is an asymetrical matrix since the shortest distance from A to B is not necessarily the same length as the shortest path from B to A. The results of this analysis are summarised in table 6.10.

Table 6.10

Category 45 has no sequiturs as such and hence no specific path lengths attached to it.

6.3.2.4 Discussion

The hypotheses were confirmed. There is significant variance accounted for by the three different dialogue types. The control dialogues were given the highest rating, followed by Backchat, with Joker last. Backchat was rated as being worse than the control set by a difference of 0.89 between means on the 7 point ratings scale, which is just significant at 0.05(Critical value 0.84). Joker was rated as worse than Backchat by 2.15 which is significant on the LSD test at 0.001 (Critical value 1.53), and of course Joker is also worse than the Control condition $p < 0.001$.

So, as predicted the control strings are seen as much more realistic than random ones. Subjects can make such judgements reliably even when presented with information in this abstract form, and with the particular category

Table 6.10 Experiment 13 Critical Path Analysis

SEQUITUR NUMBERS

| ANTECEDENT NUMBERS | | 0000000001111111112222222223333333344444 |
|---|---|---|
| | | 1234567890123456789012345678901234567890123 |
| | | ••••••••••••••••••••••••••••••••••••••••••••• |
| 1 | # | 2111111112242222223332122233221331233333231 1 |
| 2 | Command | 2112121211141221123322132245334322322442333 21 |
| 3 | Prohibit | 2112121111141221123322232245334322322442333 21 |
| 4 | Request | 2232122511241221123322132245334322332442333 21 |
| 5 | Question | 3232122433223333112223342245375433433412233 421 |
| 6 | Advise | 2233122332341113223322331245334322344552342 31 |
| 7 | Warn | 2233122333341113333322331245334322344552342 31 |
| 8 | Permit | 2211211222242112233322231245344323333552442 31 |
| 9 | Offer | 2235122333421132233223312453443233344552342 31 |
| 10 | Promise | 2233121333321132222123312453443233344552342 31 |
| 11 | Threaten | 2213131222131222222333321342243223114412333 31 |
| 12 | Assert | 2333133333322334221112433245344323344552143 31 |
| 13 | Justify | 2233122333542113223322332245324321334442333 31 |
| 14 | Accept | 1222222222333353332211321334433234234441432 21 |
| 15 | Reject | 2123111322231222222233231134237431233355231 231 |
| 16 | Comply | 1222122222343333223331321334433234234441332 21 |
| 17 | Refuse | 2121111322131222222233321342341323233132311 |
| 18 | Answer | 2333133333322334221112433245344323344551143 31 |
| 19 | Agree | 1222222223333333322113223344332342341144322 1 |
| 20 | Deny | 2333133332311224222113433134234313334551244 31 |
| 21 | Continue | 2333133333322334221112433345344323344552343 31 |
| 22 | Praise | 2333333332454333444443243144554434534555254 131 |
| 23 | Defer | 2233122322341113223322332245334312341552343 31 |
| 24 | Greet | 1222222223353333334434313334433241234444434 21. |
| 25 | Thank | 1222222213432233333213223344332342344424312 1 |
| 26 | Blame | 2223232322221223331123333251343132335513433 1 |
| 27 | Accuse | 3333131432321224222123442131235422424552343 31 |
| 28 | Confess | 2253122321231223222222331134224311514442333 231 |
| 29 | Offend | 3113121222152222222233242112125423412442333 31 |
| 30 | Sympathise | 2233222311342223331321331234234333314222412 31 |
| 31 | Challenge | 2273122333542113223322332222334212334455234 331 |
| 32 | Boast | 3333131433331224222213442112231122434552343 31 |
| 33 | Apologise | 2233222311341113333322332245324321334441433 31 |
| 34 | Pardon | 1222211222352223333243232133431323322433142 221 |
| 35 | Bid farewell | 1222222223353333334413323334433241154411443 421 |
| 36 | Pacify | 2123211321231222232222231123114322323332422 31 |
| 37 | Fulfill | 1222222223353333534134432334[illegible] |
| 38 | Joke | 2333333314464444455424344155143557151123454 1 |
| 39 | Laugh | 1222222223353333534134323334433244334111443 121 |
| 40 | Terminate | 1222222223353333333445432333443321423444[illegible] |
| 41 | Attend | 3444244444433445332213514753455345534557345141 |
| 42 | Cheer | 2533212311442221333322131345444[illegible]51134231 |
| 43 | Minimise | 1222222223353333344433333144332423444143121 |
| 44 | Complain | 3233112411332232222123421342154[illegible]1422231311 |
| 45 | / | |

set which was used. The artificial strings produced by Backchat were given significantly higher ratings than those produced by Joker, while appearing to be worse than the control strings by a margin which is only just significant.

The variance due to the differences between examples was also significant, $p < 0.001$, but the examples effect reached this level of significance by a much smaller margin than the effect of the three dialogue types.

The cluster analysis demonstrates several interesting features of Backchat. No two items are identical in their occasions of use. This is the criterion which was chosen at the outset for deciding when two categories should be regarded as different. The nodes of the dendrogram nearly all fall in the similarity range 20 - 60%, so the categories used are fairly evenly spaced in the domain of syntagmatic similarity. It has already been stressed that this grammar (like any syntax) assigns items to the same category on the basis of similar combinatorial properties and in spite of semantic differences. So not surprisingly semantic opposites with similar occasions of use are clustered together e.g. Prohibit and Command, Advise and Warn, Accept and Reject. The directive modes of instruction Prohibit, Command and Request fall into one group, together with the sanctions Threaten and Offend, while less directive acts such as Advise and Warn cluster with rewards like Offer and Promise.

The critical path analysis is of special interest as it illustrates a way forward to new kinds of research, which can develop from the study of rules of sequence. An activity map can be derived by placing all the different acts in a multi-dimensional space so that the distances between pairs represent their critical path length. In this way the presence of groups

of related acts which make up episodes may be detected. There is a technical difficulty involved in that the path distances between states are not symmetrical, they are biased by the irreversibility of time, whereas multi-dimensional scaling techniques deal only with symmetrical relations. Nevertheless, it is clear in principle how such an investigation would proceed, given a more elaborate grammar, which was worth describing in this way. Perhaps most importantly, critical path information brings into the system the first strategic considerations, which would enable us to predict which of several courses of action in the present is most likely to lead to certain outcomes in the future. If this kind of predictive information could be derived in future from studies of the sequential structure of critical bargaining and conflict relations, it could prove to be a very powerful tool with practical and theoretical applications.

It is planned to refine the grammar further at a later stage, and so to go on to these secondary analyses. The demands of time and space will not allow a possible Backchat(2) to be developed and tested here, but it is useful to draw certain lessons from Backchat (1). Its greatest shortcoming is that it is only a Markov system. Each item is only related to its immediate antecedent (not counting speaker changes). A more sophisticated grammar would include more information, not just by going to higher orders of stochastic series, but by drawing on the repertoire of rule types outlined in section 6.3.1. In this way a grammar could be constructed which could account economically for relations between widely separated items. Almost certainly the grammar would be required to derive its information from the output string of terminal items to date, so that any participant could use his own rule

system, without direct access to non-terminal features of the other's behavioural stream. Such a grammar would include non-terminal items but they would be thrown up in 'cascades' from the terminals to be re-written by hierarchical rules to further non-terminals and terminal items. There would have to be a separate(and possibly different) grammar for each interactor. At present the rules simulate the interaction as a whole, and could not possibly serve as a model for the psychology of a single participant. When the rules are re-formulated in such a way that one rule set corresponds to the mentality of each actor, modifications can then be introduced to simulate inter-personal and inter-cultural differences, conflicts of interest and belief, and the interaction of personal and situational determinants of the behavioural output. When each actor has his own rule system, the notion of deep structure can be brought into play. (This will be explored more fully in the next chapter.) Each actor can be given his own semantic representation of the course of events derived by base rules from his own intentions, beliefs and attitudes, and by trans-formational rules from the terminal outputs of other actor(s).

The simple categories may have to give way to a more elaborate feature system which preserves some of the sub-structure of each speech act. For example a sequence of events which would be represented in Backchat (1) as

Promise

Question

could include questions about the sincerity of the promise, the conditions under which it will be fulfilled, the person to whom it was addressed and so on. These cannot be distinguished in the notation of Backchat(1). If each category were made the basis of a semantic frame, e.g

A Promises to B that C before time D if E and unless

F then subtle distinctions could be made in a notation such as (Promise, A, B, C, D, E, F). It has been suggested that this modification of the category scheme to produce one of frame-bound features would be rather like the transition to a predicate calculus from a propositional calculus.

A further modification would be to allow for the generation of group as well as dyadic interactions.

To summarise the generative process that would be used in such a grammar, let us consider the way in which an incomplete dyadic interaction would be continued. Each individual has his own rule set, and a cognitive representation of the state of play, consisting of a deep structure showing the beliefs, attitudes and intentions of the actors, and a surface structure showing the history of events. The deep structure has been constrained by both base and transformational rules, and the surface structure by the transformational rules of both participants. Note that unlike a sentence grammar, this kind of rule system cannot derive and complete its deep structure, and then transform it to the surface. The cyclical nature of the process demands that an event which arises in the deep structure of one actor be realised in the surface structure of his behaviour, and thus pass into the interpretive deep structure of the other actor, whence it acts upon his rules to select a new item of behaviour which passes to the surface and so on. Consider a concrete example: Mr. A has caught Mr. B in compromising circumstances, and has suspected and accused him of committing some misdemeanour. B, who is innocent, has denied this. The state of play is now this. A common surface structure exists for the two actors and any observer. A has accused B, and B has denied the accusation. A however has a cognitive representation

which embodies more information than just that. It shows that he believes that people who behave as B has done are guilty of some offence, it shows that B's denial is ambiguous (one might argue that A has a different deep structure for each interpretation) either the denial is truthful in which case certain logical consequences about B and his behaviour are entailed, or it is false and there are other consequences. Amongst the logical derivatives of the truth or falsity of B's denials are implicit propositions which A knows he can test, his base rules tell him that he can elaborate sensibly on this deep structure by believing B's story as it stands, disbelieving it as it stands or examining the clues to its truth or falsity. Let us suppose that A looks further ahead to the consequences of each course of action and decides that further investigation suits his purpose best. He finds in his mental picture of B's ambiguous behaviour a key fact which must take one form if B is guilty, and another if B is innocent. A formulates a question. That is a piece of their shared pattern of outputs is derived by transformation from A's deep structure. B receives this question and transforms it to a number of logical features of his own deep structure. It is used to identify A as someone who still doubts B's innocence. It is used to recall base rules which show that the question can be answered or evaded. It is used to recover features of the deep structure on which a truthful answer would be based. Perhaps it causes resentment at A's lack of faith in B and causes B to search his conception of A's deep structure for some reply which A is likely to accept, and be misled.

The complications are endless. The main point is to

demonstrate the contrast with a sentence grammar. Deep and surface structures are not static in social interaction but they grow and change with each new event. The actors mental map of the social world influences his behaviour and in this sense surface structure is produced from deep structure; but as both parties act, their world view changes to incorporate the actions and their consequences, and in this sense deep structure is derived from surface structure, and of course from other sources of information concerning situations, roles and so on.

It must be stressed yet again, that the system described here, although couched in anthropomorphic terms is not necessarily a valid model of the actors mental processes. If it serves to simulate his behaviour, and the judgements he forms, it will be a plausible candidate for that status, but only that. If it does not simulate the behaviour (achieve observational adequacy) then it is certainly not a representation of the actors mental processes.

## 6.4 SUMMARY

In this chapter the surface structure of conversation has been examined and the notion of deep structure introduced.

To describe the surface structure three stages of analysis are required. First the behaviour stream must be segmented to form discrete behaviour particles or acts. This process is problematic with non-verbal behaviours, but less so with language. The units must then be classified using a taxonomy based on the similarities and differences between items in the way that they form combinations. Finally the classes of items must be arranged in well-

formed strings by sequencing rules. These may be elicited by the study of naturally occuring strings, or preferably, by the synthesis of artificial strings from hypothetical rules, for evaluation and comparison with idealised well-formed examples.

In one study, a rule system called Backchat was tested in this way and found to do considerably better than random selections of items but just worse than the ideal control. It was suggested that the grammar be refined by the use of a feature system to represent the events, by the use of different rule schemes for each actor, by including deep structures and by allowing for more complicated associations between items.

With the conclusion of the studies of surface structure, the main theme of this thesis comes to an end. Before closing, however, it is necessary to give further consideration to the concept of deep structure in social behaviour, and to applications of the study of performance. That will be done in the last two chapters.

oOo

# CHAPTER 7 DEEP STRUCTURE

7.1. The arguments for a deep structure in English, which is sufficiently distinct from the surface phrase structure to merit a separate description,may also be applied to the structure of social interaction.

## 7.1 TENTATIVE COMPARISONS

The principal theme of this thesis finished at the end of chapter 6, with a description of surface structure, albeit in rudimentary form. The representation of surface structure must be refined before any other aspects of discourse structure can be explored in detail, and that should be the first priority in future. In the meantime it is interesting to speculate briefly on the other aspects of the linguistic analogy introduced in chapter 5, and to fill out, as far as possible, the overview of interaction structures which was presented there.

One of the most fascinating facets of recent linguistic work has been the exploration of grammatical 'deep structures' A number of workers in other disciplines have adopted the concept and applied it literally or analogically when describing the profound structure or underlying reality of events, as realised in the observed patterns of observation and measurement. One must remember when considering such interpretations,the great diversity of meanings which have been read into the original concept of deep structure, and the varying degrees to which different authors modify and extend the concept to suit their own need.

Meethan (1969: 652) gives a general definition of linguistic deep structure as in the following terms:-

> The deep structure of an item (say a sentence) is a representation of it which shows its semantic relations more directly than its surface structure does, and which takes the form of a structural description...

Deep structures of a kind could function in two ways. They could be part of the mental apparatus which the actor uses when forming and interpreting novel strings of behaviour, or they could be confined to the system of artificial rules which are used to represent the properties of the DCS. In the next few pages a number of uses for a concept like deep structure will be described, without giving further emphasis to the fact that abstract models of a language or DCS, and the generative process used by the speaker or actor in vivo <u>are not necessarily identical</u>.

The idea that organised patterns of behaviour have behind them some cognitive structure, is by no means new. Bartlett (1932: 201) wrote of cognitive 'schemata' in terms which could apply to the general properties of a behavioural structure:-

> 'Schema' refers to an active organisation of past reactions, or of past experiences, which must always be supposed to be operating in any well-adapted organic response. That is, whenever there is any order or regularity of behaviour, a particular response is possible only because it is related to other similar responses which have been serially organised, yet which operate, not simply as individual members coming one after another, but as a unitary mass. Determination by schemata is the most fundamental of all the ways in which we can be influenced by reactions and experiences which occured some time in the past. All incoming impulses of a certain kind, or mode, go together to build up an active, organised setting: visual, auditory, various kinds of cutaneous impulses and the like, at a relatively low level; all the experiences connected by a common interest: in sport, in literature, history, art, science, philosophy, and so on, on a higher level.

Similarly Tolman(1948: 192)

> (The brain) is far more like a map control room than it is like an old-fashioned telephone exchange. The stimuli, which are allowed in, are not connected by just simple one-to-one switches to the outgoing responses. Rather, the incoming impulses are usually worked over and elaborated in the central control room into a tentative cognitive like map of the environment. And it is this tentative map, indicating routes and paths and environmental relationships, which finally determines what responses, if any, the animal will finally release.

The common implication of such remarks is, of course, that the orderly stream of behavioural events which the outside observer notices is not the product of a simple process, in which each item is derived in some simple way from one or more of its antecedents. Instead the succession of events arises from a complex cognitive structure in the actor, and in the case of communicative ability gives rise to another in the the observer, thus effecting the commun-

ication between the two. We might assume that this structure plays a (different) role in the generation and interpretation of behaviour, but the differences between generative and interpretive deep structures is not always emphasised. (This is not to be confused with the different roles of deep structure in generative and interpretive semantics.) In the case of a single message being transmitted from emitter to receiver, the generative and interpretive roles of deep structure could be quite distinct. In the interplay of a social interaction, however, the distinction is not so clear. Each actor presumably has his own recollections of the course of events, together with his own goals, beliefs, attitudes, interpretations and so on. Clearly this is rather like Bartlett's schema or Tolman's cognitive map, and we shall assume for the present that it may be placed in the overall picture of a quasi-linguistic behavioural

structure as the 'deep structure' of that particular behaviour sequence. Insofar as each item of behaviour, then, is derived from the deep structure of the actor, and then contributes to the deep structure of actor and observers, the generative and interpretive roles of deep structure are inextricably linked. When one of the observers becomes the actor, his conception of what is going on in the interaction, which as previously an interpretive deep structure, becomes part of the generative procedure by which he selects his next item of output. The deep structure as it exists for any actor at any moment, is essentially synchronic, although embodying a sequence of events. But as new information is received the picture changes, both by addition and reinterpretation, so the actors behaviour over a period of time is guided not so much by a deep structure as by a diachronically linked series of deep structures.

The specifically linguistic use of the notion of a deep structure, and the term itself were introduced by Chomsky (1965). This is how he located the idea of deep structure in the theory of syntax.

> The phonological component of a grammar determines the phonetic form of a sentence generated by the syntactic rules. That is, it relates a structure generated by the syntactic component to a phonetically represented signal. The semantic component determines the semantic interpretation of a sentence. That is, it relates a structure generated by the syntactic component to a certain semantic representation. Both the phonological and semantic components are therefore purely interpretive. Each utilises information provided by the syntactic component concerning formatives, their inherent properties, and their interrelations for a given sentence. Consequently, the syntactic component of a grammar must specify, for each sentence, a deep structure that determines its semantic interpretation and a surface structure that determines its phonetic interpretation. The first of these is interpreted by the semantic component; the second by the phonological component.

> It might be supposed that surface structure and deep structure will always be identical. In fact, one might briefly characterise the syntactic theories that have arisen in modern structural (taxonomic) linguistics as based on the assumption that deep and surface structures are actually the same... The central idea of transformational grammar is that they are, in general, distinct and that surface structure is determined by repeated application of certain formal operations called 'grammatical transformations' to objects of a more elementary sort. If this is true (as I assume, henceforth) then the syntactic component must generate deep and surface structures, for each sentence, and must interrelate them... For the moment it is sufficient to observe that although the Immediate Constituent analysis (labelled bracketing) of an actual string of formatives may be adequate as an account of surface structure, it is certainly not adequate as an account of deep structure.
>
> (Chomsky, 1965: 16)

Two things should be noted. First, that Chomsky's remarks apply to the formal description of the (English) language, they are not intended as a description of the machinery of the speaker-hearer. Secondly, the crucial point about linguistic deep structure is that it is <u>different</u> from the surface structure, not that it is found to 'exist'. Perhaps the deep structure is best viewed as a conceptual convenience like a 'line of force' or a 'free north pole' in magnetic theory. These are inventions which are retained because of their usefulness, rather than because of their demonstrable reality. As with so many scientific propositions, it is more reasonable to say the language works as if it had a deep structure of a certain kind, than to say it has that kind of deep structure. The definition of deep structure as the input to the semantic component would allow us to talk of the deep structure of any code. The interesting feature of natural languages is that this definition leads us to the conclusion that deep and surface structures are different, since there are so many cases where the same semantic representation has several

surface forms, or (perhaps more interestingly) the same surface form has several semantic representations. For example:

The dog chased the cat. and

The cat was chased by the dog.

would for most purposes be regarded as alternative formulations of the same meaning. (Active and passive forms have been shown to have different occasions of use, depending on the desired emphasis for example, so the selection is not entirely arbitrary -- Osgood, 1971, but both propositions have the same truth conditions, which is the essential criterion of synonymy here.) The active/passive forms of the sentence are handled by Chomsky's grammar as optional transformations forming two distinct surface structures from a single deep structure.

Conversely

The shooting of the hunters was awful.

has two meanings which cannot be distinguished by the labelled bracketing which represents surface structure. It is said to be ambiguous in deep structure. Similarly the sentences

John is easy to please. and

John is eager to please.

which look so similar in their surface structure are seen to be quite distinct semantically when one asks who is pleased and who is pleasing? It is often said that the issue of deep structural ambiguity is a minor matter (as indeed it is to the pragmatist) as so many other cues would serve to disambiguate the utterance in practice. That, however, is only to misunderstand the point. The argument is not intended to show how the world's misunderstandings arise

from the lurking dangers of deep structural ambiguity, but that the English language is constituted in such a way that the arrangement of elements in a string which specify the sounds (or marks) which could convey that message, and the abstract formulations which could be said to represent its meaning(s), are not necessarily similar or in one-to-one correspondence. Therefore one cannot study meaningful communication in such a system by observing performance alone.

It is of no interest here to debate the relative merits of the different kinds of deep structure proposed by Chomsky (1965), Fillmore (1968) and many others. The deep structure of social interaction will certainly turn out to be sufficiently different from that of English sentences, to make a detailed comparison pointless.

A number of social scientists have drawn explicitly on the notion of deep structure in describing their view of social reality (Harré & Secord, 1972; Cicourel, 1972) but none have applied it to the kind of material proposed here.

Notions rather like deep structure abound in other branches of science. A favourite example is the geneticists' distinction between genotype and phenotype. As with deep and surface structure, the particular point of the distinction is that the two need not stand in one-to-one correspondence. Flowers whose colours are derived from a dominant red gene (R) and a recessive white gene (w), by simple Mendelian inheritance, look just as red whether their genotype is RR or Rw.

By now the concept of deep structure may seem so ubiquitous, as to be an inevitable and uninteresting

property of any communication system, but this is not so. Consider for example the ways in which a novel code might be constituted. I would suggest four distinct classes distinguished by their semantic properties. First, and most simply are the codes which represent each message by a single signal. In some respects the naval flag code works in this way. One flag means 'I have fever on board' and another 'I require a pilot'. One flag is required for each message in the phrase book, and the repertoire of messages may not be extended by the use of combinations. Such a code might be called a unit code. The next most complex variety is the sequence code in which a finite number of signals may be transmitted in different orders to represent different messages. An example would be the system of real positive integers. The symbols 0 - 9 may be used in any order and in any number to represent the members of the infinite set of positive integers. Not only do substitutions of one symbol for another change the meaning, but transpositions in the order of symbols, also change their meanings. 426 and 264 are very different quantities. In the case of this example there is no syntax. All possible combinations of digits constitute a well-formed integer.

Third in order of complexity would be a group code where the meaning of a string changed as its labelled bracketing (surface structure) changed. Thus in the Morse code (.-) (.-) (.-) has one meaning and (.-.) (-.-) has another. (One could argue that this analogy is invalid since the bracketing is specified by the transmission of spaces. This is not always so at high speed, and in any case the example will serve to clarify the point.) Since codes

in this class could have semantic representations which were isomorphous with surface structure, the idea of a distinct deep structure is not necessarily required.

Finally there are the eliptical or enigmatic codes where the semantic representation is not uniquely specified by surface structure. Now a separate deep structure inferred or 'recovered' from the surface by systematic application of transformation rules, becomes a useful concept.

Clearly a social interaction is meaningful in the way that an enigmatic code is meaningful, in either case the substitution, transposition or regrouping of events will affect the meaning assigned to a string by the native actor, but even the surface structure thus specified is not the whole story. Ambiguity remains, extra information has to be read between the lines. The speaker has to be credited with mental attributes which are never explicitly represented in the string. As part of the process of attribution, we read logical consequences into the actor's statements. If he says he believes John to be more intelligent than Mary, and Mary more intelligent than Sam, we assume that he hold John's intellect in higher regard than Sam's. If he says he killed his dog he must believe his dog is dead. The inferences are not all logical deductions. Some belong more to the realm of psychologic than logic. If the actor chooses one of two course of action bearing equal cost, we assume its outcomes are more desirable for him. If he supports a political party and believes they will reduce taxes, we might assume he supports them because he would like his taxes reduced. The inferences are not always unambiguous, however. The small boy, caught with a bag full of apples and accused of stealing from the Colonel's orchard might protest his innocence. In which

case he is innocent, truthful and informative or guilty, lying and seeking to deceive. The surface structure of events is ambiguous and does not tell us which is the case, the base rules embodying the spectator's beliefs about the kinds of mental attributes which make up internally consistent states of mind, say that only those two 'deep structures' are possible. To infer that the boy was guilty, truthful and seeking to deceive would be an illogical inference -- an ill-formed deep structure.

Of course the actual base rules and deep structure involved in any situation would be far more complicated than these simple examples, but it is pointless to speculate further on their exact nature until attention can turn legitimately from interaction surface to deep structures.

The fact that such attributions are made does not imply that human beings are constituted in such a way that their behaviour is shaped by a process of efficient causality involving desires, emotions and beliefs in this way, any more than Chomsky's grammar implies that there are masses of brain tissue which excite in response to deep structure phrase markings. The system of beliefs held about human behaviour can be very important in understanding the course of events even if it is incorrect, just as the folk medicine of a native tribe may be a poor description of pathology but still, in a sense, explanatory of the rituals which attend the sick-room. The concern here is with formal rather than efficient causality: the structural resemblance between the observed course of events and their logical counterparts.

Another analogy may clarify the concept of an interaction deep structure still further. Social interaction is often said to be like a game of chess. The analogy is

used to draw attention to the importance of shared rules and conventions, symbolic behaviour, turn taking and so on; but in many respects the only chess game which really resembles an interaction is that played by enthusiasts by letter or telephone. Each 'move' of the game is transmitted back and forth as a message, and we as outside observers, are able to intercept each message and show that they follow an orderly sequence. But that sequence, represented, let us say, by a transitional probability matrix, does poor justice to the game of chess. In order to understand what is happening, we must reconstruct from the sequence of messages, the board on which the game is played, and the private conception of the state of play which is held by each player. It is the state of play resulting from recent moves, rather than the recent moves themselves, which shape the future, and give the transmitted messages the appearance of an orderly sequence. Only by working from a conception of the board and the rules is any real prediction or comprehension of the course of events possible. The particular sequence of messages (surface structure) and the states of play on the two boards (deep structures) are both peculiar to <u>that particular game</u>, whereas the base rules constraining the states of play which could exist, and the transformational rules (and tactics) by which a state of play becomes a plan of action are properties of <u>the game of chess</u>, and are common to all occasions. Now it may be argued that any sequence of moves from the known starting position uniquely specifies the resulting board positions so the notion of a separate deep structure is dispensible in this case, but there are games whose very essence is to discover the opponents deep structure from the surface

structure of play, as in the schoolboy game of 'battleships'. Here the deployment of warships on an imaginary sea is unknown to the enemy and must be discovered by the firing of test shots, whose effect is reported. The (base) rules of the game contain the possible fleets which may be set up at the outset. Thus each player constructs a map(deep structure) which is unknown to the other. Then by reference to certain rules (transformation rules) and tactical considerations (performance variables) he engages in a sequence of overt moves (surface structure) designed to locate and destroy the enemy fleet.

It is a far cry perhaps from inky-fingered schoolroom battles to Chomsky's grammar and the theory of attribution, but the role of some kind of 'deep structure' in the structural analysis of interaction should be clarified by these examples.

The fact that each actor in an interaction has his own conception of the history of events and its meaning, should introduce enough ambiguity to justify some use of deep structural analysis.

There are no standard ready-made methods for discovering deep structures and transformation rules, but the hypothetico-deductive procedure is appropriate. Suppose a set of strings were available, whose semantic representations had been explored in some suitable judgemental task, say by card sorting for similar attributed features. It would then be a straightforward matter to induce some principle relating the properties of the strings to the attributions based on them, from which testable hypotheses could be derived. The possible universality of the deep structure and base rules would be another, empirical issue

## 7.2 SUMMARY

It has been argued in previous chapters that the speech acts which form a conversation are arranged in orderly sequences, and that the sequences themselves carry information. It now seems likely that we shall find no simple correspondence between the sequences and the information they carry, as there may be several ways of representing the same meaning, or several meanings which could be legitimately associated with the same representation. If that is the case it will be convenient to speak of a separate semantic representation or deep structure for the behaviour stream. The relation of deep structure to surface structure could be described by transformation rules, and its internal consistencies by base rules. In descriptions of social behaviour it is most convenient to think of a deep structure as used in generative as opposed to interpretive semantics, that is a deep structure which governs the selection of items for output, rather than depending on the nature of items already selected, by the actor. The deep structure will of course be interpretive with respect to the output of other actors.

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# CHAPTER 8 PERFORMANCE MODELS AND BEYOND ; CONCLUSIONS

8.1 The work described here could be used as a basis for further studies of surface structure, deep structure, performance and generative processes. Computer simulations and critical path analyses could be derived from elaborated rules as could the information required for improved procedures of negotiation, conflict resolution, and social skills training.

8.2. The structural analysis presented, though incomplete, does indicate a clear way forward to more detailed and testable models of interaction structure.

## 8.1 PERFORMANCE MODELS AND BEYOND

The plan for a structural analysis of conversations outlinedin chapter 5, has been started, and will in all probability turn out to be at least as long and complex a business, as the analysis of grammar. So its completion is way beyond the scope of a single thesis, or even a single career, but the analysis which begins here has a number of implications for future research which should be considered.

The first priority is to refine the description of surface structure, presented in chapter 6. The principle focus of attention throughout the structural analysis should be the orderly progression of events which constitutes a social interaction, and the consequences of that orderliness (Argyle, Collett & Clarke, 1974). The rules describing the legitimate futures which may arise from a given past may be elaborated and tested,

and could be embodied in a computer simulation. It would then be possible to run on-line interaction experiments in which events were coded and fed to the computer as they occured, then a next move generated by the rules and specified to a 'computer-controlled confederate'. In this way a number of rule schemes could be evaluated in realistic interaction settings. The rules could be of great complexity and yet still give rise to a particular instruction in time for the confederate to make his next response, so following the rule scheme throughout the interaction. The stilted style of previous 'pre-programmed interaction' experiments could be avoided by making the program generate subtle and sophisticated input-output relations in place of a stereotyped output repertoire. The use of a human confederate to realise each computer instruction, would eliminate the need for the complicated rules of natural language to be stored in the machine itself.

From a surface structure model thus described and tested, several things would develop, including an experimental access to deep structure as described in chapter 7, and a potential model of performance. Whereas the concern was previously with the sequences of events which could be judged to be sensible conversations or interactions, attention would now move to those which actually occur. One might ask whether they are a true sub-set of the sequences generated by the competence model, and if so, how items are selected from that set for output on any particular occasion. Similar attempts are now being made with sentence structures (Osgood, 1971).

The computer 'simulation' used for the discovery of surface rules (above), could be extended to provide a critical path analysis of interactions. The various alternative moves offered by each state of play could be weighted for probability and psychological cost. In this way the program could predict the future course of critical interactions, and so serve in training and advising those who have to confer and bargain under difficult circumstances.

The training of mental patients in social skills (Argyle, Trower and Bryant, 1974) has already drawn upon this model of interaction structures to some degree, and a more specific description of surface structure would be particularly useful in that field. Working from the social skill model of behaviour (Argyle, 1967) described in chapter 1, the social skill therapists/trainers find rules of interpretation and performance relatively easy to conceptualise and express. The greatest difficulty is with the organisation of behaviour, and the relations between perception, motivation and performance. This is the translation process of the social skill model, which this project set out to study.

A grammar of social behaviour would provide a formal system for predicting the likely responses of an individual, in a variety of different situations. It could also be modified to give a summary statement of the differences between individuals, not just in terms of their response repertoire, but also in terms of their peculiar way of reacting to situations of different kinds. That could lead to a new kind of personality theory incorporating person and situation interactions.

The grammar of interaction would be at least a plausible

model of the generative process used by the actor in vivo to regulate his behaviour. Further experiments could be carried out to see whether the items of information suggested by the grammar, and the operations performed on them really did correspond to the actors generative process.

It is be hoped that a greater understanding of such aspects of interaction management would facilitate all sorts of practical improvements in the resolution of conflict, the treatment of mental disorder, and the promotion of communication and understanding between people.

## 8.2 CONCLUSIONS

This thesis has two main themes. The first has to do with the nature of conversation and other social behaviour sequences.

The evidence suggests that a conversation or interaction works rather like the product of a language or code. Individual items are built up into orderly sequences, which carry information largely in the way the items are arranged in time. Each actor has to weigh up the situation every time he speaks, and derive from it some idea of the appropriate performative force for his next utterance.

The pattern of utterances may be investigated in two ways: by observing the speakers and inferring from their choice of utterances the choice procedures they are using; or by interviewing the speakers, to elicit the knowledge they have of conversations and their construction, as represented in an abstract generative grammar. The former is a study of performance and the latter a study of competence.

Most of the influence on the speaker's choice of

utterance comes from the last four or five utterances by himself and the other speaker, but nested sequences are allowed, so the system of derivations is not a linear stochastic process.

Actors regard some sequences of events as more probable than others, and their judgements are significantly more accurate than hypothetical random responses.

A number of concepts from linguistics are helpful in understanding the structure of conversation, for example the distinctions between syntax and semantics, syntagmatic and paradigmatic relations,and deep and surface structures.

The surface structure of discourse may be analysed in three stages:

1) Division of the behaviour stream into units. This is not particularly difficult with verbal behaviour.

2) Categorisation of the units. This is made more difficult by the presence of context dependent constitutive rules (or paradigmatic structures) which assign items to equivalence classes on the basis of their intrinsic properties and the context in which they appear.

3) Sequence analysis. For complicated sequences this is best done by postulating some kind of generative rules, and then comparing their output with real or idealised sequences. There are a number of generative rule types which need to be tested, including those which derive each item of output from the cues which went before; and those which derive all output (terminal) elements from non-terminal elements which are never spoken.

The surface structure of a conversation does not uniquely specify its meaning, so it is convenient to postulate the existence of a separate deep structure, whose form is governed

by base rules, and related to the surface structure by transformation rules.

An adequate description of surface structure would lead to further research on the nature of deep structure, the generative processes used by the actor in vivo, and to means of predicting and modifying real sequences of events. Differences in generative rules between actors, could be used in a personality description which was sensitive to person and situation interactions.

The principle shortcomings of the analysis as presented here, are that it is incomplete, and a number of complex issues have had to be simplified in order to incorporate them in a more comprehensive overview. This cannot be avoided when attempting to analyse an intensely relativistic system for the first time. Such an analysis must proceed from a simple overview to a more sophisticated one, rather than from a complete understanding of one part, to the investigation of the next. Differences in rules between individuals, groups, and situations, important though they are, are better left until we have an archetype with which to compare the diversity of observed forms. It would seem far more reasonable to describe one discourse system and its thousand variations, than to describe a thousand discourse systems. Similarly the non-verbal aspects of interaction will be more easily assimilated in a crudely structured conception of interaction sequences, than mixed into the bewildering array of unclassified events from which the analysis must begin.

The linguistic analogy suggests a whole program of research into a number of key aspects of social behaviour and its production. The analysis has only just begun, but

the indications are that it will produce some important information about the way people generate and interpret behaviour. It may even show how certain behavioural problems arise, and how they could be remedied.

The second and more important theme of the thesis concerns the subject of social psychology as a whole. This has been criticised in recent years for treating stimuli and responses as meaningless events; for treating human mental processes as entirely mechanical; and for only considering simple relations between small numbers of variables or events. The kind of research methods described here could overcome these difficulties, and give a more realistic description of the patterns and regularities of social life. Furthermore they should lead to some account of the complexities of observed behaviour in terms of the enduring characteristics of the actor. This second explanatory level of analysis deals with a limited set of objects, properties and processes, from which the unlimited diversity of observations is produced. This is the level on which real scientific discoveries are made, remembered and used. The most important feature of the techniques described here is that they could restore to social psychology the second level of analysis which is often missing, and which has been the hallmark of the older and more successful sciences.

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# Appendix A

## The Experiment

The aim of this study is to investigate the ways in which people use language in everyday situations. It makes use of the idea that people not only regulate their speech in accordance with a number of basic "rules", but also have an extensive and largely accurate knowledge of the sort of regularities the rules produce.

This questionnaire is designed to test a number of theories about the patterns of language usage by recording the reactions of people like yourself: the skilled users of the language.

The items of the questionnaire all concern commonplace fragments of dialogue. It is only because of their apparent familiarity that we are able to use your judgments about them. This does NOT make them any the less complex or important as an object of study. In other words, please treat this seriously and try to express accurate judgments rather than witty or unusual replies.

## The Procedure

The questionnaire is in two parts. The first is a question booklet, and should not be marked in any way. The second is a form on which you can fill in your answers. Please return BOTH parts to:-

David Clarke

Department of Experimental Psychology,

1 South Parks Road,

Oxford.

In order to make certain comparisons possible, you will find that some of the items on the questionnaire recur in various forms. You should pay no special attention to this, but rather treat each item separately as a unique situation.

Many thanks for your help.

Section 1

Below you will find 15 numbered extracts from possible conversations. We are interested in the likelihood of each extract occuring with its four component sentences happening in the order shown. You should indicate how probable you think each sequence by finding its number in the answer booklet and writing next to it a number from 1 to 7. Please use the number 1 to indicate the least likely items and 7 to indicate the most plausible.

Example

Item No "x"

A Second left after the traffic lights.

B Where's the Post-Office?

If you thought that a likely order of occurence for those two utterances your answer would be ....

X 6

...and if you thought it unlikely it would be, say...

X 1

The letter A and B are used like names to indicate the two speakers.

1 A Do you have the time?

B It's three o'clock. Why do you want to know?

A I have a bus to catch.

2 A Where are you off to?

B Didn't I tell you this morning?

A No.

B I'm going in to town.

3 A Did you forget Mike's birthday?

B When was it? I suppose I must have done.

A Three weeks ago tomorrow.

4 A Where did you spring from?

B I was behind there. Did I make you jump?

A Nearly out of my skin.

5 A Do you want to buy a second-hand camera?

B How much do you want?

A Twenty-five quid.

B I'll think about it.

6 A Do you have the time?

B Why do you want to know? It's three o'clock.

A I have a bus to catch.

7 A Where are you off to?

B I'm going in to town. Didn't I tell you this morning?

A No.

8 A Did you forget Mike's birthday?

B When was it?

A Three weeks ago.

B I suppose I must have done.

9 A Where did you spring from?

B Did I make you jump? I was just behind there.

A Nearly out of my skin.

10 A Do you want to buy a second-hand camera?

B I'll think about it. How much do you want for it?

A Twenty-five quid.

11 A Do you have the time?

B Why do you want to know?

A I have a bus to catch.

B It's three o'clock.

12 A Where are you off to?

B Didn't I tell you this morning? I'm going in to town.

A No

13 A Did you forget Mike's birthday?

B I suppose I must have done. When was it?

A Three weeks ago tomorrow.

14 A Where did you spring from?

B Did I make you jump?

A Nearly out of my skin.

B I was just behind there.

15 A Do you want to buy a second-hand camera?

B How much do you want? I'll think about it.

A Twenty-five quid.

Section 2

In this section there are thirty numbered items. Each one has a beginning and two endings. Your job is to indicate on the answer sheet which ending you think more likely for each beginning. Each alternative is marked either X or Y, so you can indicate your answer by writing the appropriate letter beside the number of the item on the reply sheet.

Example

A Where is the Post Office?

X

B Half past three.

Y

B Further along this street, on the left.

If you think the second answer the more likely of the two, they you would write Y by the number of that item on the answer sheet.

---

16 A (Bumps into B on the street.)

B Watch where you're going, you nearly knocked me over!

A I'm very sorry.

B That's O.K.

X

A Thanks

B Forget it.

Y

A Could you tell me the time?

B Just after two thirty.

---

17 A I think you acted very foolishly

X

B I think I was partly to blame.

Y

B You were the cause of all the trouble

---

18

A I am told you were caught shop-lifting.

| X | Y |
|---|---|
| B That's right. | B Who says so? |

---

19

A Your work has not had a very good reception lately.

B How do you mean?

A I didn't mean it to be insulting.

B Sure.

| X | Y |
|---|---|
| A It's good of you to realise that. | A I suppose you've just been unlucky. |
| B It's nothing. | B I suppose so. |

---

20

A I think we should settle this, let me pay for the damage.

| X | Y |
|---|---|
| B I would be willing to pay half, in order to finish the argument. | B You should pay for everything in my opinion. |

---

21

A Do you want to tell me what happened to your school report?

| X | Y |
|---|---|
| B I put it out of sight so you wouldn't see it. | B Do we have to have an inquisition over it? |

---

22

A Your casserole tastes of burnt potato.

B You always complain.

A It's not that I mind. I just thought you'd like to know.

B Well it is a help to know how you like it.

| X | Y |
|---|---|
| A That's very fair | A The sprouts are great. |
| B Don't mention it. | B That's good |

23

A I will not say I'm sorry when I'm not.

| X | Y |
|---|---|
| B I'm prepared to shake and make up. | B To hell with you. |

---

24

A Your work record shows a large number of days missing,why is that?

| X | Y |
|---|---|
| B I had some time off with the flu. | B I try to come in as regularly as I can. |

---

25

A I think that move is against the rules.

B Really?

A I'm not accusing you of cheating.

B Of course not.

| X | Y |
|---|---|
| A I'm glad you see that. | A Play it again? |
| B That's O.K. | B Alright. |

---

26

A I'm sorry I've been so pig-headed over all this.

| X | Y |
|---|---|
| B I suppose my obstinacy is part of the trouble. | B You were always the stubborn one. |

---

27

A Have you been going through my letters?

| X | Y |
|---|---|
| B I'm sorry. | B I just came in to collect some things I left here. |

28

A I see your boy failed his exams again.

B Mind your own business.

A I didn't mean to pry.

B No, I understand.

| X | Y |
|---|---|
| A Thank's for taking it like that. | A Did he get in the cricket team? |
| B It's nothing. | B Yes, he was vice-captain. |

---

29

A You should try to make amends.

| X | Y |
|---|---|
| B Let's forget the whole thing. | B You have quite a lot to make up for. |

---

30

A The test showed you had more than the legal limit of alcohol in your blood.

| X | Y |
|---|---|
| B It was just one little lapse. | B I had hardly drunk a thing. |

---

31

A (Bumps into B on the street.)

B What's the hurry?

A I'm very sorry.

B That's O.K.

| X | Y |
|---|---|
| A Thanks. | A Could you tell me the time? |
| B Forget it. | B Just after two thirty. |

32

| | |
|---|---|
| A I suppose it was partly my fault | |
| X | Y |
| B I think I was partly to blame. | B You were the cause of all trouble. |

---

33

| | |
|---|---|
| A Have you been in trouble with the law? | |
| X | Y |
| B That's right. | B Who says so? |

---

34

| | |
|---|---|
| A Your work has not had a very good reception lately. | |
| B That's a nasty thing to say. | |
| A I didn't mean to be insulting. | |
| B Sure. | |
| X | Y |
| A It's good of you to realise that. | A I suppose you've just been unlucky. |
| B It's nothing. | B I suppose so. |

---

35

| | |
|---|---|
| A I don't see why I should pay out, it was not my fault. | |
| X | Y |
| B I would be willing to pay half, in order to finish the argument. | B You should pay for everything, in my opinion. |

---

36

| | |
|---|---|
| A How come your school report got "lost" when I found it behind the bookcase? | |
| X | Y |
| B I put it out of sight so you wouldn't see it. | B Do we have to have an inquisition over it? |

37

A Your casserole tastes of burnt potato.

B Is it very strong.

A It's not that I mind, I just thought you would like to know.

B Well it is a help to know how you like it.

| X | Y |
|---|---|
| A That's very fair. | A The sprouts are great. |
| B Don't mention it. | B That's good. |

---

38

A Let's shake hands and be friends.

| X | Y |
|---|---|
| B I'm prepared to shake and make up. | B To hell with you. |

---

39

A Have you had to miss any work through illness?

| X | Y |
|---|---|
| B I had some time off with the flu.. | B I try to come in as regularly as I can. |

---

40

A I think that move is against the rules.

B You've got a cheek.

A I am not accusing you of cheating.

B Of course not.

| X | Y |
|---|---|
| A I'm glad you see that. | A Play it again? |
| B That's O.K. | B Alright. |

41

A You always dig your heels in, in an argument, and never budge an inch.

X

Y

B I suppose my obstinacy is part of the trouble.

B You were always the stubborn one.

---

42

A What were you doing looking through my letters just then?

X

Y

B I'm sorry.

B I just came in to collect some things I left here.

---

43

A I see your son failed his exams again.

B How did you know that?

A I didn't mean to pry.

B No I understand.

X

Y

A Thanks for taking it like that.

A Did he get in the cricket team?

B It's nothing.

B Yes, he was vice-captain.

---

44

A I think I owe you an apology.

X

Y

B Let's forget the whole thing.

B You have quite a bit to make up for.

---

45

A Were you driving when drunk?

X

Y

B It was just one little lapse.

B I had hardly drunk a thing.

Section 3

Your task in this section is the same as in section 1. You should decide how likely each of the following items would be, to occur as shown below. Indicate on the answer sheet by using a number from one to seven. (1 for the least likely, 7 for the most.)

46 A1 What are you reading?

B2 I'm doing English, what are you doing?

A3 Medicine, what college?

B4 I'm at Exeter.

47 A1 What are you having?

B2 Do they have the new lager here?

A3 No.

B4 Pint of bitter then, please.

48 A1 Are you going to the match?

B2 Who's playing?

A3 City and Spurs.

B4 No, I don't think I'll bother.

49 A1 Where've you been, you were...you got here last night?

B2 I've been... yes, I've been in London working.

A3 Sorry, you've been where?

B4 I've been in London working.

50 A1 Who is that man over there?

B2 Which one?

A3 In the blue jacket?

B4 That's Simon, the one who won the scholarship.

51 A1 Do you belong to the film club?

B2 Yes.

A3 You have good stuff, don't you there?

B4 Yes.

52 A1 Have you travelled a lot round Europe?

B2 Europe-not much. I never went abroad 'till last year. I went to Greece last year. You?

A3 I've travelled a bit, went to Russia about three years ago.

B4 I'd like to go there.

53 A1 Where's Jake?

B2 I don't think I know him.

A3 You do-tall with gingery hair.

B4 Oh yes, he just went through there.

54 A1 Excuse me, could you tell me how I get to the station?

B2 Central or Northern?

A3 Central.

B4 It's down there, second right and then straight ahead.

55 A1 Where were you before you came to Oxford?

B2 Well, in a school in Kent.

A3 Yes, you come from Kent do you?

B4 No, from Canada originally.

Section 4

This section uses the ten items from section 3 again. (Numbers 46 - 55) This time you should try to decide for each line or utterance which of the previous lines it is related to. For example you may think B2 is an answer to a question posed in A1, or that A3 is the continuation of some point made in A1. On the answer sheet you will find the numbers B2, A3 & B4 under each item number. You can indicate for each of these utterance numbers, which it is derived from by writing the number of its antecedents in the space provided.

Example. If you think B2 derives from A1 your answer should look like this: B2 A1

nb. It is important that you get this the right way round. That is the number you write in should refer to the antecedant of the typed number, NOT to its sequitur. To check this, make sure that each number you write in is LOWER than the typed number it appears beside.

If you think any line unrelated to what has gone before, please enter a 0. If you think any line derives from more than one of the previous ones, please write ALL their numbers in the answer space.

In those cases where a number of successive utterances produce a continuous elaboration of a single theme each should be related to the one before, rather than to the first introduction of that theme.

When you have finished this section, the questionnaire is complete.

Thank you again for your help.

David Clarke.

Name

Age

Sex

Occupation(or subject of study, if you are a student)

Address

Section 1(Answer with figures 1-7)

| | | |
|---|---|---|
| 1 | 6 | 11 |
| 2 | 7 | 12 |
| 3 | 8 | 13 |
| 4 | 9 | 14 |
| 5 | 10 | 15 |

Section 2(Anser X or Y)

| | | |
|---|---|---|
| 16 | 26 | 36 |
| 17 | 27 | 37 |
| 18 | 28 | 38 |
| 19 | 29 | 39 |
| 20 | 30 | 40 |
| 21 | 31 | 41 |
| 22 | 32 | 42 |
| 23 | 33 | 43 |
| 24 | 34 | 44 |
| 25 | 35 | 45 |

Section 3 (Answer with figures 1-7)

| | | |
|---|---|---|
| 46 | 50 | 53 |
| 47 | 51 | 54 |
| 48 | 52 | 55 |
| 49 | | |

Section 4(Answer with line number(s) of antecedent(s).

| 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 |
|---|---|---|---|---|---|---|---|---|---|
| B2___ | B2___ | B2___ | B2___ | B2___ | B2___ | B2___ | B2___ | B2___ | B2___ |
| A3___ | A3___ | A3___ | A3___ | A3___ | A3___ | A3___ | A3___ | A3___ | A3___ |
| B4___ | B4___ | B4___ | B4___ | B4___ | B4___ | B4___ | B4___ | B4___ | B4___ |

## Appendix B -- Experiment 11 Dictionary of Utterances

| | |
|---|---|
| 1 | What's the Vicar in? |
| | The butler's been in something. |
| | I've seen him in something? |
| | I've seen the uncle before. |
| | The doctor is in a series. |
| 2 | Television you recall. |
| | On T.V.? |
| | Recently? |
| | On the box? |
| | On television. |
| 3 | Yes he's in something. |
| | I think so |
| | Yes. I'm not sure tho'. |
| | Possibly. |
| | Yes. |
| 4 | Something on now? |
| | A current programme. |
| | B.B.C. |
| | I.T.V. |
| | B.B.C.2. |
| 5 | Yes. |
| | No. |
| | I'm not sure. |
| | No I don't think so. |
| | Possibly. |
| 6 | I remember him too. |
| | I don't remember him. |
| | His name is familiar. |
| | I remember him vaguely. |
| | His name rings a bell. |
| 7 | Is it that Doctor programme. |
| | That Scottish programme. |
| | A medical programme. |
| | On in the early evening. |
| | A hospital programme. |
| 8 | Dr. Finlay? |
| | Scottish? |
| | Doctor at large? |
| | Nationwide? |
| | General Hospital, |
| 9 | Yes I know who he is. |
| | I know now. |
| | No, but I remember now. |
| | No - I know who he is. |
| | Yes could be, I know. |

10 Don't tell me.
Who is he?
Well?
Tell me!
Who?

11 Remember?
You know.
Think about it.
You should remember.
You know too.

12 Is he that farmer.
Oh the chap in a kilt.
Not the farmer.
The milkman?
Is he the new chap?

13 I think so.
Yes.
I would say so.
No the shop assistant.
I think you're right.

14 He looks older on stage.
He looks younger.
He looks greyer on stage.
He acts well.
He works hard then.

15 So does Alan Badel.
Guiness is looking good.
Do you think so, yes perhaps.
So does his brother.
Most actors do.

16 Yes doesn't he.
Oh yes.
I think so too.
That's true I think.
I agree with you there.

17 Did you see the wall shake?
The wall shook.
The wall is shaking.
The wall was unsteady.
Scenery was unsteady, did you see that wall shake.

18 No when?
Did it.
When was that.
Which scene.
Which act.

19 In the kitchen scene.
Rather funny I thought.
Second scene.
First.
Third.

20 Which wall.
Where.
Really.
Fancy that, which.
Can't be safe, which wall.

21 And the last?
That was lucky.
What happened on the tenth.
Why did the tenth happen?
So the last one?

22 Whiplashed my back.
Yes but the tenth.
I hurt my back.
I fell badly.
I hit a log.

23 Christ, you poor devil.
it was bad it was?
That was a shame.
Was it painful?
Poor old thing.

24 Oh, it's O.K. now.
Yes very.
Of it's alright.
Not at all.
Don't mind me.

25 What were you doing?
Oh dear.
How did you do it?
What happened.
How did it happen.

26 Tried to go bare foot.
Hurt my foot.
Fell hard.
I was being foolish.
I was a fool.

27 -mad fool.
What it broke off?
You must be mad.
That was silly.
That's your fault.

28 Yes, but slalom was boring.
No you fool.
no but I was tired of the other.
I know but I needed a change.
t'other bored me.

29 How was the slalom today.
What then.
The slalom you mean.
from the other Ski-ing.
The slalom you mean.

30 Did four clear runs.
I just twisted it.
Well it wasn't too bad.
Yes, made that three times.
Well I ran four.

31 How fast?
Well that's not bad.
Good speeds?
What speeds?
That's not bad.

32 Twenty-eight; thirty; then thirty-four.
Ah but it is.
Fast enough.
Oh they were good enough.
Was quite fast.

33 Not bad in these conditions.
Not in this weather.
The weather isn't good.
Weather wasn't too bad then.
And in these conditions.

34 Well we have to practice.
Practice needed.
I must practice more.
No, just need practice.
Needs more time.

35 What for?
For when?
Why is that?
Why is that?
For what?

36 The competition next Saturday.
Some competition.
Because of a competition.
Big competition coming.
The big day.

37 Where is it being held?
Oh, sounds interesting.
Where about's in England.
Oh yes.
Where will that be.

38 At Reislip I believe.
yes, its held at Reislip.
At Reislip.
At a place called Reislip.
Reislip green.

39 Hey sounds keen.
Must be a tough one.
That's a keen place.
It'll be hard.
-keen one.

40 Yes it'll be a stiff one.
I expect so.
Yes I believe so.
Yes but fun.
I hope so.

41 We've moved house.
My parents moved.
I got married and left Manchester.
I left home.
I moved away.

42 And you forgot to notify them?
And there wasn't a centre?
And you didn't write.
And you didn't rejoin.
And you forgot that you had to notify them.

43 Yes, you're right.
That's it.
Correct.
I completely forgot.
I don't think they received my letter.

44 I'll be moving shortly.
I'll be leaving soon.
I'll be going in the near future.
I'll be leaving to go to a job.
I'll be moving house.

45 Will you?
Oh, that's nice.
Really?
Where?
Great.

46 Yes, to London.
I'm going to London.
We're moving to London.
Probably London.
I'm away to London.

47 I've never been to London.
I've never been there.
I've never seen the "bright lights".
Never been.
I've never been.

48 No, I haven't either.
Nor me.
I've been once before.
I haven't yet.
That's where I used to live.

49 Well, you must notify them.
Well, enjoy yourself.
Remember to write to them.
You must tell them.
You must find a new centre in London.

50 I will.
I have already.
I shall.
I'll not forget.
I'm going to tell them now.

51 You didn't find it frightening?
Did you find it frightening?
Were you nervous?
You weren't scared?
Were you scared?

52 Well, I was rather nervous.
A little.
Not really.
Yes.
No, not at all!

53 I was scared my first time.
It's not bad, though.
I'm not at all.
I was too.
I think everyone is.

54 Taking the sample was the worst.
The first sample is worst.
The worst part is the sample.
I didn't know they took it from your thumb, first.
They take a sample from your thumb.

55 Yes, my thumb's still aching.
Do you think so?
Yes, I agree.
Yes, I can still feel it.
Far worse than the injection.

56 It's only the prick of the needle you feel.
So's mine.
Then, there's only the injection.
It's the needle.
It's only a pin prick.

57 Yes, there's nothing else to it.
Nothing else.
It's not too bad.
And that's not too bad.
Nothing but the prick.

58 It's pretty quick as well.
It doesn't take long.
It's over in a couple of minutes.
Not long either.
It takes a lot less time than I imagined.

59 Only about five minutes.
About ten minutes.
Doesn't seem very long.
Only a few minutes.
Five minutes?

60 And then fifteen minutes after.
Plus fifteen minutes after.
And lying down for a few minutes.
That's for the injection.
No, it's not long.

61 Yes, so I have to go abroad for it now.
Yeah, but I go to the continent to get it now.
I can only get it from far off places now.
I obtain it from foreign lands now.
I get it wherever I can now.

62 But you can only speak English?
And you can't speak any other language?
But your one failing is that you can't speak in another tongue.
And you can't speak Italian.
I suppose you're a typical Englishman and can't speak anything else?

63 How did you guess?
Dead right.
You're smart!
How did you know that!
You summed it up well.

64 Let me have a look at it.
Can I see the letter?
Where's this letter, then?
Give it to me then.
Can I read the letter?

65 OK - here.
Yeah.
On the table.
It's on the desk.
It's over here.

66 Impossible!
How do you know what he's on about?
This doesn't make sense.
Is this really Italian,
I can't decipher this!

67 Well you can get the gist of it.
You can tell vaguely.
You can read around it.
You can pick up some words.
Some of the words are similar.

68 Yes, I suppose so.
Well, if you say so.
Well you maybe can but I can't.
Gosh you are clever.
You're a genius.

69 Anyway what are you doing here?
But to change the subject. Why are you here?
But on another track. Why did you come here?
Sidetracking. What are you here for?
Anyhow. What are you doing in my part of the woods.

70 Just thought I'd come to see you,
I wanted to see you.
Ah, don't you know.
Have you no idea?
Surely you can think that one out.

71 That's nice. What are you doing now.
That's as good an answer as any. How's work?
I never knew you cared! How's things at college?
Ah. What are your working on now?
No. How is your training going.

72 Still slogging away. How's things with you?
Hard! What about you?
There's too much reading to do. Are you getting any sleep now?
I'm plodding on. Are you working regular hours now?
It gets more and more complicated. How's your work.

73 Well apart from nearly going bankrupt, everything's fine.
A few weeks ago I nearly had to close up shop. But its OK now.
Yes everythings alright now; even tho' we were in a bit of a spot last month.
The going was a bit heavy last month, but we got some cash now.
We didn't have a penny a few weeks ago, but its fine now.

74 Are you O.K. now?
Is everything really fine?
So everything's cool.
How did you manage that?
What did you do to get that?

75 Yes, I got a loan.
Sure, I raised four thou. from a client.
Yes I got some money from a friend.
There are some friendly bank managers around here.
I've got some good friends.

76 Oh, has Peter paid up?
Oh good, Peter?
Not Peter.
Surely not our friend?
Not...

77 No, he's bankrupt. We should get about 10p. in each pound.
No, he crashed but we should get a small percentage in the pound.
Of course not. He's bankrupt.
No. He's got no money.
You must be joking! No chance there.

78 Oh no!
Is that all?
And you're not getting anything.
You don't get a dime I suppose.
I suppose you got about fivepence.

79 Yes it's a drag.
Yes. Still that's life.
No. But that's the way the cookie crumbles.
Never mind, eh.
Sure thing.

80 Never mind as long as you're on you feet again.
As long as everything's running smoothly now.
Of well, as long as your happy.
So long as you're cheerful.
So long as you don't get into a muddle again.

81 Have they any family.
Are they married.
Do they have families.
Are they both married.
Are you a granny.

82 Yes my son has a wife and two daughters.
My son is he has a wife and child.
My son has.
Only my son.
Yes twice my son has two children.

83 What about your daughter.
Is your daughter married.
Your daughter.
Has you daughter any plans.
Is your daughter settling down yet.

84 She is engaged at the moment.
She's getting married soon.
Ah, she's engaged.
Oh yes.
Yes I think she'll be married soon.

85 Oh that's nice.
Oh great.
That must make you happy.
How nice.
Hm that's good.

86 Yes she will marry in the Summer.
Yes in the Summer.
The wedding is in June.
The wedding is to be in July.
I think her plans are for next summer.

87 Is her Fiance nice.
Is he nice.
What's the chap like.
Do you like the man.
Do you find her chosen one agreeable.

88 Oh yes a likeable sort of chap.
He's a great guy.
He's a reasonable sort of fellow.
Yes quite a lot.
Well I have got used to him now.

89 But surely they have transport.
But don't they have cars.
When you say they won't see you. They must have transport.
I know you can't go and see them but they can come to you.
Surely they must see you sometimes.

90 Yes they do.
Oh yes of course
Well yes.
Yes they can.
Oh yes occasionally.

91 So they can come over and see you sometimes.
So you will see them.
You must see them sometimes then.
You see them at Christmas of course.
How often surely more than once a year.

92 Yes.
Sometimes.
Oh yes.
Oh well of course.
Oh yes sometimes once a month.

93 You must keep up your contacts here as well.
You must keep your friends here.
Keep up your friends here too.
Don't you go to your friends here anymore.
You've got your friends here as well to see.

94 But it will feel so strange without Bert.
But not without Bert.
How can I with no Bert.
I don't feel I can.
But they were Bert's friends really.

95 I am sure everyone will want to help.
I am sure people will understand.
They'll understand how you feel.
I'm sure they still want you.
And yours, they still want you as well.

96 Yes, they might overpower me.
I don't want to be smothered.
They might interfere.
I don't know they might be nosey.
I don't know that I want them fussing round now.

97 Now come on! be reasonable.
That's hardly fair on them.
No. that's hardly likely.
Is that really likely.
Now Mrs. Jones frienship's a two-way afair, they won't nose where you don't want them.

98 What do you mean.
Why.
Why not.
-I think they might.
Perhaps not.

99 Well they have been friends for how long?
How long have you known them.
You've known them for ages, haven't you?
Come down to earth. Is it really after all you've known them years.
Well after all how long has the friendship lasted.

100 Twenty years.
A great many years.
Well years I suppose.
Yes twenty in fact.
Since we moved here - that is twenty years.

101 Yes, although it would be hard to find one in this area.
Yes, because property always appreciates so much.
Yes but you would have to save a lot of money first.
Houses are so expensive.
Property costs so much though.

102 Yes but I would like to live in the country later on where houses are cheaper.
You could buy a cheaper house in the country.
Houses cost less in Cornwall.
You could probably only afford one out in the wilds.
I bethouses in the outer Hebrides are much cheaper.

103 The trouble with that is that you might find it hard to find a job.
You might have to travel a long way to a job.
There are few hospitals there though.
Yes and there, there might be few jobs.
Not many job prospects though.

104 Yes, but I could always suggest setting up an O.T. Department in a nearby hospital.
I could always do a different job.
Yes but I could find a job even if I had to start a department.
You might have to pioneer a new rehabilitation centre.
You could lecture on the value of O.T.

105 Yes that would be a challenge.
That's an interesting idea.
Yes I expect they would be very grateful to you.
Yes, that would be rather exciting.
It might help to improve things.

106 There must be loads of hospitals who still haven't got one.
The job is so new that many places haven't caught on yet.
Yes many places still need departments.
Its still a very new profession.
Some places might take up the idea.

107 Yes well the big one near us at Kingston hasn't even got one.
One near us in the middle of town hasn't even got one.
Even in our highly populated area some hospitals are still behind the times.
Even some large places haven't got them.
Where I live its still largely unheard of.

108 Really that's very surprising.
How strange.
Its terrible isn't it.
Isn't it disgusting.
There isn't enough publicity about it.

109 Yes I was surprised when I saw they hadn't even got plans for one.
They aren't even putting one in their new block.
Some don't even seem to have heard of O.T.
Some people don't even know what O.T. is.
O.T. is completely strange to some people.

110 Still we have got a long time before we need to think of such things.
I am not going to think too much about the future yet.
Mm, I will think about that later on.
Yes, but I will worry about things like that in a few years.
Yes, I will consider it more when I've finished my training.

111 Mm, I am glad just to be a student at the moment.
Yes, We still have three years to go yet.
Yes, its a long time to the end of our training.
Mm, we've hardly started training at the moment.
I can't imagine not being a student any more.

112 Yes I would have hated to leave school and gone straight to work.
I'd rather be here than doing a boring office job.
Mm, but I would rather be here than out of work.
Yes but I am sure I wouldn't have liked my other job.
I bet its better than working in a bank.

113 Yes, but think of all the money we could have now.
Yes, but I would be better off.
You'd have more money though.
You'd be better paid though.
Higher pay.

114 Well we've got enough.
Yes but I'm not starving yet.
Well I can buy most things I want now.
I'm comfortable enough.
Yes but I don't mind not having much money.

115 Hm, but more would always be welcome.
I wouldn't say no to a bit more money though.
Yes but its a drag saving for things.
Yes but you can always buy anything you want.
I will accept any more that is offered though.

116 I wish I was like Julie with a rich father.
Julie is lucky being so well off.
I wish I could just go and ask my father like Julie.
Julie's father gives here loads of money.
Wish I was like Julie.

117 Mm, but she does get a bit embarrassed about it.
Yes but she worries if people know about it.
Yes but she doesn't seem very pleased about it.
She looks ashamed of it sometimes.
She seems afraid to tell people she's so well off though.

118 I wouldn't.
Peculiar girl.
I'd love to have a lot of money.
Funny person.
Don't understand it myself.

119 Well its hard to tell when you've never experienced it.
I wouldn't know, I've never had much money.
It's hard to tell if you would like it if you've never had any.
It may not be nice being rich, I don't know.
It might be awful being rich.

120 Yes, but I can imagine it.
Mm, but its nice to think about it sometimes.
Yes, it might be worse than being poor
It would be better than being poor.
Poor people are at a huge disadvantage though.

121 What made you consider this profession.
why this profession
what were your reasons for starting this course.
why are you here
what are you doing here

122 I certainly wasn't sure at first
My primary decision was not very firm
-well I wasn't convinced
my decision to come wasn't firm
I wasn't convinced at first

123 why not
What caused that
Why was this
Why
Realy.

124 It seemed to involve a lot of practical work.
It did not seem wholy suited to me.
I didn't know if I would fit in
I was unsure of the consequences of my decision
I didn't think I was suited to the job

125 You don't enjoy this.
The minor difficulties worried you
You were put off by superficial difficulties
You were discouraged by trivialities
Your reasons for thinking this weren't very strong.

126 I've never realy done much before
I was concerned about my standard in certain crafts.
I thought that I might not be able to keep up
I did not realise that they were trivialities at the time
I thought they were at the time

127 Is it proving difficult now
Does this still concern you
You still feel this
You are still concerned
Your feelings haven't changed

128 Surpisingly no, I rather enjoy it - That may be the novelty.
Surpisingly I now find I enjoy something I've never bothered with before.
No
Negative
No

129 Do you find you have a lot in common with your classmates
Do you communicated with your fellow students
You get on well with your fellow students
Do you mix well
Do you find it easy to mix with the others

130 Obviously our interests often coincide - but not as much as I'd expected
Yes on a superficial level
Fairly well
Averagely
On the whole yes

131 Do you find any aspect boring
Do you feel we could improve the course in any way
Could any aspect of the training be improved
Could we improve anything
Is everything here to your liking

132 No
I do not
I don't think so - no
Negative
Yes

133 Does any member of your family do anything of this nature
Have your family influenced you in any way.
Have you been influenced by anything in particular
What have been the major influences to your coming here
Have you been persuaded that this is a good idea by anyone

134 My mother has done some voluntary work
My mother may have done so by example
My mother
My Mother, to a small degree
Not realy, my mother was obviously in favour.

135 Did she encourage you
Did she try to influence you
Did she attempt to sway your judgement
Has she attempted to persuade you.
She did not try to pressurise you.

136 No, she always leaves others decisions up to themselves
Not verbally
Not intentionaly
Not strongly
No

137 So you have found this term satisfactory
You intend to stay
You have enjoyed the course so far?
Have you found the course satisfactory so far
You think that you have made the right decision

138 Yes
Indeed
Of course
Affirmative
Yes

139 It is a profession which one must adapt to
You may find this profession rather difficult
This decision should not be made lightly
You realise the gravity of your decision
I hope your satisfactory

140 I agree
Yes
I agree with you
Affirmative
So do I

141 They're not there now.
I can't find them.
They were here a moment ago.
They must have been moved.
They have gone.

142 Maybe they're on the floor.
Are they back in the cupboard?
Are they on the floor?
Are they under something?
Are they with the silver.

143 Yes, here they are.
Maybe, I'll look. Yes.
Yes
Found them.
Got them!

144 Good.
Peace at last.
Found them?
At last!
I'm glad.

145 I'll have to make a paper pattern.
I'll need a pattern.
I'll just make a pattern.
I'd better make a pattern.
I shall need a pattern.

146 The newspaper is under the table.
Use newspaper, there's some around.
The paper's over on the desk.
Theres some paper somewhere.
Use some newspaper from that stack.

147 Found it, are there any scissors.
I've got it, have you brought your scissors?
Here it is, seen any scissors?
Yes, got your scissors.
Got it, seen the scissors.

148 Yes, I have some here.
There's a pair under that file.
Yes, over there.
I've a pair here.
Here's a pair.

149 Have you decided on anything?
What are you making.
Thought of anything to make yet?
What are you going to do.
Have you decided what to make.

150 I was looking at this box.
I was thinking of a box.
What about this box?
I've been looking at this box.
Yes, a box.

151 Looks very nice, but difficult.
Looks a bit problematic.
Very nice, but it will be hard to do.
Lovely shape but difficult.
Looks hard to do.

152 I think I'll try making it.
I'm going to have a go.
Maybe, but I'll try.
Have to wait and see.
Yes, never mind, I'll try.

153 I wouldn't
Good luck.
Brave of you.
I suppose so.
Well done.

154 Doesn't matter if it turns out wrong.
Nothing lost if it turns out wrong.
If its no good it won't matter.
Nothing lost if its no good.
Won't matter if its no good.

155 No, I suppose not.
No, you're right.
No.
No, Except for a lot of time and energy.
No, your problem anyway.

156 Anyway I'm going to try.
I'll try it.
Here goes, I'll begin.
I'm going to make it.
I'm going to try

157 What time is it?
What's the time?
Isn't it time for break?
Do you know the time?
What time is it?

158 Almost break.
Almost coffee time.
Nearly 10-30.
Nearly coffee time.
Nearly break.

159 The morning session seems to be dragging.
Morning's going slowly.
Time's dragging.
It's been a slow morning.
A slow morning,today.

160 Yes, its very slow.
Yes, isn't it.
I agree
Yes.
It is, very slow.

161 Still I expect she's made lots of new friends.
I expect she's met someone else.
I suppose she's got in with another crowd of people.
I expect she's lost contact with the others too.
I should think she's got another boyfriend.

162 She probably has.
No doubt she has.
Yes.
What a shame.
Most people make new friends.

163 And I expect she's lost interest in us now.
She's certainly got no time for us now.
And got lots of new things to do.
She's probably very busy at college.
And she must get a lot of work from college.

164 Still never mind.
Well, who cares?
Still so long as she's happy.
Yes.
Poor thing.

165 I expect we'll hear out of the blue one day
We might hear eventually.
Yes, I expect we'd hear if she was lonely.
We'll hear from her one day.
I expect she'll write soon.

166 I'll tell you who I did hear from.
I heard from someone else though.
I heard from an old friend the other day.
I heard from someone you know the other day.
I heard from my pen pal the other day.

167 Who's that?
An old friend?
Someone I know?
Oh, who?
What's her name?

168 A friend living in Belgium.
Yes, my pen-pal.
Michelle who lives in Belgium.
Do you remember Michelle?
Michelle.

169 And what did she have to say?
Any exciting news?
What news did she have?
Yes, what news did she have?
What did she say?

170 She asked if I'd like to go over there.
I've been invited over there.
Her family have invited me to go and stay.
She's invited me to stay.
She asked me if I'd like to go and stay.

171 That would be nice, how long for?
You lucky thing, for how long?
How long for?
When?
Next year?

172 Oh, about a month I think.
Just a few weeks.
As long as I like.
A few weeks at Easter.
Yes, for a few weeks.

173 You lucky thing.
You are lucky.
I wish I had an opportunity like that.
Oh, I'd jump at the chance.
I'd love to go if I were you.

174 The only thing is I can't afford to miss work.
It will mean missing work though.
It means I will have to take time off work.
Work is the only problem.
I expect I'll go but work is a problem.

175 No, that is a problem.
How annoying.
Will they mind?
As usual.
What a shame.

176 How is your job going?
Do you still like your job?
No, what is your job like?
How are you getting on in your job?
Are you enjoying your job?

177 I'm really enjoying it.
Yes, very much.
Quite pleasant.
Fine thank you.
Yes, at the moment.

178 Does your brother know what he wants to do?
What about your brother?
And how's your brother getting on?
And your brother?
How about your brother?

179 If he had his way he wouldn't do anything.
He hasn't decided what to do yet.
He's not really.
He's a bit bored with his job.
He's working as a bus driver.

180 But he's so clever, it seems such a waste!
He's very clever isn't he.
What do you mean I thought he was clever.
Really?
No?

181 Do you think she'll mind
Will she mind do you think
Do you think she'll be upset
I think she'll be annoyed, don't you?
I think she might mind do you

182 Yes I do really
Yes
Of course.
Yes I think she might.
'Afraid so.

183 It's a pity really.
It's a shame.
Oh dear.
What a pity.
How unfortunate.

184 But it can't be helped.
I can't help it.
I can't do anything though.
It's not my fault.
It's my fault really.

185 Well I'll see her.
Do you want me to tell her?
I'll tell her if you like.
Do you want to see her?
I'll see her if you'd prefer.

186 Whatever for?
Why?
Don't be daft.
No not really.
What on earth for?

187 Well I don't mind telling her..
I wouldn't mind.
I don't really want to though.
Good I don't really want to.
I don't like telling her things.

188 No, I don't either.
I wouldn't either.
Well.
So what now?
What can I do?

189 Let's both go
We'll go together
We'll both see her
Can't we both go.
We'll both go round

190 No that would be silly
That would be embarrasing
No that would be ridiculous
That'd be childish
That would be stupid

191 Yes I suppose it would
I guess so
Yes I think it might
Yes I guess it might
Well yes it would

192 She could always find a flat with someone else.
She'll get another flatmate.
Jean will share with her.
She can share with Tony.
She can live with Susan.

193 But she won't like it.
She wouldn't like that.
I don't think she'd like that.
I can't see her liking that.
I don't think she'll like it.

194 After you've promised to share with her you mean?
Because you said you'd share you mean?
Because she wants to share with you?
After you said you'd definitely share with her.
Because she's expecting to live with you?

195 Yes.
Mm.
I suppose so.
Yup.
Of course.

196 Well you couldn't forestall the future.
You couldn't know what was going to happen.
Well you couldn't know.
You couldn't see into the future.
You couldn't be blamed.

197 No I couldn't.
I guess not.
No.
Well, no but
I don't know

198 Why not forget the whole thing?
Of forget it all.
Oh to hell! Forget everything.
Why not change the subject.
Oh let's drop the subject.

199 Good idea.
Great idea.
Best idea yet.
Good idea, best yet.
Super suggestion.

200 What are you doing tonight?
Where are you going tonight?
Going anywhere tonight?
Doing anything tonight?
What are you doing Saturday?

201 Not when they talk a lot.
Not when it's noisy.
I don't like it too loud.
Not much they're talking all the time.
No, they chatter away too much.

202 Like Mrs. Oliver, she talks all the time.
Mrs. O. is a bit noisy.
The new patient makes a lot of noise.
The girl in the third bed down just never keeps quiet.
Lesley can't keep her mouth shut for long.

203 She's a good person, though.
She means well.
She does try to be helpful, though.
She doesn't mean badly.
She tries to be kind.

204 I wonder how that girl is who was operated on today?
I hope J. is alright after her operation.
They took Jane off to be operated on this morning.
Jane had her operation today.
Jane was operated on this morning by the top surgeon.

205 She'll be back tomorrow, probably.
They'll bring her back in the morning.
She'll be with us again soon.
I should think she'll be back tomorrow morning.
She'll soon be back here.

206 How did you feel when you came around?
How did you feel when you came to in the recovery ward?
How were you feeling after your operation?
Did you feel bad after your operation?
Did you feel poorly after your operation?

207 Awful.
Pretty grotty.
Lousy.
Terrible.
Really grim.

208 When I opened my eyes there was a man
being sick opposite me.
When I woke up a man opposite me was vomiting.
Someone was bleeding like mad in the next
bed to mine.
There was a man with his leg chopped off
next to me.
There was a women with her head in plaster
next to me.

209 There was a tiny baby crying nearly all
the time I was there.
A child screamed all day during my stay there.
A kiddy was yelling and moaning most of
the time.
The woman next to me was whining non-stop.
Someone was moaning all the time while I
was there.

210 The Sister there was lovely.
The Sister on Recovery's nice.
I liked the Sister on Recovery.
I thought the Sisiter there was so nice.
I think the Sister there is really good.

211 Oh! She couldn't have been the same as the
one I had.
Not the one I saw.
I didn't like the one we had.
I hated the one.
The one I had was horrible.

212 The nurses there were all so kind.
I liked the nurses there.
The nurses on Recovery are nice.
All the Nurses are good there.
The nurses on Recovery are so friendly.

213 Yes, They're good girls, most of them.
Nice lot on the whole.
Thoughtful and well trained..
Yes,I liked them too.
Yes, very kind.

214 I don't much care for that new staff nurse
though.
I think the staff nurse who arrived yesterday
is pretty nasty.
But I don't like that staff nurse E.
I can't stand staff nurse E.
I hate that new staff nurse.

215 Oh, I dare say she's alright.
She might be O.K.
Perhaps she's got a good.
She gets into a temper easily.
She's very moody.

216 She was really rough with Betty this morning. Made her cry.
She hurt B. earlier today.
She was hard on B. earlier today.
She was very unkind yesterday to B.
She was so rude to Betty.

217 That's cruel, Betty's such a gently girl.
Poor Betty would'nt hurt a fly.
Betty's such a mild person.
Betty's so inoffensive.
Betty's so kind and quiet.

218 Pretty little sister of hers.
Her sister's an attractive child.
I think her sister looks sweet.
I like her younger sister.
Her younger sister is pretty.

219 The one who came yesterday?
Did she come this morning?
She visited her today.
She came in yesterday.
She popped in earlier today.

220 Yes, with her mother and aunt.
Yes, with her father.
Yes, with their younger brother.
Yes, with their cousin.
Yes, with their uncle..

221 No! this is a ball. A blue ball.
I don't think she has. It'll be a black cat.
Is is not a brown cat.
You're telling lies again.
A red cat it mustn't be really red.

222 No it's a red cat.
I like that ball.
Its a red ball...
Oh - a ball!
Is it?

223 Have you got a ball
Do you play with a ball
Can you see that ball
Do you like the ball
Is it the same as yours.

224 Yes. I'm going to be a footballer.
Yes. My ball.
I'm going to play with my ball.
Yes. I'm going to play with it later.
Yes I'm good with a ball.

225 Are you. Tell me what you do with your ball.
Do you play on the field.
Where do you play with ball.
Isn't your ball bid to play with indoors.
A footballer. Where?

226 I kick it in the street.
Sometimes I throw.
I play outside with it.
I roll it.
Run with it.

227 Do you, and what colour is your ball.
What colour is this ball.
Is your ball blue.
Is your ball the same as this one?
Is your ball brown.

228 It's red.
I don't know.
It's the other colour.
It's like that.
It's like the other things.

229 Oh.
Is it?
Red again.
Are you sure.
You like red don't you.

230 Like our cat.
I like red.
Yes it is.
Yes my ball is red.
Come on. Come on.

231 Now let's see what's on the next page, oh yes a
What's that in the corner.
I'll bet you know what this is.
What's this here.
Here's another picture. What is it.

232 A ball.
A red ball.
Another ball.
It's like my ball.
It's the ball again.

233 No. That was a ball on the other page. You are being silly.
No come on quickly.
No it isn't. What are you doing?
It isn't, look at this.
No there was only one ball.

234 I'm going soon you know.
I'm not.
No I like balls.
I'm never silly.
Am I. Turn over.

235 What is this here - it's a house.
What colour is your house.
This is a house.
I can see a house here.
What's this picture.

236 A red house.
My house.
Yes like mine.
A big house.
Yes it is.

237 Do you live in a house?
Is is like our house.
Has your house a red door?
The same as your house.
It's a big house.

238 Yes our house is big.
Sometimes.
I think so.
Yes in my house.
Yes I live in a house.

239 And who lives there.
How many people are there.
Who is in there with you.
Who sleeps in your house.
Does your family live in the house.

240 Me - and mummy.
Mummy.
I live there with mummy.
My mummy does with me.
We all do mummy as well.

241 I agree with that.
Of yes.
Of course.
Naturally.
Absolutely.

242 But it's their property and no-one elses.
But its up to them.
What a quandary to be in though.
Let it be on their heads. It's their lives.
It's their fault.

243 But not their fault. How about financial help.
They should get an allowance.
Couldn't they get a grant of some sort.
What about fund raising.
There are sure to be financial difficulties.

244 They should have a small allowance.
I think so too but only a small amount.
They wouldn't get much.
They don't deserve very much.
That's their fault.

245 But any baby causes a financial burden.
But babies are expensive luxuries.
Babes eat up money.
But they need it.
But money is vital.

246 They should have thought about that before.
That goes without saying.
I know that.
I realise that.
They must live with their problems.

247 How did they know that their child would be like that.
The parents didn't realise what the result would be.
It wasn't expected to be so terrible.
It wasn't their fault.
What a problem.

248 Experiments should be made on the parents.
How about tests.
They should be sent to the clinic.
Why didn't they see their Doctor before-hand.
Didn't they have tests?

249 How about the Thalidomide babies.
What about congenital limb deficient children.
The Thalidomides are different of course.
Spastics are different tho!
Malformed children are another matter.

250 Now that is a different question.
Now your being obscure.
Thats not what we were talking about.
Of course.
Naturally.

251 I'm glad that you see it that way.
I think they are connected.
They are related to each other.
I think it is relevant.
Of course it is important.

252 They are the result of slapdash tests.
Shoddy workmanship that's what it was due to.
Cheap labour was the cause of the problem.
Uneducated workers caused this chaos.
Unskilled labour was the reason.

253 But tests were made if not all of them.
The full no. of experiments were not made.
Not enough tests were performed.
Unskilled research.
Bad choice.

254. Everyone was in too much of a hurry to make money.
Money was the main objective.
Money grabbers.
Just out for financial gain.
Trying to make money.

255 No it was to help the mothers.
How about the drug assistance for mother.
It may have been thought to have been for the mother's good.
No advantage to the parents.
Mother lost out where she thought she would gain.

256. But it didn't do much good did it.
That wasn't very successful.
Failure in the largest degree.
Not much good, Eh.
Hopeless.

257 Slapdash methods never do, do they.
Rush and ruin I say.
More haste less speed.
Too speed conscious. .
Very bad.

258 No.
Exactly.
I agree.
Oh yes.
Definately.

259 I think more time should be taken over things like that.
Why not go slowly and succeed.
Slowly is the best way.
Slow and safe is better.
Don't rush and success will be assured.

260 Slow and methodical.
Why not.
Exactly.
You think so?
I also agree.

261 I've been told that three times now.
That's the third time I've been told.
encore un fois (yet again)
That's nothing new.
I'm a bit tired of hearing that.

262 Well it doesn't look as though you will.
You probably won't.
Shouldn't think you will.
I doubt that you will.
It's not very likely then?

263 I never do get them, I haven't yet anyway.
Well I don't usually.
I don't make a habit of getting them.
I don't bruise very easily.
It's not normal practise.

264 They also said you had a cut hand.
Haven't you cut your hand as well.
They said your hand was cut.
DId you saw your hand off too.
Didn't you mash a finger up as well.

265 It looked worse than it was in fact.
It's not as bad as it looked.
That's O.K. it wasn't very much.
Oh no; it was only a scratch.
Don't make it sound so terrible, it's nothing.

266 and also that you had a great lump on your head.
and you've got a bump on your head.
didn't you bang your head as well.
did it hit your forehead?
and you nearly knocked yourself out.

267 It looks rather as though I've been fighting.
it would seem that I'd had a fight.
looks as if I've been in a brawl.
yes, it looks like I've been in a punch up.
it looks as if I've fought at waterloo

268 quite probably with me, knowing you
not with me I hope
was it with me?
I should think you were attacking me.
more likely me you mean.

269 Yea, step outside and I'll fight you.
Get your guns and we'll have a show down.
Come here and I'll sock you one.
Cassius Clay versus ailing Alister can't you see it.
Yes I'll scratch your eyes out.

270 No seriously are you O.K.
Be sensible are you really alright.
Stop messing about, will you be O.K.
You're never serious are you.
You're a real laugh aren't you.

271 Ya, I'm going to sleep right now, or I was.
Well I was about to have a snooze.
I think I'll have a kip.
No, but I think I'll sink into dreamland now.
Oh always, that's how I stay sane.

272 Do you want some tea?
Would you like a cuppa.
have some tea first
are you going to drink some more tea
do you want another drink

273 If I drink any more I'll be bursting.
I'll pop if I have any more.
I'll be rushing to the loo all afternoon if I do.
are you trying to ruin me for life.
you'll do me in at this rate.

274 Well I'm going to anatomy soon.
Well there's an anatomy lecture soon.
I should be at anatomy in a minute.
no but I'll be ruined if I miss anatomy now.
I'd better get to anatomy now.

275 What is the lecture after tea?
What's happening after tea?
how about after tea then?
what are you doing after tea?
what's next then?

276 O.T. Theory I think.
I think its O.T. theory.
It's probably O.,T. theory
Yet another lecture I should think.
Something mentally exhausting no doubt.

277 I'll still be ill by then I'm sure.
I'll make sure I'm still ill.
I'm bound to be sick by then.
Well I'll still be layed out by then.
Well I'm still knocked out O.K.

278 What was it you were making anyway.
What were you trying to make when it happened.
Were you making something by the way.
What wierd creation were you making at the time.
By the way what was the work of art to be.

279 Well it started off as a silver spoon.
It was going to be a spoon.
I was making a spoon.
A tea spoon and don't be rude about it.
A silver spoon.

280 Not another!
Again?
Oh! really.
oh! um how lovely.
but you've already made one.

281 oh nothing much because I had a good dinner at Hospital.
I'll have the same as you.
Cheese on toast I think.
I've got that chicken to finish.
I've got meat over from yesterday.

282 I don't know what to make I don't seem to have any appetite.
I'm just opening a tin of Spagetti Bolognaise.
I'm having a pork chop and sprouts.
Must be boring having chicken four days now.
I'll have to think of something quick.

283 Did you see what lectures I have next week?
Am I going to have anatomy on Monday?
Are we having the same lectures next week?
Yes, is it physiology on Monday?
Is it Psychology next Monday?

284 Oh blow I forgot to look.
Yes we're together for evening lectures next week.
Yes, as far as I know.
Yes I think so I cannot remember now.
As far as I can remember.

285 I must get some more water so we can have some more coffee.
I'll put the kettle on.
Do put the kettle on for some coffee.
Lets make some coffee.
Now for some coffee.

286 Yes, after that we'll eat and then get ready to go out.
Yes, then we'll start getting some supper.
Yes, I'm dying for a cup.
Yes, I'm quite thirsty.
Yes, I need a cup quite badly.

287 Can I borrow your sugar I forgot to buy some?
Oh there's no sugar, can we use yours.
I'll have to borrow your sugar there's none left.
May I borrow your sugar. I've run out.
Can I have some of your sugar.

288 Yes sure I'll bring it in a minute.
O.K.
I've got plenty.
I think I have some left.
Of course.

289 What are you going to wear tonight?
Are you wearing a long tonight?
Are you wearing a warm dress tonight?
Are you wearing a coat tonight?
Are you wearing that long brown skirt tonight?

290 I don't know probably my long skirt.
Yes.
Might do.
I'd better.
Yes, it's the warmest.

291 You'll need it because it's so cold.
That's sensible - its not very warm.
You'd better or you'll freeze.
Sensible.
Good idea.

292 What about you?
And you?
How are you getting dressed?
What do you think you'll wear?
And you?

293 Trousers I suppose. My red ones this time.
My red trousers.
Trousers as usual.
The usual - trousers.
Trousers - what else do I wear.

294 Of the new ones from Marks and Sparks? .
Not those old ones surely.
Which ones - the green ones.
The blue ones.
Oh those nice black ones.

295 Yes. And my black jumper.
No, I've got a new pair.
Yes, I guess so.
No I'm fed up with those.
Yes, I hadn't thought of those.

296 The kettle's boiling - I'll get that sugar.
Will you make the coffee.
I'll just make the coffee.
Good, now for some coffee.
Lovely, hot coffee.

297 You don't mind if I start doing the veg do you.
Yes, then I'll start doing the veg, if you don't mind.
I'll start on the veg, if that's O.K.
If you don't mind I'll start the supper.
I'll just start the supper, if that's O.K.

298 No of course not, we'll be late if you don't.
Yes, you'd better.
Not a bad idea.
I don't mind.
Yes.

299 Do you think John and Paul will be there?
John and Paul are bound to be there tonight.
Who'll be there - John and Paul do you think?
Might John and Paul be at the pub tonight.
Dick and John might be there.

300 I doubt it - they've got an exam next week.
They said no because of exams next week.
Don't think so - haven't they got exams now.
They didn't think so because they're working hard.
Shouldn't think so exams.

301 Well they're about the cheapest on the market.
You can pay by instalments.
They're made in Austria.
They're more popular than Mobylette.
The price is going up in March.

302 And are they good?
And what about mileage?
What does it do to the gallon?
Is it expensive to run?
Are they economical?

303 130 to the gallon.
65 to a tank.
130 mpg.
No complaints with 65 miles to a tank.
Oh yes very good on petrol.

304 Wow.
Far out.
Amazing.
No worry about rationing there.
Good.

305 That's two stroke.
That's mixed.
Oh two stroke.
You have to get mixture.
Special mixture though.

306 What's that mean?
Uh?
I beg your pardon.
Sorry what is that.
What special mixture is it.

307 Two stroke, mixture of oil and petrol.
25 to 1, petrol and oil.
So much oil to ½ gallon of petrol.
It's a mixture of oil and petrol.
1 shot of oil to tank of petrol.

308 Oh.
Ah.
Mmm.
Oh yes.
I see.

309 Can you buy it at garages.
Do garages sell it?
Where do you get it?
And garages stock this?
Do you have to mix it yourself?

310 Most sell two stroke but its best to do it yourself.
Yes but do it yourself.
Most garages do sell it,
Yes.
It is best to mix your own but garages do have it.

311 Oh dear that's a bit of a bind.
What a nuisance.
Good.
Splendid.
I see.

312 No... quite simple madam.
Not really madam.
Yes.
Right.
Anything else?

313 How about a test run then?
May I ride it?
Is it possible to have a go?
May I take a ride?
Yes I'd like a test run.

314 I'm afraid you can't have one.
I'm afraid not.
Sorry madam.
I'm afraid we don't give test runs.
That's not possible.

315 That's ridiculous, buy a bike without riding it.
Why on earth not?
You expect me to spend 65 quid without a ride.
That's bad policy.
What sort of a shop is this.

316 Fraid so.
Firm policy madam.
Yes.
There's nothing I can do.
The manager will be here tomorrow.

317 You must be mad. Do you sell anybikes..
Has this always been the case.
Well that's out of the question.
Let me see the manager then.
Well that's no good.

318 We are not covered for this kind of liability.
We are not covered at all.
We can't let you ride it unless you're insured.
He's not here today.
I'm sorry madam.

319 How do you expect to do any trade.
Do you sell many bikes?
Well you ought to be covered.
When will he be here.
It's just ridiculous.

320 The manager will be in tomorrow.
Come and see the manager.
I'm sorry madam please talk to the manager.
Tomorrow the manager will be here.
All I can suggest is that you call and see the manager.

321 Oh yes I forgot that this is the holiday time now.
I forgot schools broke up now.
Oh yes its summer holiday time now.
Of course holidays start earlier nowadays.
Are yes its July isnt it.

322 Have you far to go too sir?
Are you going a long way.
Where are you going.
Are you going as far.
Have you got a long journey.

323 Just another hour or so to Bedford.
To Bedford.
To Lincoln.
To Stratford.
Not far, just to Salisbury.

324 I've never been there.
I'd like to go there one day.
I'd like to visit Lincoln.
I've always wanted to go there.
I've not been to Salisbury.

325 No. nor have I before. I'm going to stay with an old friend who's recently moved there.
It my first time.
I haven't before.
Yes so have I.
Nor have I.

326 Where do you live then?
Where do you come from?
Where are you from?
Where's your home
Whats the name of your home.

327 Durham.
Sunderland.
Scarborough.
Newcastle.
Warlesborough.

328 Oh so do I in castle street.
How funny I do too, Castle street.
I do as well - York house.
Like me - fancy that Lennard Road.
What a small world I do too in the close.

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Come and see the manager.
I'm sorry madam please talk to the manager.
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I do as well - York house.
Like me - fancy that Lennard Road.
What a small world I do too in the close.

329 Yes I know it well.
I know where you mean.
Oh I know.
That's quite near.
I know t'spot.

330 And I go to school in Scotland.
I'm at school farther north.
I'm at school in Edinburgh.
My school's in Glasgow.
My schools even farther north.

331 You're quite a traveller then.
You get around then.
You must be used to travelling then.
You travel a lot.
You are obviously a seasoned traveller.

332 Have you been to Africa Sir -
Have you been to America.
Have you been to Japan.
Have you ever been to India.
Have ycu ever been to Australia?

333 Yes I was out there during the Boer war.
Yes.
Yes, I was there two years ago.
Yes, five years back now.
Yes, just a month ago.

334 That must have been exciting.
Was it exciting.
Was it marevellous.
Was it a huge country.
That must have been a long way.

335 Well I suppose you would think it was.
You would think so I expect.
Yes it was.
You could certainly say so.
You would think so.

336 My father has just come back from America.
My father has just been to Africa.
My father has recently been to Japan.
My father has just visited Australia.
My father has recently visited Holland.

337 Has he - was he there on business do you know.
Was he working there.
Has he, on business.
Really, on business.
Oh business.

338 Yes I think so. He publishes books.
Yes he writes books.
Yes he's interested in cultures.
Yes, selling books.
Yes, looking at old books.

339 Do you like reading books.
Do you read a lot.
Do you read books at home then.
Do you enjoy looking at books.
Do you like reading.

340 Well yes some.
Quite a bit.
Yes.
Some books.
Sometimes.

341 Yes I seem to have done that a lot lately.
Mmm, I do that a lot now.
Yea, I usually work then. the night.
Mmm, me too.
Oh don't remind me. I'll have to too.

342 What would we do without coffee?
Coffee - great stuff.
Just think what we'd do without coffee.
Wonder what we'd do if coffee hadn't been invented.
Coffee - irreplacable stuff.

343 Without it we'd be asleep all the time I should think.
I'd sleep all the time without it.
Fall asleep if it wasn't for coffee.
Sleep all night without it.
We'd not be able to stay awake without it.

344 Yea and never get those essays written.
Yea, and your work would suffer.
Mm, never do my work.
Not be able to hand essays in.
Never get any work done.

345 I really must get down to working.
I ought to do some work sometime.
I shall have to work soon.
I must make myself work.
I must get my nose down to the old grindstone.

346 Ah, I've heard that said before.
That's quite a saying.
You've said that before.
I've heard you mutter that before.
That's been said several times before.

347 So I have and nothing happened.
Yea, I've said it before I know.
Yea!
I know!
I know and nothing ever happened!

348 Ugh, can I have some sugar.
Ugh. Sugar.
Ugh, there's no sugar in my coffee.
Any sugar please.
Could I have some sugar please?

349 Oh sorry, help yourself.
Here.
Dig in.
Help yourself, sorry I forgot.
Do please help yourself.

350 What are you doing at the weekend.
Doing anything exciting at the weekend?
Planned anything for the weekend.
Doing anything special this weekend?
Doing anything this weekend.

351 Ooh I dunno yet.
Nothing planned yet.
Not yet.
Nope.
No.

352 I hope to be going to London.
I should be going to London.
I'm going to pay London a visit.
Should be going up to London.
I'm hoping to see the sights of London.

353 How are you planning to get there.
What are you doing for transport.
How are you getting there.
Oh, how?
How are you going to get there?

354 Hitching.
Use the old thumb.
Cheapest way - hitch.
Hitch - hike.
Well, thumb should come in useful.

355 Yea, its the best way.
Best way.
Good idea.
Mm.
Good idea. It's an interesting way.

356 Trains are too expensive.
I can't afford a train fare.
Train fares take a big chunk out of my allowance.
Trains are too jolly expensive.
Well a train fare burns a hole in my pocket.

357 Mm and buses are awful contraptions.
Mm and bus journeys are so boring.
Yes and bus journeys take so long.
Yea and buses are cumbersome things.
Buses are awful things.

358 I couldn't agree more.
Agreed.
Mmm.
Yea, they get in the way more than anything else.
Yea.

359 I never even use them to get into town now.
I never use them now.
I don't bother with buses at all now.
I don't use 'em.
I never both with them these days.

360 No nor do I.
Neither do I.
No I'm the same.
No, I don't either, not at all.
No.

361 No doubt Dad had it for his lunch too!
I must be psychic!
Yes it is.
Not really.
I don't know.

362 We had a killing time at break today.
We had a laugh today.
We mucked around today.
We played around a lot today.
We larked around today.

363 Why what did you do?
What happened?
Oh yes.
Did you now!
That doesn't surprise me.

364 We sang songs in the classroom.
Penny tilted all the pictures up in the classroom.
We sang rugby songs in the classroom.
We sang little ditties in our form room.
We moved all the desks round.

365 So-
What happened then?
Then what happened?
So what happened?
And?

366 Miss Wright came in and sent us outside.
We were caught in the act and sent outside.
The prefect on duty sent us outside.
We were sent outside by the headmistress.
We were sent out.

367 Here's your cup of tea.
Here's your drink.
Your hair looks nice today.
You look nice today.
Your drink's ready.

368 He'd want to see her tho'
Poor Alister.
He'll be hurt.
That will upset him.
He won't like that.

369 Is he still fishing then?
Does he still like her then?
I thought he had got over her.
Does he still want to go out with her.
Hasn't he got over that yet?

370 How did you hear about that?
Who told you that?
Where did you get that from?
Who told you about that?
Where did you hear that?

371 Yes! And he even consented to pull out his pipe.
He was even being polite.
And he wasn't rude once!
He even put his pipe out when I came in.
He carried out quite a reasonable conversation.

372 But I am always telling him.
I told him that last week.
But I've told him lots of times.
But I've told him before.
I spoke to him but he wouldn't listen.

373 Perhaps someone he likes told him.
He wouldn't listen to you.
That doesn't count.
Before what tho' !
He doesn't like you tho' !

374 That was uncalled for.
That was even nastier than my remark before.
That was a nasty remark - even worse than mine.
Don't be so beastly.
Pig - that was bitchy.

## Appendix C  Program Matrix

As used to generate rows 351 - 374 of the 374 x 374 celled matrix.

```
      PROGRAM (MIND)
      INPUT 5=CRO
      OUTPUT 6=LPO
      OUTPUT 7=CPO
      END
```

```
      MASTER MIND
      INTEGER X(5020)
      INTEGER N(374), CR, LP, A, B, C
      J=0
      X(1) = 0
      A = 1
      CR = 5
      LP = 7
      B=351
      C=374
1       A=A+1
      READ(CR,100)     (X(A), A=2,5020)
100   FORMAT(5019         I0)
IS THIS LARGE A REPEAT COUNT INTENDED AT ABOUT COL 23, LINE 0017 ?

2     DO 14 I=B,C
      DO 15 K=1,374
      N(K) = 0
15    CONTINUE
      A=1
6     IF(X(A) -I)4,5,4
4     A=A+1
      IF  (X(A)) 10,6,6
5     A=A-1
      IF (X(A)) 12,8,5
8     A=A+1
      IF (X(A)) 14,4,9
9     J=X(A)
      N(J) = N(J) +1
      GO TO 8
10    WRITE(LP,202)(N(J), J=1,374)
14    CONTINUE
      GO TO 12
12    CONTINUE
202   FORMAT(37414)
IS THIS LARGE A REPEAT COUNT INTENDED AT ABOUT COL 15, LINE 0037

      STOP
      END
```

Appendix C  Program Shorthand

As used to detect pairs of items in the 374 x 374 celled matrix which had been placed in the same pile in Experiment 12 by 3 or 4 subjects.

```
DØCUMENT    DCSHØRTHAND

*FØRTRAN
      PRØGRAM(SHØRTHAND)
      INPUT 1 = CR1
      INPUT 2 = CR2
      INPUT 3 = CR3
      INPUT 4 = CR4
      INPUT 5 = CR5
      INPUT 6 = CR6
      INPUT 7 = CR7
      INPUT 8 = CR8
      ØUTPUT 9 = LPO
      END
      MASTER HAND
      INTEGER LP, CR, A, M, N(374), L,K(15)
      LP=9
      L=-2
      M=0
      WRITE(LP,201)
201   FØRMAT(45H LEVELS ØF CØRRELATIØN
      DØ 1 CR=1,8
      IF(CR-8)16,17,17
17    DØ 1 I = 1,24
      GØ TØ 19
16    DØ 1 I=1,50
19    CØNTINUE
      M=M+1
      READ (CR,100) (N(J), J=1,374)
      DØ 5 J=1,374
      IF(N(J)-3)9,2,9
9      IF (N(J)-4)5,2,5
2     IF (I-J) 3,5,3
3     L=L+3
      K(L)=N(J)
      K(L+1)=M
      K(L+2)=J
      IF(L-13)5,22,22
22    WRITE(LP,202)(K(A),A=1,15)
      L=-2
5     CØNTINUE
1     CØNTINUE
100   FØRMAT(374I0)
202   FØRMAT(1516)
      STØP
      END
      FINISH
****

↑**********************************************
```

## Appendix C  Program Clusprog

```
DØCUMENT     CLUSPRØG

*FØRTRAN
      PRØGRAM(CLUSTER)
      INPUT 5 = CRD
      ØUTPUT 6 = LPD
      ØUTPUT 7 = CPD
      END
      MASTER HAND
      INTEGER N(45,180), I, J, Ø, K, L, M
      REAL X(45,45)
      DØ 1 I=1,45
      READ (5,100) (N(I,J),J=1,45)
      READ (5,100) (N(I,J),J=46,90)
      READ (5,100) (N(I,J),J=91,135)
      READ (5,100) (N(I,J),J=136,180)
1     CØNTINUE
      DØ 2 I=1,45
      DØ 3 Ø=1,45
      K=0
      L=0
      M=0
      DØ 4 J=1,180
      IF (N(I,J)-1)6,5,6
5     K=K+1
6     IF (N(Ø,J)-1)8,7,8
7     L=L+1
8     IF (N(I,J)+N(Ø,J)-2)4,9,4
9     M=M+1
4     CØNTINUE
      X(I,Ø)=100*M/(K+L-M)
3     CØNTINUE
2     CØNTINUE
      DØ 10 I=1,45
      WRITE (6,200) (X(I,J),J=1,22)
10    CØNTINUE
      DØ 11 I=1,45
      WRITE (6,201) (X(I,J),J=23,45)
11    CØNTINUE
100   FØRMAT (45I1)
200   FØRMAT(1HO,22F5.0)
201   FØRMAT(1HO,23F5.0)
      STØP
      END
      FINISH
****

↑*************************************************
```

## Appendix C  Program Pathprog

```
DØCUMENT    PATHPRØG(22)

*FØRTRAN
      PRØGRAM(ANALYSE)
      INPUT 5 = CRO
      ØUTPUT 7 = CPO
      ØUTPUT 6 = LPO
      END
      MASTER MIND
      INTEGER I, J, K, Y, N(45,90), X(45,45)
C     FILL ARRAY X WITH 100S
      DØ 21 I = 1,45
      DØ 22 J = 1,45
      X(I,J) = 100
22    CØNTINUE
21    CØNTINUE
C     READ DATA INTØ ARRAY N
      DØ 1 I = 1,45
      READ (5,100) (N(I,J),J=1,45)
      READ (5,100) (N(I,J),J=46,90)
1     CØNTINUE
C     TRANSFER ANY 1S FRØM ARRAY N TØ ARRAY X
      DØ 50 I = 1,44
      Y=0
      DØ 4 J = 1,45
      IF (N(I,J)-1)4,3,4
3     X(I,J)=1
4     CØNTINUE
C     SEE IF THERE IS A / IN CØLUMN 45
      IF (N(I,45)-1)7,5,7
C     PUT CØLS. 46 - 90 ØF ARRAY N INTØ CØLS. 1 - 45 ØF ARRAY X
5     DØ 7 J = 46,90
      IF (N(I,J)-1) 7,8,7
8     X(I,J-45) = 1
7     CØNTINUE
C     SEE IF THIS RØW ØF ARRAY X IS FULL
20    DØ 9 J = 1,45
      IF (X(I,J)-100) 9,10,9
9     CØNTINUE
```

Appendix C  Program Pathprog (Continued)

```
      GØ TØ 2
10    Y=Y+1
      IF(Y.GT.10)GØ TØ 2
C     FØLLØW PATHS FRØM X TØ N, AND ENTER THEM AS Y+1 IN X
99    DØ 11 J = 1,45
      IF (X(I,J)-Y) 11,12,11
12    DØ 13 K=1,45
      IF(N(J,K)-1)13,15,13
C     SEE IF ØLD PATH IS SHØRTER
15    IF(X(I,K)-Y-1)13,13,14
14    X(I,K) = Y+1
13    CØNTINUE
C     SEE IF THERE IS A / IN CØLUMN 45 ØF ARRAY N
      IF (N(J,45)-1)11,16,11
C     FØLLØW PATHS FRØM X TØ N, AND ENTER IN ARRAY X AS Y+1
16    DØ 17 K=46,90
      IF(N(J,K)-1)60,19,60
19    IF (X(I,K-45)-Y-1)60,60,23
23    X(I,K-45) = Y+1
60    CØNTINUE
17    CØNTINUE
11    CØNTINUE
      GØ TØ 20
2     CØNTINUE
      WRITE (6,200) (X(I,J),J=1,45)
50    CØNTINUE
24     CØNTINUE
25    CØNTINUE
100   FØRMAT (45I1)
200   FØRMAT(1H ,45I1)
      STØP
      END
      FINISH
****

↑**********************************************************************
```

## Appendix D Glossary of Key Terms

The definitions given below are not intended to provide a comprehensive explanation of the concepts, but merely to make the text more comprehensible to anyone who is unfamiliar with these terms.

Act Meaningful behavioural event such as threat, promise, greeting, etc.

Actor Person whose behaviour is to be explained.

Atomism Mode of scientific analysis in which phenomena are treated independently of one another.

Base Rule A re-writing rule in generative grammar generating the deep structure.

Centroid Linkage Relation used in cluster analysis, meaning that the similarity between clusters is taken to be the distance between their centroids in similarity space. Centroid is like a 'centre of gravity' for the cluster.

Cluster Group of items found to be similar during some taxonomic study or cluster analysis.

Competence Topic of investigation involving the actor's knowledge of a system of language or behaviour, and the rules which embody or are equivalent to that knowledge.

Constative Aspect of an utterance to do with the trans-

mission of propositional meaning, and evaluated according to its truth or falsity.

Constitutive Rule A rule describing the assigment of objects to classes, e.g. X counts as Y.

Critical Path Analysis Technique for deciding which of a number of alternatives involves least cost or delay.

Deep Structure The syntactic representation of a sentence most closely related to its meaning or semantic representation.

Descriptive Adequacy Criterion for evaluating a grammar, to comply with which the grammar must generate all and only the sentences of the language, and assign the correct structural description to each.

Descriptive Competence That part of the actor's knowledge which enables him to predict events, and assign probabilities to particular transitions between events.

Diachronic Changing with time, and structured in the time dimension.

Ellipsis Process of abbreviation by which incomplete messages may be transmitted intelligibly.

Emic Mode of analysis based on the actor's judgements.

Episode Segment of the behaviour stream containing several inter-related acts, which are not related (in the same way)

to events outside the episode boundaries. The counterpart of the sentence in social behaviour.

Equivalence Class Set of items related by some relation which is transitive, reflexive and symmetric.

Etic Mode of analysis based on observation and measurement of behaviour.

Explanatory Adequacy Criterion for evaluating a grammar, to comply with which the grammar must generate all and only the sentences of the language, assign the correct structural description to each, and comply with the theory of linguistic universals.

Felicity The quality of 'happiness' by which a performative utterance has the desired effect.

Finite State System A system which can only exist in one of a finite number of states. It may be shown that English cannot be generated by a finite state device having one state for each morpheme; but a device which has states corresponding to non-terminal items could possibly generate English.

Generative Semantics Semantic theories in which a logical or semantic deep structure is used in the generation of syntactic forms.

Holism Mode of analysis in which phenomena are regarded as inextricably interrelated, or a group of phenomena are

investigated as a whole.

Illocution A kind of performative utterance which achieves its function in being said.

Interpretive Semantics Semantic theories in which a semantic representation is derived from syntactic forms by interpretation of a deep structure.

Langue The language as a system (an abstraction).

Markov Chain A sequence of events in which each is governed by the preceding one. Strictly this applies to the probability of transition between events, but the term is used here of any series deriving each element from its immediate antecedent.

Moral Competence The actor's knowledge of the constraints on social behaviour, having to do with polite and respectable conduct.

Morpheme Unit of linguistic analysis, roughly equivalent to a word, or one of its meaningful sub-components.

Multiple Articulation Property of language whereby small units combine to form larger units which are meaningful in a way which is not a simple sum of their parts.

Nested Conditions Feature of experimental design, in which different levels of one treatment are peculiar to one level of another.

Nested Sequences One sequence of events inserted in another, which is broken off and then resumed.

Non-terminal Elements Part of a generative grammar which do not appear as items of output, e.g. S and NP.

Observational Adequacy Criterion for evaluating a grammar, to comply with which the grammar must generate all and only the sentences of the language.

Paradigmatic Relations Formerly called associative relations. Relations between words (or events) based on their similarity, and particularly their intersubstitutability in contexts.

Parametric Analysis Mode of scientific description in which qualities are represented by continuous variables, and interrelated by equations.

Parole Language as realised in acts of speech or writing.

Parsing The syntactic analysis of a sentence, especially in terms of its constituent structure.

Performance The use an actor makes of his knowledge of language or social behaviour. Actual behaviour, often taken to include the means of production of the behaviour.

Performative Utterance An utterance 'doing social work' such as promising or consoling. More properly there is a performative quality associated with every utterance.

Equivalent to speech acts, often sub-divided into illocutionary and perlocutionary aspects.

Perlocution An utterance achieving its function by being said but not necessarily in being said, e.g. persuade as opposed to urge.

Phrase Structure Syntactic structure of a sentence as a hierarchy of constituents.

Positivism Empiricism. Philosophy of science placing great emphasis on direct observation and measurement. Associated in its extreme form with radical behaviourism, when applied to psychology.

Proaction The continuity of an individuals own behaviour from event to event.

Prosodic The melodic sound of a sentence. The fluctuations in pitch of the first formant.

Quotient Set Set of equivelance classes making up a universe.

Reaction Relation between an actor's behaviour, and the behaviour of other actors.

Recursion Property of a generative device or rule system whereby it may revisit the same states or sequences of operations.

Regulative Rule Rule determining the correct use of a class

of objects or behaviours.

Relativism Quality of a system describing the interdependence of the values and processes which define it.

Rule Item of information facilitating the production or recognition of a class of behaviours, by the actor or in an abstract or mechanical device.

Semantics The study of meanings, and particularly the relation of meaning to form in language.

Semiotic Competence The aspect of the actor's knowledge of a communicative system relating to the correct and meaningful use of symbols.

Single Linkage Feature of a cluster analysis meaning that the similarity between clusters is derived from the distance between their nearest members.

Speech Act As performative utterance

Statistical Approximation A reconstruction of a regular sequence of events, from the transitional probabilities between them.

Stochastic Sequence A sequence governed by the transitional probabilities between events. Used here of any form of transition between overt events (whether probablistic or not). Linear Stochastic sequence used of any sequence of events which could be represented by transitions between adjacent

events or strings. It is most commonly used here to describe the form of the output from the actor, which may be non-stochastic, even when the generative device is deriving that output from a stochastic sequence of non-terminal items.

Structure An object or sequence of events made up of systematically arranged parts.

Surface Structure A description of the output form of a sentence or event string showing the class to which each event belongs, and the relations between them, usually as a phrase structure.

Synchronic Structure Not structured in the time dimension. Unchanging, or described without reference to its changing properties, as it exists at a particular time.

Syntagmatic Relations Relations between the elements of a structure specially those between the morphemes of a sentence.

Syntax The internal relations of a string.

System A set of interrelated objects and processes, usually with a high degree of mutual interdependence.

Terminal Element The product of a generative syntax which is output as a linguistic token, capable of being spoken or written.

Test Frame A well-formed string with an item deleted, to test the equivalence of other items in context.

Transformation Rule Rule relating deep and surface structures.

Transitional Probability Matrix Matrix showing the probability that the second of two items or strings will follow, given that the first has occured.

Translation Process whereby the actor infers an appropriate response from the nature of incoming stimuli, and his own goals and beliefs.

Well-Formedness Term used in logic and linguistics to show that a succession of propositions or symbols has been correctly derived and is permissible within that system.

Appendix E1 Experiment 1 Dialogue 1

1A: Oh, yes, I've remembered now.

2B: What?

3A: What are you doing on Saturday night?

4B: Going to dinner, which is at seven o'clock and then doing a.... singing in concert.

5A: (Oh, well...) Ah, and what time do you finish that, because there's a party which you're invited to!

6B: Ah, another party. I'm invited to Bill's party as well. Bill Taylor.

7A: (Mmm) Oh he didn't invite me.

8B: Oh, oh discrimination.

9A: He only said Saturday night?

10B: Saturday night, I was going to go to that straight after the concert.

11A: Oh well there's...

12B: Another one as well, God!

13A: Yes, oh perhaps that's why I haven't been invited, where I'm already going to a party.

14B: Mmm, I'll believe...

15A: Mary and Sue and Jane have got a party and I think it'll be quite a nice party, wine.

16B: (Bill probably said.../oh/ah/I've got/ah) Yes, where's it.. where's it at?

17A: It's near the station.

18B: Oh Golly, Cherry Lane or something?

19A: I don't know, Pete... I can't remember. Pete doesn't know at the moment. He is going to find out this afternoon, where it is.

20B: Yeah, well the thing is, since we're not starting''til eight thirty, we'll probably not finish 'til ten thirty, the concert, then we'll go to...

Appendix E2 Experiment 1 Dialogue 2

1A: I've got a choice of getting one of those.

2B: They're not bad.

3A: Hundred and fifty quid.

4B: How old .

5A: Sixty six, I think. I thinks its B or C registration.

6B: Six, seven years.

7A: I think it's C..., or B. No, it's B. B registration.

8B: So everything will depend on the condition of it, I think. I mean the year never matters.

9A: It's pretty good on... outside the... I've travelled in it fairly regularly, couple of times a week.

10B: Poke round underneath, if it's not rusty, buy it.

11A: Yeah...have to check on that before I...

12B: I mean the...the thing with this sort of thing is, is rust, because engine maintenance is...is quite easy.

13A: The engine's running very nicely, although the chap who owns it isn't at all mechanically minded, whatsoever.....knows nothing about cars, apart from you put your foot down on one pedal it moves forward, an you put your foot on the other it stopped. If you don't put your foot on the third one to push the lever in the middle it makes a funny sort of grating sound, but er...

14B: (Ah well) One to go and one to stop and one to make you play around with the stick in the middle, er... Someone bought an eleven hundred, a friend of mine, and you should never buy an old eleven hundred, because the, er, underneath, the, er, way they construct the chassis is with an underframe which goes rusty, and it costs a hundred and fifty pounds to do anything about it.

15A: It's a lot of money.

16B: It's more than the car's usually worth.

17A: Well I don't mind if I pay a hundred and fifty quid and is lasts me a couple of years.

18B: Sure that's, that's fair enough.

19A: Because I'm not fantastically mechanically minded, but I could do a lot of stuff on it. I could get it up on a hydraulic jack or something, and scrub the underneath clean and re-underseal it.

20B: Yeah, yeah, that's a very good thing.

Appendix E3 Experiment 1 Dialogue 3

1A: I'm at College A.

2B: You are? Ah! You're not in B Hall are you?

3A: No, I'm in, um, the new building. (The first one).

4B: Oh you're not in C Hall? No you're in...

5A: No, the other one.

6B: 'cause I know one girl... two girls in C Hall: Mary Evans and um Clare Jones and my cousin's in... just come this year. She's in B. She's reading Law,or Should I say Jurisprudence.

7A: (Yes/oh/Mmm) Which ever one you prefer. I'm a third year Physicist. (Final year).

8B: I don't know anything about physics at all.

9A: Well neither do I.

10B: I never even did them at school.

11A: Not at all, ever?

12B: Well, I...

13A: General Science?

14B: I did them for a term. So I do know something about them. I did Chemistry, did Biology.

15A: (Mmm) Do you feel that this is a vast hole in your education, or anything?

16B: No.

17A: What will you do after this certificate?

18B: Ah, well one should be ordained.

19A: One is ordained?

20B: Technically speaking. One should be if one.. It's not to say if one passes that... it doesn't necessarily mean that one gets ordained, you know.

Appendix E4 Experiment 1 Dialogue 4

1A: They do that to monkeys.

2B: (Mmm) We're slightly more developed monkeys they say, Oh dear, I've knocked against the wall with the soles of my shoes. Look. Oops. Terrible!

3A: (I mean you don't want to believe everything you...) Not quite true. Some Pathologists would have you believe that bacteria are more developed than we are.

4B: Oh no, I wasn't saying there was anything more about... we're more developed than monkeys. I wasn't saying anything about that.

5A: I don't know. That's quite true.

6B: I did say some people would say. I don't know, I haven't gone into it.

7A: They've certainly got more mental processes going, that's a fact but whether the structure of our society is better than...

8B: Monkey societies is quite another matter.

9A: (Quite/yeah) You don't get monkeys waking up at eight, eight o'clock in the morning thinking Ah, hah, I've got to go to work.

10B: Have you heard about the chimpanzee they taught to quote talk?

11A: Yeah. That's a load of rubbish actually - anatomically they... they can't talk.

12B: Oh, no, it's not... it's not verbal, it's er...

13A: It's all grunts Ahhh, Eehh stuff like that.

14B: (Yes/Yeah) It's talk in quotes because what they've done is, um, taught the chimp to use various signs for communicating different things, and she's doing it accurately, they say.

15A: (Mmm) A couple in America, two Doctors actually, brought a chimp up as a child, as a human child, put nappies on it and all this kind of thing.

16B: Oh crickey.

17A: Wanted to get it to talk, and I think it got about two words, one of which is supposed to be Daddy but it, it was just more of a groan.

18B: (Mmm) Well they didn't, didn't try and teach this chimp to talk verbally, they they wanted to see it it could handle symbols and things, and it appears it can. On a simple...well...

19A: (Mmm/what kind of..) Tell it jug and it touches a jug or something like that?

20B: Well actually they've got the words or some sign meaning, you know this is jug and can arrange them so... to communicate, you know, say I want so and so. Does that get it?...can do the same for other things.

Appendix F1 Experiment 2 Dialogue 1

1A: I wonder why people associate Hull with dreary northern backwaters.

2B: Especially when Hull is so full of fascinating places of interest to all interested in how people in ports live.

3A: How much of interest in Hull do you find in port area alone?

4B: I think old and disused docks tell much of past glories, speaking in historical vein, but is much outside dock areas.

5A: Essentially I would agree that most of character of Hull lies within dock area, but so few visitors to Hull actually visit dockside.

6B: Regrettably, very few visitors ever come to Hull, let alone to see river pursuits or to trace old town walls or see churches.

7A: Excepting of course lorry drivers and commercial travellers, and even people of this nature rarely stay long enough to appreciate old town and history of place.

8B: Very few people ever hear of Beverley, and Beverly Minster must be great point of interest, not only in Yorkshire.

9A: Beverley is only one of East Yorkshire's lesser known attractions, and yet I find Beverly Minster every bit as interesting as York Minster.

10B: I think trying to make people aware of Hull's attractions is fighting a losing battle.

11A: Only solution is to introduce people here to Hull itself.

12B: I do not agree - I let people rot in their own ignorance.

13A: You must admit Hull is virtually out of reach, so to speak, and everywhere has attractions if people look for attractions.

14B: I do not like missionaries.

15A: What have missionaries to do with subject?

16B: Missionaries convert people from ignorance to bliss, of course.

17A: Somebody has to convert people.

18B: I wish you would go out to African backwoods.

19A: If only I could spend some time in African backwoods.

20B: I can see you swinging from creeper to creeper.

## Appendix F2 Experiment 2 Dialogue 2

1A: I am going on canal holiday.

2B: Where are you going?

3A: I am going near Melton Mowbray and in Midlands.

4B: What canals are in Midlands?

5A: Grand Union canal is in Midlands with large number of locks.

6B: Grand Union canal has how many locks?

7A: I do not know, but Grand Union Canal has many locks.

8B: Canal holiday sounds very interesting.

9A: Canal holiday is very interesting when weather is good.

10B: I like good thunder storm .

11A: Are really good thunder storms in mountain countries like Switzerland.

12B: My familiar spirit likes Swiss thunderstorms.

13A: You like mountain countries, then?

14B: Is too much effort climbing mountains.

15A: Climbing mountains keeps you fit and healthy.

16B: I do not believe climbing mountains keeps me fit and healthy..

17A: Lazy body makes lazy brain.

18B: Muscles on arms and legs mean muscles in head.

19A: Is better than brains leaking out.

20B: Is good to have brains in first place. Mountain rocks make hole in head and muscles sag out.

Appendix F3 Experiment 2 Dialogue 3

1A: Only way to make tea is to pour boiling water on tea leaves and leave to stand.

2B: You can make tea by pouring boiling water on tea bags, but not leaving to stand.

3A: I prefer boiling water poured into brandy.

4B: You know I prefer champagne, but you are welcome to water poured into brandy.

5A: You can only drink champagne out of lady's slipper. Does not taste good unless you know where lady's foot has been. Is necessary to know lady well.

6B: You know me well. You can drink champagne out of my slipper. I am not giving you champagne if you do not drink out of my Hush Puppies.

7A: Hush puppies are not slippers. Are small young quiet dogs. Small young quiet dogs go to sleep very quickly if have champagne. I do not wish to drink your champagne if is inside small young quiet sleepy dog.

8B: I am giving you recipe for my next favourite drink. I put vodka and tomato juice in a glass and shake, put whisky, rum, coca cola, shake again. If you feel ill you can have soda bicarb.

9A: Soda bicarb is essential.

10B: I am smoking cigarette.

11A: Is what kind of cigarette?

12B: My cigarette is Rothmans.

13A: Is your cigarette king-size?

14B: My cigarettes are always king-size, I think you can observe.

15A: King-size cigarettes are for king-size people. You do not qualify spatially.

16B: I am not answering your remark. I am changing subject.

17A: I love you too.

18B: Weather is cold, do you agree?

19A: Weather is so cold I hate to think of polar bears swimming in Cherwell since polar bears get ice between toes.

20A: I am not continuing conversation because I am having last laugh.

Appendix F4 Experiment 2 Dialogue 4

1A: I am changing my oil at moment.

2B: Oil changes are great. I presume your car is feeling good now?

3A: Why does car always elicit your first thoughts and never me?

4B: You know that is untrue about you car eliciting my first thoughts. I say that things are quite reverse. Why are you visiting my home?

5A: I would not talk if I were you. You idea of home is Martha's Trailer Park, Brooklyn.

6B: My idea of home is place filled with nice people. Can you say as much?

7A: My idea of home is well-oiled trailer.

8B: Can't you think of anything but well-oiled trailers?

9A: Oh to be in Martha's cross bearings now that 10W30 is there.

10B: You are one of those people who take more interest in well-oiled cross-bearings than in reality. Isn't that so?

11A: You would not say such things if you really knew and understood cross-bearings.

12B: I think I know all there is to know about well-oiled cross-bearings. I do not really think you can say as much.

13A: Are you saying that you bear your crosses often?

14B: When you are around of course I bear my crosses, do you think things are any other way?.

15A: If you ask me you should be grateful for very fact that you have crosses to bear. You know how scarce wood is getting these days.

16B: Wood is scarce these days, I admit, but men are not, you have to admit that.

17A: In Oxford men are in conspicuous surplus, why even ugly girls receive attention.

18B: Ugly girls get attention from equally ugly men.

19A: Beauty is only skin deep. How unfair you are to speak harshly of those young men.

20B: Beauty is deeper than skin -- you cannot imagine how gorgeous my lungs are.

Appendix G1 Experiment 5. Zero order approximation to dialogue

1A: I want - want tobacco.

2B: Stupid, stupid, stupid.

3A: Don't fret, there's plenty more where those came from.

4B: I know... but I promise I wouldn't get cross.

5A: Do you not know?

6B: I will come.

7A: The place has a style worth preserving.

8B: Why, I never complained, I only told what happened in my rooms. And anyhow, your behaviour there was not exactly blameless.

9A: I only kissed him because he threatened to put me into a barrel if I didn't.

10B: Beg pardon.

11A: Yes?

12B: Yet you are so banal as to consider me chiefly a freak.

13A: I find you droll, but droll my little one.

14B: Nothing else.

15A: Listen. Turn round all of you, and keep going straight ahead. Don't separate or you'll have had it. Get moving now.

16B: My God , did you hear the Old Man say that Dr. Groteschele might have "the right one"? That's the closest he has ever come to a commitment.

17A: Who are the children? There's something about the way they look at one with those curious eyes. They are strangers you know.

18B: Come on in.

19A: Quite absurd, suffering bores me, any more.

20B: Okay, so I got the message. Thanks.

Appendix G2. Experiment 5, First order approximation to dialogue.

1A: That's the way the world goes.

2B: Cheerio.

3A: There you go.

4B: How nice to see you.

5A: Hello!

6B: That's nice.

7A: That's rather splendid.

8B: How's the world been treating you?

9A: Oh, I see.

10B: How's life been treating you?

11A: Yes.

12B: Never mind, eh?

13A: No.

14B: You must be joking.

15A: Good heavens.

16B: Oh dear.

17A: Goodbye.

18B: You learn something new every day.

19A: Really?

20B: You see.

Appendix G3. Experiment 5, Seonnd order approximation to dialogue

1A: When did we last meet?

2B: Two weeks ago.

3A: Have you seen him alone since then?

4B: No, I haven't.

5A: But you told me yesterday that you had.

6B: I didn't.

7A: Oh!

8B: Well?

9A: It wasn't really my fault.

10B: Well, whose fault was it.

11A: Not mine.

12B: Oh well, it must be his.

13A: Yes, I suppose it must be.

14B: Quite so.

15A: Yes, I suppose you'd say so.

16B: Yes, I would.

17A: Right, well that's settled then.

18B: Okay, we'll go.

19A: I'll get my coat.

20B: I'll be with you in a minute.

Appendix G4 Experiment 5, Third order approximation to dialogue

1A: How long is it since we last met?

2B: I can't say, it must be ages.

3A: I think it was about this time last year.

4B: Yes, perhaps it was.

5A: No, maybe it was a little earlier.

6B: I wouldn't like to say.

7A: Well, I'm not absolutely sure, but I think it was.

8B: Well I'm not telling.

9A: I wouldn't expect you to break a confidence.

10B: That's alright.

11A: No, it's not alright.

12B: Why not?

13A: It's not possible to do things in that way.

14B: It is surely.

15A: I don't see why.

16B: It's obvious.

17A: Well, I don't see it.

18B: Well your not particularly bright.

19A: That goes for a lot of people.

20B: But you in particular.

Appendix G5 Experiment 5,Fourth order approximation to dialogue

1A: How long is it since we last met?

2B: It can't be more than a week or two.

3A: Has there been any change in your situation since then?

4B: None at all.

5A: That's too bad isn't it.

6B: Yes, but perhaps it will get better.

7A: Maybe.

8B: I hope so.

9A: Things can't be any worse than they have been.

10B: You've always got to look on the brighter side.

11A: Have you?

12B: No.

13A: Oh dear, cheer up!

14B: Cheer up?

15A: Yes you've looked down in the mouth for days.

16B: Why should I cheer up?

17A: Well I don't like to see you unhappy.

18B: Sorry, but it can't be helped.

19A: Well it's a bit stupid, lingering over things you can't do anything about.

20B: But I can't tell you about it.

Appendix G6 Experiment 5,Fifth order approximation to dialogue

1A: It's a long time since we last met.

2B: Yes, doesn't time fly.

3A: I've been meaning to get in touch with you.

4B: I've been meaning to get in touch with you, too.

5A: All the same, its good to see you.

6B: Where shall we go to eat?

7A: Um, let's see, there's the Mitre, or the "Sorbonne" but that's a bit expensive, then there is the "Tudor Cottage".

8B: Let's try the "Tudor Cottage" again.

9A: I think you'd probably prefer the "Sorbonne" in spite of the extra cost.

10B: Is it better value for money?

11A: Have you ever been to the "Sorbonne"?

12B: No I haven't, let's try it.

13A: I think you'll find that it's worth going there.

14B: Let's fix a date then.

15A: Alright, let's try a week on Tuesday at 8 o'clock.

16B: Okay.

17A: Where shall we meet?

18B: In the pub down the road.

19A: That's fine by me.

20B: See you there then.

Appendix G7 Experiment 5, Natural dialogue between strangers

1A: I'm at College A.

2B: You are? Ah! You're not in B Hall are you?

3A: No, I'm in, um, the new building. (The first one).

4B: Oh you're not in C Hall? No you're in...

5A: No, the other one.

6B: 'cause I know one girl...two girls in C Hall: Mary Evans and um Clare Jones and my cousin's in... just come this year. She's in B. She's reading Law, or should I say Jurisprudence.

7A: (Yes/Oh/Mmm) Whichever one you prefer. I'm a third year Physicist. (Final year)

8B: I don't know anything about physics at all.

9A: Well neither do I.

10B: I never even did them at school.

11A: Not at all, ever?

12B: Well, I...

13A: General Science?

14B: I did them for a term. So I do know something about them. I did Chemistry, did Biology.

15A: (Mmm) Do you feel that this is a vast hole in your education, or anything?

16B: No.

17A: What will you do after this certificate?

18B: Ah, well one should be ordained.

19A: One is ordained?

20B: Technically speaking. One should if one... It's not to say if one passes that... it doesn't necessarily mean that one gets ordained, you know.

## Appendix G8 Experiment 5, Natural dialogue between strangers

1A: Most of the experiments that I am a subject for just involve, you know, peering at things and saying whether you can seem them or not, or reading and having to memorise things, then they test how good your memory is.

2B: Mine's hopeless.

3A: It's a real art though. You can learn to memorise some things, because I've been a subject so often and you don't... you read a lot about it and you read about techniques, so you go in somebody's experiment, and they're very very, you know, cross.There's another one I was doing where a man was seeing what effect it had to wear headphones, and unexpectedly you suddenly get horrible loud noise.

4B: Yes.

5A: And it... oh, it's terrible, I didn't do that very much. You know you get... 'cause you had to concentrate on a... on looking at something and so...

6B: What... how did they test your reaction, just visually or did they take electrodes?

7A: Yeh, Yeh they did the electrode thing, and to make sure you were reacting to it... that they were... what he wanted to see was the effect this had on your being able to see something that was only just visible. You know, just how much the distraction stopped you from doing it. Oh, it was terrible. You were sitting there and all of a sudden you got "Hah-Schhh" in both ears

really loudly. But er..you know. I'd really jump and he said my skin reaction was so...

8B: I'm sure anybody's would.

9A: Mmm, it does.

10B: But I... I expect they do these sort of tests for people who are, oh... people who have to react to loud noises, like people in the army I suppose.

11A: Yes, yes I suppose it's...yeah.

12B: They want to see how well they can cope.

13A: It certainly does put you off, I must say, however hard you try to concentrate.

14B: I've never been a subject for one of these experiments, but some friends of mine at home were subjects and they had very similar tests, they were made to smell something horrid.

15A: Mmm.

16B: You know, without suddenly realising, some...a whiff of something horrid would suddenly come into the room. And then, you know, they test their reactions. They used to test their breathing by, oh I don't know what what they used to do. Suddenly I think somebody used to come and clap somebody over the mouth, and then...very nasty.

17A: I only go in for harmless ones now. I make sure there's nothing nasty going to happen to me before I do them. 'Cause some of the ones they do at the, you know, some of the social psychology ones, really I think seem quite immoral. There's one famous one where they put somebody in a room with a lotof other people, and had all the other people defending a totally indefensible viewpoint, to see if this person would change his mind.

18B: Uh-huh.

19A: You know, to see to what extent you are influenced by other people's opinions. And all these other people, you know, they were just stooges.

20B: It's ridiculous.

Appendix G9 Experiment 5, Natural dialogue between friends.

1A: Oh, yes, I've remembered now.

2B: What?

3A: What are you doing on Saturday night?

4B: Going to dinner, which is a seven o'clock and then doing a... singing in a concert.

5A: (Oh, well...) Ah, and what time do you finish that, because there's a party which you're invited to!

6B: Ah, another party. I'm invited to Bill's party as well. Bill Taylor.

7A: (Mmm) Oh he didn't invite me.

8B: Oh, oh discrimination.

9A: He only said Saturday night?

10B: Saturday night, I was going to go to that straight after the concert.

11A: Oh well there's...

12B: Another one as well, God!

13A: Yes, oh perhaps that's why I haven't been invited, where I'm already going to a party.

14B: Mmm, I'll believe...

15A: Mary and Sue and Jane have got a party and I think it'll be quite a nice party, wine.

16B: (Bill probably said.../oh/ah/I've got/ah/) Yes, where's it...where's it at?

17A: It's near the station.

18B: Oh Golly. Cherry Lane or something?

19A: I don't know. Pete...Ican't remember. Pete doesn't know at the moment. He is going to find out this afternoon, where it is.

20B: Yeah, well the thing is, since we're not starting 'til eight thirty, we'll probably not finish 'til ten thirty, the concert, then we'll go to...

Appendix G10 Experiment 5, Natural dialogue between friends

1A: They do that to monkeys.

2B: (Mmm) We're slightly more developed monkeys they say, Oh dear, I've knocked against the wall with the soles of my shoes. Look. Oops. Terrible!

3A: (I mean you don't want to believe everything you...) Not quite true. Some Pathologists would have you believe that bacteria are more developed than we are.

4B: Oh no, I wasn't saying there was anything more about... we're more developed than monkeys. I wasn't saying anything about that.

5A: I don't know. That's quite true.

6B: I did say some people would say. I don't know, I haven't gone into it.

7A: They've certainly got more mental processes going, that's a fact but whether the structure of our society is better than...

8B: Monkey society is quite another matter.

9A: (Quite/Yeah) You don't get monkeys waking up at eight, eight o'clock in the morning thinking Ah,hah, I've got to go to work.

10B: Have you heard about the chimpanzee they taught to quote talk?

11A: Yeah, That's a load of rubbish actually - anatomically they... they can't talk.

12B: Oh no, it's not... it's not verbal, it's er...

13A: It's all grunts Ahhh, Eehh Stuff like that.

14B: (Yes/Yeah) It's talk in quotes because what they've done is, um, taught the chimp to use various signs for communicating different things, and she's doing it accurately, they say.

15A: (Mmm) A couple in America, two Doctors actually, brought a chimp up as a child, as a human child, put nappies on it and all this kind of thing.

16B: Oh crickey.

17A: Wanted to get it to talk, and I think it got about two words, one of which is supposed to be Daddy but it, it was just more a a groan.

18B: (Mmm) Well they didn't try and teach this chimp to talk verbally, they they wanted to see if it could handle symbols and things, and it appears it can. On a simple...well...

19A: (Mmm/what kind of...) Tell it jug and it touches a jug or something like that?

20B: Well actually they've got the words or some sign meaning, you know this is jug and can arrange them so.. to communicate, you know, say I want so and so. Does that get it?...can do the same for other things.

Appendix H1 Experiment 6, Zero order dialogue

A Yes?

B Yet you are so banal as to consider me chiefly a freak.

A I find you droll, but droll my little one.

B Nothing else.

A Listen. Turn round all of you, and keep going straight ahead. Don't separate or you'll have had it. Get moving now.

B My God, did you hear the Old Man say that Dr.Groteschele might have "the right one"? That's the closest he has ever come to a commitment.

A Who are the children? There's something about the way they look at one with those curious eyes. They are strangers you know.

B Come on in.

A Quite absurd, suffering bores me, any more.

B Okay, so I got the message. Thanks.

Appendix H2 Experiment 6, Zero order dialogue

A I want - want tobacco.

B Stupid, stupid, stupid.

A Don't fret, there's plenty more where those came from.

B I know... but I promise I wouldn't get cross.

A Do you not know?

B I will come.

A The place has a style worth preserving.

B Why, I never complained, I only told you what happened in my rooms, And, anyhow, your behaviour there was not exactly blameless.

A I only kissed him because he threatened to put me into a barrel if I didn't.

B Beg pardon.

Appendix H3 Experiment 6, Zero order dialogue

A Virtually nothing.

B Fine with me.

A I joined her when she was new. We loaded steel rails in Middlesborough. Ten years ago, that is.

B What makes you think he is still a Party member?

A Who said that?

B What is Digby's game?

A Don't you wish you were coming Gussie?

B Will one be enough?

A Oh, it was me. It was me made sure you would come.

B But I don't want to go to bed.

Appendix H4 Experiment 6, Zero order dialogue

A So let's go.

B I expect they were used to plan their sales route.

A You know a lot about stalking!

B You see you can't get rid of me. Are you going to tell me where you're going or not?

A You see I...

B Yes really it is pretty grim.

A Well, thank you for the present. I'll be going. Merry Christmas.

B What does she do?

A Not lately, for some reason he seems quite affluent these days. But if he's blackmailing you I shall have to tick him off. Whatever your relationship he has no right to sponge on you. I won't stand for that.

B My God.

Appendix H5 Experiment 6, First order dialogue

A Is that that way you feel?

B Why don't you call round sometime?

A I had a long talk with Archie the other day and he seems to think that you have undergone some sort of revolution in your political ideals. I told him I didn't think this was the case, but I'm not sure. What is your stand now?

B Yes you can most certainly borrow it. I don't play it anymore. Though when Christopher becomes a little more proficient he will want to buy his own, and no doubt a better instrument than this.

A I would like to say yes, but it's impossible to do so.

B How's your new 'Hi-Fi'?

A I'd better start thinking hard then.

B I wonder if the manager has seen those files yet.

A Come and see my etchings.

B That's O.K. with me.

Appendix H6 Experiment 6, First order dialogue

A What do you think of the lousy weather?

B What's you new job like?

A I'm having trouble making up my mind deciding what to vote in the coming poll. Have you any ideas to convince me one way or the other?

B No I haven't seen her since Christmas. I suppose she has been very busy with all the arrangements to make, but I hope to see her before the big day.

A I don't think I could have done any better.

B Hope you're feeling better, having seen you drifting round the coffee area for the last two days rather aimlessly.

A Don't forget to tell the others.

B It was a shame that she didn't get her job.

Appendix H7 Experiment 6 First order dialogue

A What have you been doing lately?

B I'll come with you.

A Did you know that Alice has got engaged? She only met the young man a few months ago. His name is Paul Marsh. He's a modern linguist like yourself. Do you know him?

B I did quite actually, it wasn't as bad as I expected. There were only four people there and the whole interview only lasted about ten minutes.

A I hoped you enjoyed the dinner.

B How's life treating you?

A Cheerio then.

B I wish I could give up smoking, it would save me so much money.

A How's the work going?

B Oh what a shame -- I really liked her.

Appendix H8 Experiment 6 First order dialogue

A God, you're looking well today!

B I hear you've been ill.

A Yes we went to see that play at the New Theatre the other night also. I didn't enjoy the performance of the lead actor very much, what did you think?

B We're doing quite well actually, though we did have to stop going for several weeks during my exams. However we managed to join up with the same class again, so we haven't missed anything at all and gained financially.

A It is really much faster to cycle into town these days.

B How was your dinner with John last night?

A We'll start planning that, then, next Monday.

B Yes she's grown enormously these last few months, hasn't she?

A Where are you going for your holidays?

B I really think the police ought to do something about that sort of thing - it lowers the tone of the neighbourhood.

Appendix H9 Experiment 6 Second order dialogue

A Do you always catch this train?

B Every week.

A Yes the meetings only used to be every fortnight but people got so keen and interested that we decided to have more activities.

B Have weekly meetings produced more activity, or is it just that the committee enjoyed debating the possibilities of what could be and still don't get round to doing it?

A I'm sure those who enjoy talking about doing things don't enjoy doing things.

B To some extent that's true, but I wouldn't use it as a blanket statement.

A Of course, but there are many exceptions.

B Yes but that's the general rule that applies.

A Yes I suppose you have to be careful about generalising, but in this case it's O.K.

B But how can you be sure in this case, surely it's no different from anything else?

Appendix H10 Experiment 6 Second order dialogue

A What are you doing here?

B I might ask you the same question.

A You might indeed, but we're not talking about me now, we're discussing your behaviour and I'd still like to know the reasons for it.

B I don't really see what it has to do with you. My life's my own. I don't go sticking my nose into yours, so why should you bother with mine?

A To you I must seem a nosy-Parker, but to me it was just plain curiosity.

B That's O.K. I'm used to people being inquisitive. Not asking anything under these circumstances might get you into a mess later on.

A Yes, but it's always difficult to know how far you can intrude.

B I agree. However in this case I think we'll be alright.

A Yes I suppose it will be difficult this time. I hope it will be O.K.

B Well it should be, but it all depends on Peter.

Appendix H11 Experiment 6, Second order dialogue

A How's Maud?

B Who is Maud?

A Maud is the character in a film called Harold and Maud who is an eccentric Bohemian lady who lives in a railway carriage.

B It sounds more like one of those modern non-comprehensible plays which you don't feel any different after you've watched than before you watched, so I don't think I'm very interested in going to see it.

A It depends in what frame of mind you watch the play.

B Well I was feeling very negative, I had had an unsatisfactory week, due to being disorganised.

A Don't let that bother you, we'll see what we can salvage from your work.

B That's very good of you.

A I know.

B Well I hope you do know, and don't just think you know.

Appendix H12 Experiment 6, Second order dialogue

A Which way are you going?

B I'm going home.

A Oh don't go yet. I know it's not a very good party yet, but things may liven up after eleven o'clock when the pubs close.

B Well I'll stay a little bit longer, but I don't want to get home too late. But if as you say it gets much better then I hope I won't be tempted to stay too long.

A I hope you can be tempted.

B Yes, I'm sure I can, but I've got an essay crisis at the moment.

A Well let me know when things have calmed down a bit.

B Yes I will, and perhaps I could contact you then.

A Yes do that and you can tell me what you've found out.

B I don't suppose it'll come to much really -- but there's always hope.

Appendix H13 Experiment 6, Third order dialogue

A I'm feeling much better than I was.

B It takes a long time doesn't it.

A Yes, time is a factor obviously but I don't think I would have got very much better had it not been for the medicaments the doctor prescribed for me.

B Do you know whether there is likely to be a recurrence, and if so does it mean you should have, for instance, an annual course of treatment, or will this one see you for several years or for ever?

A I hope there'll be no recurrence.

B Well I'm glad, and I hope things go as you anticipate them to.

A I hope so too, we're all keeping our fingers crossed.

B I'm sure there's no need for that. These things usually do go right.

A Well you can never rely on the weather I suppose.

B No, not in England, but where I come from.

Appendix H14 Experiment 6, Third order dialogue

A Yes it's been a long time since we've seen each other.

B What have you been doing these last few weeks?

A I've been out of circulation for a bit. I haven't been seeing many people. I've been working very hard finishing things off.

B Perhaps now you're finished we could come round to see the result of this great labour. I'm sure when we see the result of all the beautiful decorations you have done we shall be encouraged to do something with our house as well.

A It really isn't much in the way of an unusual series of decórations, but by all means have a look.

B Well in your opinion it's not much, but if you've spent so much time on it, it must be something, and I'd still like to see the end product.

A I just hope you won't be disappointed.

B Of course not, it will be interesting to see how much progress you've made.

A Well I think I've come along quite well, and my hopes are quite high, so with any luck it will be O.K.

B That's pleasing to know, because if you've done well it will go well with the rest of our research, and seem more influential to those above us.

Appendix H15 Experiment 6, Third order dialogue

A Like what?

B Looking so well and happy.

A Oh well it's going away for a month to Crete that does the trick. You should try it too.

B I wish I had the money!

A I was forgetting about the money as I paid so long ago.

B Money spent is money gone, so you may as well use your opportunities.

A They seem to be rather few and far between at the moment, as well.

B But you'll probably get your promotion next year so you'll have more opportunity then.

A Well with any luck, but there are plenty of other people who are just as able as I am.

B Yes, but do they know the boss as well?

Appendix H16 Experiment 6, Third order dialogue

A Nice to see you too.

B Are you very busy at the moment?

A No I'm never busy when you're around. If you have time would you like to come up for some coffee? It would be very pleasant to have a chat. We haven't seen each other for so long.

B Well that would be nice, but I must confess to have looked you up for 'shop' purposes as I have this problem and I can't solve it. But perhaps it would be more civilised to have coffee first and then pick your brains afterwards.

A No I don't mind, might as well pick my brains in a comfortable atmosphere.

B O.K. we'll start now.

A How do we start?

B First of all by copying down the data.

A That's going to be rather boring isn't it?

B Well I don't guess I'll do it myself. I'll get one of my underlings to do it.

Appendix H17 Experiment 6, Fourth order dialogue

A I've been meaning to get in touch with you.

B Yes, I haven't heard from you for weeks.

A Well you know how it is, pressure of work. I've been very busy tying up ends of my thesis, but now that I'm back in the social round we must arrange something.

B Well you seem to have chosen your moment to reappear because I'm having a party this weekend so you may as well come to that if you're free.

A Tell me where it is.

B It's at my place. Starts at ten and goes on all night.

A If it alright with you I'll be there about midnight.

B Yes that's fine, but please bring a bottle.

A Champagne or beer?

B It's up to you.

Appendix H18 Experiment 6, Fourth order dialogue

A Mmm, it's a pity you didn't see me last week.

B I was away in Cornwall.

A You missed a good party at Bill's, but I expect you had good rest in Cornwall. What was the weather like?

B For Cornwall not really all that good because at this time of year it's usually scorching down on the beach. However, it was better than you had here.

A Is that possible?

B Well O.K. you had better weather here. I was just unfortunate to be in Cornwall during a poor spell.

A Yes and there's no way of predicting the weather.

B No, that's one of the nice things of living in Britain.

A I suppose it makes for variety, but it can be very annoying when you go on holiday.

B I don't know -- most of the times I seem to be very lucky.

Appendix H19 Experiment 6 Fourth order dialogue

A It's been a long time hasn't it.

B Not so very long really.

A Oh yes, it's been ages. Last time I saw you you were still involved in the last Oxford University Dramatic Society production. How did it go?

B Not very well actually as far as I was concerned. As you know I was understudying for Marilyn. She was ill on the second night and I had to step in and I wasn't really prepared to do so.

A How come? I thought that was what an understudy was suppoed to do.

B I thought it was very unlikely that Marilyn would be ill so I just got the gist of things rather than getting it together.

A And how did it turn out on the night?

B Surprisingly well. We had three encores.

A You must have felt very pleased with yourselves.

B Yes -- specially considering it was the first time we'd performed with that group.

Appendix H20 Experiment 6, Fourth order dialogue

A Yes, I'm glad I bumped into you.

B What a surprise!

A I've been meaning to contact you, but with pressure of work I hadn't actually got round to it. I expected we would run into each other sooner or later.

B Well now we have met, what profound reason was it you wanted to see me since destiny has brought us together.

A I wanted to know if you were interested in the new films which I have acquired.

B What sort of films are they?

A They're not what one might call profound, but I think you might be interested. They are of last weekend's trip.

B Oh yes, I'd love to see them, but not just now as I'm rather busy.

A Well come along later if you've got time, because I'm sure you'll like them.

B Yes, and I'll have to see your new camera as well.

Appendix H21 Experiment 6, Fifth order dialogue

A I've never seen you here before.

B No, its the first time I've been here.

A What new tack have you discovered in your research that brings you to this neck of the woods. I thought most of your books were in the other library.

B Well actually I'm not here to work at all. I just came in to see a friend and this is the only place I know I can definitely find her at a given time of day.

A So this is the new social Mecca.

B Well not really. Just yet another distraction.

A Distraction from what?

B Distraction from my work at the office.

A Do I take it that you don't enjoy your work.

B No, its not that, I really do enjoy it -- that's why I don't want to be distracted from it.

Appendix H22 Experiment 6, Fifth order dialogue

A Yes but I'm sorry I've got to rush off.

B Yes I can see your bus.

A Buses are like kettles - they don't come when they are waited for, and they do come when they are not wanted. Perhaps you could give me a ring sometime in the near future.

B Well I wouldn't have called a bus kettle-like, but never mind you'd better run.

A Bye.

B Hope you catch it.

A I'll put my running shoes on.

B Well it's too late now, you've missed it anyway.

A Damn.

B Well it gives you a good excuse for staying here a bit longer now.

Appendix H23 Experiment 6, Fifth order dialogue

A You're looking well,Tom.

B I've just come back from my holiday.

A That's very nice. Where did you go? It must have been somewhere sunny and Mediterranean.

B Well not quite. We only went to Jersey, but they had splendid weather there. Instead of spending all our time on the beach we hired bicycles,so I expect the extra wind from rushing up and down hills helped promote my tan.

A Did it give you big muscles too?

B No they were there already.

A Modesty too!

B Nonsense, I had those since I started my training at the Gymnasium.

A If I were you, I'd try to get rid of them.

B Well I can always appear in 'Playgirl'.

Appendix H24 Experiment 6, Fifth order dialogue

A I've come all the way from Ipswich.

B That must have cost a lot.

A No, I hitched.

B Did it take you long? I'm surprised you took the risk really. These days I neither hitch for lifts nor give them.

A Sometimes it's the only way to travel.

B True if you're pushed. Otherwise security's more advisable.

A If you're a man it's quite safe really.

B Yes that's true but there's always the danger of burglars.

A It seems a rather unlikely risk. I think I should go ahead anyway.

B I suppose it has the advantage that at least it's proof against inflation.

Appendix H25 Experiment 6, Sixth order dialogue

A Can I come in?

B Please do.

A I've been trying to call you on the phone a few times but you always seemed to be out or engaged so I thought I'd pop round instead and see how you were.

B Yes perhaps you ought to know a little bit more about our timetables. We are out three times a week which is why you couldn't get us. And we've been ringing my mother and cousin a lot lately since my mother is going away and we are going to look after the house, and my cousin is going to have a baby.

A Well in that case there's no point in me ringing you.

B Not really, sometimes I'm in. Anyway it's nice of you to come round.

A Well I'm pleased to be here for both business and pleasure.

B Well come upstairs, have some tea and then we can get down to business.

A That's very kind of you to spare the time.

B Well I may make some form of profit out of it, so I can afford to spare it.

Appendix H26 Experiment 6, Sixth order dialogue

A Yes I thought I'd call and see you while I was in town.

B I've been meaning to call on you for ages too.

A It's a pity you didn't pop round over the weekend. We had an impromptu get-together when some friends came up from London and we all went punting. It would have been nice if you could have joined us. Let's organise something for next weekend.

B Well if you don't object to punting again let's go on the river as it's a long time since I've taken out a punt.

A I'm afraid one cold bath a year is enough for me.

B Did you fall in then? It doesn't matter -- you needn't do so this time as we'll try to punt in a civilised manner.

A No I didn't fall in -- we punted in a very civilised manner. I just happened to pour down with rain half way through.

B Well let's arrange it that as long as the weather is good we'll go punting.

Appendix H26 contin.

A You can never rely on the weather in this country, and anyway I'm not particularly fond of punting.

B Oh come on -- don't be a spoil-sport.

## Appendix H27 Experiment 6, Sixth order dialogue

A Where shall we go and talk?

B Would you like to come back to my home?

A That would be a lovely idea. I've got a few things to do first. Could I pop round and see you in half an hour?

B That is quite agreeable because it gives me time to clear up my sewing from the living room so that you won't be sitting on pins all the time.

A I didn't realise that you were interested in sewing.

B At present I'm making a tent.

A Is that for your holiday.

B Yes it's supposed to be, although I don't know whether it's going to work out.

A Well I hope it doesn't all come apart in the middle of a storm.

B I don't know about it coming apart. I'm worried it'll leak necause we can't get hold of any of the water-proofing stuff.

Appendix H28. Experiment 6, Sixth order dialogue

A Nice to see you too.

B We haven't met for such a long time.

A No we haven't, but now that we've bumped into each other there's something I've been meaning to tell you. I came across an article in Time magazine which relates very closely to your research. Would you like me to give it to you sometime?

B Oh dear I must be getting rusty having slipped on that, as I haven't seen it myself. Yes it would be very nice if you could lend it to me.

A O.K. I'll pop round with it tonight.

B That would be very kind of you but I'll probably be out. If you pop it into my pigeon hole that would be preferable. Or else I'll sus it out for myself.

A No, I will put it in your pigeon hole as you suggest, because I've got it quite close at hand.

B That's very kind of you, thank you.

A That's O.K. you see what you can make of it.

B I'll try my best but I don't suppose I'll be any better than anybody else.

Appendix H29 Experiment 6, Text order dialogue

A I heard you were in town.

B I arrived by plane yesterday.

A By plane -- does this go down on the firm's expenses or have you suddenly won the pools?

B Neither actually, in fact it's all a bit of a con. In fact I'd never flown before.I was talking to my friend who was coming down to the airfield at Abingdon and I managed to 'hitch' a ride with him, so to speak.

A You lucky devil.

B Well it's nice to get out of Oxford for a while. Where does life happen here?

A I wish I could tell you.

B I hope my trip hasn't been wasted then.

A No I don't suppose so -- you probably had a better time than I had here.

B Oh I knew life on these camps was a bit low, but is it really that grim?

## Appendix H30 Experiment 6, Text order dialogue

A Fe el like coming for a pint?

B Yes I'd love to.

A I know this nice little place round the corner. Shall we pop in for lunch? Then we can have a chat.

B Do you really know where this place is. I seem to remember spending most Sundays looking for a 'nice little place' and never finding it, and compromising and going back to the Lamb and Flag again.

A Oh that was just one of my walking tours. This one is straight there.

B Well I'll believe it when I see it.

A Don't worry, you can trust me this time.

B O.K. I'll give you the benefit of the doubt.

A I've fooled you this time again!

B I never could trust these ramblers. You never know where they'll take you next.

## Appendix H31 Experiment 6 Text order dialogue

A I thought I'd see you at Bill's party.

B I wasn't invited.

A Maybe that's because Bill felt afronted because you didn't invite him to yours. Anyway you didn't miss very much, it wasn't as good as yours.

B Well I suppose it's nice to know you consider my party was a success. I couldn't invite Bill because the numbers had got too many. Perhaps I ought to contact him and put things straight.

A Yes do that, it's a pity that people take offence over these things.

B I'm sure Bill hasn't really taken offence. He just pretends to other people that he has as it seemed wrong not to do so.

A But you should remember --he does like to play social games. As so many people do around here, and maybe this is just one of them.

B Well I will go and see him and straighten this out.

A Yes I think you'd better, it's probably part of his game.

B Perhaps if I flatter him he'll change from games to reality.

Appendix H 32 Experiment 6, Text order dialogue

A Yes, what have you been up to?

B Come inside and I'll tell you.

A I'd love to, but could I come back in a few minutes. I have to catch the bank before it closes.

B Yes certainly come back then. What time does your husband meet you? Would it be possible for you to stay to tea?

A He doesn't usually meet me, but I still have to go before tea time.

B Why, have you got something else on?

A Yes, and it's rather important.

B Well do come in for a few minutes anyway, even if you can't stay to tea after you've been to the bank.

A Yes, I'd love to. We can talk about old times.

B Yes and I should be able to run you to where you've got to go.

Appendix H 33 Experiment 6, Real dialogue

A I'm at 'College A'.

B You are? Ah! You're not in 'B Hall' are you?

A No, I'm in, um, the new building. (The first one).

B Oh you're not in 'C Hall'? No you're in...

A No, the other one.

B 'cause I know one girl...two girls in 'C Hall': Mary Evans and um Clare Jones and my cousin's in...just come this year. She's in 'B'. She's reading law, or should I say jurisprudence.

A (Yes/Oh/Mmm) Whichever one you prefer. I'm a third year physicist (final year).

B I don't know anything about physics at all.

A Well neither do I.

B I never even did them at school.

Appendix H34 Experiment 6, Real dialogue

A They do that to monkeys.

B (Mmm) We're slightly more developed than monkeys they say. Oh dear, I've knocked against the wall with the soles of my shoes. Look. Oops. Terrible.

A (I mean you don't want to believe everything you...) Not quite true. Some pathologists would have you believe that bacteria are more developed than we are.

B Oh no, I wasn't saying there was anything more about... we're more developed than monkeys. I wasn't saying anything about that.

A I don't know. That's quite true.

B I did say some people would say. I don't know I haven't gone into it.

A They've certainly got more mental processes going, that's a fact but whether the structure of our society is better than...

B Monkey society is quite another matter.

A (Quite/Yeah) You don't get monkeys waking up at eight, eight o'clock in the morning thinking 'Ah, hah. I've got to go to work'.

B Have you heard about the chimpanzee they taught to quote 'talk'?

Appendix H35 Experiment 6, Real dialogue

A Oh, yes, I've remembered now.

B What?

A What are you doing on Saturday night?

B Going to dinner, which is at seven o'clock and then doing a... singing in a concert.

A (Oh,well..) Ah, and what time do you finish that, because there's a party which you're invited to.

B Ah, another party. I'm invited to Bill's party as well. Bill Taylor.

A (Mmm) Of he didn't invite me.

B Oh, oh discrimination.

A He only said Saturday night?

B Saturday night, I was going to go to that straight after the concert.

Appendix H36. Experiment 6, Real dialogue

A Most of the experiments that I am subject for just involve, you know,peering at things and saying whether you can see them or not, or reading and having to memorise things, then they test how good your memory is.

B Mine's hopeless.

A It's a real art though. You can learn to memorise some things,because I've been a subject so often and you don't ... you read a lot about it, and you read about the techniques, so you go in somebody's experiment, and they're very very, you know, cross. There's another one I was doing where a man was seeing what effect it had if you had to wear head-phones, and unexpectedly you suddenly get horrible loud noise.

B Yes.

A And it... oh, it's terrible, I didn't do that very much. You know you get... 'cause you had to concentrate on a... on looking at something and so...

B What... how did they test your reactions, just visually or did they take electrodes?

A Yes, yeh they did the electrode thing, and to make sure you were reacting to it... that they were... what he wanted to see was the effect this had on your being able to see something that was only just visible. You know, just how much the distraction stopped you from doing it. Oh, it was terrible. You were sitting there and all of a sudden you got "Hah-schhh" in both ears really loudly. But er... you know. I'd really jump and he said my skin reaction was so...

B I'm sure anybody's would.

A Mmm, it does.

B But I... I expect they do these sort of tests for people who are, oh... people who have to react to loud noises, like people in the army I suppose.

Appendix I. Experiment 13. 10 Random strings produced by Joker

1 #

A Thank

B Offer

A Question Refuse

B Permit

A Warn Warn Attend Greet

B Comply

2 #

A Permit Defer

B Warn Offer

A Question Pardon Complain

B Deny

A Pacify

B Answer

3 #

A Complain Prohibit

B Justify

A Pardon Agree

B Deny

A Offend

B Terminate Agree Laugh

Appendix I(2)

4 #

A Blame

B Comply Permit Praise

A Complain

B Permit Greet

A Terminate

B Fulfill Apologise

5 #

A Greet

B Answer

A Request

B Defer

A Threaten

B Accuse Promise

A Joke

B Justify

A Answer

6 #

A Request

B Continue

A Permit Terminate Threaten Minimise

B Comply

A Fulfill

B Continue Apologise

Appendix I(3)

7 #

A Offend Accept Challenge Minimise

B Justify

A Justify Question Offer

B Sympathise

#

Agree

8 #

A Question

B Justify

A Terminate Complain

B Terminate

A Offer Apologise Comply

#

B Agree

A Threaten

9 #

A Sympathise

B Confess

A Accuse

B Warn

A Accuse

B Joke

A Bid farewell Sympathise

B Threaten Laugh

Appendix I (4)

```
10          #
      A     Comply
            #
      B     Agree
      A     Advise  Praise
      B     Complain  Threaten  Offer
      A     Reject
      B     Bid farewell
      A     Refuse
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Appendix I(5) 10 strings produced by Backchat

11

#

A Offer

B Reject Apologise

A Accept

B Terminate

#

A Warn

B Accept Thank Promise

A Accept

12

#

A Prohibit

B Offer

A Thank

#

B Command

A Question

B Question

A Question

B Refuse

A Warn Justify

13

#

A Permit

B Reject Justify

A Question

B Question

A Answer Question

B Answer Terminate

Appendix I(6)

14 #

A Warn

B Accept Continue

A Deny

B Question

A Question

B Question

A Question

B Refuse

A Question

15 #

A Complain

B Cheer

A Joke Laugh Laugh Joke Laugh Terminate

#

B Request

A Comply

16 #

A Request Justify

B Accept

A Praise

B Minimise

#

Request

A Offer

B Reject

A Command Threaten

Appendix I(7)

17 #

A Command Threaten

B Question

A Answer Question

B Answer

A Continue

B Deny Justify

A Accept

18 #

A Boast Continue Continue

B Blame Offend

A Prohibit

B Offer

A Question

B Question

A Refuse

19 #

A Question

B Question

A Question

B Question

A Answer

B Continue

A Deny Apologise Justify

B Accept

Appendix I(8)

```
20          #
      A     Command  Threaten  Justify
      B     Question
      A     Refuse
      B     Advise  Justify
      A     Question
      B     Question
      A     Question
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

Appendix I(9) 10 Control strings

21 #

A Assert Complain

B Accept Justify Offer

A Agree

#

Assert Question

B Answer Justify

22 #

A Greet

B Greet Threaten

A Laugh Deny

B Continue

A Deny Accuse

B Apologise

A Assert

23 #

A Assert Accuse

B Confess Apologise

A Pardon Pacify

#

B Joke

A Laugh

#

Praise

B Minimise

Appendix I(10)

24 #

A Question

B Answer Question

A Answer Question

B Answer Question

A Question

B Answer Question

25 #

A Greet Question

B Answer

#

Praise

A Agree Boast

B Blame

A Minimise Apologise

B Permit

26 #

A Offend Accuse

B Deny Pacify

A Blame

B Justify

A Threaten

B Warn

A Apologise Promise

Appendix I(11)

27 #

A Greet Question

B Answer Boast

A Attend

B Boast

A Permit Challenge

B Offend Justify

28 #

A Greet Offer

B Thank

A Request

B Refuse Reject

A Offend

B Sympathise

A Complain

B Terminate

29 #

A Complain

B Assert

A Deny Justify

B Joke

A Accuse

B Apologise Offer

A Reject Confess

Appendix I(12)

| | | |
|---|---|---|
| 30 | | # |
| | A | Greet |
| | B | Joke |
| | A | Prohibit Question |
| | B | Answer Justify |
| | A | Deny Justify |
| | B | Agree |
| | A | Warn. |

## Appendix J. Experiments 9,10 & 11

In experiments 8, 9 & 10 data were pooled across subjects and items, which violates the assumption of independence of observations, associated with the $\chi^2$ distribution. Below the data are presented separately for each item pooled only across subjects. McNemar's test for the significance of changes is used when the expected number of changes in each direction is greater than 5, and the binomial test when it is less than 5, (Seigel, 1956: 67).

McNemar's Test Experiment 9

| Items | Changes Y to X | Changes X to Y | $\chi^2$ | df | p two-tailed |
|---|---|---|---|---|---|
| 25/40 | 12 | 0 | 10.08 | 1 | 0.01 |
| 43/28 | 4 | 6 | 0.1 | 1 | n.s. |

Experiment 10

| | | | | | |
|---|---|---|---|---|---|
| 32/17 | 2 | 13 | 6.67 | 1 | 0.01 |
| 20/35 | 4 | 9 | 1.23 | 1 | n.s. |
| 38/23 | 2 | 16 | 9.39 | 1 | 0.01 |
| 26/41 | 9 | 11 | 0.05 | 1 | n.s. |
| 44/29 | 2 | 13 | 6.67 | 1 | 0.01 |

Experiment 11

| | | | | | |
|---|---|---|---|---|---|
| 36/21 | 2 | 13 | 6.67 | 1 | 0.01 |
| 42/27 | 1 | 12 | 7.69 | 1 | 0.01 |

Binomial Test Experiment 9

| Items | Total number of observed changes | Number of changes in less frequent direction | p two-tailed |
|---|---|---|---|
| 31/16 | 9 | 2 | n.s. |
| 19/34 | 4 | 2 | n.s. |
| 37/22 | 8 | 2 | n.s. |

Experiment 11

| | | | |
|---|---|---|---|
| 18/33 | 9 | 2 | n.s. |
| 24/39 | 2 | 0 | n.s. |
| 30/45 | 6 | 2 | n.s. |

The summary statistic for experiment 9 was not significant (section 4.5.3). One item pair (25/40) was significant ($p < 0.01$, two-tailed) in the direction of more frequent appreciation -- minimisation after accusation, and more frequent new topic offer after neutral enquiry. All other significant items changed in the direction indicated by the summary statistics for that experiment.

# Bibliography


ALTMAN, S. A. (1965) Sociobiology of Rhesus Monkeys. II: Stochastics of social communication. Journal of Theoretical Biology, 8, 490-522

AMIDON, E.J. & HOUGH, J.B. eds. (1967) Interaction analysis; theory, research and application. Reading, Massachusetts: Addison-Wesley.

ANNETT, J. (1969) Feedback and human behaviour. Harmondsworth: Penguin.

ARGYLE, M. (1967) The psychology of interpersonal behaviour. Harmondsworth: Penguin.

ARGYLE, M. (1969) Social interaction London: Methuen.

ARGYLE, M. (1972) Non-verbal communication in human social interaction. In R. A. Hinde (ed.) Non-verbal communication. London: Cambridge University Press.

ARGYLE, M. (1975) Predictive and generative rule models of P x S interaction. Paper presented at the symposium on interactional psychology, Stockholm, June, 1975.

ARGYLE, M. (n.d.a ) A radical alternative in social pscyhology? Unpublished manuscript.

ARGYLE, M. (n.d.b) Unpublished manuscript on interruption and rules of speaker change.

ARGYLE, M., COLLETT, P. & CLARKE, D.D. (1974) The sequential structure of social behaviour applied to social skills and group conflict. Unpublished research proposal submitted to the Social Science Research Council.

ARGYLE, M. & LITTLE, B.R. (1972) Do personality traits apply to social behaviour? Journal for the Theory of Social Behaviour, 2, 1-35.

ARGYLE, M., TROWER, P. & BRYANT, B. (1974) Explorations in the treatment of personality disorders and neuroses

by social skills traning. British Journal of Medical Psychology, 47, 63-72.

AULD, F. (Jr.) & WHITE, A.M. (1956) Rules for dividing interviews into sentences. Journal of Psychology, 42, 273-81.

AUSTIN, J. L. (1962) How to do things with words Oxford: Clarendon Press.

BALES, R.F. (1953) The equilibrium problem in small groups. In T. Parsons, R.F. Bales and E. A. Shils. Working papers in the theory of action. Glencoe, Illinois: Free Press.

BALES, R.F. (1955) How people interact in conferences. Scientific American, March 1955, 3-7.

BALES, R.F. & GERBRANDS, H. (1948) The interaction recorder: An apparatus and checklist for sequential content analysis of social interaction. Human Relations, 1, 456-63.

BARKER, R.G. (1963) The stream of behaviour as an empirical problem. In R.G. Barker (ed.) The stream of behaviour. New York: Appleton-Century-Crofts.

BARTLETT, F.C. (1932) Remembering: a study in experimental and social psychology. London: Cambridge University Press.

BASSO, K.H. (1972) 'To give up on words': Silence in Western Apache Culture. In P.P. Giglioli (ed.) Language and social context. Harmondsworth: Penguin.

BEISHON, J. (1971) Systems. Bletchley:Open University Press.

BELLACK, A.A., KLIEBARD, H.M., HYMAN, R.T. & SMITH, F.L.(Jr.) (1966) The language of the classroom. New York: Teachers College Press.

BENJAMIN, L.S. (1974) Structural analysis of social behav-

iour. Psychological Review, 81, 392-425.

BERNSTEIN, B.B. (1962) Social class, linguistic codes, and grammatical elements. Language and Speech, 5, 221-40.

BJERG, K. (1968) Interplay analysis. Acta Psychologica, 28, 201-45.

BRONOWSKI, J. (1973) The Ascent of Man. London: British Broadcasting Corporation.

BROSS, I.D.J. & STERMOLE, D.F. (1973) Computer-assisted discourse analysis of a jargon. Computer Studies in the Humanities and Verbal Behaviour, 4, 65-76.

BROWN, R. & FORD, M. (1961) Address in American English. Journal of Abnormal and Social Psychology, 62, 375-85.

BROWN, R. & GILMAN, A. (1960) The pronouns of power and solidarity. In T.A. Sebeok (ed.) Style in language. Cambridge, Massachusetts: Massachusetts Institute of Technology Press.

BRUNER, J.S. (1974) The ontogenesis of speech acts. In P. Collett (ed.) Social Rules and Social Behaviour Oxford Psychology Department, mimeo; and Blackwells (in press).

BRUNING, J.L. & KINTZ, B.L. (1968) Computational Handbook of Statistics. Glenview, Illinois: Scott, Foresman & Co.

CARTER, L. (1951) A note on a new technique of interaction recording. Journal of Abnormal and Social Psychology, 46, 258-60.

CHOMSKY, N. (1957) Syntactic structures. The Hague: Mouton.

CHOMSKY, N. (1959) On certain formal properties of grammar. Information and Control, 1, 91-112.

CHOMSKY, N. (1963) Formal properties of grammars. In R.D. Luce., R.R. Bush & E. Galanter (eds.) Handbook of Mathematical Psychology II. London: Wiley.

CHOMSKY, N. (1965) Aspects of the theory of syntax. The Hague: Mouton.

CHOMSKY, N. (1971) Deep structure, surface structure, and semantic interpretation. In D.D. Steinberg and L.A. Jakobovits (eds.) Semantics, Cambridge: Cambridge University Press.

CHURCHILL, L. (n.d.) The grammar of questioning. Unpublished research proposal.

CICOUREL, A.V. (1973) Cognitive Sociology. Harmondsworth: Penguin.

CLARKE, D.D. (in press, a) The use and recognition of sequential structure in dialogue. British Journal of social and clinical Psychology.

CLARKE, D.D. (in press, b) Rules and Sequences in conversation. In P. Collett (ed.) Social Rules and Social Behaviour, Oxford: Psychology Department, mimeo, and Blackwells (in press).

COLLETT, P. (n.d.) The repertory grid and anthropology: The Psychological Structure of a Spirit Community. Unpublished manuscript.

COLLINS, O. & COLLINS, J.M. (1973) Interaction and social structure. The Hague: Mouton.

CONDON, W.S. & OGSTON, W.D. (1967) A segmentation of behaviour Journal of Psychiatric Research, 5, 221-235.

COOKE, A. (1974) The linguistic analogy and the study of social action. An examination of some applications of linguistic philosophy and generative grammar. Unpublished doctoral dissertation. Oxford University.

COULTHARD, R.M. (1973) The analysis of classroom language. Social Science Research Council Newsletter, 19th June, 1973, 5 - 8.

DICKMAN, H.R. (1963) The perception of behavioural units. In R. G. Barker (ed.) The stream of behaviour. New York: Appleton-Century-Crofts.

DIXON, W.J. ed. (1973) BMD: Biomedical Computer Programs. Berkeley: University of California Press.

DUNCAN, S. (Jr.) (1972) Some signals and rules for taking speaking turns in conversations. Journal of Personality and Social Psychology, 23, 283-292.

DUNCAN, S. (Jr.) (1973) Towards a grammar of dyadic conversation. Semiotica, 9, 29-46.

EKMAN, P. & FRIESEN, W.V. (1969) The repertoire of nonverbal behaviour: Categories, origins, usage and coding. Semiotica, 1, 49-98.

ERVIN-TRIPP, S.M. (1964) Analysis of the interaction of language, topic and listener. American Anthropologist, 66, 86-94.

ERVIN-TRIPP, S.M. (1969) Sociolinguistics. In L. Berkowitz (ed.) Advances in Experimental Social Psychology. New York: Academic Press.

FARRELL, B. A. (1970) On the design of a conscious device. Mind, 79, 321-46.

FELDSTEIN, S. (1972) Temporal patterns of dialogue. Basic research and reconsiderations. In A.W. Siegman and B. Pope (eds.) Studies in Dyadic Communication. New York: Pergamon.

FERRARA, J.W. (1973) A verbal interaction recording technique for studying individuals in small groups. Journal of Personality and Social Psychology, 90, 207-212

FIELDING, G. & FRASER, C. (1975) Language and interpersonal relationships: some experimental data. Paper presented to the British Psychological Society, Scottish Branch conference, Stirling, January, 1975.

FILLMORE, C.J. (1968) The case for case. In E. Bach & R. T. Harms (eds.) Universals in Language. New York: Holt, Rinehart & Winston.

FISHER, R.A. & YATES, F. (1963) Statistical tables for biological, agricultural and medical research. Ediburgh: Oliver & Boyd.

FLANDERS, N.A . (1970) Analysing Teaching Behaviour. Reading, Massachusetts: Addison-Wesley.

FOA, U.G. & FOA, E.B. (1972) Resource Exchange. Towards a structural theory of interpersonal communication. In A.W. Siegman and B. Pope (eds.) Studies in Dyadic Communication. New York: Pergamon.

FODOR, J.A. & BEVER, T. (1965) The psychological reality of linguistic segments. Journal of Verbal Learning and Verbal Behaviour, 4, 414-20.

FRAKE, C.O. (1964) How to ask for a drink in Subanun. American Anthropologist, 66, 127-32.

FRIES, C.C. (1952) The structure of English. New York: Harcourt, Brace & Co.

GANDY, R. (1973) Structure in mathematics. In D. Robey (ed.) Structuralism. Oxford: Clarendon.

GARFINKEL, H. (1967) Studies in ethnomethodology. Englewood Cliffs: Prentice-Hall.

GOFFMAN, E. (1955) On face work: an analysis of the ritual elements in social Interaction. Psychiatry, 18, 213-31.

GOFFMAN, E. (1972) Relations in Public. Harmondsworth: Penguin

GORDON, K. (1924) Group judgements in the field of lifted weights. Journal of experiment psychology, 7, 398-400

GREENE, J. (1972) Psycholinguistics, Harmondsworth: Penguin.

GUNTER, R. (1966) On the placement of accent in dialogue: A feature of context grammar. Journal of Linguistics, 2,159-179.

HALLIDAY, M.A.K. (1970) Language structure and language function. In J. Lyons (ed.) New Horizons in Linguistics. Harmondsworth: Penguin.

HARRÉ, R. & SECORD, P.F. (1972) The explanation of social behaviour. Oxford: Blackwells.

HARRIS, Z.S. (1952) Discourse analysis. Language, 28, 1-30

HARRIS, Z.S. (1963) Discourse analysis reprints. The Hague: Mouton.

HELLER, K. (1972) Interview structure and Interview style in initial interviews. In A.W. Siegman & B. Pope (eds.) Studies in Dyadic Communication. New York: Pergamon.

HUTT, S.J. & HUTT, C. (1970) Direct observation and measurement of behaviour. Springfield, Illinois: Thomas.

HYMES, D. (1967) Models of the interaction of language and social setting. Journal of Social Issues, 23, (2), 8-28.

JAFFE, J., FELDSTEIN, S. & CASSOTTA, L (1967) Markovian models of dialogic time patterns. Nature, 216, 93-4.

JAKOBSON, R. (1972) Verbal communication. Scientific American, September, 1972, 72-82.

JARDINE, N. & SIBSON, R. (1971) Mathematical taxonomy. London: Wiley.

JEFFERSON, G. (1972) Side sequences. In D. Sudnow (ed.) Studies in Social Interaction. New York: Free Press.

JEFFERSON, G., SACKS, H. & SCHEGLOFF, E.A. (n.d.) Preliminary notes on the sequential organisation of laughter. Unpublished manuscript.

JOHNSON, N.F. (1965) The psychological reality of phrase structure rules. Journal of Verbal Learning and Verbal Behaviour, 4, 469-75.

JONES, E.E. & GERARD, H.B. (1967) Foundations of social psychology, New York: Wiley.

JOOS, M. (1950) Description of language design. Journal of the Accoustical Society of America, 22, 701-8.

KATZ, J.J. & FODOR, J.A. (1963) The structure of a semantic theory. Language, 39, 170-210.

KELLEY, H.H. & SCHENITZKI, D.P. (1972) Bargaining. In C.G. McKlintoch (ed.) Experimental Social Psychology. New York: Holt, Rinehart & Winston.

KEMENY, J.G. & SNELL, J.L. (1960) Finite Markov Chains. Princeton: Van Nostrand.

KENDALL, M.G. (1948) Rank Correlation Methods. London: Griffin.

KENDON, A. (1967) Some functions of gaze direction in social interaction. Acta Psychologica, 26, 22-63.

KIRK, R.E. (1968) Experimental design: Procedures for the behavioural sciences. Belmont: Brooks Cole.

KORSCH, B.M. & NEGRETE, V.F.(1972) Doctor Patient communication. Scientific American, August 1972, 66-74.

KRAUSE, M.S. (1972) Strategies in argument. Journal of Psychology, 81, 269-79.

LABOV, W. (1970) The study of language in its social context. Studium Generale, 23, 30-87.

LABOV, W. (1972) Rules for ritual insults. In D. Sudnow (ed.) Studies in social interaction. New York: Free Press.

LAFFAL, J. (1965) Pathological and normal language. New York: Atherton.

LAKOFF, G. (1968) Instrumental adverbs and the concept of deep structure. Foundations of language, 4, 4-29.

LASHLEY, K.S. (1951) The problem of serial order in behaviour. In L. A. Jeffress (ed.) Cerebral mechanisms in behaviour. New York: Wiley.

LAWTON, D. (1968) Social Class, Language and Education. London: Routledge & Kegan Paul.

LEARY, T. (1957) Interpersonal diagnosis of personality. New York:Ronald Press.

LEAVITT, H.J. & MUELLER, R.A.H. (1951) Some effect of feedback on communication. Human Relations, 4, 401-10.

LEVI-STRAUSS, C. (1968) Structural anthropology. Harmondsworth: Penguin.

LIBERMAN, A.M., HARRIS, K.C., HOFFMAN, H.S. & GRIFFITH, B.C. (1957) The discrimination of speech sounds within and across phoneme boundaries. Journal of Experimental Psychology, 54, 358-368.

LYONS, J. (1970) Chomsky. London: Fontana.

MACKAY, D.M. (1972) Formal analysis of communicative processes. In R.A. Hinde(ed.) Non-verbal communication. London: Cambridge University Press.

MARSDEN, G. (1965) Content analysis studies of therapeutic interviews. Psychological Bulletin, 63, 298-321.

MARSHALL, J.C. (1965) The syntax of reproductive behaviour in the male pigeon. Oxford: Medical Research Council psycho-linguistics unit report, unpublished.

MARTIN, E. (1970) Towards an analysis of subjective phrase structure. Psychological Bulletin, 74, 153-166.

MARTIN, J.G. (1972) Rhythmic (hierarchical) versus social structure in speech and other behaviour. Psychological Review, 79, 487-509

MCCAWLEY, J.D. (1968) The role of semantics in a grammar. In E. Bach and R.T. Harms (eds.) Universals in Language, London: Holt, Rinehart & Winston.

MCGUIRE, M.T. & COLEMAN, R. (n.d.) A model for the study of dyadic communication II: Research approach, research and discussion. Unpublished manuscript, Stanley Cobb laboratories for Psychiatric Research, Massachusetts General Hospital, Harvard Medical School, Boston.

MCGUIRE, M.T. & LORCH, S. (n.d.a) A model for the study of dyadic communication I: Orientation and model. Unpublished manuscript. Stanley Cobb Laboratories.

MCGUIRE, M.T. & LORCH, S. (n.d.b) Natural language conversation modes. Unpublished manuscript, Stanley Cobb Laboratories.

MEETHAM, A. R. (1969) Encyclopaedia of linguistics, information and control. Oxford: Pergamon.

MEHRABIAN, A. (1972) Non-verbal communication. Chicago: Aldine-Atherton.

MELTZER, L., MORRIS, W.N. & HAYES,D.P. (1971) Interruption outcomes and vocal amplitude: explorations in social psychophysics. Journal of Personality and Social Psychology, 18, 392-402.

MENDELEEV, D.I. (1879) La loi périodique des éléments chimiques Paris: Renau, Maulde et Cock.

MILGRAM, S. (1974) Obedience to Authority. London: Tavistock.

MILL, J.S. (1851) A system of logic, ratiocinative and inductive. 3rd. edn. London: Parker.

MILLER, G.A. (1951) Language and communication. New York: Mc.Graw-Hill.

MILLER, G.A. & CHOMSKY, N. (1963) Finitary models of language users. In R.D. Luce., R.R.Bush and E. Galanter (eds.) Handbook of Mathematical Psychology II. New York: Wiley.

MILLER, G.A., GALANTER, E. & PRIBRAM, K.L. (1960) Plans and the structure of behaviour. New York: Holt, Rinehart & Winston.

MILLER, G.A. & MCNEIL, D. (1968) Psycholinguistics. In G. Lindzey & E. Aronson (eds.) The Handbook of Social Psychology III, Reading, Massachusetts: Addison-Wesley.

MILLER, G.A. & SELFRIDGE, J.A. (1950) Verbal content and the recall of meaningful material. American Journal of Psychology. 63, 176-85.

MISCHEL, W. (1973) Towards a cognitive social learning reconceptualisation of personality. Psychological Review, 80,252-83.

MORRIS, W.N. (1971) Manipulated amplitudes and interruption

outcomes. Journal of Personality and Social Psychology 20, 319-31.

MURRAY, H.A. (1951) Towards a classification of interactions. In T. Parsons & E.A. Shills (eds.) Towards a general theory of action. Cambridge, Massachusetts: Harvard University Press.

NEISSER, U. (1967) Cognitive psychology. New York: Appleton-Century- Crofts.

NEWTSON, D. (1973) Attribution and the unit of perception of ongoing behaviour. Journal of Personality and Social Psychology, 28, 28-38.

ODUM, E.P. (1971) Fundementals of Ecology. Philadelphia: Saunders.

OSGOOD, C.E. (1968) Interpersonal verbs and interpersonal behaviour. Report from the Group Effectiveness Research Laboratory, Illinois University. Unpublished.

OSGOOD, C.E. (1970) Speculation on the structure of interpersonal intuition. Behavioural Science, 15, 237-54.

OSGOOD, C.E. (1971) Where do sentences come from? In D. D. Steinberg & L.A. Jakobowits (eds.) Semantics: an interdisciplinary reader in philosophy, linguistics and psychology. London: Cambridge University Press.

PEASE, K. & ARNOLD, P. (1973) Approximations to dialogue. American Journal of Psychology, 86, 769-76.

PÊCHEUX, M. (1971) A method of discourse analysis applied to recall of utterances. In E. A. Carswell & R. Rommetveit (eds.) Social Contexts of Messages. London: Academic Press.

PIAGET, J. (1971) Structuralism. London: Routledge & Kegan Paul.

PIKE, K.L. (1967) Language in relation to a unified theory of the structure of human behaviour. The Hague: Mouton.

RAUSH, H.L. (1972) Process and change: A Markov model for interaction. Family Process, 11, 275-98.

ROBINSON, W.P. (1972) Language and social behaviour. Harmondsworth: Penguin.

ROGET, S.R. (1959) Thesaurus. Harmondsworth: Penguin.

SACKS, H. (1972a) An initial investigation of the usability of conversation for doing sociology. In D. Sudnow (ed.) Studies in Social Interaction. New York: Free Press.

SACKS, H. (1972b) On the analyzability of stories by children. in J.J. Gumperz & D. Hymes, (eds.) Directions in socio-linguistics. New York: Holt, Rinehart & Winston.

SACKS, H.(n.d.a) The sequential organisation of conversation. Manuscript of forthcoming book.

SACKS, H. (n.d.b) Class notes, unpublished.

SACKS, H., SCHEGLOFF, E.A. & JEFFERSON, G. (n.d.) A simplest schematics for the organisation of turn-taking in conversation. Unpublished manuscript.

SAUSSURE, F. de. (1916) Cours des linguistique générale. Lausanne: Bally et Sechehaye. (1974) Course in general Linguistics. Glasgow: Fontana.

SCHEFLEN, A.E. (1964) The significance of posture in communi-cation systems. Psychiatry, 27, 316-31.

SCHEGLOFF, E.A. (1968) Sequencing in conversational openings. American Anthropologist, 70, 1075-95.

SCHEGLOFF, E.A. & SACKS, H.(1973) Opening up closings. Semiotica, 8, 289-327.

SCHLESINGER, I.M. (1974) Towards a structural analysis of discussion. Semiotica, 11, 109-22.

SCOTT, M.B. & LYMAN, S.M. (1968) Accounts. American Socio-logical Review, 33, 46-62.

SEARLE, J. (1965) What is a speech act? In M. Black (ed.) Philosophy in America. London: Allen and Unwin and Cornell University Press.

SEARLE, J. (1969) Speech acts. London: Cambridge University Press.

SEGAL, E.M. & STACY, E.W. Jr. (1975) Rule governed behaviour as a psychological process. American Psychologist, 30, 541-52.

SHANNON, J. & GUERNEY, B.Jr. (1973) Interpersonal effects of interpersonal behaviour. Journal of Personality and Social Psychology. 26, 142-50

SHAPIRO, D. (in press) Conversational structure and accurate empathy. British Journal of social and clinical Psychology.

SHIELDS, M. (n.d.) Some cognitive aspects of children's language acquisition. Unpublished manuscript.

SIEGEL, S. (1956) Nonparametric statistics for the behavioural sciences. New York: McGraw-Hill.

SIMMONS, R. & SLOCUM, J. (1972) Generating English discourse from semantic networks. Communications of A.C.M. 15, 891-905.

SINCLAIR, J. & COULTHARD, R.M. (1975) Towards an analysis of discourse: The English used by teachers and pupils. London: Oxford University Press.

SLATER, P.J.B. (1973) Describing sequences of behaviour. In P.P.G. Bateson & P.H. Klopfer (eds.) Perspectives in Ethology. New York: Plenum.

SOSKIN, W.F. & JOHN, V.P. (1963) The study of spontaneous talk. In R.G. Barker (ed.) The stream of behaviour. New York: Appleton-Century-Crofts.

SPEIER, M. (1972) Some conversational problems for interactional analysis. In D. Sudnow (ed.) Studies in Social Interaction. New York: Free Press.

STONE, G.P. & FARBERMAN, H.A. (1970) Social psychology through symbolic interaction. Waltham, Massachusetts: Ginn-Blaisdell.

TOLMAN, E.C. (1948) Cognitive maps in rats and men. Psychological

Review , 55, 189-208.

TURING, A.M. (1950) Computing machinery and intelligence. Mind, 59, 433-60.

VAN HOOFF, J.A.R.A,M(1973) A structural analysis of the social behaviour of a semi-captive group of chimpanzees. In M. von Cranach and I. Vine (eds.) Social communication and movement. London: Academic Press.

WEBB, J.T. (1972) Interview synchrony. An investigation of two speech rate measures in an automated standardised interview. In A. W. Siegman and B. Pope (eds.) Studies in Dyadic Communication. New York: Pergamon.

WEIZENBAUM, J. (1967) Contextual understanding by computers. Communications of the A.C.M. 10, 474-480.

WELLS, G. (n.d.) Learning to code experience through language. Unpublished manuscript.

WINER, B.J. (1962) Statistical principles in experimental design. New York: McGraw-Hill.

WINOGRAD, T. (1972) Understanding natural language. Cognitive Psychology, 3, 1-191.

YNGVE, V.H. (1973) I forget what I was going to say. Paper from the ninth regional meeting of the Chicago Linguistic Society, unpublished.