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Fundamental frequency variation in conversational discourse

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University of California, Los Angeles, 1989

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Fundamental Frequency Variation in Conversational Discourse

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy in Linguistics

by

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1989

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CONTENTS

CHAPTER 1. INTONATION: ITS DESCRIPTIONS AND USES

CHAPTER 2. METHODOLOGY

CHAPTER 3. HYPOTHESES

CHAPTER 4. COMPARISON OF SYNTACTIC GROUP BOUNDARIES WITH PITCH GROUP BOUNDARIES

CHAPTER 5. CLAUSE RELATIONS AND PITCH

CHAPTER 6. INFORMATION AND PHRASAL PITCH PROMINENCE.

CHAPTER 7. INTERPERSONAL AND TEXTUAL FACTORS RELATED TO PITCH

CHAPTER 8. CONCLUSIONS

LIST OF FIGURES

LIST OF TABLES

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ABSTRACT OF THE DISSERTATION

Fundamental Frequency Variation in Conversational Discourse

by

Marian Shapley

Doctor of Philosophy in Linguistics

University of California, Los Angeles, 1989

Professor Pamela Munro, Co-chair

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While a great deal is known about intonation and the use of pitch or of fundamental frequency in utterances without context, very little is known about the use of pitch in continuous casual speech. This study addressed a part of this problem, the use of raised pitch in conversational discourse. Three aspects of pitch use were investigated: the relation of pitch to syntactic boundaries, the relation of pitch to type of information conveyed, and the relation of pitch to some interactive functions occurring in different discourse modes. Several hypotheses about the use of Fo in conversational discourse which bore on these aspects were tested. The study used as data Fo values derived from conversations, which were segmented into pitch groups defined by common declination lines. A method was

devised to represent the Fo of a period of speech by a single value, comparable to that of other periods of speech. Conclusions included the following

Raised fundamental frequency serves to demarcate syntactic boundaries. Ninety-seven per cent of declination group beginnings and 89 per cent of clause beginnings coincided with syntactic group beginnings. Phonetic cohesion has some tendency to accompany syntactic cohesion, in that the second clause of clause combinations tended to be phonetically subordinate.

Type of information being conveyed is marked by pitch level. The highest pitched and most likely to be stressed information occurs with interactive utterances, making sure the listener understands the speaker, has things correct, and follows the discourse, rather than on conceptual information.

Discourse modes of narrating and conversing can be differentiated by mean pitch, which is influenced by several interactive functions which are accompanied by raised pitch. But even without the presence of these functions, the pitch of conversing mode remains higher than that of narrating mode.

CHAPTER 1. INTONATION: ITS DESCRIPTIONS AND USES

1. INTRODUCTION

Intonation, or the pattern of fundamental frequency in speech, has usually been studied in short periods of speech--the tone unit, the sentence, or occasionally inter-sentence patterns--and most of the research has been done on either hypothetical sentences, or on material read aloud. There is a wealth of significant and interesting results from this work. But very little data exist on long stretches of spontaneous conversation. The pitch contour of a longer text is not just a simple concatenation of the pitch of several clauses: the pitch of each clause or partial clause is related to what comes before it and what comes after it, and can only be interpreted in context. In this study which uses the pitch of continuing conversations (in English) as data, the relative height of pitch within and between clauses is observed.

Within a given speech style, intonation serves many functions. Intonation itself is not easy to describe, and because of the many functions it serves it is difficult to differentiate in any given case just what phonetic phenomenon is correlated with what syntactic, semantic, textual or social function. This dissertation concentrates on one aspect of intonation, namely pitch level, and a few

specific uses of pitch were selected for study. The aspects of pitch studied were:

1) the relation of pitch units to syntactic boundaries.

2) the relation of pitch to the kind of information being conveyed.

3) the relation of pitch to the interaction of speakers, that is, what is going on between the speakers.

On the first topic I will show that the natural speech studied here is divided into temporally based declination units whose boundaries tend to coincide with syntactic boundaries, and that the first clause in clausal combinations tends to have the higher pitch.

On the second topic I will show that the pitch level used by a speaker is related to the kind of information being conveyed.

On the third topic I will describe several interactive and textual factors related to pitch level, and show that two discourse styles can be distinguished on the basis of average pitch level. These differences in pitch level can be attributed partly to the above-mentioned factors.

Several specific hypotheses were investigated which bore on these aspects. These are listed in Chapter 3.

1.1 Speech Style and Data

There are many variations in natural speech, not just in the phonetic aspects of the speech but also in the

morphology and syntax which may vary with the genre, or situation or circumstances under which the speech occurred. For example, a person giving a lecture will use different syntactic forms and pitch patterns than a person broadcasting a sports event (Weber 1985). So it is important, when talking about intonation, to identify the kind of data to which various facts apply. I shall adopt here the terms "reading style" and "casual style" (after Labov 1972) to described the kind of data used in studies of intonation. "Reading style" means that the data was prepared sentences or paragraphs or other texts read aloud by subjects. Casual style means natural, unrehearsed speech recorded by researchers.

The bulk of the research on intonation has been carried out using reading style speech. A few studies have used casual style, or natural speech. But casual style as defined here includes several different discourse modes which might be differentiated, for example, teacher-pupil talk, narratives, jokes, arguments, sports broadcasting. Johns-Lewis mentions three dimensions for a taxonomy of discourse style: a) the spontaneous vs non-spontaneous dimension, (spontaneous vs. read or rehearsed, b) public vs. private dimension, (public speeches or radio interviews vs. private conversations), and c) relative status and expertise of speaker vis-a-vis audience (for example teacher-pupil relations vs. conversations of close friends).

In most studies of discourse modes or modalities, the comparison is made more difficult by the fact that the different samples of speech from different modes are from different speakers under differing physical and social circumstances. In the present study comparisons will be made between discourse modes identified within the same speech samples, thereby holding constant the troublesome speaker-situation variation, that is, the three dimensions mentioned by Johns-Lewis.

1.2 Outline of Study

The steps of the study are as follows. Detailed procedures are described in Chapter 2.

1) Identification of syntactic units for analysis. The data were first divided into syntactic segments judged to be relevant for pitch comparisons.

2) Determination of pitch level for each segment of data. A method of segmenting the data into pitch groups was devised, and an approximate pitch level was assigned to each segment.

3) Identification of other factors related to changes in pitch. Various factors hypothesized or previously shown to be related to pitch changes were coded for each syntactic segment, and the pitch levels of segments were evaluated in terms of these variables. The factors included textual, informational, syntactic and interpersonal variables.

4) Analysis of syntactic and phonetic boundaries.

5) Analysis of relation of information type to pitch level.

6) Analysis of relative contribution of interaction in the speech situation to pitch change of different discourse modes.

The data consisted of excerpts from several multi-person conversations, totalling 30 minutes of elapsed time.

Figure 1.1 shows pitch plotted by time for a section of a conversation. As can be seen, the pitch rises and falls with some regularity. In the course of the next chapters, various correlates of these rises and falls will be demonstrated.

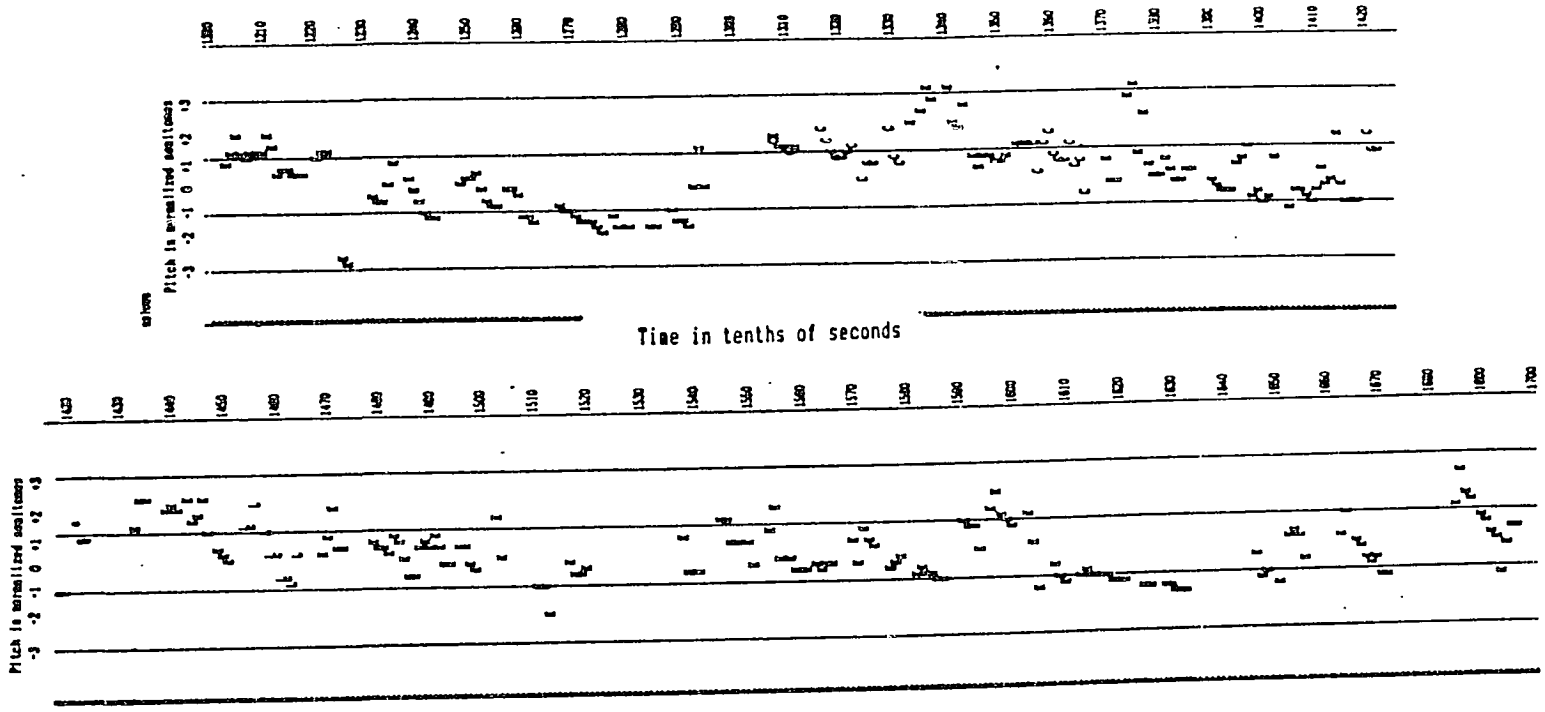

Figure 1.1. Pitch Points for a Section of a Conversation.

Text for Figure 1.1

```
1205   K: I GUESS^ uh it was just called wo:men's STUDIES~ //
1227      but uh/^ was trying to
1250      ++++  /^ was TAlking on SEX differences,//
1267      +++ and trying to put  together a VEry sophisticated
          developmental ARGUMENT~ // +++++++++ heh heh?
1305   C: they  WANTed  (to) $$ + so  something $ they  could  use  on
1336      the $ barriCADES //
1346   K: for @ RIGHT @ EXACTLY a)you know @@@ I @ had I //
1357   C: a SLO:GAn or two //   +++
1371   K: NO  // I was
1376      + ACTUALLY~ it was one of my most + ANI^mated LECTures~//
          It was REALLY^ all //
1422   C: SCHOLARLY^ + (tho) //
1433      It WAs a bit +++  it WASn't exactly scholarly //
1457   S  sparkling with (aa) footnotes //
1470   K: NO, no, (aaaaa)  but it was it was you know
1486      there WAS, there was a CERtain + COHERENCE to it $$$$$$ //
1512      I was,//
1516      there was //a $$$ theoretical + theoretical @@@ Idea
          behind it
1563   K: and uh// I saw these+++GLA:ZED faces $$$L@@@@@
1582      and as SOON as // [I got THROUGH    (Ssss)    uh//
1603      $$ you know I DID't get through (I said )
1617      I cAme to the End +++
1645      and I said //  +++  how about some QUESTIONS //
1664      and the FIRST question I GOT was //
1686      +++++++++++++  WHY do you keep TALKing about MOTHERS //
          ++++++++++++++++++  $$$$$$$$$$$$$$$$$$$$$$$$$$
```

2.0. PHONETIC DESCRIPTIONS

Most of the research on intonation has used perceived pitch as the data, described in such terms as tones or tone units. The data of the present study are acoustic data, but a brief outline of the variables of perceptual data is presented in order to discusss the research intelligibly. In this section some relevant phonetic terms are defined, and ways of describing intonation are reviewed.

2.1 Definitions.

In this section some commonly used terms used in intonation studies are defined.

2.1.1 Suprasegmentals. The phonetic speech signal consists of two parts, the segments, which are the vowels and consonants which make up the syllables, words and larger syntactic units of language, and suprasegmentals, which include pitch, loudness, length, stress and intonation. These latter features are called suprasegmental because they are phonetic features which are associated with units larger than the segment. Other suprasegmentals include timing variables such as rate of speech, rhythm and pauses, as well as voice quality.

Suprasegmentals do not have a phonemic role in English in the sense that they are not used to affect word meanings, with the exception of some noun/verb pairs such as PROduce and proDUCE. In discourse they function to mark word and

paragraph spacing, and syntactic and topical boundaries. They are also used to identify important words in a clause by means of clausal stress. In addition, suprasegmentals convey information about the speaker, such as his/her approximate age, sex, education and geographical origin, as well as attitudes and emotions.

2.1.2 Pitch. Pitch refers to a perceptual phenomenon, the perception of the acoustic signal of fundamental frequency, sometimes abbreviated as Fo. The data for this study are described in terms of fundamental frequency values. The relationship between pitch and fundamental frequency is not always direct. Some changes in Fo are not perceived as changes in pitch. For example, it takes a greater change in Fo before a change in pitch is detected at high frequencies than at lower frequencies (Ladefoged 1962). Furthermore, for a given language, some pitch changes are phonologically distinct whereas others are not. Nevertheless, the relationship between Fo and pitch is monotonic, and Fo is a reasonable indicator of pitch. The speech signal which listeners react to is, of course, the phonological interpretation of the perception of Fo, rather than Fo itself.

In this study the term pitch will be used synonymously with Fo, except when referring to specific data.

2.1.3 Intonation. Intonation is normally defined either in terms of fundamental frequency, or in terms of

pitch. Thus in terms of Fo, "intonation refers to the linguistically significant functioning of fundamental frequency at the sentence level" [as opposed to word level] (Lehiste 1970). When it is defined in terms of pitch, Ladefoged (1975) states that "the intonation of a sentence is the pattern of pitch changes that occurs". Brazil (1985) notes that intonation is "traditionally equated with variations in the perceived pitch of the speaking voice". Some earlier definitions of intonation included features other than pitch. Crystal (1969) for example, defined intonation as "a complex of features from different prosodic systems... the most central (of which) are tone, pitch range, and loudness, with rhythmicality and tempo closely related". It is, of course, difficult to separate out perceptually the impression of pitch from that of factors such as loudness. However, Lehiste (1970) has shown that pitch alone, or Fo, is related to linguistic phenomena. Since this dissertation uses Fo values which are mechanically derived, the perceptual problem will not be addressed.

2.1.4 Stress. As perceived in English, stress is a combination of pitch, loudness and length, or in acoustic terms, fundamental frequency, amplitude and duration, with pitch being the most dominant cue, and duration the second most dominent Stress may occur on a syllable with any combination of higher pitch, increased loudness and longer

duration than on unstressed syllables. In this dissertation, only the pitch height aspect of stress is measured. No definitive data exist on the relation between perceived pitch and Fo in discourse, although work is in progress on this problem (Schuetze-Coburn in progress.)

2.1.5 Declination. A common intonation phenomenon discussed in the literature on studies of pitch is the tendency for the pitch of an utterance to end lower than it starts. This downward trend in pitch is called declination. It has been noted in a large number of languages and is considered a language universal by Bolinger (1978). Lieberman (1967, 1986) claimed that normal breath groups, (periods of an inspiration and expiration, with linguistic controls) even in infant cries, have this pattern of declining pitch and amplitude, which he attributed to physiological factors.[1]

It is of course, well within the speaker's power to control pitch, but the tendency, as noted by many researchers, seems to be to begin units with a relatively high pitch.

---

1. In simplified terms he claimed that pitch is due to the regulation of subglottal air pressure, maintained over time as the volume of air decreases through expiration. Air is forced from the lungs by the elastic reflex of the lungs (Ladefoged 1967). When the lungs are full, the air pressure is greater, causing more rapid vibration of the vocal cords, hence higher pitch. At the end of expiration, the air pressure diminishes, resulting in a lowered pitch.

2.2 Describing Intonation in Perceptual Units.

Linguists have devised several different methods of describing intonation, no one of which has achieved universal acceptance. Various approaches to the problem are reviewed in this section, including tunes, tones and tone units, and declination units. The units may be based on either perceptual data or on acoustic data. While the present study uses acoustic data, much of the literature on intonation involves the use of perceptual units of intonation. Therefore a brief review of perceptual methods of analysis is given, in order to facilitate understanding of the literature supporting some of the hypotheses.

2.2.1 Tunes. A tune is a pitch contour for a given utterance. It has traditionally been attached to a sentence type. The earliest descriptions of intonation were in terms of tunes. Jones (1918) and Armstrong and Ward (1931) represented all English sentences by two tunes, one falling at the end and one rising (with some variations). These methods oversimplfy the intonation of English, although they are useful for introductory pedagogical purposes. A more recent use of tunes is that of Liberman and Sag (1974). They attempted to relate specific contours to specific meanings, for example a "surprise" contour and the "contradiction" contour, illustrated below, in which "elephantiasis isn't incurable" is said as an incredulous reply to "I've got elephantiasis. I'm going to die".

elephantiasis isn't incurable.

(Liberman and Sag (1974)

However, the inventory of contours is far from exhaustive at this time, and, as Bolinger (1986) has pointed out, there are a number of counterexamples to the claim that specific meanings can be associated with a given contour. For example the same pitch contour may occur with the question, "is it far from here to Elm Street", or the statement "Funny you should ask" (Bolinger 1986). Tunes are traditionally based on perceptual data, although acoustic data may be used.

2.2.2 Tones. A tone is the pitch of a single syllable. Tones may be either kinetic, involving pitch movement, or static, that is, level. Tones have been described differently by different researchers. Thus Kingdon (1958) described a tone as "A stress considered from the point of view of the pitch or pitch-change associated with it". American researchers, on the other hand, have considered tone as pitch level or movement, independent of stress. Specific tones have been described in terms of kind of pitch movement, in terms of pitch levels, and in terms of features. Tones have generally been described

independent of speech content on which they occur.

2.2.2.1. Kinetic or Nuclear Tones. Tones as described in British studies are perceptual units, consisting of pitch movement on a syllable or word. They are usually described in terms of the direction of pitch movement, such as falling, rising, etc. Tones were introduced into descriptions of intonation by Palmer (1922). The description and number of tones was enlarged and refined by Kingdon (1958), Crystal (1969), Halliday (1967,1985), O'Connor and Arnold (1973) and Brazil (1985), among others. The number of tones vary from researcher to researcher. Ladd (1980) pointed out that currently there are a few consensus tones agreed upon by most researchers, including rising, falling, fall-rise, rise-fall.

Kingdon (1958) described typical (sentence) intonation as a series of gradually descending level tones. When stresses occur, the level tone is replaced by a kinetic tone, that is, one with pitch movement.

2.2.2.2. Pitch level descriptions of tones. In American linguistics, perceptual pitch was represented by Bloomfield in terms of pitch phonemes which he called secondary phonemes. He identified three sentence final phonemes, falling pitch, rising pitch and low rising pitch, an exclamatory pitch phoneme and a pause-pitch phoneme, a rise in pitch before a pause. Later such pitch phonemes were represented as pitch levels by Pike (1945), who divided

intonation into four pitch levels, each of which he called a pitch phoneme. Trager and Smith (1951) further developed the level model adding terminal junctures. Such discrete representations of pitch levels are now known to be only perceptually valid relative to the surroundings - as argued by Bolinger (1951) and shown by experiments by Lieberman (1960), and Pierrehumbert (1979).

Lieberman asked two linguists who were familiar with the Trager-Smith system of tone transcription to assign pitch levels to texts of several sentences, both with and without the words. The tasks were separated by several months. Of the pitch levels assigned, 60% varied both between linguists and for a single linguist. The most consistent transcription occurred when the words were present in the signal.

Pierrehumbert (1979) found that of two syllables judged as having the same pitch in a sentence, the second one actually had a lower Fo pitch when it occurred farther along in the sentence.

The conclusion is that perception of absolute pitch levels, as measured by judgements of height, are unreliable, and dependent on the context.

Nevertheless, explanations in terms of levels can be useful, e.g., where levels are relative to the context, as used by Pierrehumbert (1980) in her two-level, high and low, rule-governed analysis of intonation.

2.2.2.3 Feature-defined tones. Crystal and Quirk (1964) and Quirk et al.(1972) defined intonation in terms of features, such as rises and falls of various heights, which can combine to form various patterns of intonation. Vanderslice and Ladefoged (1972) described pitch in terms of binary features such as +high or +low, attached to points in the melodic line. Thus, pitch levels are a part of the description of a tone, but these levels do not correspond to some fixed level of pitch, but are relative to the context, avoiding the problems of the ealier level models. Feature models often include prosodic features other than pitch, such as loudness. These descriptions are usually independent of the textual content. Pierrehumbert (1980) also combined feature and level approaches. She described sentences with two features, ±high pitch and ±low pitch, and combinations of high and low pitches. The actual height of a high or a low depended on the height of previous highs and lows, by rules she developed. The model attempts to account for downstep as in some African tone languages, as well as for relative pitch in English.

2.2.3 Tone Units. Tunes form phonetic units by themselves, since they are not broken down into component parts. Tones, however, being defined on syllables, combine to form larger phonetic units call tone units or tone groups. Researchers have attempted to describe all the intonations of English by combinations of various tones.

The tone unit is a phonetic unit defined in terms of tones. It typically consists of one tone with pitch movement, called the nucleus or nuclear tone, with optional preceding material (a pre-head) and optional following material (a tail). Tone unit boundaries are usually identifiable by final fall in pitch, or pauses or other cues, although in fact the boundaries are also determined by grammatical or semantic factors (Crystal 1969:207). Tone units were identified by Quirk (1972:1044) as "a sequence of stressed and unstressed syllables...The peak of greatest prominence is called the NUCLEUS of the tone unit..."

Halliday 1970:3) defined a tone group in terms of metric feet ("The tone group consists of a number of feet...". "Within a tone group is some part that is especially prominent, called the tonic"..."The tonic syllable carries the main burden of pitch movement within the group" (1970:4). Pierrehumbert (1980), in her study of intonation in terms of Fo, identified a similar unit as a sequence of pitch accents, with an optional beginning boundary tone, and at the end a phrase accent and a final (obligatory) boundary tone.

Tones and tone units are perceptual phenomena and an attempt to represent them by Fo points can only be approximate. Figure 1.2 shows an attempt to divide Fo contours into tone units, with nuclear tones assumed to be at pitch peaks, marked by arrows.

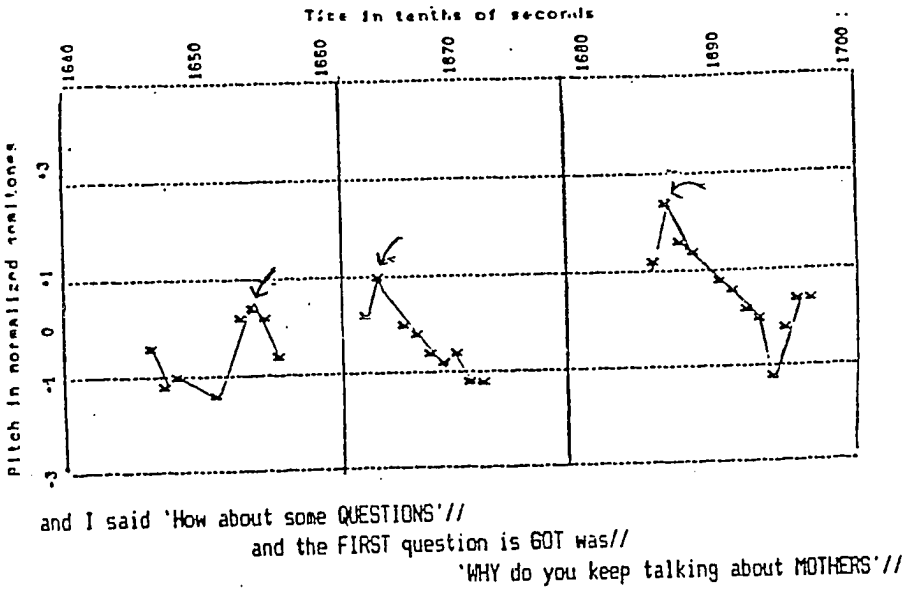

Figure 1.2 Representation of Tone Units and Nuclear Tones. (Arrows point to Tones)[2]

In rapid speech the boundaries of tone units, as well as nuclear tones, are often difficult to identify. Studies by Brown et al. (1980) and Currie (1981) showed that listeners tended to identify nuclear tones by position in clause, or by new information contained rather than pitch prominence. Nevertheless, the tone unit remains the most widely used unit of perceptual pitch identification.

---

2. In Figure 1.2 and all the figures which plot Fo points over time, the points are connected by lines forming contours. Strictly speaking, pitch is only produced with vowel sounds, so that the time taken by consonant production should be represented by breaks in the contour. It was felt that a connected line was more easily scanned.

2.2.4 Pause units. Because of the difficulty in identifying nuclear tones, Brown, Currie and Kenworthy (1980), in their study of Casual Style and Reading Style language, used the pause unit. They often found more than one nuclear tone per pause unit, and argued that the pause unit is a more reliable unit of analysis of prosody of natural speech.

Pause units are certainly more reliable to define in Fo curves than any other unit, but their usefulness depends on the use to which they will be put. In the present case, where one goal was to determine the pitch of syntactic units, pause units were not sufficient to demarcate the syntactic units. This was because often several syntactic units occurred within one pause unit, and it also happened that pauses occurred in the middle of syntactic units. Pauses nevertheless are important demarcators of phonetic boundaries in that they largely tended to coincide with phonetic group boundaries as described in Chapter 2.

2.3 Describing Intonation Using Acoustic Data.

The tones and tone units described so far are perceptual concepts. In recent years, with the advent of computer programs for extracting and modelling pitch, several studies have been made using using Fo data. Some of these studies derived formulae for sentence intonation by rule. Others described pitch changes for various syntactic phenomena.

2.3.1 Intonation by rule. Several studies of sentence intonation using Reading Style data have derived rules or formulae to model the intonation of sentences, the most comprehensive studies being those of Cooper and Sorenson (1980), Liberman and Pierrehumbert (1984). They are based on experiments in which several subjects read a sentence containing several full NP's or other pitch prominent material. The Fo of these high points was then plotted, and a formula derived which will reproduce the lines formed by connecting the pitch peaks. The rule may be expressed in terms of distance from a declining base line, or for Liberman and Pierrehumbert from a decaying exponential curve. In this manner different lengths of sentences were compared, as well as different types of two-clause sentences.

2.3.2 Synthesized speech. Researchers investigating the synthesis of speech sometimes have used a phonetic unit defined by declination line, that is, Fo points which form a coherent group by the sharing of a common declining baseline of pitch. Gibbon (1984) applied such a model to Casual Style speech. Other researchers have not been concerned with phonetic units, but defined pitch in terms of syntactic units. Attempts to produce intonation in mechanical speech use simplified and stylized forms of fundamental frequency curves. Such stylization is demonstrated by Maeda (1974) and O'Shaughnessy (1976). Maeda experimentally validated such

stylization, by presenting for listeners' comparison a simplified rule-generated intonation contour along with a normal contour. The listeners found no difference between the simplified version of a contour and the original. He concluded that speech quality "is not significantly reduced by the rule-generated contours".

Extensive research on listeners' acceptability of simplified pitch contours has been done by Cohen and t'Hart, and Collier and colleagues in Dutch (Cohen and t'Hart and Collier (1967), t'Hart and Collier (1978), t'Hart 1984). They showed that Dutch intonation could be modelled by a limited number of straight line segments of standard slopes and lengths. They took natural speech and from it made a synthetic intonation contour which could be varied at will. Thus, they were able to create a simpler contour which was accepted by listeners as perceptually the same as the more ragged natural fundamental frequency contour. Similar studies were done for British English by Willems (1982) and de Pijper (1983). These models of stylized speech are basically variations on the "hat" intonation contour (Figure 1.3), found by Cohen and 't Hart (1967) in Dutch speech and also by Maeda in American English. The line segments making up the pattern are plotted on a declining base line, to give a result as in Figure 1.4.

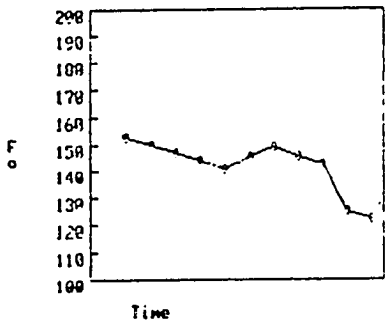

Figure 1.3 "Hat" contour

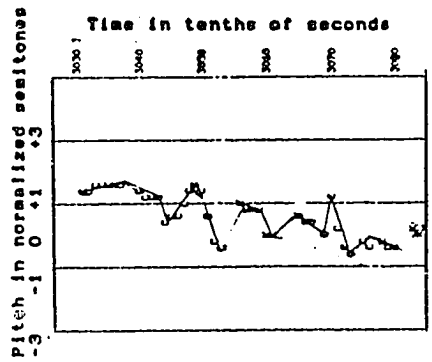

Figure 1.4 Simplified Contour Imposed on Fo Points.

The research of Dutch phoneticians differed from that of researchers who utilized tone units or tunes in that their models were strictly phonetic, and no attempt was made to relate the phonetic form to the syntax or semantics of the texts which they were using for data (except of course that the data came from spoken language and were not just random words). Thus a model such as theirs, applied to Fo points without syntactic boundaries present, provides a less circular basis for testing the relationship of syntactic or semantic boundaries to phonetic boundaries, by the subsequent addition of such boundaries.

2.4 Summary of Phonetic Descriptions.

Intonation has been described in terms of perceptual units, that is pitch, and in acoustic units, that is

fundamental frequency, or Fo. Perceptual units often used include tunes, tones and tone units. The nuclear tone of a tone unit, which is a prominent syllable with pitch movement, is the most commonly used descriptive device for intonation. Descriptions using acoustic data may use tunes and tone units, but may also be in stated terms of rules describing the declination of Fo peak lines or of base lines derived from plots of Fo points. A pitch peak in terms of Fo is an objective measure unlike the perceptual tone, but it is very difficult to determine from Fo points whether the peak is heard as part of a rising, level or falling tone. That is, there is as yet no exact way to derive perceptual units such as tone units from Fo curves. However acoustic units are as valid measures of intonation as perceptual units as long the data type is known.

3.0 SPEECH UNIT TO WHICH INTONATION IS ANCHORED

Underlying most definitions of intonation is the idea that some sort of syntactic or semantic group is coterminous with some sort of phonetic group. Utterances which have been described as coterminous with some phonetic group include sentences, clauses, sense groups and information units.

3.1 Sentences.

The earliest studies associated intonation with sentence type. Butler (1634), in a manual of punctuation, represented an early recognition of the relation of

intonation and sentence type. He described the use of the period with a sentence in which "falleth the Tone of voice below its ordinari tenour," and use of the question mark indicating a rising tone "Erotesis [question mark], if it be pure, raiseth the common Tone or tenour of the voice in the last word". (cit.Danielsson 1963:49)

As noted above, researchers using tunes to describe intonation associated different tunes with different sentence types. The early generative hypotheses (e.g.Stockwell 1960, Chomsky and Halle 1968) also assumed that phonetic groups corresponded to syntactic groups, such as sentences or clauses, and intonational rules were included among the phonological rules of the languages.

Researchers studying sentence intonation by rule assumed the rules to apply to clauses (Cooper and Sorenson 1981, Pierrehumbert 1982, Liberman and Pierrehumbert 1984).

3.2 Sense units.

Others, recognizing that the sentence or clause did not necessarily correspond to phonetic units such as tone units, defined semantic units such as sense groups, and information units. The term sense-group was proposed by Kingdon (1958) to mean "groups of words that have a semantic and grammatical unity--not necessarily complete". Selkirk (1984) in her work on metrical phonology, used the term sense unit, consisting of a head and either a modifier or argument of that head.

Hayes (1984) more generally defined a sense group, which he called a phonetic group in metrical phonology, as a head (defined in X-bar terms) and everything to the left of it, and optionally one nonbranching complement to the right. Hayes recognized that the boundaries of his phonetic group may not hold for unrehearsed or casual speech.

All of the above studies dealt with data which were either written language, with the researcher's interpretation of what is stressed, or invented examples in Reading Style.

3.3 Information unit.

Somewhat allied to the sense unit is the information unit, identified by Halliday (1985) as containing one bit of information. He defined a unit of information as a "process of interaction between what is already known or predictable and what is new or unpredictable" (1985:275) It is not a measure of unpredictability but "the interplay of new and not new that generates information in the linguistic sense. Hence the information unit is a structure made up of two functions, the New and the Given". Halliday considered the tone unit as the phonetic unit of speech and equated the tone unit with the information unit, with one unit of information per tone unit. The pitch prominence of a tone unit is on the new information. For Halliday the default information unit was the clause, but single clauses could be

more than one information unit, or a single information unit could be two clauses, or overlapping may occur. Halliday used some Reading Style data, with some Formal Style (public speaking) examples, and also Casual Style (1985b) speech.

The present study uses acoustic data (Fo), declination units for the phonetic units, and a kind of sense unit as well as clause units for speech units. There will be references to tone units in the research of others, but no perceptual units are used with the current data.

4.0 THE ROLES OF PITCH IN SPEECH

Intonation, that is pitch variation, plays an important role in spoken language. In this section I will discuss the various uses of pitch in language, and the place of intonation in linguistic theory.

4.1 Uses of Pitch.

Speech is organized in several ways. At the segmental level speech is organized phonologically into syllables. At the lexical level speech is organized morphologically into words. At the syntactic level constituents are organized into syntactic combinations such as clauses and phrases. At the topical level, semantic relationships organize speech into topical constitutents, and at the interpersonal level, the interaction is organized by turns.

Pitch plays a role at each of these levels. At the

segmental level, Fo functions to help distinguish syllable-initial voiced and unvoiced consonants (Lehiste and Peterson, 1961:420). It can also change the perceived syllabification of a word, for example, a fall in pitch can make a monosyllabic word such as *yes* into a bi-syllabic word (Ainsworth 1986).

At the lexical level, Fo is a part of word stress. As such it may be used to distinguish between some noun/verb pairs such as *PROduce* and *proDUCE*.

At the syntactic level, pitch is part of the signal which distinguishes clause boundaries. At the semantic level, pitch has been associated with topical boundaries, as well as playing a primary part in phrasal stress. At the interactive level, pitch functions in many ways, such as playing a role in managing or getting the floor, signalling disagreements to listeners, and conveying attitudes and emotion.

This study is concerned with the syntactic, semantic and interactional use of pitch in discourse. The use of pitch or Fo at the segmental and lexical levels will not be addressed here.

The syntactic, semantic and interactional uses of pitch serve the primary functions of language. Halliday (1978) defined three functions of language as follows: (1) the ideational function, which organizes how a speaker refers to his world; (2) the interpersonal function, which

establishes or maintains social relationships; and (3) the textual function, which creates coherent and appropriate texts. Intonation supplements the segmental signals for each function.

Speech without pitch variation, such as synthesized speech which lacks pitch contours, or that of some deaf speakers, is difficult to understand. When intonation is added to such speech the content can be more easily comprehended; intonation can supplement the spoken segments of language and aids in their interpretation.

The functions of speech are not necessarily independent and a given utterance may convey more than one of them. For example a speaker uttering a new clause not only marks a syntactic boundary but may also start a new topic, interrupt another speaker, or put forth a disagreement. Neither are the prosodic cues independent: the same cue may serve more than one of the functions. For example, falling pitch may accompany agreement, as well as clause or topic ending. In addition, more than one aspect of intonation may occur simultaneously, as when pitch is raised with emotion (e.g. Scherer 1977, Williams 1972) and syntactic pitch cues remain. For example, "one recognizes a yes-no question whether the speaker's voice expresses anger or not. The acoustical correlate is still a not-falling terminal fundamental frequency contour" (Lieberman 1967).

Also the syntactic and semantic content of utterances

may influence the perceptions of pitch. Brown et al. (1980) and Currie (1981), using Casual style data have demonstrated that when people are asked to identify nuclear stressed words, they tend to select words either in clause final position or carrying new information, sometimes ignoring pitch cues.

In summary, the functions of pitch are many, and it is not easy to separate out a single measure, such as a tone or a tune of the the pitch of a single syllable, and relate it to a single function of language. The problem is very complex, and an approach such as the present can only suggest partial answers to it.

5.0 INTONATION AS A PART OF LANGUAGE

It has been said that intonation is not a part of language, but is peripheral or "around the edge of language" (Bolinger 1964). Other researchers (Bloomfield 1933, Ladd 1980) claimed that intonation or some parts of it are phonemic and belong in a grammar of language. Certainly many of the suprasegmentals are thought of today as peripheral; that is, such phenomena as pause, tempo and voice quality have not been shown to play a role in abstract phonological models of sentence production. However, pitch declination, and final lengthening have been shown to be related to sentence production, and might be included in such a model. Crystal (1969) argued for a scale of linguistic contrastivity for features of non-segmental

phonology, with "those prosodic features of utterances describable in terms of closed systems of contrasts" at the most linguistic end of the scale, and such idiosyncratic features as voice quality at the other extreme (129ff). He considered tones and tone units to belong at the most linguistic end of the scale.

The arguments for intonation being a part of language have largely been concerned with whether it could be considered an organized system with choices available which co-occur with meaning differences. Some features of such a system are that it be

1) learned as part of a cultural tradition,

2) language specific,

3) purposive, used consciously for communicating, and

4) arbitrary, with no relation between sign and referent.

5.1 Co-occurrence and Minimal Pairs.

Arguments have been made for a system of intonation for several levels of organization of speech. The examples below of the phonemicity of intonation are variously based on systems of tones, tone units, tunes or on pitch height.

5.1.1 Grammatical Level. Minimal pairs have been produced to show that intonation can disambiguate syntactic catgories, as in the following constructed example.

(1) a: he speaks English NATurally//.

b: he speaks ENGlish//NATurally//. Schubinger1958:91

In a) there is only one tone unit, whereas in b) the *naturally* is a separate tone unit, evaluating the fact that he speaks English. Crystal (1975) claimed that tone unit boundaries coincided with syntactic clause boundaries in all but 100 of the 12,000 tone-units in his data.

5.1.2 Information function. According to Chafe (1976), pitch height can distinguish new from given information. The constructed example (2) illustrates different placement of pitch prominence focussing different new information.

(2) a. I saw a MAN in the garden.
b. I SAW a man in the garden. Couper-Kuhlen1986:110

5.1.3 Textual functions. An example of minimal pairs differentiating textual meaning is Bing's constructed example:

(3) a) This is my /sis\ter, /Eu\nice.

vs.

b) This is my /sis\ter, Eunice Bing1984:10

where the pitch of *Eunice* distinguishes whether she is being spoken about, as in a), or spoken to, as in b).

5.1.4 Pragmatic functions. Pragmatic functions can be disambiguated by tones. For example the use of a final rising tone produces the interpretation of a question in example 4, a falling tone produces a declarative clause.

(4) S: She wasn't invited to the wedding.

SN4:Schegloff
(cit. Weber 1898)

5.1.5 Attitude. The expression of attitude is sometimes cited as the primary function of intonation, (Schubiger 1958:38, Bolinger 1986:195). Intonation may support an attitudinal interpretation of an utterance different from the lexical interpretation. The following example from Cutler

(5) Looks like it's going to be a really groovy party.

Cutler1980

can be interpreted as straight approval, or it can be said in a sneering intonation, in which case the meaning is reversed.

5.2 Incomplete Co-occurrence.

There is no question that in the above examples, the spoken versions can disambiguate meaning which is not clear in the written versions. That is, the intonation is sufficient to indicate a meaning change.

But the intonation is not necessary--there are other ways besides intonation of demarcating syntactic categories, of indicating vocatives, of doing questioning and of expressing attitudes and emotions.

This kind of lack of complete co-occurrence, where the phenomenon does not occur with all cases of a given meaning, that is, more than one choice can convey the same meaning, is not unheard of in other linguistic systems. Not all

acceptable lingustic segments do occur in all cases where expected. For example, the morpheme /s/, denoting plural in English does not occur with all plural forms, yet its status as a linguistic marker is unquestioned. Inverted word order question form does not always occur with questions, but such word order is considered part of the linguistic system. Neither does question intonation always occur with questions (Weber 1989).

However, a different kind of lack of co-occurrence is more troubling. Unless one is very vague about meaning, counterexamples can be provided showing that different meanings may accompany the same tone.

For example, Bing's example of an intonational contour used to distinguish a vocative (3b) also occurs with other meanings such as adverbials as in the following example. In the one case, b), the adverb suggests the speaker's attitude and the other case, a), the adverb modifies the verb.

(6) a. She/mar\ried him/hap\pily.

vs.

b. She/mar\ried him, happily. Bing 1984:16

She describes this intonational contour as a discourse contour having a general meaning in which certain parts of the sentence do not contribute to the truth value of the sentence.

Claims for the constant meaning of tones, such as a low

falling tone for sentence final intonation, depend on the how meaning is defined. Cruttenden (1986), for example, distinguishes between "local" meanings, where different meanings may accompany the same tone and "abstract" meanings, where they do not. For example for the rise-fall tone he lists two local meanings, "impressed" as in Example 7, and "challenging" as in example 8.

(7) I enjoyed the whole concert/but what a fi^nale!

(8) (I don't like to keep reminding him)
But you damn well ^ought to! Cruttenden:101

But for a more abstract meaning, the rise fall-tone may be conflated with all falling tones, with a common factor ascribed such as that "they are all 'referring', or involve 'contrast within a given set' , or make a selection from a contextual background which the speaker assumes he and the listener share. (These are all general meanings ascribed to the fall-rise by different authors)" (Cruttenden:98).

Thus tones may either have different meanings, or several tones may have the same rather inexplicit abstract meanings.

The condition of sufficiency implies that a given tone will always have the same meaning associated with it. How then can a given tone be both sufficient to make a difference, and yet be able to connote different meanings?

The answer lies in the context in which the tone occurs, both the phonetic context and the lexical and

situational context.

5.3 Context.

Part of the problem of assigning meaning to tones is that there is as yet no agreed upon description of a system of tones. But the problem is not as simple as merely identifying tones. It is a question of how the tone is perceived against the background in which it occurs. Experimental evidence of the importance of context was provided by an investigation of the "question intonation" commonly and readily associated with yes/no questions in English. Hadding and Studdert-Kennedy (1964) in an investigation of perception of questions vs. declarative intonation (reading style data), found it possible that "contours identified as statements tended to be heard as having a terminal fall (even when, in fact, the final contour is rising), while contours identified as questions tend to be heard as having a terminal rise". A single high peak in the utterance could override terminal falling intonation, and the whole be heard as a question. The implication is that the perception of "question intonation" cannot be described independent of the context of surrounding speech. Also to be considered is the contribution of such factors as timing and voice quality in phonemic interpretation.

Cruttenden, when describing the different functions

for the same tone, uses the term "conditioning factors", such as syntactic type, tense, speaker-listener relationships and context to account for the different interpretations of tone meaning. That is, the context in which the tone occurs is important in its interpretation. The example below illustrates the importance of context. With the same tone, upon viewing a situation, the utterance can be interpreted as either "what a great job" or "what a disaster".

(9) Great! Constructed example

5.4 Other criteria of Language Systems. A few other criteria for language systems were listed earlier. The following sections evaluate intonation by these criteria.

5.4.1 Learned as part of a cultural tradition. This conditions implies also the condition that the feature is language specific. Intonation meets these criteria. Intonation is learned along with grammar and lexicon. The well-known differences in intonation of even related Indo-European languages such as English, Spanish and French is evidence of language specificity.

5.4.2 Purposiveness. Intonation is used consciously for communicating.

5.4.3 Arbitrariness. A vulnerable point of the argument that intonation should be a part of grammar is that of arbitrariness. Bolinger (1978) and others (e.g.,Lindsey

1986) have argued for a universal meaning of certain tones, such as falls for 'being through' and rises for 'not being through', as well as a meaning of high pitch as a sign of importance. Ohala (1983) argued for a universal meaning, in animals as well as humans, of high pitch, which he calls a frequency code, as a signal of helplessness communicating surrender.

5.5. Summary. By the criteria described, the role of intonation as a part of language has to be described as "to some extent". Intonation makes a meaning difference in many cases, it is language specific and learned, but it may not be entirely arbitrary. Meanings ascribable to tones are very vague, and a tone may have more than one meaning. Clearly the context needs to be taken into account in interpreting the meaning of tones.

The most easily defended position at this point is that of Crystal which puts intonation at the most linguistic end of a scale of features of non-segmental phonology. Various other aspects of prosody and grammar are involved in tonal phonemic differences, however poorly described to date.

6.0 SUMMARY.

In this chapter I outlined the methods used to describe intonation, both perceptual units and acoustic units. Then I described various syntactic and semantic units which have been proposed as coterminous with intonation units. I described

the uses of intonation at various levels of linguistic organization, and discussed briefly the status of intonation as a part of grammar.

CHAPTER 2: METHODOLOGY

1. INTRODUCTION

In this section I will describe the data used, and the syntactic, semantic, interactional and phonetic treatment of those data.

Briefly, the study used a collection of transcripts from multi-person conversations which were divided into syntactic groups and into phonetic groups on the basis of coherent pitch contours. Pitch data derived from these groups were then related to various syntactic, semantic and inter-actional features of the conversations.

2.0 DATA SOURCE

The conversations were of the "dinner table" variety, in which a group of guests were gathered at residences. This created a situation in which talk was expected to be made, with no particular informational goal. The speakers knew they were being taped, but seemed not to be bothered by this, and commented later that after the first few minutes they forgot about the tape recorder. The tapes were from one to two hours long, and excerpts used were not taken from the beginning portions.

Altogether 30 minutes of conversation was analyzed for both pitch and discourse factors. Excerpts were selected on the basis of inclusion of one or more extended turns, usually narratives or relation of facts or personal

experiences, along with periods of rapid interchange of turns. Thus a comparison was possible between two types of speech, that where a turn has been assured, (a speaker has the floor) and that of back-and-forth talk, or competitive turn-taking.

There were a total of 18 speakers, of whom nine produced one or more extended turns or narratives in the talk. The other speakers engaged in shorter exchanges and comments on narratives. The participants included 12 adults in their 40's and 50's, and six younger adults, 18 to 25. No conversation included only the young adults, although all conversations included some of them. The participants were all college educated; most of the older ones were academics.

Both male and female speakers were used. The intonation curves for the females generally showed more variation than those for the males, because some of the males had rather flat deliveries and often their voices became laryngal, with consequent difficulty in extracting pitch. So in terms of minutes of speech, females are more heavily represented in the data.

Because of the varied nature of the talk, some sections of the data were more relevant in some situations than in others. For example, listeners' (vocal) responses were lacking for long stretches of monologue, and topical structure was lacking for some shorter exchanges. But this need not be a problem. In fact, the presence or absence of

listeners response has been related to the Fo characteristics of the talk (Shapley 1987b). The use of more than one discourse style in the same speech event, by the same speakers, provided a controlled comparison of discourse style of speakers.

3.0 SYNTACTIC GROUPS

The texts were divided into what I shall call "syntactic groups". These are sequential syntactic units in which a pitch prominence could occur, and in which no more than one might be expected to occur (although this sometimes happened). Certain well-established facts about stress assignment helped to define these groups; for example, predicates or combinations of verb + object tend to have only one prominence and so form a single syntactic group, as do noun phrases with preceding articles or adjectives. Pronouns tend to be unstressed so that clauses with a pronominal argument and a lexical argument form a single syntactic group. If more than one lexical NP occurred with a verb, each was assigned to a separate syntactic group. In practice this restriction applied only to multiple objects as in (1).

```
        (1)   C: and you pour water over  it
                 and you add sugar//
  -->            and um +++++++++ YEAST.                WIN165
```

When lexical subjects occurred there always also occurred some reason to separate the subject from what

followed, such as intervention of a relative clause, of an utterance by another speaker, or of a repair by the speaker, as in (2).

--> (2) S: some of these things AREN'T
they by definition CAN'T be missurveyed
The survey DEFINES it. SUR215

Further subdivisions of the categories were made, such as dividing the clauses into different types of clauses. The grouping represents an attempt to classify so as to emphasize clausal relations. For example, adverbial clauses and complement clauses were separately categorized.

Any part of the text could only be in one syntactic group. Syntactic groups are the units to which all the textual data were related. Detailed information was recorded for each group including pitch information and syntactic, semantic and interactional data. The forms of the syntactic groups are listed below.

3.1. Clauses.

3.1.1 Unmarked finite clauses. Finite clauses were those with a finite verb (one which takes an -s ending and has a past form). Clauses were divided into intransitive clauses, clauses with adverbial complements, usually containing verbs of motion, and transitive clauses. If transitive clauses contained more than one non-pronominal arguments, they were divided into two syntactic groups, a subject and a verb phrase.

```
        (3) Len:  Not likely.
intr-->           it's  you got to be kidding          SCA1452

-->     (4)  K:  We went upstairs//
                 and the clock radio wasn't there
adv comp-->      and we went into my study            ROB3495

tran->(5)  Steve: The Planet of the Apes
                  turned out to be Earth               APE1
```

3.1.2 Marked clauses. Marked clauses included conjoined clauses, which were part of two-clause structures marked by the use of a conjunction, adverbial clauses marked by an adverb, relative clauses, marked by a relativizer or by their position in a sentence, and question clauses, marked either by a question word or inverted word order. These clauses, which might also have been classified as transitive or intransitive, were classified in these data as marked clauses in order to study clausal relations.

```
         (6) K:  It broke the nails~
conj -->         but it didn't break the door.         Rob1782

         (7) PY: (and I) visited Barry FIELD
rel cl-->         who is an economist                  VES158

quest--> (8) F:  Do they live ALONE+++//in this house?//
                                                       VES1842
```

3.1.3 Non-finite clauses. Non-finite clauses included complements, participles and purpose clauses.

```
          (9)  K:  We uh have// we had a VERY CLEVER way//
comp -->           to lock our sliding  doors~.        ROB1357
```

```
        (10)  S:  but then they tried to cover their TRACKS
              K:  //Uh, no THEY//
part -->      S:  shutting the window afterward//
part -->          and locking the door//                ROB2380

nom->   (11 ) PY: and to get out the FRONT DOOR just//
                  you know I mean//
                  it's like going through a TENEMENT//
                  or something//                        VES769
```

3.2 Partial Clauses.

Partial clauses are arguments of verbs or predicates which occur without the rest of a clause. They may be unfinished utterances or fragments. They may be arguments which are separated from the rest of a clause by some intervening item, such as a relative clause, or a contribution by another speaker. They may also be conjoined predicates or NP's, as in lists, with each predicate or NP forming a separate syntactic group.

3.2.1. Arguments of Verbs. Arguments include NP's which were separated from the rest of the clause by intervening items, as well as conjoined objects.

```
     (12) S:  I mean there are various KINDS of lines//
              called RHUMB lines//
object -->    and different surveyors TERMS//
              for when you're NOT going on the corrdinates//
object -->    or NOT a great circle.//                  SUR685
```

3.2.2 Predicates. Predicates included intransitive verbs and verb + argument combinations, which occurred as conjoined predicates, as below, and predicates which were separated from the rest of the clause by interposed items such as relative clause or other speakers' comments.

```
    (13) Rodney:  and when you're +++++ lecturing//
                  you throw the (way out) up in front
pred -->          and write on the one on the BACK
pred -->          then throw it up
pred -->          pull the OTHER one down~                APE551
```

3.2.3 Fragments. Fragments are constituents tacked on to a previous clause, utilizing the syntax of the previous clause for interpretation.

```
       (14)  K:  Actually//
                 it was one of my most + ANImated LECTURES//
                 It was REALLY all
frag-->      C:  SCHOLARLY + though                        WOM1422
```

3.3 Adverbials.

Adverbials includes all non-clausal adverbials.

3.3.1 Prepositional Phrases. Those prepositional phrases which were not necessary arguments of the verb formed separate categories.

```
         (15)  Pete:  THAT one was sold out
PPhrase -->           before they went on SALE              SCA330
```

3.3.2 Adverbs. Sentence scope adverbs formed syntactic groups.

```
Adverb-->(16)   C:  Anyway, it's not MY name.               WOM580
```

3.4 Other Syntactic Groups.

3.4.1 Short answers. A separate group included short answers to questions such as *yes* and *no*.

3.4.2 Focussing and fronting phrases. Such

constructions as clefts and pseudo clefts, as well as short clauses used for focussing formed syntactic groups. An example is given below.

```
-->  (17) PY:  and the thing IS, though//
                that it needs a TREMENDOUS amount
                of ren renovation.                    VES425
```

3.4.3. Miscellaneous. Miscellaneous included false starts and incomplete utterances, that is those begun and not finished.

```
          (18)  F:  Do they live ALONE +++ in this house?
false start--> Py:  They have some uh +++
false start-->      they have (    ) let us say
                    they have some tenements.         VES1875
```

Miscellaneous also included rote utterances such as *uh huh*, *You know* and filled pauses such as *um*. *I mean* and *well* were typically so low pitched, and spoken so quickly that pitch data were not available, so they were usually not classified separately. Where there were pitch data available, they were classified as "miscellaneous".

3.5 Summary of syntactic groups.

Selections from two conversations are given below to illustrate the syntactic group coding.

```
(19)
  misc                  PY:  Well $$ um +++++++++++++
  cl + adv compl             you sort of COME down
  prep phrase                through this you know this CASTLE
  prep phrase + misc         down the MAIN stair, I mean
  cl + adv compl             they live on the TOP two floors
  NP subject                 and the bottom
  intrans cl                 the WHOLE bottom area is being
                                                 renovated
  marked conjunction         so it's sort of derelict
```

(20)

false start	Len:	THEY got,
transitive cl		THEY got their tickets FREE
adverbial cl		because they were PUNCHED
intrans clause		I don't know
complement		how they GET their tickets
transitive cl	Steve:	They paper the HOUSE
question cl	Matt:	the TICKETS were punched?
answer	Len:	Yeah like you know how
adverbial cl		when you get a DISCOUNT RECORD
transitive cl		they clip off a CORNER?
misc feedback	Matt:	um hm
NP object	Len:	PUNCHED TICKETS
preposition ph	Matt:	with a HOLE in them
conjunction cl	Steve:	so you CAN'T turn it in.
matrix	Matt:	It seemed like a very
NP object		like the WRONG PLACE
complement		to try to give away TICKETS.
question cl	Len:	What, at the BOWL?
short answer	Matt:	Well yes.
adverbial		if you're giving away TICKETS
transitive cl		you should give it away
preposition ph		to somebody
relative clause		who's liable NOT to go
purpose clause		to get more PEOPLE there.

4.0 OTHER INDEPENDENT VARIABLES.

4.1 Extended clauses.

An extended clause was defined as a clause complete with its dependent adjuncts. Clauses, as defined above, included only a verb and its arguments. The extended clause was intended as a discourse approximation of a sentence. An extended clause might include more than one syntactic group. (21) is an example of an extended clause.

(21) K: HOURS later,
ONE of us had the sense
to look at the CLOCK RADIO. ROB190

4.2 Semantic Variables.

In addition to the syntactic classification, several other types of variables were studied. These included information status, variables representing semantic organization of texts, and variables occurring in interactive situations.

4.2.1 Information status. Each syntactic group was labelled according to the kind of information it contained. The categories used are listed below; the basis for the classification is thoroughly discussed in Chapter 6.

New, that is, not recoverable from discourse
Accessible, inferrable from text or contest
Given, that is, recoverable from discourse
Contrasts
Insists
Discourse variables, including discourse markers
True/false (yes or no short answers)
Locatives of time and place
WH questions
Feedback

4.2.2. Topical organization. Syntactic groups were classified as to their status in topical groups. Groups were labelled as topic initial, on- topic, or topic modulation, in relation to the preceding syntactic group. Topic is a notoriously difficult concept to define; the criterion used here for topicality is mainly whether the utterance could be seen as referring to, or defining relations to some single concept, in terms of the rhetorical structures described by Mann and Thompson (1986,1988).[1] Thus topical references have in common a single reference

about which several things are being said. Usually there will be a single point of view, and sharing of the same subject except for quotations. The syntactic group which is topic initial need not necessarily contain the referent which the topic is about, and may be a subordinate clause, or phrase, but the first utterance on a topic was that marked as topic initial, and expected to be marked by pitch prominence. An example of on-topic syntactic groups is shown below.

	TEXT	Code	Relation
(22)			
Py:	When I was up in New YORK+++	Topic Initial	circum-
	about three or four months ago	on-topic	stantial
	WELL ++++++++ it was in the WINTER	"	"
	so it must have been in DECember++++	"	"
	and (++) out at COLUMBIA (and)	"	"
	I visited uh +++++Barry Field	"	nucleus
	and his +++++	"	elaboration
	who is an economist	"	"
	and his wife ++	"	"
	or live-in ++++	"	"
	Constanza Waletski ++	"	"
	who is also an economist	"	"VES1

Not all parts of the data were useful for topical analysis, but topical status was coded where it could be determined. Topics were defined in the narratives or long turns relating experiences, and sometimes in data consisting of short interchanges or turns. The relationship of

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1. For the present purposes, a complete detailing of the rhetorical relation of satellites to nuclei was not necessary, but only the fact of relationship, because only the boundaries were being studied.

adjacency pairs between questions and answers was also used as indication of topicality. Adjacency pairs are pairs of utterances such that on hearing the first utterance, the listener is under some obligation to produce a second pair part to fit (Schegloff & Sacks, 1973). Questions, of course, could be classed in any of the three topic categories; answers related to the question were called on-topic. Question-answer pairs were also categorized as interactional variables.

Not all talk was topic initial or on-topic. Often conversation drifts from one topic to another with each clause being related to the other but with a new topic. This was called topic modulation (Menn and Boyce 1982). Unconnected utterances such as parts of a second simultaneous conversation were coded non-topical. Also non-topical were speakers' offerings of food during a topical conversation.

Agreements and disagreements were omitted from consideration when coding topic. Agreements and disagreements present a speaker's opinions, and may add nothing to the topical content.

4.3. Interactive variables.

4.3.1. Turns. The primary interactional organizational variable is the turn, defined here as any period of speech by a single speaker. A change of speaker initiates a new turn. Some turns are very short and don't interrupt the

topic flow. These are called feedbacks, and are typically *uh huh* or *yeah* or other supportive words. The interactive structure of turn-taking has been described by Sacks, Schegloff and Jefferson (1974).

A syntactic group was coded as turn-initial if it was the first group in a turn, otherwise it was coded as either non-initial or feedback. Some turn initial-utterances were designed to try to get the floor; if such attempts were successful, the group was coded as an interruption; an unsuccessful attempt was coded as a try. The turn categories are listed below.

turn initial
- successful unopposed
- successful interruption
- unsuccessful try

non-initial turn
feedback

4.3.2 Attitude. Attitude of speakers toward the statements of previous speakers was coded in terms of agreement or support vs. disagreement. This feature defines interactive support, and is usually also semantic support for the previous speaker's point of view. While disagreement is usually signalled by a negative, agreeing statements can also contain negatives, as below, where B's negative response indicates agreement with A.

(23) A: That's not very good
B: No, it isn't. constructed example

Categories for this variable are:

agreement
indirect challenge
direct challenge, usually signalled by a no
Next turn repair initiators (a kind of challenge)

4.3.3 Repairs and repair initiators. Repair is a term which was designated by Schegloff (1977) to include not only corrections to speech errors, in the sense of replacement of an error by something that is correct, but replacement where no error may have been heard, as in rephrasing, as well as insertion of words which are not replacement, such as the result of word searches. Schegloff classified repairs as self-repaired or other-repaired. Self-repairs were included in the analysis of information status. The repaired utterances were coded as incomplete utterances when they were incomplete.

A repair initiator is an utterance which is recognized as a request for clarification, such as verification questions. Next turn repair initiators were coded as verification questions.

4.3.4 Listeners' Responses. Responses by listeners included laughter and overlapping talk. These responses may occur both between syntactic groups and as laughter during speech. Laughter by the speaker, or self response, was also included. This may also occur in mid-turn, when a speaker produces a laugh token between words, or even between syllables. The categories are shown below.

laughter by listener:	between or mid-turn
overlapping talk by listeners:	mid turn
laughter by speaker:	between or mid-turn

This does not mean that a verbal response in the form of a turn is not considered a response, but rather that is already coded as an initial turn.

4.3.5 Quotations. Direct and indirect quotations were coded. An example of a direct quotation follows.

(24) MA: and I REMEMBER that because you $
J: that's right.
MA: bought a month's worth of OREOS. $$$
And about the second week people said
"DIDN'T you get anything but OREOS? JOB1749

4.3.6 Discourse functions. The discourse function describes what the speaker is doing with the talk. What the speaker is doing figures in the description of style of talk. For example, the speaker narrates during a narration. He/she may also of course, evaluate during a narration. The data were first coded for speech style, which means that the talk was split into segments, each of which could be described as either story talk, parts of story talk, or non-story talk such as back and forth talk. The categories were as follows:

Story talk	Non-story talk
Orientation	short turn exchanges
Pre-story talk	Here-and- now talk (about immediate environment)
narration	
mid-story evaluation	
post-story talk	

The term "story" as used here does not necessarily refer to stories as narratives as defined by Labov (1972), which required a time-ordered sequence of acts, but also includes the relation of experiences in a non-punctual or non-eventful manner. A story implies extended turns by a single speaker, with perhaps, feedback from listeners.

Another classification into narrating and conversing styles was made primarily on the basis of turn length; that is whether one speaker was holding the floor or there was rapid exchanges of turns. This classification is more fully described in Chapter 7.

5.0 PHONETIC DATA

In this section the preparation of the phonetic data is described.

5.1. Collection of Pitch Data.

The texts used were recorded on several low quality cassette recorders in various non-laboratory environments, namely private homes. There was in some cases considerable background noise, but the recordings suffered more from the directionality of the single microphone than from background noise. That is, some speakers were more easily heard than others, so that amplitude data were not collected. Nevertheless, reasonable pitch data for the selections included were available.

A digital sound spectrograph was used for the pitch

analysis. The Fo values were read off from narrow band spectrograms using the 10th harmonic where available. Where the 10th harmonic was not available, the highest clear harmonic which was available was used. Wide band spectrograms were used to aid in the identification of the segments. Data were noted for every tenth of a second. If talk was going on, a Fo value was noted (when readable). If laughter was occurring, or a pause, this was noted as data. The Fo figures were used to compute the mean Fo by speaker, and the normalized Fo values used in the analysis.

5.2 Conversion of Data Scales.

The Fo values were converted to normalized semi-tone scores, in order to be able to compare the pitch of different speakers. The first step was to convert the Hertz values, which are on a linear scale, to semi-tone or octave values, measured on a logarithmic scale. This was done by dividing the log Hertz value by the 12th root of 2, or log(2)/12, which is approximately .0577. (An octave interval, which doubles the pitch, is added by adding log(2) to the log(Hertz) value; since there are 12 semitones in an octave, a semitone interval is achieved by an increase of 1/12 log(2). Assuming a zero point of 16.36 Hz for the semitone scale, (to represent the lowest pitch of the human voice), the semitone value is actually 12/log(2)*(log(Hz/16.35)).

Means and standard deviations of these values were computed for all selections of each speaker, and normalized scores computed from these to give values in terms of standard deviations from a mean of zero.

Standardized scores were used so that the pitch values of different speakers could be directly compared in terms of variation from the norm, regardless of the speakers' individual pitch means and range. The semitone scores were used because the distributions of Fo for many of the speakers was more nearly normal in the log distribution than in the Hz distributions, so that normalized scores computed from semitone scores were more reliable. Figure 2.1 shows representative pitch distributions for both Hertz and semi-tone values, for a male and a female speaker. It has been noted (Cruttenden 1986, McConnell-Ginet 1978) that some speakers, especially males, use primarily the bottom third of their range, giving a skewed distribution. This was true for some of the male speakers in the sample, but not all.

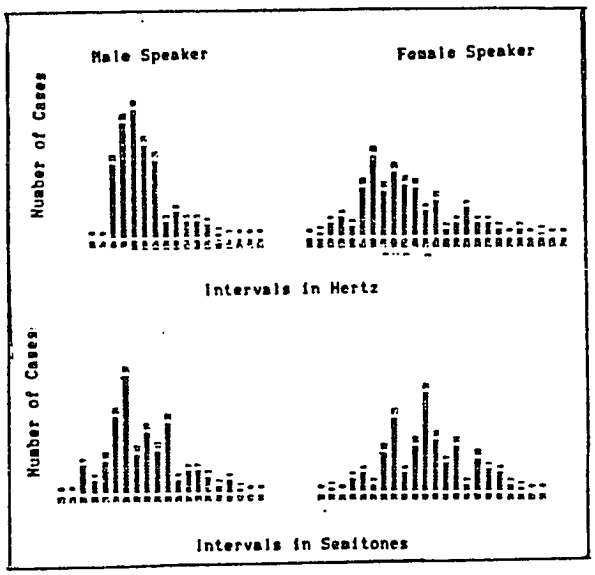

Figure 2.1 Distributions of Fo for Hertz and Semitone Scales

5.3 Pitch Comparisons.

The measures of pitch were derived from these normalized scores, describing pitch groups.

5.3.1 Pitch Groups. The primary phonetic unit of this study is what I shall call a "pitch group". Pitch groups were arrived at by segmenting a plot of Fo points by time into units sharing certain characteristics. Figure 2.2a shows such a plot, taken from a section of Figure 1.1. I assumed a model of clause intonation which can describe English Fo in terms of a series of straight-line segments, such as "/" , "\", "__" etc. as do the Dutch models described in Chapter 1. The normalized pitch values were connected by lines, except where there was a long pause (.5

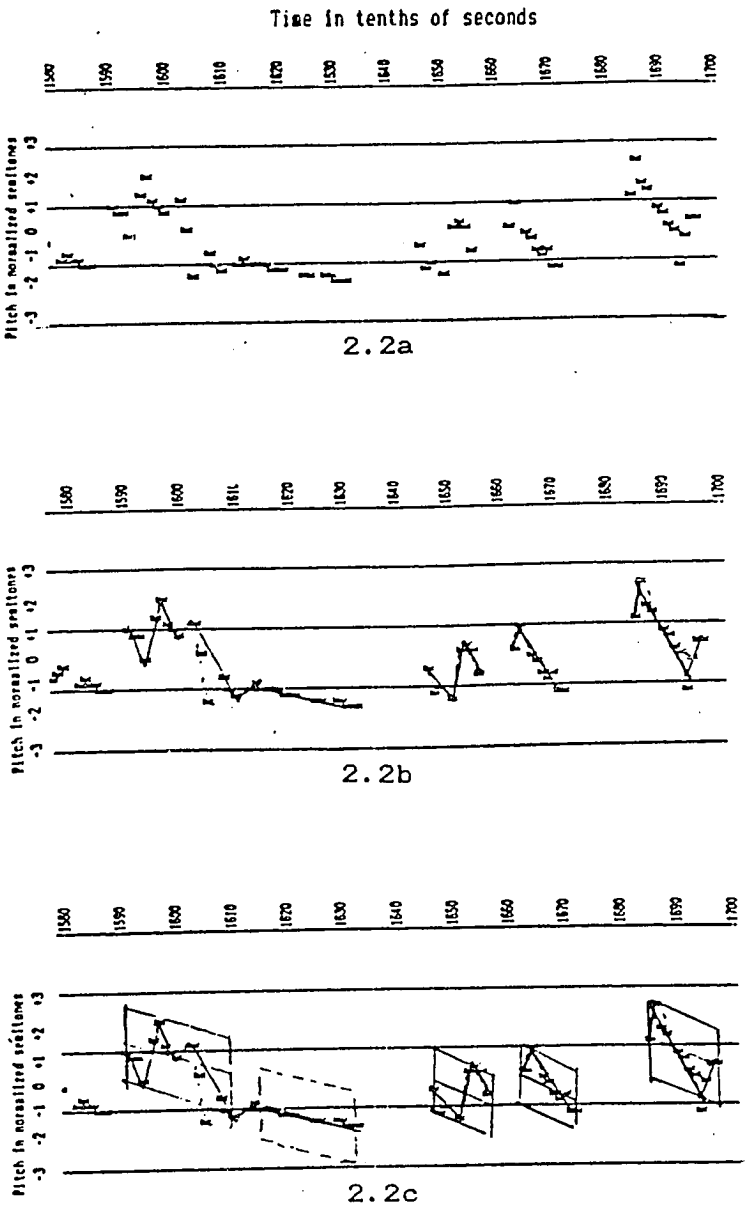

Figure 2.2 Construction of Pitch Groups from an Fo Plot.

seconds or more) and these ragged contours were then simplified into straight-line segments (Figure 2.2b).

This plot was then divided into segments, each of which was a pitch group (Figure 2.2c). This was done by superimposing a grid or envelope in the shape of a parallelogram[2] over the points. The grid was formed by a declination line which connected low points, and a top line which connected the high peaks, and a mid-line, which marked out a middle level of pitch. The lines were drawn with a fairly consistent negative slope, which decreased with the length of the utterance. Boundaries of pitch groups were located where 1) the pitch reached a speaker's low point, or the declination line so drawn reached the speakers low, 2) when a long pause occurred, or 3) when it was no longer possible to include high points in the envelope being drawn. A fourth criterion, seldom used, was syntactic. When it was difficult to determine where a group should end, syntactic group boundaries were used if possible. Ideally, the slope of the declination line would be computed from the Fo points involved. In practice this was infeasible because of the small number of points and the amount of variation between pitch groups. The practice of drawing declination lines by eye is a common technique. Pierrehumbert (1980) found that

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2. Some models (e.g. Pierrehumbert 1980) use an envelope in which the top line has a greater slope than the bottom, tending towards convergence. For the present purposes of comparison between groups, the parallel envelope was adequate and simpler to construct.

peak lines scaled to a hypothetical baseline fit the data better than when scaled to a computed baseline.

The mid-line in the envelope marked out a middle level of pitch (Willems found a three level model better suited to British English than the two level model used for Dutch). It is not necessary for the method to use a specific number of levels, but at having least three enables one to convert the fundamental frequency curve to a series of straight line segments reasonably accurately. The distance from the middle line of the envelope to either the top or the bottom lines was called the pitch range. The range in the majority of cases was close to one standard deviation. (Recall that the Fo scores were normalized with a mean of zero, and a standard deviation of one.)

All of the Fo points were assigned to a pitch envelope. Then in order to compare relative pitch of the groups, a single point on the envelope could be compared to the same point on other envelopes. The mid-point was chosen as the point where the value of the pitch was read. This was called the pitch register.[3] Pitch register is then a measure of Fo height for a pitch group, and for syntactic groups contained in that pitch group.

A prominent pitch peak, in this definition, is one which reached the top line of the envelope. Figures 2.3 and 2.4

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3. The term "register" was originally used to differentiate between normal voice and falsetto speech, and sometimes laryngeal speech. It is used here in the more general sense which also discriminates pitch heights of normal speech.

show such pitch groups.

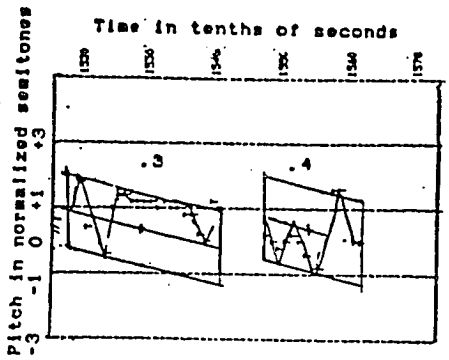


Figure 2.3 Pitch Groups defined by Fo Envelopes

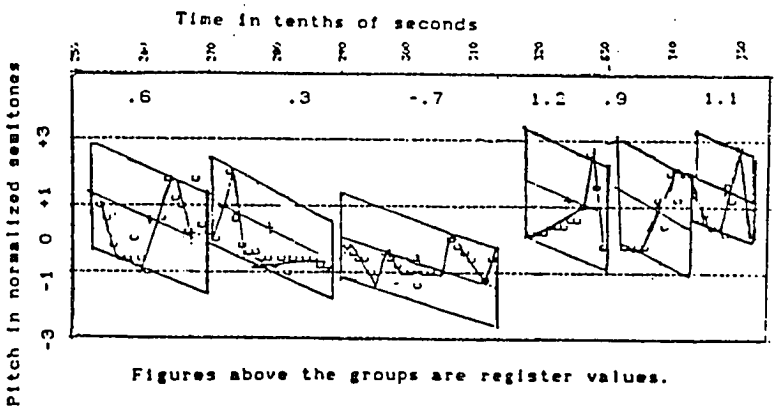


Figure 2.4 Pitch Groups Illustrating Falling and Rising Register.

Another measure of pitch was also used, which was the amount of change in pitch register from the preceding (in time) pitch group. This was used because studies have shown that changes in Fo are more important than Fo pitch levels in determining intonation contours (Klatt 1973).

The process of constructing these pitch register grids, derived from the fundamental frequency data, was guided by

research which showed the following:

a) Stylization by using a series of straight lines in place of Fo contours has been shown to be a perceptually acceptable manner of simplifying intonation curves (Maeda 1974, 't Hart 1984, Willems 1982, de Pijper 1983.) Research by Hadding and Studdert-Kennedy (1964), Garding and Abramson (1965) also supported this, resulting in the conclusion that there much more actual pitch variation than is relevant in a given language.

b) The pitch of speech in a given turn, or breath group, starts high and declines over time. This downward tendency was named declination by Cohen (1965) when, in attempting to resynthesize his hat contours, he found that the speech was better represented if the whole contour was tilted downwards to the right. Since that time declination has been noted in many languages of the world and has been called a universal (Bolinger,1978).

c) The slope of the declination line has been shown to be inversely proportional to the length of the utterance (Cooper and Sorenson 1980, de Pijper 1983). That is, the longer the utterance, the less steep the slope. This means that there is a tendency for the drop in pitch during a pitch group to be constant, but to take longer to achieve in longer utterances.

d) People tend to have fairly fixed lower points of their pitch range (Boyce and Menn 1979). That is, a speaker

which s/he ends her/his utterances--whereas the starting point is not nearly so consistent. Thus the reaching of a low point can be taken to signal the end of a phonetic group. (In some cases, a speaker continues on in an ancrustic mode, that is with low pitched unstressed speech) at this level). This end point is a boundary indicator for a phonetic group.

e) An Fo peak which occurs late in an utterance, and which is lower in Fo than one earlier in the utterance, may be heard as as high or higher than the earlier one. (Pierrehumbert 1979). That is, perception of high pitch depends on the length of the speech segment or breath group. The later in a pitch group a peak appears, the less absolute height it needs be to be perceived as high. Figure 2.5 illustrates such a case. The peak in the first pitch group is perceptually close to that in the second group, although the second peak is absolutely higher.

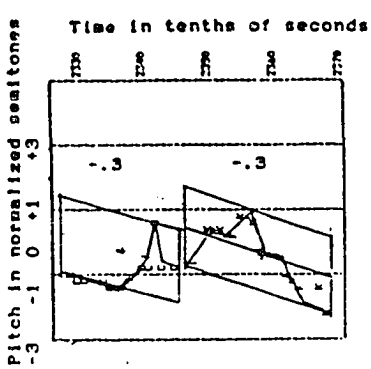


Figure 2.5 Fo Peaks in Pitch Groups with Equal Register Values

It was possible to easily fit the data in pitch groups for about 85% of the utterances, deriving a pitch register and a range for each. For the remainder there was not enough information to derive a range; the data were either too limited in quantity, or too flat to guide with any certainty the drawing of a grid, so that only a single declination line could be drawn. For these cases the center of what data existed was used as register and the range was set to the median range of the other cases, ± one standard deviation.

Of course the absolute bottom pitch was of little use as an end point when the pitch register was elevated. In these cases, the slope of the envelope (which varied with the length of the speech segment) was used to determine when a group ended (how long a group of this slope should go on.) Thus while the grid for an utterances was always drawn from the Fo points, time was an underlying factor and constraint. The question did sometimes arise whether to extend a pitch group which contained more than one syntactic group, or to reset the declination and start a new group. If the speaker reached his minimum there was no problem. If he didn't, then the decision was based on slope and time. Figure 2.6 illustrates this situation.

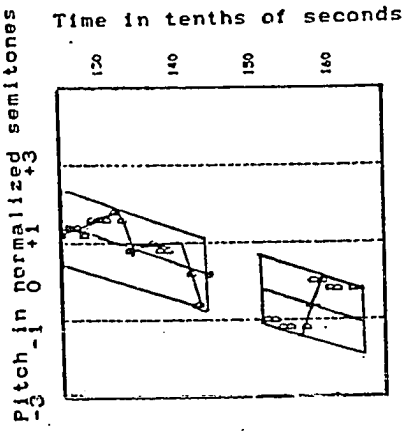


Figure 2.6 Pitch Groups with Descending Register

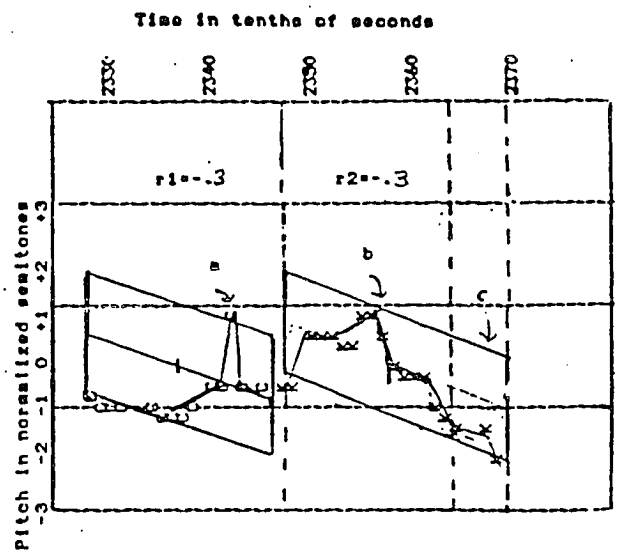
In Figure 2.6 two pitch groups were drawn because other pitch groups with the same slope lasted about two seconds, and not the three or more seconds which would be involved in a single pitch group.

A binary measure of pitch in terms of register was coded for each syntactic group, indicating whether or not the boundary of the group coincided with the beginning boundary of a pitch group.

5.3.2 Summary: Pitch groups were derived from plots of intonation values over time, separating the points into phonetic groups. These groups cohered by means of a consistently declining grid consisting of a baseline, a mid-line and a top line. A single figure, called pitch register, was recorded for each pitch group. This measure, and the change in this measure from one group to the next, were used to represent the Fo of pitch groups and syntactic

groups associated with them.

Figure 2.7 illustrates a segment of data divided on syntactic group boundaries by dotted lines and the register envelopes or grids fitted to the data.



a) C: you think they got a LADDER and (om)
b) K: Well I think they stood on a chair
c) that's underneath

Figure 2.7 Fo Prominences and Fo Changes for Phonetic Groups and for Syntactic Groups

Pitch envelopes are defined by parallelograms. Syntactic groups are marked by dotted lines. Figures above the groups are register values. Change in register is the difference between register 1 and register 2 (zero in this case).

5.4 Stress

For the investigation of stress placement by information type, pitch prominences believed to represent stresses were identified, recognizing that pitch prominence

is only one aspect of stress perception. Stress determination was made using the pitch groups, identifying those points in pitch groups which reached the top line of the pitch grid as stressed points. In Figure 2.7, the points a and b were considered stressed.

5.5 Advantages and Disadvantages of Different Measures.

5.5.1 Pitch Level vs. Pitch Change. For measuring pitch, two values were used - the absolute pitch height, and the amount of change in pitch from the preceding unit. In general when comparing pitch of sequential units, such as the last unit of one clause with the first unit of a new clause, the amount of change is the more desirable measure. Even when comparing non-sequential units, such as for example, all adjectives to all adverbs, the change is a more dependable measure, because it measures pitch relative to the current baseline, and because the change in Fo is more important to the perception of pitch than the absolute height. But if a measure of overall rise or fall in pitch is required, as for example for periods of evaluative speech where speakers raise their voices, as compared to periods of narration, then the absolute value of pitch is preferable. In fact, the two values tended to correlate well in almost all cases.

5.5.2 Register Height vs. Maximum Pitch Height. Some earlier studies have used as a measure of clausal pitch the maximum pitch in the clause. A difficulty of using the

maximum peak value was mentioned earlier. That is that perceptually, where a peak is, in the utterance, affects how it is perceived. That is, lower peaks near the end of an utterance are perceived as as high as higher peaks near the beginning of the utterance. This is due to declination, and a comparison between absolute values may not be perceptually correct. Figure 2.5 illustrated this situation.

5.6 Pitch Range.

Pitch range was defined in terms of the register grid. Range measured the maximum variation of pitch from the mid-line of the grid to the bottom or top line of the grid. Studies have shown that range varies with factors such as emotion (Fonagy 1978) or speech mode (what is being read Graddol 1986) or speaking style (Johns-Lewis 1986), as did mean Fo's. The correlation between range and Fo was not investigated in this study other than to note that higher Fo seemed to go with wider range. At the normal pitch register, the range was fairly constant at ± one standard deviation.

As noted earlier, many speakers use only the bottom one-third of their potential pitch range. It is thought (Cruttenden 1986) that a wider range involves stretching at the top end of the pitch envelope, with the baseline unaltered. In the present data, the extent of use of one's range varied with the speaker. Some speakers normally used the lower one-third of their range; others, both men and

women, varied widely in their normal speech range. Also by the measure used here, a widened range was accompanied by a higher baseline, contrary to Cruttenden's hypothesis.

CHAPTER 3. HYPOTHESES

1.0 INTRODUCTION

The hypotheses to be tested include those about the relation of pitch groups to syntactic groups, the relation of pitch level to the information status of syntactic groups, and the relation of pitch level to interpersonal aspects of conversation.

2. HYPOTHESES CONCERNING SYNTACTIC BOUNDARIES

Hypothesis 1. The beginning boundaries of pitch groups will tend to correspond with the beginning boundaries of extended clauses.

Hypothesis 2. The beginning boundaries of pitch groups will tend to correspond with those of syntactic groups.

These hypotheses are aimed at relating the pitch groups to the syntactic groups defined. Not all syntactic group boundaries will be expected to coincide with pitch group boundaries, but pitch group boundaries are expected to occur at some, if not all, syntactic boundaries.

Support for these hypotheses comes from studies of sentence intonation using Casual Style data by Kreiman (1982) and Berkovits (1984) as well as studies by Lehiste (1979) and Cooper and Sorenson (1981) using Reading Style data. Such research showed that sentence final boundaries are cued by falling pitch as well as a number of other

factors, including presence of a pause, laryngealization and pre-boundary lengthening.

A third hypothesis concerns the relation of syntactic cohesion and phonetic cohesion.

Hypothesis 3. Clauses which are combined syntactically will correspond to combinations of phonetic groups in which the first appearing clause will have the higher pitch and the second one, subordinate pitch.

Corollary: Those clauses which are more loosely combined syntactically will have proportionately fewer second clauses which are phonetically subordinate; those which are more closely connected will have more second clauses which are phonetically subordinate.

Support for hypothesis 3 comes from the experimental studies by Cooper and Sorenson (1981), who investigated the boundaries between main and subordinate clauses. They found that a resetting of the declination line occured for the second clause.

O'Shaughnessy (1979) also investigated bi-clausal combinations and found boundaries marked by kind and amount of Fo change.

3.0 HYPOTHESES CONCERNING INFORMATION STATUS OF CONCEPTS.

Three hypotheses regarding the information status of concepts will be considered. These hypotheses deal with stress as it is measured by pitch prominence only.

Hypothesis 4: New information tends to receive stress.

Hypothesis 5: When given information receives stress it is used to manage the discourse.

Hypothesis 6: Contrastive stress tends to be higher pitched than stress on new information.

There is support in the literature for all of these notions. The placement of stress prominences in a text is often explained by discourse analysts in terms of information status, that is the emphasis is on new information, or on that which is being contrasted. Halliday (1967, 1985) explicitly equated tone units and information units, defining a tone unit as the phonetic realization of an information unit, with the nuclear tone on the new information.

Chafe's (1984) class of "already activated concepts", similar to Halliday's "given", is "spoken with an attenuated pronunciation." Thus one would expect new information to be stressed and given information not to be stressed.

Brown (1983) in experimentally elicited conversation, found a relation between prominence and new information. Shapley (1987a) using casual style data, found that 71% of the utterances with new information status had pitch prominence on the new information.

Justification for hypothesis 5 comes from Lehman (1977)

who pointed out that stressed given information may be used to control the mechanics of information flow. For example, a return to topic after an embedded diversion, or side sequence, will often be signalled by prominence on an already mentioned item. Her data were several elicited narratives as well as telephone conversations.

In support of hypothesis 6, Brown, Currie and Kenworthy (1980) found higher pitch on items which realized contrastive information than on new information in casual style speech, as did Brazil, Coulthard and Johns (1980). In both investigations high pitches were also found on items described as "emphasized", though not contrastive.

4.0 HYPOTHESES CONCERNING TEXTUAL AND INTERACTIVE FEATURES

The following hypotheses are divided into those which are concerned with speech mode, those which are concerned with boundaries, and those which are concerned with the amount of interaction which occurs between speaker and listeners.

4.1 Hypothesis concerning discourse mode.

This hypothesis relates to speech style, also called discourse mode.

Hypothesis 7. Pitch level of narrations will be lower than that of conversational talk characterized by short exchanges.

Discourse modes as used here were defined either periods of speech involved in story-telling or narrating experiences by a single speaker, or as periods of speech involving short conversational exchanges with rapidly changing topic.

Hypothesis 7 was based on research by Johns-Lewis (1986) and Graddol (1986), showing differing overall pitch for different discourse modes.

4.2 Hypotheses Relating to Pitch Levels of Boundaries.

Hypothesis 8. Turn-initial syntactic groups will be higher in pitch than the preceding syntactic groups, and tend to coincide with pitch group boundaries.

Hypothesis 9. Topic beginning boundaries will have higher pitch than non-beginnings, and will tend to coincide with pitch group boundaries.

Hypothesis 10. Extended clause beginnings will have higher pitch than non-beginnings.

Support for hypothesis 8 concerning turn-initial status (that is, "speaker change status") is implied in sentence level reading style studies of intonation (e.g. Cooper and Sorenson 1981) in which subjects began their reading with initial high peaks. Some physiological evidence for declination mentioned earlier also supports this hypothesis. A previous study of casual style data (Shapley 1987a) found that turn-initial utterances almost invariably had pitch prominence.

Support for hypothesis 9, about raised pitch for topic beginnings, comes from analyses of the pitch of causal style speech by several researchers, who have defined pitch sequences of several tone units, and related them to topically related units of information. Examples are the tone sequences of Brazil (1985), rhetorical structures defined by Woodbury (1983), which have in common that an initial high peak is followed by one or more lower peaks, and the material included in this unit is semantically related. For example a unit might consist of a main clause and ancillary clauses, as in the rhetorical structures described by Mann and Thompson (1986,1988).

Research supporting hypothesis 9 using Casual style data includes studies by Woodall (1984) and Gibbon (1984). They described topical groups which begin with a very high pitch prominence followed by one or more lower pitched segments. A new very high prominence signals a new topic. Woodall identified pitch peaks and contours from pitch curves drawn in musical notation, which she described in terms of topic beginnings and subordination. Gibbon's model of pitch structure identified prosodic frames, which may contain one or more lower-pitched frames, defined in terms of both peakline and baseline features. He distinguished stable subframes as narrative texts and unstable groups as periods of interaction. Brown et al. (1980), and Menn and Boyce (1982) also found new topics to start with higher

pitch than previous utterances, as did Umeda (1982) and Couper-Kuhlen (1986).

Experimental studies on casual style data by Kreiman (1982), Shaffer (1984) and Lehiste (1979) found that the best topic boundary cue was a rise in pitch at topic beginnings. They identified topic beginning with the beginning of a prepared paragraph presented to subjects.

Support for hypothesis 10, regarding the correlation of raised pitch and extended-clause beginnings, comes from the same studies citing support for turn-initial high pitch, hypothesis 8.

4.3. Hypotheses Concerning Interaction of Speaker and Listeners.

Hypothesis 11. The pitch of syntactic groups which are interrupting another speaker or trying to get the turn will be raised above average.

French and Local (1986) have shown that pitch height is relevant in managing interruptions, that is gaining the turn, in causal style data. Cutler and Pearson (1986) in judgments of clauses cut from read-aloud paragraphs, found a downstep in pitch a good turn-yielding cue but a pitch upstep a good turn-holding cue.

Hypothesis 12. Syntactic groups functioning to disagree with or are non-supportive of previous syntactic group utterances will have higher pitch than the previous syntactic group.

Hypothesis 13. Syntactic groups functioning to agree with or support previous syntactic group utterances will have an equal or lower pitch than the previous syntactic group.

Brazil (1985), and Coulthard and Brazil (1982) supported these hypotheses, pointing out that contradictory answers and answers to questions not in agreement with what the questioner expects tend to be higher pitched; those agreeing tend to be equal or lower pitched. Menn and Boyce (1982) tested similar hypotheses in parent-child speech, and found large rises in pitch for utterances that were dissonant or disagreeing, and little change in pitch for utterances which were consonant or agreeing with the previous utterance. Results of the current analysis are expected to generalize the findings of Boyce and Menn to pitch in adult conversation.

Hypothesis 14: Pitch level rises as the amount of response from listeners increases.

Shapley (1988) found that in a subset of the data used here, rises in pitch occurred when there was response from listeners in the form of laugh tokens, feedback, and on-topic comments. It was expected that this relationship would hold for the full dataset.

Hypothesis 15. Direct quotations will have higher pitch than non-quotations.

Support for this hypothesis comes from observation of

natural speech data.

Hypothesis 16. Repair initiators, (also called verification questions) will be higher pitched than preceding utterances.

Justification for this hypothosis comes from the work of Menn and Boyce (1982). They found that in parent-child speech, verification questions, or repair initiators had higher pitch than the previous utterance.

CHAPTER 4. COMPARISON OF SYNTACTIC GROUP BOUNDARIES WITH PITCH GROUP BOUNDARIES

1.0 INTRODUCTION.

In this chapter I will compare the boundaries of the syntactic groups with those of the pitch groups, and test the hypotheses concerning these boundaries, which are:

Hypothesis 1. The beginning boundaries of pitch groups will tend to coincide with the beginning boundaries of extended clauses.

Hypothesis 2. The beginning boundaries of pitch groups will tend to coincide with those of syntactic groups.

Recall that a syntactic group, as the term is used here, is a syntactic category in which it is expected that no more than one main stress will appear, and which may be as short as an adverb or a filled pause or as long as a clause.

Recall also that pitch groups are derived from fundamental frequency curves, and are defined by a grid covering a coherent organization of pitch points, with a declining baseline, and are described by a single number called pitch register. When a speaker's Fo reaches the bottom of his pitch range, or when the bottom line of the pitch grid reaches that level, then the declination line is reset and a new pitch group begins. It is these pitch groups which will be compared with syntactic groups.

The congruence of syntactic boundaries and phonetic units has been assumed by almost all researchers in

intonation. A measure of the degree to which this correspondence holds will be expressed here as the number of occurrences of a given kind of syntactic group which start new pitch groups, rather than continue an already started pitch group.

1.1 Resetting of Declination and Pitch Subordination.

A pitch group may consist of one syntactic group or more than one, or occasionally a syntactic group may be split into more than one pitch group. The term "resetting" is used to describe the beginning of a new pitch group. When a new pitch group is begun, this means the declination line has been reset, and when a syntactic group is included in an old pitch group, it means there has been no resetting of the declination line, and the group is called subordinate in pitch.

Resetting of the declination line can take place at the same level as the previous group, at a higher level or at lower level. Resetting at a lower level implies pitch subordination, much as no resetting does. Resetting at an equal or higher level does not do so, although the expectation is that such resettings occur at syntactic group boundaries. In this chapter only the fact of resetting or not will be considered, whatever the level. Figure 4.1 (a copy of Figure 2.4) shows examples of reset pitch groups, illustrating both rises and falls in the pitch register.

I will first look at the overall correspondence of pitch group boundaries with syntactic group boundaries, and describe the exceptions. Then I will examine which clause boundaries and which syntactic group boundaries tend to coincide with new pitch group boundaries, and which do not. Lastly, I will examine the effect of the methodology used to construct pitch groups on pitch group initiation.

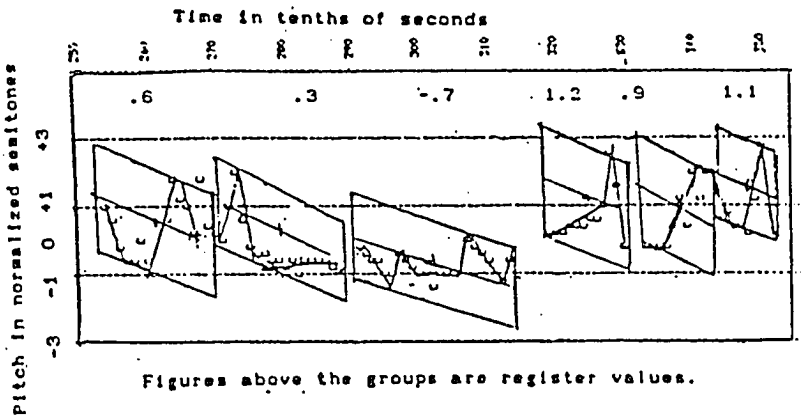


Figure 4.1 Pitch Groups With Falling and Rising Registers

1.2 Measurement of Syntactic Group Boundaries.

As stated earlier, intonation units have long been associated with some syntactic or semantic unit of speech, that is, the boundaries of one were assumed coterminous with the other.

Hypotheses 1 and 2 state this relationship in terms of coterminous beginnings. Pitch group beginnings were

compared with syntactic beginnings. To say that syntactic group beginnings coincide with pitch group beginnings means that the resetting of declination (starting of a new pitch group) correlates with the beginning of a syntactic unit of some sort.

1.2.1 The Extended Clause, a syntactic unit of discourse. Ideally, to compare the results with those of sentence intonation studies, the syntactic unit studied should be the sentence. But sentences are not always easy to identify in discourse. In short exchanges occurring in back and forth talk sentences are usually easy to identify because a turn is usually not longer than a sentence, as illustrated in example (1).

```
(1) Nora:  Who are you going to hear TONIGHT?
    Len:   STRAVINSKY. Stravinsky and
    Pete:  Stravinsky's going to show UP?
    Len:   NO, he's dead ( )~
    Nora:  I thought it was your ROCK CONCERT~
    Len:   No~
    Steve: in Hollywood BOWL?
    Nora:  (    ) heavens, you're CULTURED.
    Matt:  No, it's the BUDGET buy.          SCA1
```

However, in long turns as well as in some short exchanges, many sentences get started which are never finished, because they are interrupted, as are the first two in the example below, or because of the speaker's replanning, as in the last two in Example (2).

```
(2)  Len:    [ +++ ( ¯ ) ]
     Steve:  [A lot of these things] you know++++ AREN'T+
              by definition they CANNOT be mis-surveyed.
              The survey DEFINEs it.
-->  Rodney: Yeah.  This was at
     Steve:  =and NOT the description.
-->  Rodney: THERE [was a+
     Steve:         [There's  this great ISSUE on  the
              so-called straight line BORDER between
              [CALIFORNIA and  NEVADA
     Len:     [Canada     ]
     Len:     yes,  UT::+++ a-ho
     Steve:  which of course is NOT
              is  it  a great CIRCLE or not
              I'm talking about the DIAGONAL  border
     Len:     Oh,  OK.
-->  Steve:   and  the  DESCRIPTION of  it
-->           when they made the TERRITORIES,
              they take a point in  the center of TAHOE
              this was defined by latitude and longitude,
              I think.                                SUR 177
```

and some sentences do not have clear end points, as below.

```
(3)  C:      You take FRUIT
             and you CUT up your fruit ++++
             and you put it in a ++++ bag ++++
             a plastic, no not a plastic bag +++++++++++
             a NYLON net bag
             This is the easiest way of doing ( )++++++++
             and you put (in) the fruit
             CHOP it up
             and put it in that +++++++++
             and you pour WATER over it
             and you add SUGAR,
             and u:m +++++++++ YEAST ++++++++++++++++++
             You may add some pectins (some of that)
                                                     WIN200
```

I have used as a sentence-like unit the extended-clause (Chafe 1987), which consists of a clause complete with its dependent adjuncts. Clauses without their dependent adjuncts, as coded in syntactic groups, are referred to merely as clauses. I have further identified syntactic

groups which occurred in extended-clause-initial position. Such initial syntactic groups include for example initial prepositional phrases, and adverbs, and some clauses. Non-initial groups include relative clauses, conjoined predicates, and clauses preceded by adverbs. The following examples illustrate initial and non-initial positions. In the examples, pitch groups are separated by double slashes.

(4)	Rodney:	I SAW one of those APE suits//	*initial*
		in PHYSICS one time	*non-initial*
			APE389
(5)	Steve:	ANYWAY,//	*initial*
		at SOME point	*non-initial*
		surveyors had to go OUT	*non-initial*
			SUR823

The comparisons to be made, then, are between extended clause beginnings (initial syntactic groups) and pitch group beginnings, and also between all syntactic group beginnings and pitch group beginnings. It was expected that resetting would correlate with extended clause beginnings, and no resetting or resetting at a lower level would correlate with extended-clause non-beginnings. That is, the first syntactic group in an extended clause would coincide with the beginning of a pitch group, and subsequent groups in the clause would not. This is assumed by studies of sentence intonation using experimental reading style data, such as those of Cooper and Sorenson (1981) in which there is a gradual decline in pitch peaks over time, with resetting for new clauses.

2.0 NON-COINCIDENT SYNTACTIC GROUP BOUNDARIES AND PITCH GROUPS

In the great majority of cases, 1247 out of 1287 or 97% of the time, the beginning boundaries of pitch groups coincided with syntactic group beginnings, but there were exceptions. These involved the separation of a syntactic group into different pitch groups. (More than one syntactic group may be in a pitch group, but if the pitch group boundaries occur at syntactic group boundaries, then they fit hypothesis 1).

2.1 Word Searches.

A common type of irregular boundary was when word searches or pauses occurred, usually in the middle of a syntactic group. Thus in (6) and (7) the pause is before the NP object, and predicate noun respectively.

```
(6)  K:  They broke in the uh +++//
-->      sliding GLASS DOOR//
         INCIDENTALLY, that sliding glass door.. ROB569

(7) Py:  Still if you HAVE to live in New York//
-->      that's one of the nicest +++++++// PLACES,
         BECAUSE you have a sense of uh//
         because you have this big view.        VES2463
```

A second somewhat similar type of irregular boundary involved a break after the subject of a clause, or after the subject and auxiliary.

```
     (8)  K:   BECAUSE it was locked in that position//
               they could get hold of both ENDS of it
-->            and they just +++++// lifted it OUT.  ROB1653
```

```
-->(9)  Pete:  I've heard of PEOPLE who were  ++++++++++//
               caught outside the FOR- outside the SPORTS
                    ARENA
               who were doing just that.                SCA1629
```

A third type of search occurred when a word which normally occurs at the beginning of a succeeding clause was attached to the previous clause. For example, the pitch or timing break may come after a conjunction (e.g. *and uh*), or an initial article *the*, thus leaving part of the coming item in the pitch group of the previous syntactic group.

```
--> (10) P: well then you COULD'VE but +++++++++//
            they only had ONE AD for that//
            and then they had SCALPERS ads//          SCA629

--> (11) J: but I HAVE to give Marilyn credit because uh//
            the REAL thing, the MOST important thing
            she did was//                             JOB468
```

In the first example above, the *but* which usually occurs in clause-initial position was in the pitch group preceding it. In example (10) the *because uh* was separated from the following clause. These examples could be called clause searches, rather than word searches, and signal that the speaker is not finished with his/her turn. Frequencies of occurrence of these types are the following:

word search before objects	13
predicate search after subject/auxiliary	10
clause search after conjunction or article	14

The number of such cases was not great, although those listed include only the cases which involved in a resetting of pitch register. Other cases occurred in which either the

break in pitch level was not great enough or the pause was not long enough to warrant a reset declination line.

2.2 False starts.

Another type of boundary irregularity occurred with false starts, that is, incompleted syntactic groups. False starts are illustrated below.

```
--> (12)  K:     I NEVER really +++ TALKED to uh//
                 I guess I DID talk to Mary a little bit//
                 about uh +++++ her women's STUDIES course//
                                                        WOM906
--> (13)  Len.   They [MADE //
-->       Pete:       [they [MADE a //
          Len.            [and then they could GO ON
                 and make seven more MOVIES //          APE77
```

In (12) the first clause is never finished, and a new pitch group is started for the repaired next clause. In (13) the first clause is interrupted by another speaker, and a new pitch group started when the first speaker resumes and repairs the utterance. However, in all cases, the beginnings of the pitch group and syntactic group boundaries coincide, so such cases were not considered exceptions to Hypothesis 1.

2.3 Partial clauses.

Partial clauses occurred when a clause was split into its components by the interjection of another clause, such as a relative clause or by a repair, which formed its own pitch group.

```
     (14) Ln.  YEAH, BUT I realized//
               you could pick UP,
-->            if you WAITED in line//
               you could A HOLD of the upper seats.//  SCA544
```

--> (15) C: but the OLDER one//
who was THIRTEEN, passed out.// DOG320

In the first example above, the interjection of the "if" clause, a parenthetical correction, restarted the complement, and broke the pitch group into two groups for the clause, as did the relative clause in the second example. These breaks in continuity came at syntactic group beginning boundaries, so were not counted as examples of irregular pitch group boundaries. Partial clauses included isolated objects, predicates and complements, isolated subjects, or subject-verb combinations, incompleted utterances or false starts, repairs, and utterances spoken as fragments. Short answers to questions were tabulated separately. Table 1 lists the environments of these partial clauses. About a fifth occurred as part of lists or event chains. Clauses split by the speaker's use of relative or adverbial clauses made up less than 10% of the cases. For 40% there was no obvious syntactic reason for starting a new pitch group.

Syntactic Groups	N
Part of lists or event chains	31
marked with conjunction	26
incompleted utterances	30
self-repairs	13
broken by relative or adverbial clauses	20
fragments	27
after interruptions by others	15
miscellaneous	15
no obvious syntactic reason	103
total	280

Table 4.1. Environments of Partial Clauses

In summary, in the great majority of cases pitch group boundaries coincided with syntactic group boundaries. In cases where the boundaries did not coincide, it was usually because of intervening hesitation pauses for word searches.

3.0 EXTENDED CLAUSE BEGINNINGS AND PITCH GROUP BEGINNINGS

Under Hypothesis 1 the beginning boundaries of extended clauses and those of pitch groups should match. Table 2 shows the degree of match of these boundaries. In these tables the term "old pitch group" means that the declination line was not reset, and the term "new pitch group" means that the declination line was reset. The "per cent new" means the percentage of syntactic groups with reset declination lines.

Extended Clause	Pitch Group Old	New	Total	Per cent New
Initial	76	587	663	89%
Non-initial	371	253	624	39%
Total	450	837	1287	65%
significance level = .001				

Table 4.2. Distribution of Co-incidence of Extended Clause Beginnings and Pitch Group Beginnings.

The syntactic groups are split almost evenly between extended clause initial and non-initial position. The tendency is for initial extended-clause syntactic groups to coincide with initial pitch groups. This difference, with a chi square of 72.2, is significant at the .001 level.

4.0 SYNTACTIC GROUPS AND RESETTING OF PITCH DECLINATION.

I will next be concerned with relation of all syntactic group beginnings to the resetting of declination lines, which marks the start of new pitch groups.

The overall distribution of occurrence of new pitch groups by syntactic groups is summarized in Figure 4.2. Figure 4.3 illustrates the percentage of each category which coincides with a new pitch group.

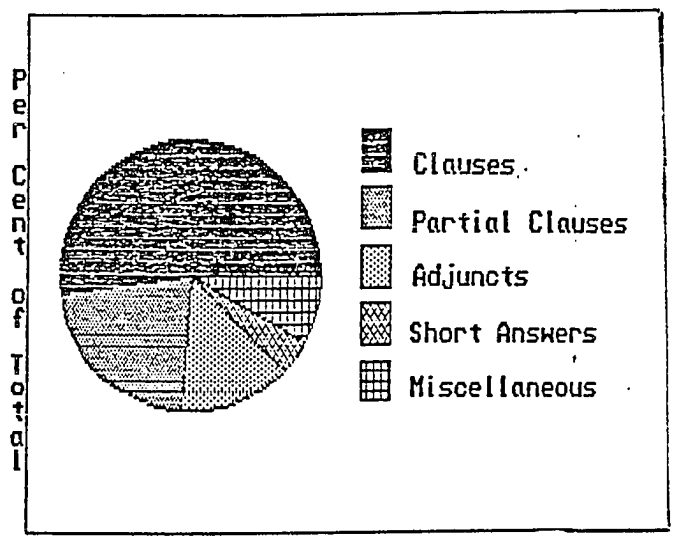


Figure 4.2 Distributions of Syntactic Category Types

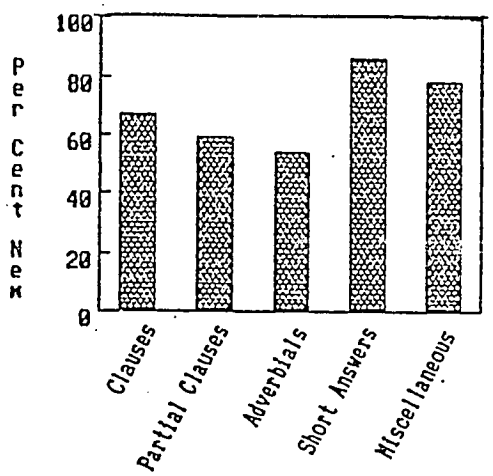


Figure 4.3 Percentage of Category Groups Coinciding with new Pitch Groups.

The data for Figures 2 and 3 are given in Table 3.

Syntactic group	Pitch Group old	Pitch Group new	total	% of Total	% New
total clauses	218	449	667	52	67
partial clauses	127	182	309	24	59
adjuncts	81	97	178	14	54
short answers	8	51	59	4	86
miscellaneous	16	58	74	6	78
total	450	837	1287	100	65

Table 3. Distribution of pitch groups by syntactic groups.

Overall, 65 per cent of the clauses began new pitch groups. Adjucts began fewer new pitch groups than clauses. Adjuncts consisted primarily of prepositional phrases, which when final tended to be de-emphasized. Short answers began more new pitch groups than other syntactic groups. This is not surprising since most of them were also turn initial, which is shown in Chapter 7 to be highly associated

with new pitch groups.

Table 4 and Figure 4 show the result of dividing the syntactic groups into those which began extended clause groups and those which didn't. The extended-clause-initial groups tended to coincide with new pitch groups more than twice as often as did non-extended-clause-initial groups.

	same pitch group	new pitch group	total	% new pitch group
Extended-clause beginnings	76	586	662	89
clauses	52	338	390	87
partial clauses	10	90	100	90
adjuncts	7	64	71	90
short answers	5	49	54	91
miscellaneous	2	45	47	96
non-beginnings	374	251	625	40
clauses	166	111	277	40
partial clauses	117	92	209	44
adjuncts	74	33	107	31
short answers	3	2	5	40
miscellaneous	14	13	27	48
total	450	837	1287	65
Significance level	.001			

Table 4.4. New Pitch group beginnings vs. Extended-clause Beginnings

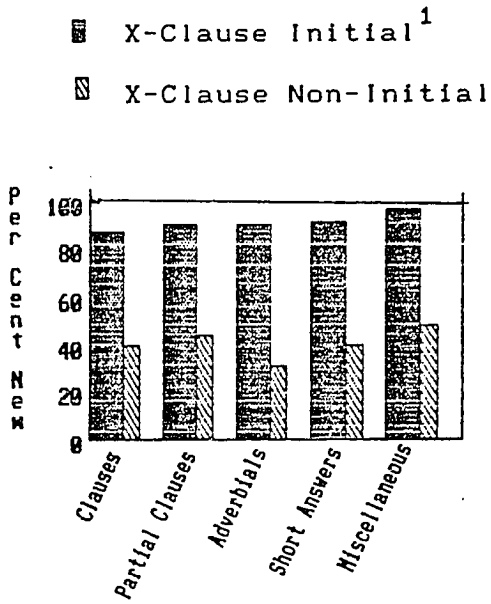


Figure 4.4. Coincidence of Extended-clause Initial and non-Initial Syntactic Groups with New Pitch Groups.

Table 5 shows the distribution in detail of syntactic groups divided into those in which the declination was not reset (old pitch groups) and those in which it was reset (new pitch groups.

---

1. X-Clause is an abbreviation for the term "extended-clause".

	same pitch group	new pitch group	total	Per Cent new
UNMARKED CLAUSES				
Intransitive	51	104	155	67
adverbial complement[2]	31	70	101	70
transitive clauses	38	100	138	72
Total	120	274	394	70
MARKED CLAUSES[3]				
Conjunctions (and,but,or,so)	22	25	47	53
Subordination (because, so,since,unless,when,ect)	22	35	57	61
Imperatives	-	7	7	100
Relative clauses	17	18	35	51
Existentials	10	17	27	63
Appositive clauses	3	3	6	50
Questions	14	55	69	80
Answers-clause	-	7	7	14
Focus clauses	-	5	5	10
Participial clauses	3	10	13	77
Total	97	174	271	64
PARTIAL CLAUSES				
Matrix clauses	8	17	25	68
Complements	26	19	45	42
Objects	19	48	67	72
Verb Phrases and Predicates	41	33	74	45
Subjects	9	26	35	74
Subject-verb	11	21	32	66
Appositive NP's	10	6	16	41
Purpose clauses	5	2	7	71
Other Partial clauses	3	12	15	80
Total	128	183	311	59
ADVERBIALS:				
adverbs	23	50	73	68
prepositional phrases	58	47	105	45
Total	81	97	178	54
SHORT ANSWERS	8	51	59	86
MISCELLANEOUS				
uh huh feedbacks	3	10	13	77
discourse particles/	2	5	7	71
filled pauses, hesitations	3	14	17	82
Incomplete expressions	6	27	33	82
other misc(conj,deictic,adj)	2	2	4	50
GRAND TOTAL	450	837	1287	65

Table 4.5. Division of syntactic groups into initial and non-initial pitch groups

---

2) Primarily clauses with verbs of motion.
3) Clauses marked either lexically or by word order.

4.1 Summary.

The tendency, then, is for extended-clause initial position to begin a new phonetic pitch group. Only twelve per cent or 76 syntactic groups did not reset and form new pitch groups when in initial position in clauses. The beginning of whatever syntactic group is initial in time in the extended-clause tends to coincide with the beginning of a pitch group. However, non-initial position in the extended-clause is not so definitely related to old pitch groups. Thirty-seven per cent or 251 of the syntactic groups do start new pitch groups when in non-extended clause initial position.

5.0 TIME AND THE RESETTING OF DECLINATION GROUPS

In this section I address the problem of the 40% or 251 syntactic groups which formed new pitch groups, even though they occupied a non-initial position in the extended clause, and the 11% or 76 cases of extended clause initial position syntactic groups where pitch declination was not reset, to show how time and the method of construction of pitch groups might influence these figures.

5.1 Resetting of Pitch Groups where not Extended-clause-Initial.

An important factor to be considered in the resetting of declination groups is that of timing, because timing is a function of the construction of pitch groups, and resetting due to the elapsing of time is therefore to be credited

either to the way the groups were constructed, or to the articulatory system underlying the model (the length of time a person can speak without taking a breath[4]). The pitch group, while not defined in terms of time, is nevertheless constrained partly by the length of the utterance, since the determination of the slope of the group is a function of the length of a group, with steeper slopes accompanying shorter groups. When a pause is inserted in a pitch group, the declination line continues, and the end of the pitch group may be reached before speech is resumed. Some pauses can be incorporated in the pitch group while others can't, depending on the length of the pause and the slope of declination of the group.

That is, a pitch group will end after given period of time, the period depending on the slope of the declination line. Therefore, if a long pause precedes a particular utterance, the chances are that a new pitch group will begin with the utterance. The question is whether these cases where new pitch groups occurred in non-extended clause initial position were also preceded by long pauses.

A pause was defined as no speech for 0.3 seconds. The average syntactic group length coded was about 1 second, so a pause length of .8 seconds was taken as the measure of a long pause. Table 6 gives the number of pauses by length.

---

4. This is assuming that new breath groups imply new pitch groups.

Length of pause (in .1 seconds)	old pitch group	new pitch group	
0-2	94	285	
3	7	44	
4	3	38	
5	4	21	
6	4	29	
7	2	26	
8	2	19	
9	2	16	
10	-	16	
11	-	14	
12	-	6	
13	-	8	
14	-	9	
15	-	5	
16	-	6	
17	-	5	
18	-	3	
19	-	5	
20-48	-	22	
total	118	577	695

Table 4.6. Frequency of Pause Length before Syntactic Groups.

As can be seen, after a pause of 1.0 seconds or more a new pitch group always began. For the present analysis, a pause of .8 seconds was considered a sufficient time to warrant a new pitch group beginning. This criterion gave 99.6% accuracy.

The expected correlation, stated by hypotheses 1 and 2, was that new pitch groups would correspond to new syntactic groups. As was shown in Sections 4 and 5, the beginnings of the two kinds of groups did correspond a large percentage of the time. Eighty-nine per cent of extended clause beginnings were also new pitch group beginnings, and 58 per

cent of non-extended clause beginings were also not new pitch group beginnings.

Of the 257 non-extended-clause beginnings which formed new pitch groups, 52 or 20% were preceded by long pauses.

It is possible that timing factors are also relevant in these remaining cases. The preceding segment of speech, for example, may have been long enough to force a new breath and consequently a new pitch group upon continuing. Also textual as well as interactive factors play a role in the resetting of pitch groups, as will be shown in Chapter 7.

5.2 Initial Positions Not Reset.

The extended clause initial group contained 76 cases where a new pitch group did not start at the beginning of the syntactic groups. Of these cases a number were clauses preceded by an initial adverb, such as <u>yes</u> or <u>no</u>.

```
-->  (16) K:   No. Actually, what is it?//  We DO know where
               they came in.                          ROB2071.
```

Others were clause beginnings, repaired after a false start.

```
     (17) MA:  NOBODY ++++ took notes @@@@ +++++++++++++//
               NOT one//
        -->    not  EVEN +++ you know a GRADUATE student
               put  a  NOTEpad out,//
               but he DOODLED,//
               and then he FELL ASLEEP.// $$$$          JOB325
```

Conjoined clauses account for a number of cases.

```
(18)  MA:  and in the middle of the tea//
           someone else was scheduled
              to use the VERY same room
 -->       and they moved in with cables//
           and overhead projectors
 -->       and so forth they brought with them
           and the tea sort of got confused//
           and everyone had to leave //          JOB110
```

Table 7 gives the number of cases where a new pitch group did not start when a new extended clause did start, by the syntactic situation, or kind of clause.

	Number	Per Cent
conjoined clauses	15	20
preceded by initial adverb	20	26
repaired clauses	17	22
feedbacks	2	3
other	22	29
Total	76	100

Table 4.7. Environments of Extended-Clause-Initial Groups Which were Not Reset

Forty-six per cent of these extended-clause initital syntactic groups which did not start new pitch groups were preceded by either a conjunction or initial adverb, which did coincide with the beginnng of a pitch group. So the clauses were in new pitch groups, not following other clauses.

Another group were preceded by false starts and were repaired, without starting a new pitch group. These syntactic groups also can be counted as new extended clauses starting new pitch groups.

Feedback responses, typically low pitched (see Chapter

3) were often included at the end of a pitch group of another speaker and in these cases did not begin pitch groups. Only 22 cases were not accounted for by these factors.

6.0 SUMMARY

The data presented in this chapter have shown that:

1) Syntactic groups which initiate extended-clauses tend to coincide with new pitch declination groups, while those which do not initiate extended clauses may or may not coincide with new pitch groups. Thus Hypothesis 1, that extended-clause initial syntactic groups start new pitch groups, is supported. However, non-extended-clause initial syntactic groups may also start new pitch groups.

2) The beginning boundaries of pitch groups and of syntactic groups tend to coincide in these conversational situations, although there are exceptions. Thus Hypothesis 2, that pitch groups and syntactic groups are coterminous, is supported.

3) For clauses, the important factor in determining whether a new pitch group is formed is whether it is in initial position in the clause. If it is not, whatever syntactic group is initial starts a new pitch group.

4) For syntactic groups, in addition to clause initial position, the factors of a preceding long pause influences whether or a new pitch group is formed.

Chapter 5. CLAUSE RELATIONS AND PITCH

1.0 INTRODUCTION

Several researchers have identified sequences of pitch groups in which one group is subordinate phonetically to the others. These phonetic sequences have sometimes been described as correlated with syntactic sequences which form cohesive units. In this chapter I will investigate the relationship between cohesive pitch groups and clause combinations which form cohesive syntactic units. While the number of examples of different kinds of clause combinations in the data was not large, the results may show what is worth further investigation. In this section I shall 1) outline a method of describing clause cohesion, 2) outline briefly several theories of phonetic group cohesion, and then 3) show to what extent the two kinds of cohesion co-occur in the data. Hypothesis 3 and its corollary were tested.

Hypothesis 3. Clauses which are combined syntactically will correspond to combinations of phonetic groups in which the first appearing clause will have the higher pitch and the second one, subordinate pitch.

Corollary: Those clauses which are more loosely combined syntactically will have proportionately fewer second clauses which are phonetically subordinate; those which are more closely connected will have more second clauses which are phonetically subordinate.

2.0 GRAMMATICAL DESCRIPTION OF CLAUSE RELATIONS IN ENGLISH.

While it is not always possible to identify sentences in natural speech, it is usually possible to identify clauses, and their relations to each other. There are several ways of describing clausal relations. I shall use the terminology and description of clausal relations of Longacre (1985).

2.1 Clause Types.

Longacre classifies clauses into base clauses and margins, which together make up sentences.

A base is a single independent clause. Sentences may be made up of one or more bases, forming a sentence nucleus. The following are all nuclei consisting of two bases, in this classification.

(1) Mary was elated but John was sad and thoughtful
Mary was elated and so was John
Mary was so elated that she danced a jig.
Longacre:236

Margin clauses go with a variety of nuclei and are subordinated to the rest of the sentence. The adverbial clause below is a margin.

(2) When they heard the news Longacre ibid.

Coordination is a combination of independent clauses, or bases, while subordination involves an independent clause and one of several types of margins often referred to as dependent or subordinate clauses. Subordinate clauses in

English are of three types:

(1) those which function as noun phrases, as sentential expansions of subject/object slots, called complements by Longacre,

(2) those which modify verbs and propositions, called adverbial clauses.

(3) those which modify a noun phrase, called relative clauses.

2.2 Clause Cohesion.

The degree of cohesion between clauses ranges from loose in those clauses joined by conjunctions, to those connected more tightly by the sharing of an argument.

Conjunctions such as *and*, *but*, *or* and *so*, when occurring between clauses, join the clauses together. The clauses need not share any lexical features. When such conjunctions occur in sentence initial position, they are used to tie the clause to the previous text.

Subordinate clauses such as adverbial clauses and relative clauses are connected to the clauses containing the verbs, propositions or NP's which they modify. They usually do not occur independently.

The tightest cohesion between clauses is where there is overlap of arguments, and clauses are mutually dependent, as in (3),

(3) They made John walk. Longacre:240

where two clauses, matrix and complement, are joined, sharing an argument, and neither sentence is complete without the common argument *John*. Quotation sentences were classified by Longacre separately from complement sentences because they may allow pause and pitch change between the clauses.

A further kind of clause cohesion occurred in the conversational data which will be called syntactic overlap. This kind of overlap binds utterances of different speakers together, and occurs when the second speaker finishes, or adds on to, the utterance of the first speaker, using the already given syntax of the first speaker's utterance. Cases in which the second speaker finishes the utterance of the first speaker were called collaborative utterances by Jefferson (1973). Cases in which the second speaker adds on to or changes a finished utterance of the first speaker were called fragments by Shapley (1983). The example below, describing a sliding glass door which is put in backwards, contains such a fragment which is a purpose clause.

```
     (4)  K:  So you CAN't do the normal trick of putting a
              ROD +++++++++ against it and ++++++++++
frag-->   N:  Oh to LOCK it~.  I see.
          S:  (thats  wrong.you go)
frag-->   K:  to lock it.                                ROB741
```

Thus there is a gradation of clause relations ranging from the most loosely connected, by a conjunction, through adverbial and relative clauses, to those which share

arguments, as do complements, or share clause syntax, as do fragments.

2.3 Textual cohesion.

Sentence margins also may provide cohesion for texts, providing lexical overlap with a previous clause. That is, one part of a sentence, either margin or a clause in the nucleus, may refer to part of another sentence in the paragraph. Such markers as *while*, *because*, *since*, *even if*. etc. when starting clauses can refer to previous clauses, creating cohesion between them (Thompson and Longacre 1985). An example is the following:

```
(5) Steve: ANYWAY,
           at SOME point,
           surveyors had to go  OUT, in the,
           before the thing became OFFICIAL~
           it had to be surveyed,
           which means I guess  MARKERS placed along
             the way~,
           various actual markers and so forth.
refer back-> And then once that was DONE~ and the
           surveyor's report ACCEPTED by
      Len: congress
    Steve: ++  congress  or whatever..          SUR823
```

The *once* clause in the second sentence is a back-reference to the material in the previous sentence, creating cohesion. Such use of subordinating markers was not examined here, but only those indicating cohesion of joined clauses or clauses and margins.

The subordinate clauses studied here were marked by subordinating morphemes, such as *when* or *if*, or by special

verb forms such as non-finite forms in complements.

2.4 Summary

Clause combinations can be ordered by the degree of cohesion between them. Combinations rank from those loosely joined by conjunctions to those most tightly connected by the sharing of an argument.

3.0 COHESION OF PITCH GROUPS

Parallel to cohesive grammatical groups of clauses are sequential phonetic groups which usually correspond to syntactic elements. Phonetic properties of clauses in multi-clause structures have received attention by researchers not only of discourse intonation but also of sentence intonation. Most commonly clauses were considered phonetically cohesive if they used the same type of tone, or if the pitch of one was subordinate to the pitch of the other. Perceptual studies as early as Palmer (1922) distinguished "co-ordinating" vs. "subordinating" sequences with coordinating sequences having the same tones and subordinating tone sequences having different ones.

Crystal (1964) defined superordinate-subordinate pitch combinations as consisting of two clauses, each having the same type of nuclear tone, but the subordinate clause differed from the superordinate by having either less pitch width (or range) or less loudness. Fox (1984) described tone groups which are dependent or independent, depending on

whether they end in a mid or high pitch, or a low pitch. Those groups ending in a mid or high pitch are dependent groups, those ending in a low pitch are independent. The most common phonetic structure in Fox's classification is where the subordinate phonetic group is first. He gave a few examples of syntactic structures in which the subordinate group follows. An example is the final comment clause below.

(7) he'll come to'morrow/ I should ˇthink FOX:129

In Fox's schema, coordinate structures tend to have two independent tone groups, each ending with a low tone, and relative clauses and appositional phrases, as well as unlinked clauses also tend to have coordinating phonetic groups. Woodall (1984), using pitch data from a lecture, described relations between pitch groups in which equal pitch height was used in environments implying equivalent significance, and unequal pitch height in equivalent environments signalled topical subordination. Several other researchers using natural speech data claim that pitch subordination is organized on the basis of topics. Gibbon (1984) described a subordination theory based primarily on pitch and common or reset baselines. Couper-Kuhlen (1986) described major and minor paratones based on pitch height, where major paratones envelop a conceptual paragraph. Her minor paratones, when beginning high are topic initial, when beginning mid-level are paratactic additions or extensions

to a topic, and when beginning low are hypotactic subordination to what precedes. Brazil (1978:18) also identified cohesive pitch groups which he called "pitch sequences".

In experimental studies of reading-style sentence intonation, Cooper and Sorenson investigated bi-clausal boundaries, and found that a resetting of the declination line occurred for the second clause, although the level at which the second clause began was close to the level at which the first clause ended. In experiments on a number of syntactic boundaries, they concluded that the "rank magnitude of the individual fall and rise components of such patterns varied systematically with the syntactic strength and location of the phrases bordering the boundary." (1981p142). The boundaries they tested included major clause boundaries, with conjunctions and subordinating words, various fronting constructions, main clause plus complement clauses as well as phrases. O'Shaughnessy (1976,1979) also investigated reading style fronting and other phrasing intonation breaks.

Most researchers agree that, as Fox (1984) says, "it is not possible to associate a subordinate tone-group with with subordinate information in a straightforward way". The relationship between phonetically cohesive clauses is not a grammatical one. The example below illustrates this. With the same intonation, the first clause of each is

phonetically dependent on the second.

(6) when I get 'back / I'll give you a 'ring
I'll give you a 'ring / when I get 'back. FOX1984

3.1 Summary of Cohesion of Phonetic Groups.

Sequences of phonetic groups have been defined in talk in which one group is said to be phonetically dependent on another, the dependent groups being less final in tone or in amount of drop in pitch, or in point on declination line reached, than a final independent group.

4.0 MEASUREMENT OF SYNTACTIC AND PHONETIC RELATIONSHIP.

The dependent and independent phonetic groups just described are not necessarily related to dependent and independent syntactic groups. But the phonetic groups are cohesive units which might be expected to coincide with syntactic units showing internal cohesion. What kind of correlation can be expected then between clauses which form cohesive units and pitch groups? The more closely bound clauses should have in greater degree than the less closely bound combinations:

1) a tendency to share a common baseline.

2) lower overall pitch, or (pitch register) of second clause.

In the rest of this chapter I will investigate the relation between phonetic group cohesion and syntactic group cohesion, as it occurs in the data.

4.1 Methods of Measurement.

In comparing the pitch registers of sequential clauses, three possible situations may obtain. There may be one pitch group, containing both clauses (the second lower in pitch by definition), there may be two pitch groups, the second one resetting the declination at a level lower than that of the first, again indicating pitch subordination, or there may be two pitch groups, with the pitch register of the second as high as or higher than that of the first, indicating lack of pitch subordination. Figure 5.1 (a copy of figure 2.4) illustrates pitch groups with falling and rising registers.

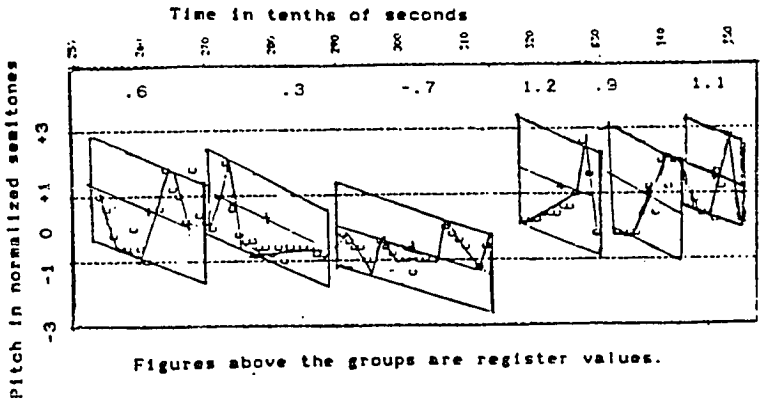


Figure 5.1 Examples of Pitch Groups with Falling and Rising Registers.

The syntactic groups distinguished in this chapter are sometimes larger than the syntactic groups defined earlier. They are entire clauses, and the pitch level comparisons are between the highest pitch group of each clause, if there is more than one. The numbers of each type of such clauses is very limited, but these are the types which occurred with enough frequency in the data to warrant counting them. No significance can be claimed for such small samples, but perhaps some idea of the validity of the relation between phonetic and syntactic subordination may be found.

5.0 RESULTS.

In this section the results for clause combinations by the same speaker will be presented.

5.1 Coordinated clauses.

I shall first consider those clause combinations which

are co-ordinate structures, joined by *but*, *and*, *or* and *so*.

When joining clauses, these conjunctions occurred only in between-clause position. *But* and *so* also occurred at the beginning of clauses which had no subsequent coordinated clause. In such cases *but* and *so* served as a link to a clause farther back in the talk than the immediately preceding clause, creating textual cohesion. Examples (8) and (9) show *but* in between-clause position, in an adversative relationship to the preceding clause. Example (10) shows two *buts*, the first between-clause, and the second preceding a first clause, doing the work of textual cohesion.

```
    8) M: you know a GRADUATE student put a NOTEPAD out
 -->      but he DOODLED, and then he FELL ASLEEP.
                                                    JOB356

    9) R. so these people THOUGHT they'd stood in the
          four STATES at one time
 -->      but they HADN'T.                           SUR125

   (10) J: and Marilyn said, you know "++++++
          PEOPLE can't be CORDIAL for more than two
          DAYs. This is going to be NOT only a strain on
 -->      you ++ but a strain on them."
          I mean they PULLED it all through you know
          we GOT through the two days stay with Hano OK.
 -->      But I THINK that's really true
          I think, I mean, to go out to a place~ JOB801
```

Or only occurred in between-clause position.

```
   11)  S:  Do you pour something off
 -->        or is the whole stuff transferred?    Wine 739
```

as did *and* in bi-clausal situations.

```
    12)  C: How did you decide they'd come in that window?
         K: Well I saw that there were holes in the screen
 -->        and the screen was out in that position.
                                                   Robber2282
```

And is also used in conjoining event chains, as in the example below. In such cases it is difficult to decide which *ands* are extended clause-initial and which are subsequent clauses of a series. They are multi-clausal constructions and are treated separately.

```
    13)  K:  so he went up
 -->         and took a nap
 -->         and woke up
 -->         and looked to see what time it was
 -->         and said "the clock radio isn't there"
                                                   Robber3083
```

And is serving a function in this chain of clauses of providing cohesion to a series of events. (See Schiffren 1987 for a discussion of this function of *and*).

So in between-clause position conjoins clauses with a resultative relationship to preceding clauses. *So* appears in between-clause position in examples (14) and (15). The *so* clause in Example (15) is a clause by a different speaker conjoined to a previous speaker's clauses, continuing his syntax.

```
    14)  K: and one position was just a little bit open
 -->        so the cats could get out                ROB1570

    15)  Len:   punched tickets.
         Matt:  did they have a HOLE in them?
 -->     Steve: so you can't turn it in.             SCA1049
```

In example (16) the *so* is used for textual cohesion,

referring further back in the text than the immediately preceding clause. This clause is also by a different speaker.

```
   16)     C: I CERTAINLY don't want WILSON on MY Diploma
  -->      D:  So you're BACK the PHONEbook now
           C:  YES, I'm back in the PHONE book, you see.
                                                      ROB273
```

Table 1 shows the pitch relations of second clauses of coordinate structures to the first clauses.

	old pitch group	reset pitch lower	reset pitch higher	Total	Percentage Subordinate
and (clauses)	16	17	38	71	46
and (chains)	32	13	31	76	59
or	5	-	-	5	100
but	11	3	2	16	88
so medial	5	1	8	14	43
total conj	39	22	45	106	58

Table 5.1 Coordinated Clauses by Relative Pitch Level of Second Clause.

In the tables, the term "percentage subordinate" refers to those clauses which were either in the same pitch groups as the initial clause of the conjunction, or were in new pitch groups with a pitch register lower than that of the pitch group of the initial clause of the conjunction.[1] The percentage subordinate measures the phonetic closeness

---

1. Phonetically subordinate clauses included all those with register changes from the previous clause of less than -.1 standard deviations.

of the clauses.

Slightly over half (58%) of the clauses in the second position for coordinated clauses were subordinate in pitch level.

Taken individually, *or* was always in an old pitch group, that is, was subordinate in pitch, and *but* was subordinate in pitch 88% of the time (either in old pitch groups, or a new group reset lower than the preceding group). *So* clauses were least likely to be subordinate in pitch, with 43% of lower pitch register. The data were too meagre to approach significance, but suggest that *or* and *but* clauses tend to be spoken as a phonetic unit with superordinate and subordinate segments. *And* clauses occurring in bi-clausal combinations occurred with less than half, 46%, of the second clauses lower or subordinate in pitch.

Coordinate structures are the most loosely bound type of bi-clausal structures, and *and* clauses are more independent semantically than the *but*, *so*, or *or* clauses. Thus it would be expected on the basis of iconicity that the correlation of such clauses with subordinate second clause pitch would be weak with these combinations. The data bear this out, with no strong tendency for subordination or superordination in pitch.

Several event chains connected by *and*s occurred in the data. The *and* clauses in the event chains tended to be

subordinate, with 59% of the second clauses reset higher.

Except for *or* and *but*, the data for coordinate structures reviewed above do not support hypothesis 3, with no clear tendency for pitch subordination.

5.2 Adverbial Clauses.

Subordinating conjunctions occurring in the data included *because*, *when*, and *if* plus single cases grouped together as miscellaneous, including *since*, *regardless* and *until*.

Because, *when* and *if* may occur either on the first or the second of the pair of clauses.

The examples below show *because* in second clause position and in first clause positions respectively.

-->	17)	Len:	they got their tickets FREE because they were PUNCHED	SCA1034
-->	18)	K:	BECAUSE it was locked in that position~ they could ++++ get hold of both ENDS of it	ROB1653

When also appeared as either the first clause (Example 20) or as the second clause (example 19).

-->	19)	C:	the FIRST thing that happened when I was introduced was,..	WOM121
-->	20)	C:	when it stops BUBBling it's made all the ALCOHOL it's going to make	WIN525

If clauses of conditional groups also occurred in either first or second clause position in the data. The

examples below illustrate these positions.

21) Matt: They said it was a real TRICK
--> if you could get TICKETS to that SCA295

--> 22) Py: STILL if you have to live in New York
that's one of the nicest ++++++++ PLACES
VES2463

Table 2 shows the pitch relations of second clauses of these subordinate clause structures to first clauses.

	old pitch group	reset group lower	higher	Total	Percentage Subordinate
because first	-	2	1	3	67
because medial	4	4	3	11	72
when clause first	1	4	2	7	71
when clause medial	8	4	2	14	86
if first	1	-	-	1	100
if medial	4	5	1	10	90
misc	3	3	-	6	100
total	21	22	9	52	84

Table 5.2. Adverbial Clauses by Relative Pitch Level of Second Clause.

In these limited data, the marked clauses appeared more often as the second of the two clauses than as the first.

There was also a tendency for the second clause to occur in a phonetically subordinate position. Second position *because* appeared phonetically subordinate in 72% of

the cases. Second position *when* clauses appeared as phonetically subordinate 86% of the time and second position *if* clauses appeared as subordinate 90% of the time.

The *miscellaneous* category only appeared with subordinating conjunctions in medial position, with the second clause lower in pitch.

Of the 41 subordinate medial-position marked clauses 35 or 84% were phonetically subordinate. In the two cases of *because* appearing on the initial clause of two, the second clause was higher in pitch. Aside from these cases, the second of two clauses in these bi-clausal structures tended to be subordinate in pitch to the initial clauses, regardless of which clause carried the marking morpheme.

The data for adverbial clauses support Hypotheses 3, that clauses which are syntactically cohesive tend to be phonetically cohesive.

5.3 Relative Clauses and Appositive Clauses.

Relative clauses modify noun phrases and are connected to the previous clause by the presence of a common NP argument. Examples are below.

```
    (28)  MA: and NO ONE
rc -->        who has huh tea @@@@@ +++++ once a week
              or every day, ++++ serves homemade cookies.
                                                    JOB1326

    (29) K:  Well I think they stood on a CHAIR,
rc -->       that's underneath                      ROB2347
```

Inclusions or exemplifying clauses are another type of

clause combination. These clauses are juxtaposed to a previous clause without any intervening conjunction, and often set off by dashes in texts. These are identified by Quirk (1985:1315) as a type of strict nonrestrictive apposition. Examples are shown below.

```
    (30) Py:  and you could SEE-- +
appo-->       it was a GLASS door--
              but you're FAR enough away from the SIDEWALK
              so $ grimacing and so forth didn't work.
                                                      VES1116

    (31) C:  I'm going to let it sit ++++ for a little
             while--
appo-->      age a little longer--.                    WIN618
```

5.4 Complements, Participles and Purpose Clauses

Complement clauses serving as noun phrases are more tightly bound to their host clause than the clause combinations considered so far because they have lexical overlap, that is, a shared argument. Examples (24) through (27) illustrate complements.

```
    (32)  MA: and I KNEW
Comp-->       they weren't accustomed to it
              because the cookies were HOMEMADE     JOB1283

    (33)  C:  how did you decide that
Comp-->       they'd come in that window?            ROB241

    (34)  MA: A LOT of people came to the first lecture
              and they managed
Comp -->      to have a TEA                          JOB985
```

Complement clauses would be expected to share the same pitch groups as their preceding matrix clauses, or if the

second clause occurred in a reset pitch group, the level to which it was reset would be expected to be lower.

5.5 Other Non-finite Clauses.

Non-finite clauses are bound to their bases by the sharing of the tense of the base, as well as sharing of an argument. Other kinds of non-finite clauses which occurred in the data were participles and purpose clauses.

5.5.1 Detached participles. Participles are non-finite clauses, acting as margins. An example follows, a description of a lecturer using a multiple blackboard setup.

```
(34)  Rod:  So he'd lectured across, went across once
            and then back and went across AGAIN,
-->         throwing the bottom ones on top. APE757
```

5.5.2 Purpose Clauses. Purpose clauses are also non-finite clauses, modifying base sentences. The following are examples of purpose clauses, the second one illustrating a purpose clause fragment, spoken by a different person than the one who began the sentence.

```
     (35) MA:  They DREDGED the entire university
-->            to find people for Jerry's talk @@@@@@@@@@@@@@
                                                      JOB138

     (36) K:  So you CAN'T do the normal trick of
              putting a ROD +++++++++against it
-->       N:  Oh, to lock it. I see.
          S:  (that's not ... wrong)
-->       K:  to lock it.                              ROB766
```

The pitch data for these clauses are shown in Table 3.

	old pitch group	reset group lower	higher	Total	Percentage Subordinate
Relative clause	17	10	8	35	77
Appositives	3	2	1	6	83
Complements	60	7	7	74	91
Carticiples	2	-	3	5	40
Purpose clauses	5	-	-	5	100
total	87	19	19	125	85

Table 5. 3. Changes in Pitch Levels Between Other Infinitival Clauses and Preceding Clauses.

Of the 35 relative clauses, 27 or 77% were subordinate in pitch. Of the 74 complements in the data 91 per cent were subordinate in pitch. Of the six appositive clauses, 83 per cent were subordinate in pitch.

There were too few participals and purpose clauses to make any real statement about subordination. Half of these clauses in the data were spoken as turn initial, by a different speaker than the preceding syntactic group, and were not included in the above table. But overall, of this group of closely bound kinds of clauses, 85 per cent were subordinate in pitch, tending to support hypothesis 3.

5.6 Quotation sentences. Quotation sentences consist of a quote formula (e.g. "he said") and a quotation. These parts are less tightly bound than complement sentences, because the the quote as an object complement acts differently from other complements. Not only can the quotation formula occur either at the beginning, in the middle, or at the end of a quote, but also the quote may be quite a long discourse of several clauses. It would be

expected that quotations would not necessarily be subordinate in pitch. Table 4 shows the pitch data for quotations.

	old pitch group	reset lower	group higher	Total	Percentage Subordinate
Direct Quotes	8	6	12	26	54
Indirect Quotes	4	1	2	7	71
Total	12	7	14	33	58

Table 5.4. Pitch of Quotes in Relation to Quote Formulas

Direct quotations were correlated with pitch subordination in half of the cases in the data, indicating their relative independence phonetically. Indirect quotations tended to be subordinate in pitch to the preceding syntactic group. There is no reason to expect indirect quotations to be different from other complements.

5.7. Between-Speaker Phonetic Cohesiveness.

The data described above refer to clause combinations by one speaker. But there are occasions when clause combinations, or phrasal combinations occur between speakers. This happens most obviously in the case of question-answer pairs. Other types of between-speaker combinations occur with fragments or collaborative utterances. In this section I will describe the relation between phonetic groups and a few between-speaker clause combinations.

5.7.1 Questions and Answers. Questions and answers exhibit a kind of cohesiveness not previously considered. They are representative of the interactive organization called adjacency pairs (Schegloff & Sacks 1973). These are sequences of utterances by different speakers, such that on hearing the first pair part, the listener is under some obligation to produce a second pair part to fit.

Questions and answers also have syntactic cohesion in that there is overlap of an argument, either a WH word, or in a Y/N question, part of the answer is repeated, or is understood. For example an answer such as *yes, it is, it* refers to something in the question. With overlapping arguments, it would be expected that such pairs would show phonetic cohesion also.

The problem of identifying and classifying questions and answers is a difficult one (see Weber 1989 for an extensive classification and discussion of the problems.) Here I shall just use broad classifications for obvious question and answer types.

Those question types identified in the data included: those marked by WH words or inverted word order which were called marked questions, verification questions or next turn repair indicators (NTRI's) which exhibit a problem in understanding the prior utterance, and unmarked declarative forms, called "sentence verification requests". This last

group is also know by the term "candidate for repair" since they suggest a possible alternative for the speaker. Answers were classified as yes or agreeing, no or disagreeing, or informative. Examples of question/answer pairs follow.

Marked question - informative answer

37) Nora: WHO are you going to hear tonight?
Len: STRAVINsky. SCA16

Marked question, agreement

38) C: You think they'd just LEFT when he walked by?
K: Yes yes, BECAUSE
S: [they heard him drive up]
K: [HOURS later one of us] had the
sense to look at the CLOCK RADIO ROB4172

Marked question, disagreement

39) C: I'll have to look at MINE.
Is THAT the key to it?
S: NO, THAT's so you can have a SCREEN~. ROB924

Verification question, agreement

40) Matt: it seemed like a very, like the
WRONG PLACE to try to give away TICKETS.
Len: What, at the BOWL?
Matt: Well,yes SCA1274

Sentence verification. Agreement

39) D: So you're BACK in the PHONE book now
C: YES, I'm back in the PHONE book, you see.
WOM292

Sentence verification, disagreement

40) S: but then they tried to cover their TRACKS
K: Uh no [then they went out... the back door]
S: [shutting the window afterward and
locking the door] ROB2405

In addition, a few other single instances of question/answer combinations occurred, for example a *yes, but* answer, difficult to class as a single response. Several questions were unanswered. Questions occurred as first pair parts, in first clause position in the clause combination, and answers in second position, as second pair parts. In addition, answers were always turn initial, and almost always formed new pitch groups.

The changes in pitch level between questions and the three answer types and are shown in Table 5.

Answers	old pitch group	reset pitch lower	reset pitch higher	total	percentage subordinate
Informative	4	10	8	22	64
Agreeing	4	12	13	29	55
Disagreeing	2	8	15	25	40
total answers	10	30	36	76	53

Table 5.5. Changes in Pitch Levels between Questions and Answers

Answers tended to be subordinate in pitch to their questions a little more than half the time. It was expected that disagreeing answers would have higher pitch relative to questions, (be superordinate phonetically) and that agreeing answers would have equal or lower pitch (be subordinate phonetically). Disagreeing answers did show less tendency to be subordinate than other types of answers and information answers showed a greater tendency to be subordinate. Almost all the answers were reset in new pitch

groups - this is not surprising since they were all turn-initial utterances, shown to be correlated with new pitch groups in chapter 7.

The idea that questions and answers, forming a tightly bound bi-clausal construction as well as an interactional unit, would also show a pitch unity, is not supported. In more than 40% of the cases, answers formed new pitch groups with a higher pitch register than the question. Disagreeing answers did differ somewhat from agreeing and informative answers, in the direction predicted, that is they were more apt to occur in superordinate phonetic position. Factors such as a different speaker, and perhaps point of view, apparently override the the syntactic and interactive cohesion.

5.7.2. Other Between-Speaker Combinations. Fragments, sometimes called collaboratives, were classified as other between-speaker connections. Fragments, as defined earlier, are utterances by a second speaker adding to an utterance of a first speaker, and deriving their grammatical relations from the utterance of the first speaker. Fragments are not grammatical sentences, because they lack some constituent of a sentence in phrase structure terms, but are constitutents which are interpreted syntactically in terms of the the grammar of the first speaker's utterance.

Fragments in the data included participles and purpose clauses, as well as NP's and other non-clausal items. These

second-clause utterances are shown in Table 6. The data for the same-speaker participles and purpose clauses are repeated here for comparison.

		old pitch group	reset pitch lower	reset pitch higher	total	% subordinate
	speaker					
participles	same	2	-	3	5	40
participles	diff	-	2	2	4	50
purpose clause	same	5	-	-	5	100
purpose clause	diff	1		3	4	25
fragments	diff	5	11	17	35	46

Table 5.6. Between-Speaker Subordination compared to Within-Speaker Subordination

The numbers of participles and purpose clauses are too small to be significant, but do show that there is no marked tendency for these between-speaker clause combinations to show pitch subordination. The data for fragments are also not indicative of pitch subordination.

6.0 CONCLUSIONS

Table 7 summarizes the pitch relations of the structures examined for same-speaker combinations.

As can be seen in this table, the amount of pitch subordination is least for the quotation sentences and for the coordinate structures, and greatest for the adverbial and other modifying clauses.

	N	Per Cent Subordinate	Average % Subordinate
Quotations			
Direct Quotes	26	54	
indirect quotes	7	71	.58
Coordinations			
and (clauses)	71	46	
so	14	43	
or	5	100	
but	16	88	.58
Adverbial clauses			
because	14	71	
when	21	81	
if	11	91	.84
Sharing arguments			
relative clause	31	71	
Appositives	6	83	
complements	74	91	
participles	5	40	
purpose clauses	5	100	.83

Table 5.7. Summary of Pitch Subordination Figures for Same-Speaker Clause Combinations.

The evidence for hypothesis 3, that syntactically combined structures will also exhibit phonetic cohesion, is not overwhelming. The occurrence of phonetic subordination ranged from 43 per cent of the time to 100 per cent of the time. However, whether or not a second clause of a clause combination will be subordinate in pitch was strongly related to what kind of clause combination was involved. *And* and *so* combinations tended not to be subordinate, as did quotation sentences, whereas some adverbial clauses and complements were almost always phonetically subordinate.

Hypothesis 3 as stated was weakly supported. However, the corollary, that the degree of phonetic subordination of a clausal combination is related to the degree of syntactic cohesion was supported. The more closely conected noun and verbal modifying clauses had a greater tendency to be subordinate in pitch that those clauses connected by conjunctions.

The between-speaker data are summarized in Table 8.

	N	Per Cent Subordinate	Average % Subordinate
participles	4	50	
purpose clauses	4	25	
answers	76	53	
fragments	35	46	50

Table 5.8. Pitch Subordination Figures for Between-Speaker Clause combinations.

There is no support for Hypotheses 3 in the between-speaker data, nor for its corollary. The effect of speaker change on pitch is a problem which needs further research.

CHAPTER 6. INFORMATION AND PHRASAL PITCH PROMINENCE.

1.0 INTRODUCTION.

This chapter concerns the placement of phrase-accent or clausal stress, as it is defined by pitch prominence,[1] in conversation. The relevant phonetic variables are those which are described in Chapter 2. The information categories, which were only briefly mentioned in that chapter, will be the subject of this chapter. In this chapter some of the literature on the topic is summarized, and a taxonomy is described which is used in this study to describe new, contrastive and other kinds of information, providing for a category of type of information for every pitch prominence noted. Then, the results of this investigation are presented in terms of the hypotheses concerning stress as pitch prominence:

Hypothesis 4: New information tends to receive stress.

Hypothesis 5: When given information receives stress it is used to manage the discourse.

Hypothesis 6: Contrastive stress tends to be higher pitched than stress on new information.

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1. Theories of the perception of phrasal stress or accent in English range from those where in which stress is perceived as pitch change alone, as a combination of the factors of pitch level, duration and loudness, to those which view stress in metrical terms, as a rhythmic beat. In the present discussion of stress, it is described in terms of pitch alone, that is, in terms of pitch height and change in pitch height as measured by fundamental frequency.

2.0 DETERMINATION OF STRESS PLACEMENT

In this section normal and contrastive stress are defined. Most linguists, when considering the placement of clausal stress, have had recourse to the concepts of "normal" stress and of "contrastive" stress. Some definitions of normal and contrastive stress will be given in the following sections.

2.1 Normal stress. The definition of normal stress is has been approached in two ways: 1) by defining what word classes can be stressed, and what classes usually cannot be stressed. and 2) by describing where in the clause the stress occurs.

2.1.1 Normal Stress in terms of Word classes. Using the first approach, Pike (1945), as well as Kingdon (1958b) defined word categories which are normally stressable and those which are not. Thus, Pike distinguished between content words (stressable) and function or closed class words (non-stressable) and Kingdon presented a detailed list of such categories. A variant of this type of approach was also used in the speech synthesis program MITalk (Allen et al. 1987, which listed word classes in order of relative peak levels assignable when stressed. Their classes, in order of increasing peak height were:

Level	Part of Speech
0	article
1	conjunction, relative pronoun
2	preposition, auxiliary verb (unstressed modal, vocative)
3	personal pronoun
6	verb, demonstrative pronoun
7	noun, adjective, adverb, contraction
8	(reflexive pronoun)
9	stressable modal
10	quantifier
11	interrogative adjectives
12	(negative element)
14	(sentential adverb)

Allen et al.101

(In MITalk systems, parentheses represent features, not word classes)

2.1.2 Normal stress as Location in Clause. The "normal" location of clausal stress is usually defined as where the stress occurs when the clause is considered with unspecified context. The historical answer to where stress occurs with unspecified context has been that it falls on the last lexical item in the clause. The nuclear stress rule derived by Chomsky and Halle (1968) was a formal definition of stress location. It said that the rightmost item capable of taking (lexical) stress is the one that receives stress.

A definition of normal stress in phonetic terms was provided by Crystal and Davy (1969, casual style) in terms of tone units, with the normal stress being on the nuclear tone of the unit. Since the nuclear tone of a tone unit is normally the last stressed syllable with pitch movement in the unit, Crystal and Davy's definition is compatible with the nuclear stress rule.

2.2 Stress on Focussed Items.

An examination of naturally occurring conversation, however, reveals that speakers often put stress on lexical items which are not the last lexical items in a clause. A definition of stress placement taking this fact into account is that which associates stress with focussed or new material. Focus, as defined by Jackendoff for example, (1972:232ff) is defined as "the information in the sentence that is assumed by the speaker not to be shared by him and the hearer", and presupposition is the information assumed to be shared.

Quirk combined word class and the location of focus definitions in these terms: "The neutral position of focus is what we may call END-FOCUS, that is (generally speaking) chief prominence on the last open-class item or proper noun in the clause...Special or contrastive focus, however, may be placed at earlier points, and so may fall on any of the non-final elements of the clause." (1972:938).

2.3 Stress on New Information.

Another definition of where stress occurs associates new information with the pitch peaks which are called tone units by Halliday (1967, 1985). The terms "given" or "old" are often applied to information which is not defined as "new".

Theories of discourse involving new and given

information had their beginnnings in the work of the Prague School of linguistics, which used the terms theme and rheme, and in the work of Halliday, who defined a message in terms of a given and new dichotomy. Halliday defined an information unit as consisting of one item of new information, plus optional given information.(1985:275) He defined a tone unit as the phonetic realization of an information unit, with the nuclear tone marking the information focus decided upon by the speaker, or new material. His definition of "new" included constrastive material, that is, new information may be either "cumulative to or contrastive with what has preceded" (1976:211) By "new", Halliday meant that the material is not recoverable by the listener. (1967:204).

Chafe (1987), in a dynamic approach to the problem, described conceptual information in terms of "activation states", which include "active", "semi-active" and "inactive" states. These terms can be associated with some uses of the terms "given", "accessible" and "new". When Chafe talks about a not previously activated concept, he refers to introducing new material into the discourse, where new is "what the speaker assumes he is introducing into the addressee's consciousness by what he says" (1976:30). Thus a "previously inactive concept" is Chafe's definition of what parallels "new" in Halliday's theory. An inactive concept is one that is in a person's long-term

memory, "neither focally nor peripherally active" (1984:9.) "Given" concepts for Chafe are those which are activated and assumed by the speaker to be in the hearer's consciousness.

Degress of newness and givenness may occur. Chafe (1976,1984) qualified his definition of newness, pointing out that an element which has not been mentioned for some time in a text may be treated as new (or "previously not activated") again, though how long this interval may be is not clear. Also, there are other kinds of givenness in addition to having been previous mentioned in the text. For example, the first and second person pronouns occurring in texts are "givens", even when not occurring previously in the text.

Some generic terms such as "the moon" are always accessible, although not in the text. Other concepts are inferrable from what is given, such as parts of a house when the house has been mentioned. Such concepts are coded as "semi-active" or "accessible" concepts.

Nevertheless, the notion of recoverability provides a workable definition for coding texts, and was adopted for this study, although some difficulties arose. Part of the difficulty of defining new information was the problem of deciding what units newness refers to. Some researchers, for example Chafe (1987), included concepts which he identifed as "things, events and properties" (1984:9ff.) That is, he included adjectives and predications as well as

NP's, but excluded adverbs. Others would include discourse information and pragmatic information as new information.

2.4 Contrastive Stress.

Most definitions of normal stress also include some mention of non-normal stress, often called contrastive stress. Halliday, as mentioned above, considered contrasts, along with new information, as items which are fresh information and receive stress. Cruttenden (1986) stated "the scope of focus [which carries the nuclear tone] itself is governed by considerations of NEW and OLD information, and contrastivity..." (Cruttenden 1986:131). These authors consider contrastive information as not-new information which nevertheless receives stress.

2.4.1 Normal-abnormal contrast. In the literature there are two primary definitions of contrastive information. One definition assumes that every sentence has a normal, default stress, determined either by syntactic structure or by information focus. Any case, then, in which a non-normally stressed word receives the stress is considered contrastive.

The normal stress location is defined as occurring on those words which normally accept stress. Other stressed word classes are called contrastive. For example, pronouns normally do not receive stress, and when they do, the stress is called contrastive.

For the other definition of normal stress, where stress

is defined by location, as in the nuclear stress rule, the abnormal stress is that which occurs anywhere else. Chomsky and Halle did not attempt to account for contrastive stress.

2.4.2 Notional or semantic contrast. A second kind of definition of contrast is based on the idea of semantic contrast, as Bolinger (1961) called it, "A rather than B". A definition of this type was given by Chafe (1976) who claimed that contrastive information is qualitatively different from new information and must be categorized separately. In contrastive circumstances the speaker assumes a limited set of candidates for a slot, known to the listener, and he fills it with the correct candidate, as in

(1) A: I didn't know Susie could cook so well
--> B: She can't. RONald made the hamburgers.
Couper-Kuhlen1986:125
(after Chafe 1976)

where Ronald is selected from the limited set of possible cooks known by the hearers. (As in all of the examples, capitalization marks the stressed syllables or words).

The two types of definitions of contrastive stress, as stress on a non-normal item or in a non-normal location, vs. stress on notional contrast, result in different judgments of contrastivity. For the example below, the nuclear stress rule or end-focus rule would put the stress on the object NP. Its occurrence is unaccounted for by the nuclear stress

rule. In the example the subject of J's talk had been brought up several minutes earlier in the conversation, and MA is returning to the topic here.

(2) --> MA: They DREDGED the entire university
to find people for Jerry's talk JOB138

Yet verbs belong is the open class of stressable words, and so are acceptable to receive stress by the normal word class definition. There is no notional contrast in this example to account for the stress. This is normal stress in my taxonomy, described in Section 3.

There are also notional contrasts which do not strictly fit Chafe's criteria for contrast, such as the following where no assertion is made as to the proper slot-filler.

--> (3) S: Is she COLLINS
--> or is she WILSON. WOM336

Example (4) is a case of notional contrast in which the item or items contrasted with are not present. The word *glass* is contrasted with whatever other materials doors are made of.

(4) Py: and you could SEE +
--> it was a GLASS door VES1115

These are contrastive in my taxonomy.

The taxonomy adopted here combined the notional contrast definition and the non-normally-stressed-word-class

definition to identify contrastive stress. No use was made of the nuclear stress rule. When contrastive items also carried new information, they were nevertheless classed as contrastive.

Obviously it was not possible to assign a given/new or contrastive information status to every stressed word, since some words or syntactic groups do not carry that kind of information, but still are stressed. Some syntactic groups such as those with only adverbials, communicate not conceptual information but social meanings of agreement or support (Brazil, Coulthard & Johns 1980). Some carry information of a pragmatic sort. As Halliday states, the "'message'" may be of any kind, such as 'how do you do' where the 'new information' is simply that the speaker is well-disposed..." (1970a:41f).

Chafe lists hedges, epistemic attitudes, tenses, and aspects as other ideas that are expressed in tone units (with a stressed nuclear tone). Cruttenden (1986:131) lists also the categories of "echoes" and "insists" which receive focus. In the next section, the taxonomy used in the present study is described. Those categories other than "new", "given", "accessible" and "contrastive", are defined in the taxonomy description.

2.5 Summary.

Several researchers have defined the locus of stress placement as either on "new" information (where "new" is

defined by the researcher) or contrastive information. Contrastive stress was defined as occurring either on certain word classes (function words) not normally stressed, or on words expressing notional contrast.

Other kinds of expressions carry other kinds of information and may receive stress. They will be defined in the next section.

3.0 TAXONOMY

In this section the taxonomy of information status of stressed items used here is described, and examples are provided for each. This section expands the brief list of information categories presented in Chapter 2.

3.1 New.

In this study, Halliday's definition of new information is used, defined as not recoverable from the text or from the physical context. "New" may apply to noun phrases, verb phrases, predicates and adjectives.

3.2 Given.

Given information is that which is recoverable in the text (having previously been mentioned), or from the physical context.

3.3 Accessible.

The term accessible (Chafe 1987) is used to describe elements inferrable from the text or from general knowledge. They include concepts which belong to the set of

expectations associated with a schema such as that described by Schank and Abelson (1977). For example, in (8) a vestibule is mentioned, and subsequently the two doors to the vestibule are mentioned in definite form, their presence being inferrable from the existence of a vestibule. Accessible also includes concepts in the text but not mentioned for some time.

The examples below illustrate new, given and accessible information.

```
     (6)
new    --> C:  well what did they TAKE?+++
new    --> K:  they took the uh color TELEVISON set.
new    --> C:  (well) isnt it NICE~ when they
given -->      only take things like THAT.          ROB274

    (7)
new     -->  K: because the police,
given     -->   the POLICE are so: stupid
contrast -->    I was the one
given     -->   who had to find that window
new       -->   SHOW them that actually
                that's where they came in.          ROB2137


 (8)  PY:      But at ANY rate,
discourse-->   you COME out~
new       -->  and there's a little old-fashioned VESTIBULE
                 type thing.
discourse-->   So you COME out
accessible->   the FIRST door, and then
accessible->   there's the OUTSIDE door.            PEY808
```

The first stress in Example 8, on *ANY* is not marked for givenness. This is because *ANY* is not used here as a concept (a thing, event or property), but rather as a discourse marker indicating resumption of a previous topic. The stressed word *COME* on the second line of (8) repeats an

earlier identical statement, and so was considered given information, as was the second *COME*. But in both cases, *COME* also served as a discourse marker indicating resumption of a previous topic.

The category of "given" or "active state" was further subdivided in terms of the function of the item. Hypothesis 5 states that stressed given information is used to hold or get the floor, or to sustain a current or previously current topic in the talk. The use of stressed given information for floor-management is illustrated in example 9, in which K is telling a story. On the fourth line, K repeats part of the second line after C's comment, retaining the floor by repetition, with the same stress, of the last successful turn. In the eighth line C finishes a sentence of K's. K immediately resays C's contribution with the same stress, incorporating it into the story and retrieving the turn. Example (10) is another illustration of turn control by resaying.

```
     (9)        K:  There were a whole lot of things, the clock
                    radio with all these things wound AROUND it.
                C:  it was there
repeat   -->    K:  a couple of radios with things wound AROUND it
                    and other things.
                C:  O:::h
                K:  all SITTING there ++ WAITING
                C:  to be picked UP
resay -->       K:  to be picked UP. And nothing (there)
                                                        ROB3999

     (10)       Pete: and behind it there's a counter and a SINK
resay-->        Rod:  there's a SINK on one side and a  counter
                       on the OTHER.                     APE638
```

Stressed given material is also used for topic maintenance, repeating an item earlier in the talk, after a digression. The digression may have been by the speaker, as in example (8), or it may have been an interruption by others, in which case the stressed given material also serves the function of retrieving the turn. The repeat of stressed given information below serves to maintain the topic.

```
          (11)  C:  and  this  went on for 24 HOURS.
                S:  Oh  no.    -->
repeat -->      C:  24 HOURS. That dog did not lift,
                    he didn't move                      DOG829
```

Some repeats are not word for word, but are paraphrases. The next example followed talk about the seven "Planet of the Apes" movies.

```
     (12)     P:  I remember  when  they  were
                  showing them ALL in one week on Channel 5.
 Paraphrase-->S:  Oh, the whole ape SERIES.            APE156
```

Stressed given information was coded for repeats of others' utterances (mostly resaying), self repeats solidifying turn and self-repeats solidifying topic, and miscellaneous.

A new/accessible/given status was assigned to referential NP's if they occurred in a syntactic group. When no such NP occurred, verbs, predicates and complements, adjectives, and adverbial complements were coded as carrying new, accessible or given information if possible.

3.4 Contrastive information.

For contrastive stress I used a combination of Chafe's notional contrast definition and the word class definition, which calls stressed function words contrastive. The two definitions often coincide, as in the case of (15) where the *I* is a closed class, usually non-stressable word, and could also be said to contrast with "people who didn't listen".

Examples of normal and contrastive stress follow.

```
    (13) C:    and you taste it.
 normal -->    It tastes TERRIBLE.                    WIN564

    (14) S:    quote "DUE southwest,
               southEAST
 notional      until you get to the Colorado RIVER
 contrast -->  You see, that's the DIAGONAL slash.    SUR578

    (15)  MA:  You know a GRADUATE student put a NOTEpad out
               but he doodled and then he fell asleep
                          @@@@@@@@@@
contrast -->J: Thanks for telling me
class -->   MA: I listened.                           JOB325
```

3.5 Insists.

While these definitions of new, accessible, given and contrastive information cover a large proportion of the stresses, there are some stressed words which do not fit these definitions. One type, illustrated in the following examples, was called "insists" by Cruttenden 1986:93). "Insists" include counterpresuppositions which deny something earlier presupposed by previous speaker, and also cases in which previous speaker was not involved, as in

"There was nothing else to DO".

```
     (16)     C:  they'd get UP +
                    show you the way out +++ anyway.
 insist  --> PY: It WAS the way out +$$+,
 contrast-->     but it turned out there was ANOTHER
                 way out +@@@@@@@@@+ that I didn't $
                 realise I should $ have been taking.
                                                      PEY1681

     (17)     C:  WHY would anybody turn over the
                     wastebaskets?
              D:  I'm not sure they were.
 insist ->    K:  it WAS!                              ROB3775
```

In these examples "WAS" is the "insist" (also classed as a disagreement in other types of analyses). In the first example, "ANOTHER" was called contrastive because it clearly referred to the second, preferred element of a pair.

The next two examples are classifed as repairs in interactional terms. I have classed this type with "insists", enlarging the category to "insists and self-repairs."

```
     (18)   K:  But I think they were~
      -->       WE think that ++++++++                 ROB361

     (19)   C:  not in a plastic bag ++++++++
      -->       a NYLON net bag.                        WIN71

     (20)   C:  we gave our old ++++DOG~
      -->       I mean BOTH dogs                       DOG197
```

3.6 Polarity Information: Yes/No answers to questions.

A separate information category was made for short answers to yes/no questions, such as *yes*, *no*, *uh uh*. Such utterances verify or disagree with previously stated textual

information, or request such information. Examples are given below.

(21) Steve: Have they MOVED the monument now?
Yes/no --> Rodney: I THINK SUR138

(22) S: Were they empty?
yes/no --> K: NO ROB785

This category appeared upon inspection to be sometimes high-pitched, and was a category used by Boyce and Menn in their study of parent child speech.

3.7 WH questions.

WH or specification questions where the WH word is stressed were put in a separate category. These are requests for information about given propositions.

(23) wh --> S: WHY am I wrong? Robber 1115

3.8 Discourse markers.

Stress placement may be used to organize discourse. This means using normally non-stressed items to gain the floor, or to introduce new topics or to indicate returns after side sequences or topical digressions (Lehman 1977, French and Local 1986, Abdul-Ghani 1978). In the following example the speaker makes a digression on the fourth line. The return to the main story line is indicated by the phrase *at ANY rate*, which returns the listener to the story at the point where the diversion began. This return is reinforced by the repetition of the stressed verb *COME*.

```
(24) PY: Well  +++++++  $$ You sort of COME  down
         through  this+++you know this ++ CASTLE,
         +++++++++ down the MAIN stair,
         I mean THEY live on the TOP two floors, +
            and the bottom   the WHOLE bottom area
            is being renovated
            so it's sort of derelict ++++++++
            And to get out the FRONT DOOR is just,
            you know I mean ++++
            it's like going through a TENEMENT
            or something.+++++
discourse-> But at ANY rate,
         you COME out +++
         and there's a little old-fashioned VESTIBULE
               type thing.                          VES630
```

Another example of a discourse marker is in clefts, pseudoclefts and other fronting expressions, preparing the listener for a new idea, as in (25).

```
discourse -->(25) PY: the thing IS though
                      that it needs a TREMENDOUS amount
                      of ren renovation              VES425
```

These are organizational moves or acts, making the discourse coherent to a listener, and are without the kind of semantic information defined as given or new.

3.9 Adverbs and adverbial phrases.

Adverbs and prepositional phrases of time, place or manner refer to the objects and events under discussion, orienting the listener. Adverbs are not usually classified as containing new information, so they are tabulated separately.

```
     (26) C:    how had they gotten in
adv   -->       the other time?                     ROB535
```

```
     (27) Rod:  (there's) this $ this GUY in an $ APE suit
                &&&&&&&&&&&&&&&&&&&&
          Len:  sitting l  waiting &&&&
pp -->          for almost the enTIRE HOUR
                to get out                                APE824

pp-->(28) Rod:  For a LONG time
                the place where the four states meet~
          Len:  [the four corners                          SUR1
```

3.10 Uncodable.

A separate category was made for syntactic groups which I was not able to code. These include false starts where no information was completely conveyed as well as rote expressions such as *mind you*, *I see*. *Well* was included here although it functions as a discourse marker. It was included here because it didn't fit well in any other category, and was usually so low pitched as to be almost unidentifiable phonetically.

In terms of pitch this category was a mixture, since many false starts were also turn beginnings or overlaps, tending to be high pitched, whereas the rote expressions tended to be low pitched. An example follows.

```
--> (29 )   Len:   They made=
-->         Pete:        = they [made a
            Len:               [and  then they could go on
                   and make  seven $ more $ movies.   APE89
```

3.11 Summary. This section has described the taxonomy used for coding stress-receiving items. Stress was defined as an Fo peak in which the Fo reached the top line of a

pitch envelope, as described in Chapter 2, and in Section 4. The coding was all-inclusive, that is, every stress was categorized. The categories included not only the traditional information categories of "new", "given", "accessible" and "contrastive", but also "insists and self-repairs", "polarity answers", "wh questions," "discourse markers",. "orientation adverbials", and "uncodable". All of these categories except the last convey some kind of information, referential, attitudinal, or textual, and any one has the possibility of being stressed.

4.0 PHONETIC QUALITIES OF PHRASAL STRESS

Stress is a perceptual phenomenon, and therefore elements identified as stressed from Fo curves are not guaranteed to be the same elements which are heard as stressed by listeners. There is as yet no reliable way of telling from Fo data whether a given pitch rise or fall is heard as stressed. No effort at experimental perceptual validation of stresses assigned was attempted here. The relationships found in this study between pitch prominence and information are only claimed to hold for stress as identified herein.

4.1 Identification of peaks.

In order to identify peaks in the data, the pitch envelope defining a pitch group described in Chapter 2 was used. A prominent peak was assumed in cases in which the

pitch reached the top line of the envelope. In a few cases more than one peak occured per pitch group. Figure 1 shows the identification of peaks in register envelopes.

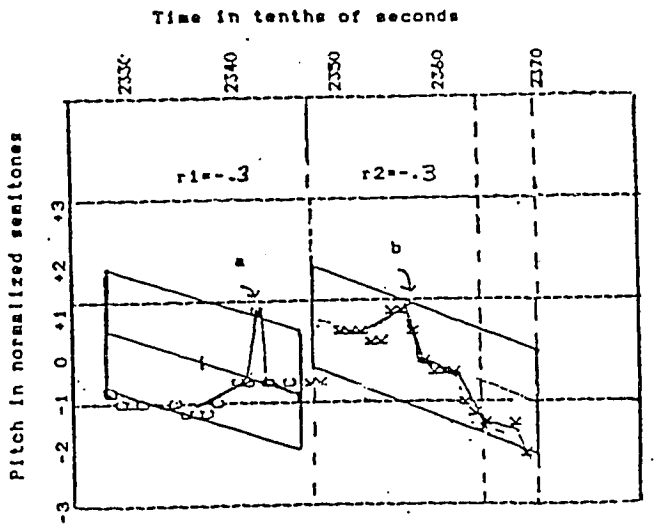

Figure 6.1. Peaks Identified from Register Envelopes

4.2 Height of pitch.

The height of the pitch peak was taken as the pitch register of the pitch group. Also measured were the changes in pitch of each syntactic group from the preceding syntactic group. It has been argued that the relevant perceptual cue to stress is the change in pitch, rather than the absolute pitch. For this reason both measures have been noted in the following tables.

5.0 RESULTS

The data presented below consist of tables and charts

showing the relation of the information categories and the measures of pitch. These measures are

1) the distribution of the information categories in the data,

2) number of pitch peaks (here also called stresses) which were associated with each information category,

3) the percentage of each category which was stressed,

4) The mean pitch register for the groups, and the change in pitch register[2] from the preceding pitch groups.

5.1 Distribution of Categories and Peaks.

Figure 6.2 shows the distribution of the information categories in the data (light bars) and the distribution of stresses in the data (dark bars). The most common information category was "new" which accounted for 46 per cent of the syntactic groups.

The distribution of stresses in the data paralleled the distribution of the information categories, with some exceptions. New information accounted for 50 per cent of the stresses, more than expected by chance,and the difference was statistically significant. Given information also accounted for a greater numer of stresses than would be

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2. Pitch register data are given in terms of pitch groups, which may contain more than one syntactic group. This means that the register for two adjacent syntactic groups may be the same, although if register were assigned separately to each syntactic group they might differ.

expected by chance. Table 1.1 gives the data for this chart.

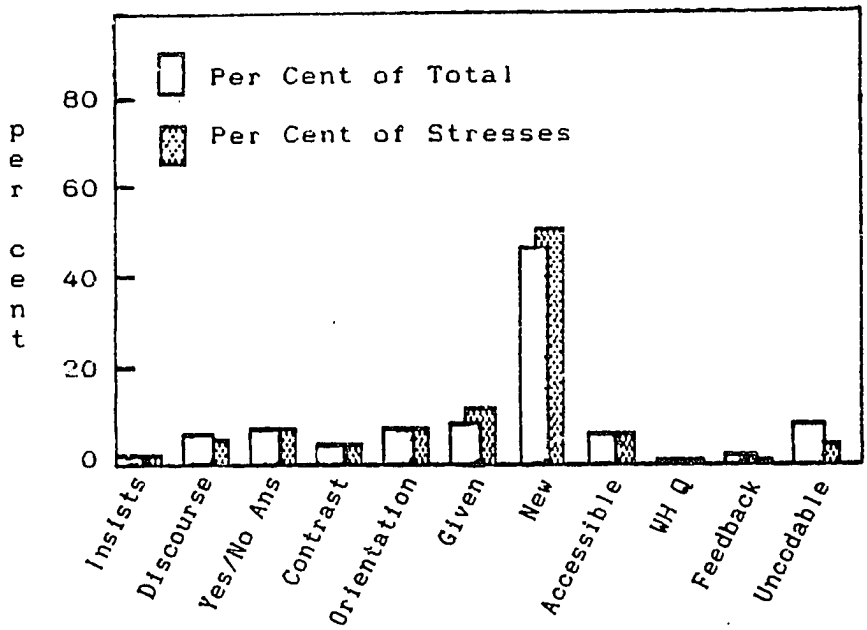

Figure 6.2 Distribution of Information Categories and Stressed Information Categories.

Category	Total N	Per Cent of total	Peaks in Category: Number of Peaks	Per cent Total
Insists	22	2	18	2
Discourse	85	6	55	5
Yes/no	93	7	72	7
Contrasts	58	4	55	4
Orientation	107	8	65	8
Given	122	9	74	12
New	603	46	437	50
Accessible	76	6	47	6
Wh questions	22	1	17	1
Feedback	31	2	7	1
Uncodable	123	9	45	4
Total	1322	100	892	100

Table 6.1. Distribution of Fo Peaks among Information Groups

5.2 Percentage of Each Category Stressed

Figure 6.3 shows the percentage of each information

group which contained Fo peaks which have been defined as stressed.

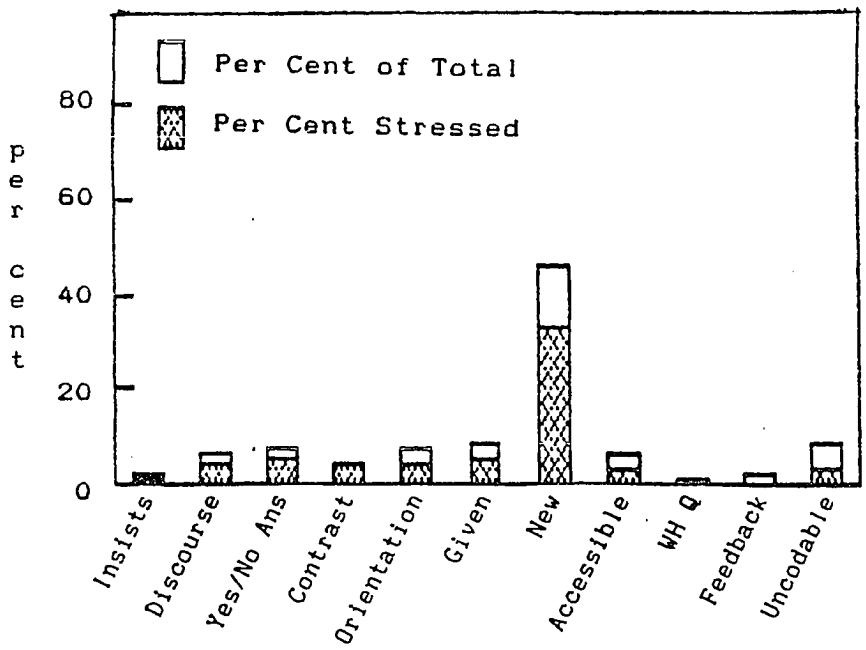

Figure 6.3 Percentage of Information Groups with Fo Peaks

In this figure, the total height of the bars repeats the information in Figure 6.2 about the distribution of information groups. The dark bars represent the percentage of each information group which was stressed.

The most noticeable feature of this chart is that while the conceptual categories of new, given and accessible were stressed a large proportion of the time, the interactional categories, though smaller in number, tended to be stressed proportionately more of the time. Only the feedback and the uncodable category had a smaller

proportion of stresses. The data for this figure was computed from Table 6.2.

Category	Total N	Number of Stresses	Per cent of Category Stressed
Insists	22	18	82
Discourse	85	55	95
Yes/no	93	72	77
Contrasts	58	55	95
Orientation	107	65	61
Given	122	74	61
New	603	437	72
Accessible	76	47	62
Wh questions	22	17	77
Feedback	31	7	23
Uncodable	123	45	36
Total	1322	892	67%

Table 6.2. Percentage of Information Groups having Fo peaks [3]

Overall, 67 per cent of the syntactic groups had stresses. Of all the syntactic groups with "new" information, 72 per cent had stresses. But 62 per cent of the "accessible" and 61 per cent of the "given" items also were stresses. Thus hypotheses 2, that "given" information would not be stressed, was not supported.

5.3 Pitch Height by Information Category.

Figures 6.4 and 6.5 show mean pitch register and the mean change in pitch register for the different information group categories.

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3. The number of stresses is greater than the number of pitch groups as shown in previous chapters because sometimes two stressed items occured within a single pitch group.

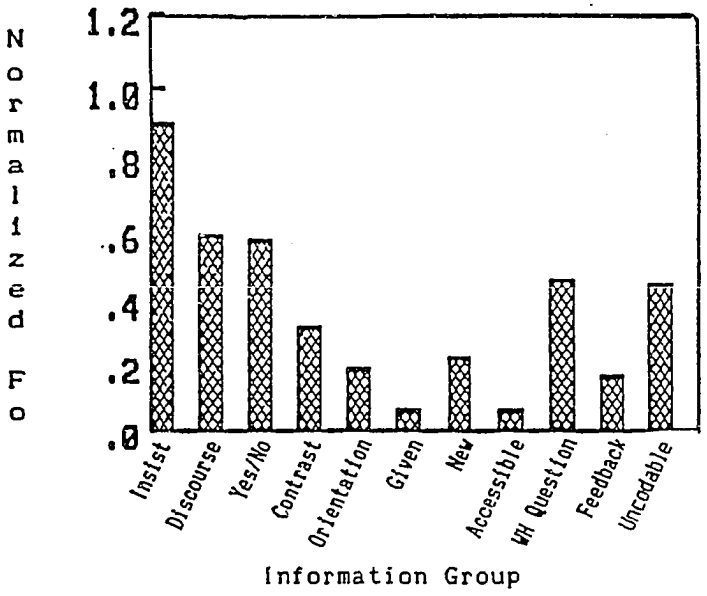

Figure 6.4. Mean Pitch Register by Information Group

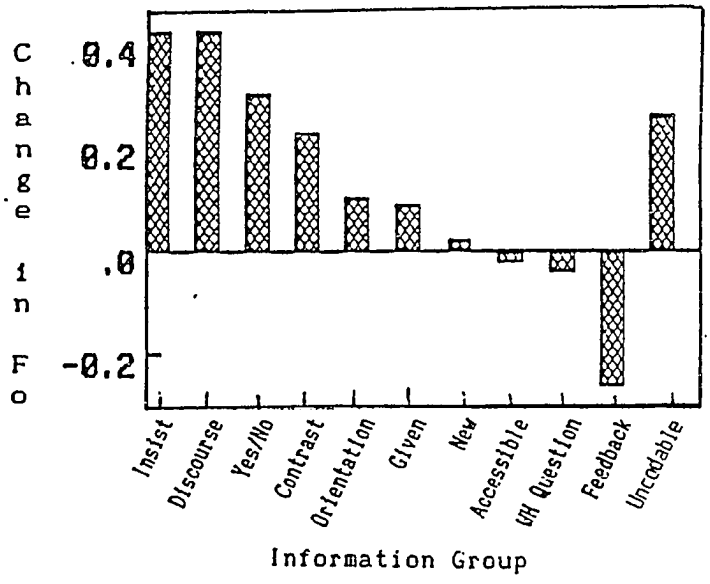

Figure 6.5. Mean Change in Register by Information Group

From these figures we can see that 1) the two register

measures give close to the same order for ranking the Fo height of the groups, and 2) the new information category ranks far below the categories of contrast, insists, polarity and discourse variables in amount of pitch change, as well as below orientations and given information. Only accessible information, WH questions, and feedbacks rank lower in pitch change. In terms of Fo height, new information ranks below everything but accessible information and feedbacks.

Table 3 gives the data for these Figures.

	Syntactic categories with peak prominences only		
Information Status	Mean Pitch Register	Mean Change in Register	N
Insists	.90	.42	18
Discourse makers	.59	.42	55
Yes/No answers	.58	.30	72
Contrasts	.32	.22	55
Wh question	.46	-.04	17
Adverbs oftime/place	.19	.08	65
Given	.06	.09	74
New	.22	.02	437
Accessible	.06	-.02	47
Feedback	.17	-.26	7
Uncodable	.45	.26	45
total	.28	.11	892

Table 63. Mean Pitch Register and Change in Register by Information Group

As can be seen from the data in the tables and the figures, the highest pitch registers and changes in register occurred in categories which have abnormal stress, in terms of usual definitions of normal stress. The "contrastive", "insists" and "discourse" categories were consistently

higher in Fo than any of the information categories. Yes/no questions and answers were also were high in Fo. These categories carry primarily interactive or social information. Contrastive information, insists, and polarity information, are used to make sure that the listener has the correct facts. Discourse information is used by the speaker to guide the listener as to what to pay attention to, and keep his place in the talk. If one assumes that higher pitch, or greater change in pitch implies that the speaker feels the item is more important to his communication than lower pitched utterance, because of its greater deviance from the norm, then it must be concluded that speakers feel that this interactive and discourse information is more important that that of any of the other types of information categories.

5.4 Pitch Height of "New" Word Classes

The category of "new" information, while it accounted for 50 per cent of the stresses in the data, was shown not to carry the highest pitch prominences. This could possibly be due to the heterogeneity of the "new" category - it included not only new NP's, but also verbs, predicates and complements, as well as adverbs modifying adjectives.

An examination of the category "new" in Table 4 shows the contribution of the various syntactic categories to the low pitch level for the total. The categories distinguished

include adverbial complements, adjectival predicates, verbs, closed class words such as pronouns, which were stressed, lexical NP subjects and objects, and predicates and complements.

	Register	Change in Register	N
Adverbs	.21	.11	51
Adjectives	.24	-.02	68
Verbs	.31	.10	102
NP Subjects	.15	-.09	41
NP Object	.22	.04	150
Predicates/Comps	-.13	-.06	15

Table 6.4. Fo of Elements in the "New" Group

Looking at the Fo of syntactic categories in the "new" group, the subject NP's are ranked lower in mean Fo and Fo change than any other group except detached predicates and complements, although NP objects average somewhat higher in Fo. Stressed verbs and adjectives, and for pitch change, adverbs, were more prominent in pitch than NP's. The lower pitch of the "new" category occurs primarily with NP subjects and predicates or complements. Referential NP's were not higher pitched than other new information.

A comparison of lexical and pronominal stressed NP subjects and objects is shown in Table 5. There is a tendency for pronominal subjects and objects to be higher in Fo than lexical arguments.

	Mean Register	Change in Register	N
Lexical subjects	.18	.06	40
Pronominal subjects	.28	.07	17
Lexical objects	.25	.02	124
Pronominal objects	.45	.75	2

Table 6.5. Fo Statistics of New NP's by Grammatical Role

Some of the items labelled contrastive are also new information, but this category totalled only 30 new items, and added into the 603 new items did not change the average significantly.

5.4.1 Turns and Pitch Height. The question arises as to why stressed NP's tend to have lower Fo than stressed adjectives, adverbs and verbs. A possible answer is their position in the talk. As is shown in Chapter 7, syntactic groups which were turn initial had higher pitch than those that were not. In a narrative, or extended turn, there would tend to be more non-turn-initial new material, so the NP elements with new/given status would tend to have lower pitch.

Table 6 shows the distribution of initial and non-initial turn status for the stress categories. The new information groups tended to be largely non-turn-initial, and the distribution of new turns significantly differed from the total turns at the .001 level. The difference for accessible and given syntactic groups was not statistically

significant.

	Number of Turns Initial	Non-initial	Total	% Turn Initial
Insists	7	6	13	53
Contrasts	4	34	38	25
Discourse	20	31	51	64
Yes/No Q and A	48	22	70	66
WH Q	6	7	13	47
New information	120	309	429	28
Accessible	10	37	47	21
Given information	39	72	119	32
Orientation	9	55	64	16
Feedbacks	3	4	7	43
Uncodable	22	23	46	48
total	296	596	892	33

Table 6.6. Number and Percentage of Initial Turns by Information Group

The categories carrying information of a contextual kind tend not to be turn initial, whereas those categories having to do with truth or falsity of statements, such as questions and answers, insists, as well as those categories managing the discourse, tend to be turn initial. While pitch is related to turn status, this is due at least in part to the kind of information in initial turn positon vs. non-initial turn position.

5.5 Given Information and Stress.

Hypotheses 5 stated that stressed given information would be used to manage the discourse. In this section I will examine the uses of stressed given information in light of this hypotheses.

Stressed given material as used here excludes pronouns

and demonstratives, classified here as contrasts: and auxiliaries and proverbs, classified mostly as insists.

Hypotheses 5 concerns stressed repetition of lexical items. Lehman cites examples of these uses where self-repetition is used in getting a turn, by repeating an utterance until people listen.

Another turn-managing functions mentioned earlier is resaying, or repeats of others utterances.

Example 30 illustrates stressed given information in answers to questions. In this case the question, an NTRI, also contains stressed given material. Repetitions such as those in (30), coded as miscellaneous, reflect the parallelism in conversation, said by Tannen (1987) to ease the production and interpretation problems of speakers, and to show participation by participants.

```
     (30)  MA:  and so the SECOND day the was NO TEA ++++++++
                There were about a third the number of people,
given  -->  J:  Was there NO TEA?
insist -->  MA: There was NO TEA.
            J:  Really?
insist -->  MA: NO TEA the second day.                JOB1172
```

In the present data, turn maintainence was indicated by self-repeats and resays, and topic maintenance by repeats, paraphrases and elaborations. About half of the stressed repetitions of lexical material in these data were used to maintain topical cohesion, and a quarter maintained turns, although separation of the functions was often difficult.

The "other" category included miscellaneous utterances such as repairs, and a vocative. The stressed given material by form is listed below.

repeats	19
resays	13
self-paraphrase	12
elaborations	12
rote sayings	3
pronouns	8
other	19

In summary, stress on given material, in addition to creating textual cohesion, may be used to maintain turn status, that is keep the floor. However, a certain proportion of stressed given lexical items reflects other social functions such as participation, humor, and the ease of parallelism. Hypothesis 5, that repeated given information is used to manage the discourse, in Lehman's definition of management of discourse, is not completely supported.

6.0 SUMMARY.

Stress was defined as an Fo peak, and the number of peaks and measures of the peaks in Fo height and change were computed for all stresses so identifed in the data. A taxonomy was devised which classified for each stress the kind of information the syntatic group conveyed.

While syntactic groups carrying new information tended to receive pitch prominence, those carrying given information as well as other kinds of information also

received pitch prominence. The largest propostion of stresses per category and the highest Fo were associated with the information groups of insists, contrasts, polarity information and discourse variables. The lowest proportion of stresses per category and the lowest pitch were associated with feedbacks and accessible information. New information stresses were below the average of all stresses in pitch and pitch change.

This means that the most deviant, and therefore the most noticeable, pitch and pitch changes occurred with the variables which are directed toward ensuring that the speakers' facts and opinions are correctly stated, and that the listeners keep track of the topic under discussion. Speakers in these data reserve their highest Fo prominences for making clear the facts about given information rather than for new textual information. Pointing out discrepancies which the speaker believes the listener is not aware of, and cueing the listener to points of view during the discourse are more important messages sent to the listener than pointing out new information, if relative pitch height is any measure.

Speakers have a choice as to what words receive stress, but when "non-normal" choices are made, they will tend to be marked by extra-high pitch.

The hypotheses set out at the beginning of this chapter were:

Hypothesis 4: New information tends to receive stress.

Hypothesis 5: When given information receives stress it is used to manage the discourse.

Hypothesis 6: Contrastive stress tends to be higher pitched than stress on new information.

In regard to hypothesis 4, while new information did tend to receive stress, other categories of information type tended to receive stresses in greater proportion. Therefore Hypothesis 4 was rejected.

In regard to Hypothesis 5, while stressed given material did often function to maintain turns, other uses of stress on given information also occurred. Hypothesis 5 was therefore rejected.

Hypothesis 6 was supported by the data.

CHAPTER 7. INTERPERSONAL AND TEXTUAL VARIABLES RELATED TO PITCH

1.0 INTRODUCTION.

It has been shown in the previous chapters that pitch group boundaries are related to syntactic boundaries, and that pitch level is related to the kind of information being conveyed. In this section I will examine the relation of pitch level to various interactive and textual variables.

One of the primary goals of this chapter was to determine the extent to which two different discourse modes could be distinguished by overall pitch level. In the first section I will distinguish between the discourse modes and then examine some variables occurring in interactive speech, which might be involved in making such a pitch distinction.

Two kinds of variables will be investigated: those concerned with boundaries of various sorts, and those concerned with the kind of interaction going on. I will first define and examine statistics relating to the discourse modes. Then I will demonstrate the effects of the individual variables studied. Lastly I will investigate which of the individual variables influenced the pitch of the two discourse modes.

2.0 MEASUREMENTS.

Recall that a syntactic group, as the term is used here, is a syntactic category in which it is expected that

no more than one main stress will appear, and which may be as short as an adverb or a "uh huh" or as long as a clause. Recall also that pitch groups are derived from fundamental frequency curves, and are defined by a grid covering a coherent organization of pitch points, with a declining baseline, and are described by a single number called pitch register. When a speaker's Fo reaches the bottom of his pitch range, or when the bottom line of the pitch grid reaches that level, then the declination line is reset and a new pitch group begins.

The Fo of syntactic groups as measured by pitch register can be expressed in two ways. It can be expressed as the register value for syntactic category or it can be expressed as the mean change in register for a syntactic group from the category preceding it in time. Both measures are reported in this chapter. For most of the hypotheses tested, measures of significance between means were the same for both measures, and the determination of whether the hypothesis was supported or not was based on the pitch register. For hypotheses 12 and 13, however, the determination of support was based on the change in pitch, since this was the way the hypotheses were formulated.

Other data of some interest included the relations between pitch group boundaries and other types of boundaries. The beginning of new pitch groups is correlated with syntactic boundaries, as shown in Chapter 4, but not

all syntactic groups begin new pitch groups. Factors other than syntax may influence where new pitch groups begin. The number of new pitch groups correlated with turn and topic boundaries will be shown.

While many of the variables influencing pitch are not independent of each other, in this section they are treated as such, being based on hypotheses independently derived from the literature. T-tests comparing the means for significance were applied. The problem of the interdependence of the variables is acknowledged, and a chi-square analysis was done to test this independence.

3.0 HYPOTHESIS CONCERNING SPEECH MODE

Hypothesis 7. Pitch level of narrations will be lower than that of talk characterized by short exchanges.

Speech mode, also referred to here as discourse mode, refers to the kind of talk which is occurring. Specifically in these data two styles were compared: a narrative or relational mode, in which a single speaker talked in long turns with occasional short feedback responses by others, and a conversational mode, in which several speakers exchanged short turns.

Hypothesis 7 predicted that a difference in average pitch would occur between the narrational and the conversational modes, with the conversational talk being higher pitched.

3.1 Story Talk vs. Non-Story talk.

The texts were first divided into segments which characterized what was going on in the talk. The segments reflected the nature of the talk, which consisted largely of a series of stories, including pre- and post-story talk and evaluations, connected by periods of short exchanges of a non-story nature. The divisions of the talk listed in Chapter 2 are repeated below.

Story talk	Non-story talk
orientation	short turn exchanges
pre-story talk	here-and- now talk (about immediate environment)
narration	
mid-story evaluation	
post-story talk	
procedural talk	

The above categories were regrouped on the basis of amount of interaction which was occurring between speaker and listeners. These categories were called "narrating" and "conversing" modes as convenient labels of differentiation.

Narrating	Conversing
procedural	short turn exchanges
orientation	here and now
narration	pre-story talk
	post-story talk
	mid-story evaluation

Narrating segments consisted of long turns broken only by feedback or other responses of no more than a single syntactic group. Conversing was characterized by short

turns and frequently alternating speakers. The pitch values for the two discourse modes are shown in Table 1.

	register	Change in register	N
narrating	.07	-.021	670
conversing	.35	.082	617
significance level	.001	-	

Table 7.1. Pitch level and pitch changes for two discourse modes.

The pitch values of the conversing group were higher than those of the narrating group. This difference was in the direction expected, that is the conversing mode had the higher pitch. The difference was significant for the means of the register values. The means representing amount of change in pitch did not differ significantly between groups. In this case the relevant figure is overall pitch level, rather than change in pitch from a previous utterance. It is the pitch of a continuous section of talk which is being analyzed. Hypothesis 7 was supported.

In the next section I will investigate some variables occurring in interactive and narrating situations which were expected to be related to pitch differences between the two modes.

4.0 HYPOTHESES RELATING TO BOUNDARIES

The following hypotheses having to do with boundaries will be investigated.

Hypothesis 8. Turn-initial syntactic groups will be higher in pitch than the preceding syntactic groups, and tend to coincide with pitch group boundaries.

Hypothesis 9. Extended clause beginnings will have higher pitch than non-beginnings.

Hypothesis 10. Topic beginning boundaries will have higher pitch than non-beginnings,and tend to coincide with pitch group boundaries.

4.1 New Turns.

Hypothesis 8 predicted that new turns (meaning speaker change) would co-occur with new pitch groups, and with a rise in pitch register. Table 2 shows the number of turn-initial syntactic groups which formed new pitch groups.

turn type	pitch group old	pitch group new	pitch group total	percentage new pitch groups
initial	21	368	389	95
non-initial	422	439	861	51
feedback	4	33	37	89
total	447	840	1287	65

Significance level .001

Table 7.2. Initial and Non-Initial Turns by Initial and Non-Initial Pitch Groups

Turn initial syntactic groups tended to be coincident with the start of new pitch groups, with 95% of the turn-initial syntactic groups forming new pitch groups. There were more pitch groups than there were initial turns. Of the 840 pitch groups, almost half, or 44 per cent occurred with turn-initial syntactic categories. That is to say, new turns were almost always also new pitch groups, but somewhat fewer

than half of the pitch groups occurred with new turn boundaries.

This tendency of turn beginnings to co-occur with pitch group beginnings is significant at the .001 level using the chi-square test.

4.1.1 Pitch Height of Turn-Initial Utterances. Table 3 shows the pitch register (Fo height) and change in register of turn-initial and non-initial syntactic groups.

Turn Status	Mean Register	Change in Register	N
Initial	.32	.17	389
Non-initial	.15	-.03	861
significance level	.001	.001	
Feedbacks	-.21	-.47	37

Table 7.3. Fo Height of Turn Initial and Non-Turn-Initial Syntactic Categories.

Turn-initial syntactic groups had a higher mean pitch register, and a higher mean change in pitch register than syntactic groups which were not turn-initial. Recall that the values for pitch register and change in register are given in terms of normalized scores with a mean of zero and a standard deviation of one. Thus the turn-initial register of .32 was higher than the non-initial value of .15, and the feedback value of -.21 was below the average pitch. The same relationship held for the change in pitch register, with a value of .17 for initial groups and -.03 for non-initial groups. Feedbacks again were much lower with a drop in pitch

of -.47. While feedback utterances are strictly speaking turn initial, their content (largely *uh huh*) was so different from that of other turn initial syntactic groups that they were counted separately. The significance levels were computed for the differences between initial and medial turns.

The figures for turn initial pitch groups are in the direction expected by hypothesis 8, and support that hypothesis.

4.2 Extended Clause Groups.

It was shown in Chapter 4 that the syntactic groups at the beginnings of extended clauses were significantly correlated with the beginnings of pitch groups. An aspect of syntactic groups not mentioned in Chapter 4 was the pitch level of extended-clause-beginning syntactic groups vs. that of non-beginning groups. Hypothesis 9 predicted that such clause-beginning groups would be higher in pitch than extended-clause-continuation groups. The figures in Table 4 show that extended-clause-beginnings do have higher pitch than non-beginnings, supporting hypothesis 9.

	register	Change in register	N
New x-clause	.27	.09	663
Same x-clause	.11	-.05	624
significance level	.001	.01	

Table 7.4. Pitch Register and Change in Pitch Register of Extended Clauses

4.3 Topic Change.

Hypothesis 10 states that topic beginnings, meaning syntactic groups occurring at topic beginnings, will have higher pitch than non-topic beginnings, and in addition will tend to coincide with reset pitch groups.

Not all of the data could be coded for topicality. Topic could be identified in argumentative or lecturing types of discourse but was sometimes difficult to identify in narratives, where a more natural division was into background vs. foreground or setting vs. events, and the material was often a relation of a series of events. But where topic change could be identified, it was so noted and the subset of data were used for the following tables.

Both topic change and aspect change were identified in the data.[1] Aspect change refers to a modulation of the topic, introducing some new aspect of a previously discussed topic, but not a complete change. "Other" utterances were all other utterances. The category "other" will always mean all utterances not possessing the variable under study.

4.3.1 Topic Change and Pitch Group Boundaries. The number of reset pitch groups by topic is shown in Table 5.

Both topic change and aspect change were significantly associated with new pitch groups, as compared to other statements. The sum of topic and aspect changes was also

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1. The terms for coding topic as well as those for coding attitude were those used by Menn and Boyce (1982).

significantly different from other statements. The significance level was .001 level for both associations.

	pitch group old	new	total	percentage new pitch groups
topic change	1	24	25	96
aspect change	20	196	216	91
Total change	21	220	241	91
Other	426	620	1046	59
Significance level	.001.			

Table 7.5. Topic and Aspect Change in Relation to Reset Pitch Register

The difference between topic change and aspect change was not significant. These figures support the first part of hypothesis 10, that topic boundaries are associated with pitch group boundaries.

4.3.2 Topic Change and Pitch Register. The Fo of syntactic groups which initiated topic and aspect change was expected to be higher than those groups which did not. The results of the topic computations are shown in Table 6.

	Register	Change in Register	N
Topic Change	.38	.13	25
Aspect change	.18	.15	216
Sum of Changes	.20	.15	241
Other	.19	-.01	1046
Significance	-	-	

Table 7.6. Pitch Register and Change in Register for Topic Changes.

In terms of pitch height and change in pitch, topic

change ranked higher than aspect change. Both had somewhat higher Fo than other responses, but the differences for pitch height were not statistically significant. Nor were the differences in the measure of change in pitch between topic change and other statements statistically significant. The second part of hypotheses 10, that syntactic groups which are topic boundaries will be significantly higher in pitch than other syntactic groups was not supported by these data. Hypothesis 10 was therefore rejected.

5.0 HYPOTHESES RELATED TO INTERACTION OF SPEAKER AND LISTENERS

In this section pitch changes identified with responses from listeners, that is those indicating listener involvement, were investigated. These included disagreements and agreements, laughter and support responses, direct quotations, interruptions and tries at interruptions, and verification questions. The hypotheses tested were the following.

Hypothesis 11. The pitch of syntactic groups which are interruptions or tries at interruption will be raised above average.

Hypothesis 12. Syntactic groups which are disagreements will have higher pitch than the previous syntactic group.

Hypothesis 13. Syntactic groups which are agreements will have an equal or lower pitch than the previous syntactic group.

Hypothesis 14: Pitch level rises as the amount of response from listeners increases.

Hypothesis 15. Direct quotations will have higher pitch than neutral utterances.

Hypothesis 16. Repair initiators (also called verification questions) will be higher pitched than preceding utterances.

5.1 Interruptions, overlaps and tries.

Hypothesis 11 relates to the pitch of syntactic groups which are interruptions, that is attempts to get the turn by interrupting, successful or not. Studies have shown (French and Local 1986) that pitch rises where there is competition for the floor. So the hypothesis is that such competition in the form of interruptions, tries, and overlaps would be associated with a rise in register. An interruption was marked whenever a speaker interrupted another and took the floor away from him. A try was marked when a listener tried to get the floor and failed. Overlap was coded when someone's speech was overlapping, for example at the end of a turn, or when there was background talking at the same time as the principal speaker's talk.

Table 7 gives the Fo values of pitch register and change in pitch register for interruptions, overlaps and tries.

Interruptions tended to be accompanied by a rise in pitch as well as being high in pitch register, as did overlaps. Tries were no higher in pitch than all other

categories, with a register value of .12 although the change in pitch was above the "other" figure. Since tries were unsuccessful attempts to get the floor, it may be that they were unsuccessful because they were not high pitched enough.

	Register	Change in Register	N
Interruptions	.56	.41	27
Overlaps	.36	.17	111
Trys	.12	.27	11
Sum	.38	.22	149
Other	.17	-.01	1138
Significance	.001	.01	

Table 7.7. Pitch Register and Change in Register for Floor Competing Syntactic Groups

Periods of interruption and tries were coded for the interrupter's speech, whereas the speech they were interrupting was coded for the speaker as having overlap. Some syntactic groups with overlaps, then, represented the speech being interrupted, and tended to be higher pitched than tries. (It was not possible to get pitch data for all attempts at interruption, but the fact of interruption was noted for the audience response measure.)

The difference in means between these floor-competing utterances and other utterances was statistically significant, as was also the difference between change in pitch and other utterances. These data confirm hypothesis 11, and also confirm French and Local's finding that

speakers raised their voices during attempts at interruption.

5.2 Disagreement and Agreement.

Hypotheses 12 and 13 have to do with speakers' attitudes of agreement or disagreement with a previous speaker. Hypothesis 12 states that syntactic groups which disagree with previous syntactic group utterances will show a rise in pitch, and hypothesis 13 states that syntactic groups which agree with previous syntactic groups will be equal or lower in pitch to the previous group.

Two degrees of disagreements were noted in the data: a direct challenge, marked by a *no* or other negative, and an indirect challenge, not so marked.

Agreement was more difficult to define. Two kinds of agreement were noted. Interactive agreement occurred when a speaker expressed overt agreement with another, often using the words *yes* or *right*. Topical agreement occurred when a speaker continued the same topic as was current, with no overt agreement or disagreement. Overtly expressed agreement was measured here.

The hypotheses about agreement and disagreement were stated in terms of the change in pitch which should occur, so that this measure will be the deciding one for these hypotheses.

Table 8 shows a comparison between disagreements and

other syntactic groups, between agreements and other groups, and compares disagreements with agreements.

	Pitch Register	Change in Register	N
Direct Challenge	.67	.46	30
Indirect Challenge	.47	.09	36
Total disagreements	.58	.29	66
Other	.17	-.03	1221
Significance	.001	.001	
Agreements	.75	.021	14
Other	.14	.020	860
Significance	.02	-	
Total disagreements	.58	.29	66
Agreements	.75	.021	14
Significance	-	.001	

Table 7.8. Pitch Register and Change in Register for Disagreements and Agreements

The pitch of total disagreements, at .58, was significantly higher than that of other statements, as was the change in pitch level, which had a value of a rise of .29. Both figures were statistically significant.

Agreements were significantly higher in pitch, than other statements, but had no appreciable change in pitch from the previous syntactic group.

The differences beween the means of total disagreements and agreements were not significant. Both categories showed raised pitch with respect to other statements. However, the difference between change in pitch were significant, with disagreements showing a mean rise in

pitch, while agreements essentially did not differ in pitch from the preceding utterances.

Based on pitch register level alone, it appears that the relationship between the pitch levels of disagreement and agreement as coded here is not a linear one, going from agreement through neutral to disagreement, but rather one in which a statement other than a neutral one is raised in pitch. By this criterion Hypothesis 13 is not supported.

However, if one considers the measurement of change of pitch level between syntactic groups, then the hypothesis does hold. Agreeing utterances are not higher in pitch than the preceding utterances.

Hypothesis 12, predicting a rise in pitch with disagreements is supported. Hypothesis 13, predicting that agreements would drop in pitch, or remain equal, is supported.

The difference in pitch change between agreeing and other utterances bears out the prediction that agreeing responses will be equal to or lower than their preceding utterances. However, the agreeing responses must be occurring in an period of generally high level pitch, or after a high pitched utterance, because of their high absolute pitch.

4.3 Audience Response.

Hypothesis 14 predicts that the pitch level will be

higher for periods when there is audience response than where there is not. The tabulation of responses here includes only feedback and non-lexical responses and laughter which occurred before the syntactic group concerned. Responses were also counted when occurring in the middle of the words of a syntactic group, that is laugh tokens inserted during the speech. Audience response describes supportive utterances, in contrast to the floor-competitive utterances of interruptions noted above.

Response from the listeners has been shown to be related to the Fo level of the discourse (Shapley 1987b). In these data the register values and change in register, shown in Table 9, support that finding.

	register	change in register	N
With response	.52	.13	252
Without respons	.11	-.08	1035
			1287
Significance	.001	.001	

Table 7.9. Pitch Register with and without Response

The pitch register of syntactic groups which follow or incorporate audience response is higher than for those groups which do not reflect response. Hypothesis 14 was supported.

5.4 Quotations.

Hypothesis 15 is based on the prediction that direct quotations represent a shift in viewpoint on the part of the

speaker which will be reflected in the intonation. It was expected that direct quotations would show a rise in pitch register, and indirect quotations would show no change from other speech. Table 10 shows these Fo data, compared with "other" statement values representing the neutral utterances. Direct quotes tended to be higher in pitch register than both indirect quotes and all other syntactic groups.

	Pitch Register	Change in Pitch Register	N
direct quotes	.52	.40	46
indirect quotes	-.16	-.09	27
significance	.001	.02	
other	.14	.01	1241
direct quotes	.52	.40	46
significance	.001	-	

Table 7.10. Pitch Register and Change in Register for Quotations

There were only 26 separate direct quotes in the data, involving eight speakers, so the figures are only suggestive. (The remaining cases are extensions of the original quotes to new syntactic groups). The difference in means between direct quotes and indirect quotes was significant. Also the differences in means between direct quotes and other utterances was significant. However, the differences between indirect quotes and other utterances was not significant. Hypothesis 15 was supported by the data.

5.5 Verification Questions.

Hypothesis 16 concerns a type of next turn repair initiator usually known as verification questions. Verification questions were found by Menn and Boyce (1982) to be marked by a large change in pitch register[2]. Table 11 lists the pitch data for these questions.

	Pitch Register	Change in Register	N
Verification Q	.76	.156	18
Other	.18	.020	1269
Significance level	.001	-	

Table 7.11. Pitch Data for Verification Questions

Verification questions were significantly higher in pitch register than other statements, but the difference in value for change in pitch was not significant. Hypothesis 16 was supported.

6.0 SUMMARY OF PITCH REGISTER VALUES.

Table 12 below summarizes the data presented so far for pitch register values. Significant differences are marked with an asterisk.

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2. Menn and Boyce's definition of verification questions was different from that used here, because it included only "echo" questions, whereas my definition also included non-echo verification questions, verifying context or shared beliefs.

	Pitch Register		N's	
	with variable	without variable	with variable	without variable
Turn Initial/not	.31**	.13	389	898
X-clause begin/not	.27**	.10	633	624
Inter/ovl/try	.38**	.17	149	1138
Disagree/not	.58**	.17	66	1221
Dquote/not	.52**	.14	46	1241
Topic chg/not	.38	.19	25	1262
Response/not	.52**	.11	252	1035
Qver/not	.76**	.18	18	1269
Agree/not	.74*	.14	14	1273
Conv/narrating	.07**	-.021	670	617

** significance level: .001.
* significance level: .01 or .02.

Table 7.12. Summary of Pitch Register Values

Most of the variables tested differed significantly in pitch register. Only topic change was not significantly higher in pitch. Agreements vs. other utterances, as well as direct quotations, were significant at a lower level. The lower significance level might be due to the very small N involved, but the differences are still highly significant.

The boundary markers of initial turns and extended clause beginnings were significantly higher in pitch than non-markers, but topic change was not significantly higher in pitch. All of the variables measuring interaction of speaker and listener were significantly higher in pitch than other utterances.

Table 13 presents the data for change in pitch register values. Again, significant differences are marked with an asterisk.

	Change in Pitch Register		N's	
	with variable	without variable	with variable	without variable
Turn Initial/other	.17**	-.03	389	898
X-clause begin/other	.088*	-.053	633	624
Int-ovl-try/other	.224*	-.007	149	1138
Disagree/other	.294*	.005	66	1221
Dquote/other	.404	.006	46	1241
Topic-chg/other	.128	-.018	25	1262
Response/none	.132*	-.008	252	1035
VerQ/other	.156	.020	18	1269
Agree/other	.021	.020	14	1273
Narr/conversation	-.021**	.082	670	716

**significance level: .001
*significant level: .01 or .02.

Table 7.13. Summary of Pitch Change Values

The differences in change in pitch were significant for fewer of the variables than the differences in absolute pitch. For those variables marking boundaries, the same two variables, turn status and extended clause status, were statistically significant, and topic change again was not.

Interruptions, disagreements, direct quotations and audience responses were significantly different in change of pitch level from other responses.

6.1 Independence of the Various Variables.

It has been assumed that the variables studied, which will be referred to as pitch-related variables, were independent of each other. In order to investigate this independence, a matrix of chi-square values was computed for the variables. This matrix is shown in Table 14.

	Clause	Turn	Interrupt	Quote	Response
Clause					
Turn	**				
Interrupt	**	**			
Quotes	-	**	-		
Response	-	-	-	**	
Attitude	**	**	**	-	-

** Significance level: .01 or .001

Table 7.14. Chi-Square Values for the Pitch-Related Variables

As can be seen from Table 14, initial turn and extended clause-initial syntatic groups are among the most independent variables. Direct quotations and audience response show less independence. The variable "attitude" includes the values of "agree", "disagree", "topic change" and "verification question". These values were mutually exclusive and thus not independent of each other.

7.0 VARIABLES DISCRIMINATING BETWEEN SPEECH MODES

The defining difference between the two speech modes was that conversation involved many speaker changes whereas narrating involved fewer, and those which occurred were by definition feedback operations. It was shown earlier in this chapter that initial turns tended to be higher pitched than non-initial turns. Therefore it might be expected that the higher pitch of the conversing mode would be related to more initial turns. In the next section this expectation is investigated, and in the following section, other possible explanations of the pitch difference between modes are

explored.

7.1 Speaker Change or Turn Initial Utterances.

Table 15 shows the numbers of initial and non-initial turns by speech mode.

Mode	Turn status initial	medial	feedback	all
Narrating	129	529	12	670
Conversing	260	332	25	617

significance level .001

Table 7.15. Initial and Non-initial Turns by Mode.

Conversing mode had twice as many initial turns as narrating mode. On these grounds the difference in pitch could be due to the greater number of initial turns. Table 16 shows the pitch values for the two modes, by turn status.

Turn	initial	medial	feedback	all	signif.
Register					
narrating	.27	.02	-.23	.06	.001
conversing	.35	.35	-.20	.33	-
total	.32	.15	-.21	.91	

Table 7.16. Pitch Values for Discourse Modes by Turn Status

This table compares the pitch levels of turn initial and non-initial syntactic groups, by discourse mode. While there was a significant difference in pitch between turn-initial and non-initial groups in the narrating modes, as also occurred in the overall statistics, this difference did

not occur in the conversing mode as shown in Table 16. The non-initial turns in this mode were not at the lower level expected but were equal in pitch to initial turns in that mode, that is both had a value of .35.

The difference in pitch between modes is not then due to the greater number of initial turns in conversing mode, but rather is related to the higher pitch of non-initial turns in conversing mode.

7.2 Other Pitch-related Variables.

I will now look at the other variables described in this chapter as being associated with high pitch, to find their contribution to non-initial-turn conversing mode pitch. In Table 17 are presented the frequencies of occurrence of these variables as related to raised pitch. The table lists the frequencies by discourse mode. Figure 1 shows the percentages of each variables ocurring in each mode. Almost all the variables occurred more often in conversing mode than in narrating mode. This fact could explain to some extent the difference in pitch between the two modes.

	Conversing variable present	variable absent	%	Narrating variable present	variable absent	%
Turn Initial[1]	260	357	42%	129	541	19%
X-clause begin	373	244	60	290	380	43
Interrupt	88	529	14	61	609	9
Responses	142	475	23	110	560	16
Disagreement	51	566	8	15	655	2
Dquote	9	608	1	37	633	6
VerificationQ	14	603	2	4	666	1
Agree	10	607	2	4	666	1
Topic change	15	602	2	10	660	1
On-topic	374	243	61	486	184	73

Table 7.17. Number of Cases of Variables Occurring in Conversing Mode and in Narrating mode.

For comparison, in table 17 data for the on-topic category are listed. This variable was coded when there was no topic change and no agreement or disagreement.

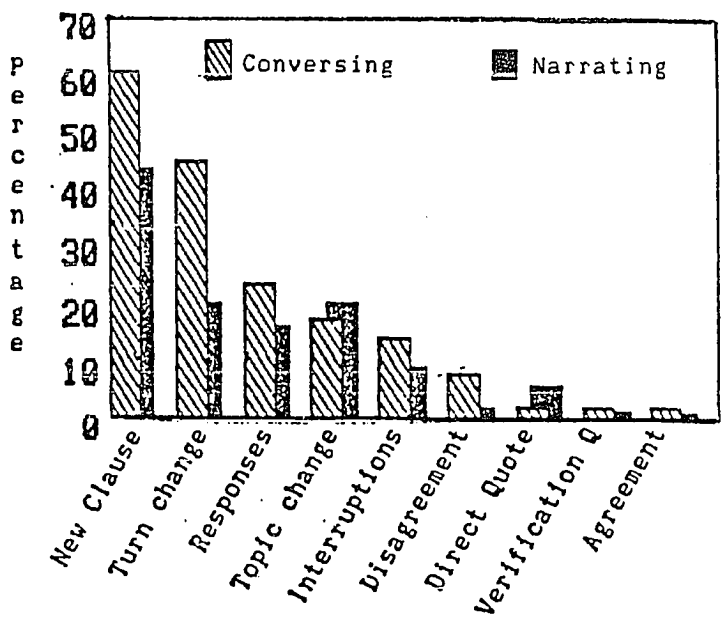


Figure 7.1. Percentage of Each Pitch-Related Variable by Mode

Table 18 shows the pitch register by discourse mode, for each of the Variables when present and when not present in the data.

	Conversing variable present	Conversing variable absent	Narrating variable present	Narrating variable absent
Turn Initial	.35	.35	.27	.02
X-clause begin	.36	.27	.15	.00
Interrupt	.42	.31	.33	.04
Responses	.65	.23	.37	.01
Disagreement	.59	.30	.57	.05
Dquote	1.18	.31	.36	.05
VerificationQ	.79	.32	.63	.06
Agree	.46	.32	1.48	.06
Topic change	.45	.32	.28	.06
On-topic	.29	.38	.02	.19

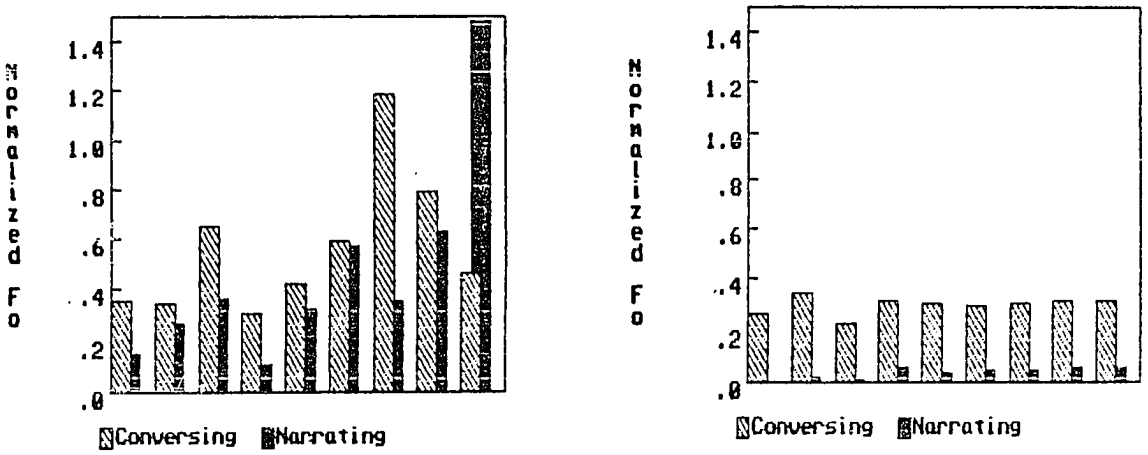
Table 7.18. Pitch Register of Variables Occurring in Conversing Mode and Narrating Mode.

As in the previous tables featuring these variables, those syntactic groups in which the variable was present were higher in pitch than when the variable was not present. Also as in a previous table, the pitch was as high or higher when the variable occurred occurring in the conversing mode than in the narrating mode.

The interesting thing about these data is that the pitch data in the second column (variable absent, conversing mode) remains high, even without the pitch-related variables. This data is also higher than that of narrating mode without the pitch-related variables.

This elevated pitch in the conversing mode is

illustrated in Figure 7.2a and 7.2b. This figures show the mean pitch for syntactic groups where each pitch-related variable is present (2a) or absent (2b), by modes.



a. Variables Present

b. Variables Absent

Figure 7.2. Pitch Register of the Pitch-Related Variables by Modes.

Table 18 represents the effect of the presence of a single pitch-related variable in syntactic groups, compared with all other syntactic groups. But many of the syntactic groups associated with these variables are associated with more than one variable, that is they are not independent. For example, all verification questions are also turn-initial and extended-clause-initial. Four of the variables (agreement, disagreement, verification questions and topic change) are actually values of a single variable, and mutually exclusive.

The question arises as to what the difference in modes

is when all or many of the factors are present together vs. not present. Will the difference in mode persist when all pitch-related variables are absent? No attempt has been made to find the pitch for all possible combinations of the variables, but a few combination are listed in Table 19.

Combinations of Variables	Conversing variable present	Conversing variable absent	Narrating variable present	Narrating variable absent	N of col 1
Turn, X-Clause	.34	.26	.28	.03	333
Turn, X-Clause, Response, Interrupt.	.88	.14	1.40	-.09	7
Turn, X-Clause, Verification Q	.87	.26	.51	-.03	15
X-Clause, Interrup.	.39	.26	.55	-.01	45
No Variables	-	.12	-	-.10	428

Table 7.19. Pitch Register of Combinations of Variables Occurring in Conversing Mode and Narrating Mode.

In these data, the pitch difference of the modes persists when comparing the modes with pitch-related variables absent. It is probable that there are some factors differentiating conversing and narrating mode that are not accounted for by the pitch-related variables studied.

8.0 SUMMARY

The texts comprising the data of the study were divided into two modes, a conversing mode and a narrating mode, and the modes were predicted to differ in overall pitch level.

Several hypotheses regarding the relation of raised pitch to certain interactional and textual functions were tested.

All of the hypotheses but one were supported. The hypothesis not supported was hypothesis 8, concerning raised pitch level with new topic beginnings. The data were in the right direction but the differences between pitch means were not significant.

The two discourse modes which were defined in this chapter differed significantly in pitch in the direction expected, that is the pitch of the conversing mode was higher than that of the narrating mode. This higher pitch was in part due to the larger proportion of the pitch-related variables occurring in the conversing mode. However, even when the high-pitch related variables did not occur in the conversing mode, the pitch was still high in relation to the narrating mode. Some variable not considered, possibly the number of participants or involvment of participants, contributes to this higher pitch. It is a question for further research.

It has been demonstrated that many variables arising out of the interactional situation in conversations influence the pitch level of speakers' voices and that pitch is related to the amount of interaction occurring, which is a reflection of what is going on in the talk.

CHAPTER 8

CONCLUSIONS

1.0 INTRODUCTION.

In this chapter the results of the investigations of the hypotheses are summarized, and a brief summary of the methodology, and the significance of the results is given.

The dissertation concerned three aspects of the relationship of the pitch height of speakers' voices to texts: the relation of pitch to syntactic boundaries, the relation of pitch to type of information conveyed, and the relation of pitch to features occurring in interactive situations.

The three aspects of speech studied were unrelated, and the results will be summarized separately, although the same pitch and syntactic data were defined for use in all three areas of study.

The study measured pitch as fundamental frequency in units based on declination lines of Fo plots. A method was devised to represent the Fo height of a period of speech, measured by declination units, by a single value, in order to compare it with that of other periods of speech.

A method of syntactic segmentation of the texts was devised, defining syntactic groups in such a way that each had the possibility of carrying a pitch prominence, and was unlikely to have more than one pitch prominence.

In the investigation of the relation of information

type to pitch prominences, a method of categorizing information conveyed by any syntactic group was developed.

Two discourse modes were differentiated in the speech samples, which proved to be significantly different in average pitch. Aspects of interaction expected to be related to raised pitch were investigated and their influence in differentiating the discourse modes investigated.

2.0 HYPOTHESES CONCERNING SYNTACTIC BOUNDARIES

Hypothesis 1. The beginning boundaries of pitch groups will tend to correspond with the beginning boundaries of extended clauses.

Hypothesis 2. The beginning boundaries of pitch groups will tend to correspond with those of syntactic groups.

Hypothesis 3. Clauses which are combined syntactically will correspond to combinations of phonetic groups in which the first appearing clause will have the higher pitch and the second one, subordinate pitch.

Corollary: Those clauses which are more loosely combined syntactically will have proportionately fewer second clauses which are phonetically subordinate; those which are more closely connected will have more second clauses which are phonetically subordinate.

Eighty-nine of extended-clause-beginning-groups also coincided with pitch group beginning groups, supporting hypothesis 1. Some non-extended-clause beginnings, 39%, also coincided with new pitch group beginnings. But hypothesis 1 was accepted as stated.

Hypothesis 2 was also supported. Pitch-group-beginning boundaries coincided with syntactic group boundaries 97 per cent of the time. However, there were many more syntactic groups than there were pitch groups. This meant that about half of the syntactic group beginnings did not correspond to pitch group beginnings. That is, many syntactic groups shared a pitch group with another syntactic group.

Syntactic boundaries tend to be sites where new pitch groups may begin, but do not necessarily begin.

The pitch groups proved to be adequate as phonetic units to compare with syntactic units. But they had the same drawback as other phonetic units such as tone units and pause units for correlating with syntax. That is, more than one syntactic group might occur within a pitch unit.

However they had the advantage of providing a pitch value for even those syntactic groups which had no nuclear tone, and would therefore not be a separate unit by tone unit standards.

Hypothesis 3 and its corollary, concerning the relation of pitch subordination and syntactic closeness of clauses, were partially supported by the data. The proportion of grammatically related clauses in which the second clause of the two syntactically combined clauses was phonetically subordinate to the first varied from around 50 per cent for *so* and *and* conjunctions and quote clauses to 100 per cent for purpose clauses, so that hypothesis 3 was not fully

supported.

The relation between pitch subordination and syntactic cohesiveness did exist, but was not always consistent. It must be remembered however, that the number of each kind of clause combination was limited, decreasing the reliability of the results.

The length of utterances was a factor in the resetting of pitch groups, that is the longer one speaks the more likely it will be that a new breath group and pitch group will occur. The degree of syntactic closeness of clauses may also be a function of the length of utterances. That is, for the most closely connected clauses such as matrix clauses and complements, the matrix clause tends to be very short and so both the closeness of connection and the shortness of the clause would tend to result in single pitch groups. This dual iconicity bears further investigation.

3.0 HYPOTHESES CONCERNING INFORMATION STATUS OF CONCEPTS.

Hypothesis 4: New information tends to receive stress.

Hypothesis 5: When given information receives stress it is used to manage the discourse.

Hypothesis 6: Contrastive stress tends to be higher pitched than stress on new information.

It had been hypothesized that phrasal stress, as defined by Fo prominence, would tend to occur on new information, and not on given information. It turned out

that while new information was stressed, so was given information, to a somewhat lesser extent, but still a significant 61 per cent of the time. Stresses also occurred an even greater percentage of the time on other information categories relating to discourse functions.

This same theme occurred for the measure of relative height of the Fo prominences. When all prominences in the data were accounted for, those which had the highest pitch were those concerned with the interactions betwen listener and speaker, such as questions and answers, insists, and markers used to keep the listener aware of what the speaker is talking about.

While pitch prominences on new information accounted for half of the total prominences, the relative proportion of occurrence as well as the height of such prominences led to the rejection of hypothesis 4. Hypothesis 5 was also rejected. While a major use of pitch prominences on given information was indeed turn management, a larger proportion of these given pitch prominences were concerned with negotiating an understanding between the participants about what was being said.

Hypothesis 6, that contrastive pitch prominence would be high, was confirmed.

Future research on the placement of stress in natural speech must take into account the importance of factors other than textual information. What is going on in the talk

is important in assigned stress. The process of assuring mutual understanding, by both speaker and listener, is material which is important to both, as measured by Fo prominence height.

4.0 HYPOTHESES CONCERNING TEXTUAL AND INTERACTIVE FEATURES

Chapter 7 was concerned with factors which were expected to make a difference in the pitch of the speech. Two discourse modes were defined, a conversing mode and a narrating mode.

4.1 Hypothesis concerning discourse mode.

Hypothesis 7. Pitch level of narrating mode will be lower than that of conversing mode.

There was a significant difference in pitch between the two discourse modes. Hypothesis 7 was supported.

4.2 Hypotheses Relating to Pitch Levels of Boundaries.

Hypothesis 8. Turn-initial syntactic groups will be higher in pitch than the preceding syntactic groups, and tend to coindice with pitch group boundaries.

Hypothesis 9. Extended clause beginnings will have higher pitch than non-beginnings.

Hypothesis 10. Topic beginning boundaries will have higher pitch than non-beginnings,and tend to coincide with pitch group boundaries.

Hypotheses 8 and 9, predicting raised pitch levels for new turns and for new extended clauses, were supported by the data. Hypothesis 10, predicting raised pitch for new

topic boundaries was not supported. The pitch was raised but not significantly so.

4.3 Hypotheses Concerning Interaction of Speaker and Listeners.

Hypothesis 11. The pitch of syntactic groups which are interruptions or tries at interruption will be raised above average.

Hypothesis 12. Syntactic groups which are disagreements will have higher pitch than the previous syntactic group.

Hypothesis 13. Syntactic groups which are agreements will have an equal or lower pitch than the previous syntactic group.

Hypothesis 14: Pitch level rises as the amount of response from listeners increases.

Hypothesis 15. Direct quotations will have higher pitch than non-quotations.

Hypothesis 16. Repair initiators, (also called verification questions) will be higher pitched than preceding utterances.

All of the hypotheses concerned with the interaction of speakers and listener were supported by the pitch register data, and most of them were also supported by the pitch change data, although the number of occurrences of any particular variable in the data was sometimes very small.

An attempt to explain the difference in pitch of the discourse modes in terms of differing distributions of the pitch-related variables investigated indicated that they all played some part. But not all of the difference in pitch of discourse modes could be attributed to the variables investigated.

Apparently the difference in pitch between the modes is also related to other factors not identified in this study. A possible underlying cause is that the amount of emotional involvement increases when more people are involved in the speech. Perhaps some measure of the amount of participation by those involved in the conversations would yield results.

Factors in the interactional situation proved to be important in the patterning of pitch prominences. These factors were important enough to differentiate in pitch between narrating and conversing, although the underlying causation of the difference is still a problem.

5.0 SUMMARY.

In this look at some ways in which pitch is used in conversational discourse, it was found that pitch is used not only in the ways conventionally noted in the literature for sentences without context, such as marking syntactic boundaries, but also to highlight factors which occur in an interactive situation. The highest pitch is reserved for such interactive segments of the talk, and overall pitch level is an indicator of the amount of social interaction occurring in the talk.

It is clear that theories about the use of pitch must take into account what is going on in the speech situation, as well as the content of the talk.

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APPENDIX

This appendix contains the transcripts for those sections of the conversations used in this study. These are preliminary transcripts, with some of the features not yet correctly marked. One problem is that many of the stresses used in Chapter 6 have not been identified in this transcription. The stresses in boldface in the transcriptions are largely perceptual judgments, which often coincide with the acoustical peak, but may not do so.

Each line in the texts represents a syntactic group. The pitch groups are separated by double slashes. There are, of course, inevitable errors in coding as well as in transcribing.

Transcription conventions.

+ pause of .1 seconds
L laughter by listeners for .1 second
$ laughter by speaker for .1 second
@ laughter by listeners and speaker for .1 second
// pitch group boundary
{ overlap
[of text by two speakers
( ) surrounds text where transcription is uncertain
= Utterances are latched together.

Perceptual judgements:
? final rise in pitch or question intonaton
. low fall in pitch, sentence final intonation
~ clause final fall-rise in pitch
` or , mid fall in pitch.
^ rise fall in pitch/
: lengthened vowel
BOLDface indicates stressed (high pitch) segments

Sources for the examples are noted after each, by author if the data was not original. For the original data the text identification and line number is given.

CONVERSATION KC79: Selection ROB:

```
Celia:   that was very nice of you ++to let her sit in your house
Karen:   that was very nice of her to take care of it (  )
Linda:   (   )
*****start*****
Karen:(    )to say it
    but our HOUSE was broken into
    ++++ TWICE this summer.//
Nora:  Interesting~ //
Celia: don't $$ tell $$$$ Mary. // $$$ ++i4++
Celia: it's $ OK
       to $ tell her NOW~
       $$ she's not in~ it // +++++
Karen: (no ) wa may kee her inadequate(overlap$$ )//
    @@@@@@@@@@@@
David: the we you were we were thinking of //
David: (  )  it was broken in back in August  ++++@@ //
Karen: she might walk around in back //
Nora:  some more @@  in the (@@@@@)//
Celia: @@ well it's GOING to be @@@ broken into~ @@@$
       @$$L some of us LLL  LIKE^ to be robbed. //
Karen: it was  VACANT
       the FIRST time it  was broken into~//
Celia: well ++++ was there,
       was nobody  in it,
       I mean no furniture or anything?//
Karen: [Oh, no, no.// ]
David: [(                    )]
Celia: well what did they TAKE? +++//
Karen: they took the uh color TELEVISION set. //
Celia: (well) isn't it  NICE~
       when they only want things like THAT.//
       Not the BABY pictures~,
       or something you really $$$$ CARE about //  $$$
Karen:o noo but I think  they were~, //
       WE^ think that ++++8+++ //
       they were +++++ (case +++++++ getting the upstairs,
       when we came back~//
       ++++++  and we'd  scared  them  off.
       but there's no good +++   EVIDENCE  on  that //
       ++++++  I mean there IS good evidence~ //
       the  SECOND  time  they broke  in~
       and got NOthing.//
       +++++++  DAVE came back
       +++++++++, and uh +++++++++  scared them off.~//  +
Celia: ++++++++++++++  how had they gotten IN the other) times? //
Karen: +++  the FIRst ^time they
       ++++  they broke in the uh //
       +++ [  sliding glass door~.
           [++@@ overlap  LL+++++LLLL
       incidentally~
```

that sliding glass door is put in
JUST like ours~ //
++++++++++ scraping of chairs
Nora: what d'ya MEAN, put in? //
Karen: ++++++++ The outside door is, //
Linda: ++++ yea,^//
Karen: +LL++++++ LOOK^ at it.//
Stan: ++++ why //
Linda: +++++++ i THINK its put in BACKWARDS.//
Karen: it's put in BACKwards`//
Nora: Is it really?. //
Karen: YES.
so you CAN't do the normal trick //
of putting a(ei) ROD //
+++++++++ against it and //
Nora: ++++++++++ oh to LOCK it~.
I see. //
Karen: to lock it. //
Stan: (thatnot) wrong Go//
Nora: of course, you COULDN't~//
+++LLL++++++++ Unless you were OUTSIDE,
+LLL+ [in which case //
Linda: [LLLLLLLL
Karen: in which case
they could just take up the ROD~//
@@@LLLL
Linda: @@@@@@@ you could ha KEEP people ha INside.//
@@@@26@@@@
Celia: ()) I'll have to look at MINE^. //
Is THAT the key to it? //
Stan: No. THAT's so you can have a SCREEN~, ++++++++you see.//
Karen: Well,
OUR screens are on the inside,~
actually.
Stan: Yeah. that's necessarily. //
++++++ You don't want //
Karen: well no actually
OURS is put in just like yours~,
but our SCREEN is on the inside //
Stan: yeah I //
Karen: oh +$$ //
Stan: I mean, the REASON (noise overlap) for this arrangement is
so the screen won't be on the inside.// +++++
Nora: NO. //
+++ No Stan you're you're wrong.~ //
Stan: +++ No?
Why am I wrong? //
Nora: +++13++++++++ Isn't there a screen on the inside// +++
Stan: No //
Nora: +++++ oh
Stan: no [that's terrible. (you don't wa)
Nora: +++ there's [a screen on the outside then //

```
Karen: yeh //
Karen: ++++++++  well you see our~
       ++ what I was +++? trying to say  was
       our DOOR~  goes just like YOUR's does.
       but we also have a  screen on the INSIDE~//
       so I don't think that [expianation ++ fits.^]//
Stan:  @@@
David: @@@                    [best of all possible worlds ] //
Celia: screen on the inside  ++++++++ then then the //
Stan:  the screen then~ +++21+++++++++++++++   //
Celia: ++++++++  so there's no [ way to LOCK your sliding door. ]//
Stan:  @                        [ we have  (            )     ]
Celia: @ so how did they get in //
Karen: well we @ have ,
       we had a very clever way
       to lock our [sliding doors~ [ A uh //
David:                             [
Karen: @@ uh,//
       the lock +++++++ broke//
       and uh and so we had  a /ei/~ //
       +++14+++++++++ we essentially had some HOLES^ drilled
       and some NAILS^ put through //
       which is a reasonably good way to LOCK^ it
Stan: (go around you can change THESE TWO and ha  )
Karen: and  uh we had uh, //
       +++++  we had two POSITIons  on  it~,//
       and  one position was
       just a little bit open
       so the cats could get  out~ //
Stan:              [ the screen is a (     )
Karen: ++++9++++  [ and it was= //
Celia: ++++  small theft  ++++ //
Karen:                      =locked in THAT position~,=// ++++
       but what they DID~ was +++to,//
       BECAUSE it was locked in that position~,//
       ++++9++++ they could +++++  get hold of both ENDS of it~,
       and they just //
       +++++ lifted it OUT~ //
       the nails held~,
       but they lifted it off the +thing` //
       ++++  [they lifted the  ++++ door out.]//
Celia:       [didn't it break?  ]//
Karen: +++7+++  it broke    the NAILS.~ //
       but +++++ (it didn't break the door. //
Karen: +++++  (he was ) careful //
Linda: +++++ @@@@@  in (wanteda new one anyway   //
Karen: actually now'//
       ++++since then it's been closed ever since.its but um  //.
       ++++++++++++++++ The NEXT time they came in //
       ++++++÷$$++ now we've $ bolted the door) //
       +++ uh +++++++++ they got up into a window //
       which is WAY off the ground (coughing).//
```

++++++++++++ there are MANY windows
they could have come IN~,//
+++ that are + right + on the porch.//
Celia: was this one less conspicuous or ++ (back of the house of
something?)//
Karen: +++ No. actually, //
++++++ what is it we DO know where they came in //
David: +++++++++([the garage)//
Karen: ++ [garage somehow, because they
Karen: ++++++ because the police. //
++++ The police are SO stupid //
Celia: ( )
Karen: @@@@@+++++++++I was the one
who had to find ++ that window,//
++++++ show them that actually
that's where they came in. //
Celia: how did you $ decide
that they'd come in that window? //
Karen: ++ Well I saw that there were holes in the SCReen~ //
+++++++++ And the screen was ( ) out in that position
+++ and that was ovbiously how they got (in)//
Celia: ++++++++++ you think they got a LADDER and (om)//
Karen: Well I think they stood on a CHAIR,
++ that's underneath //
Stan: ++++ but then they tried to cover their traCKS,=
Karen: ++++++++++++ Uh ,
++ no then they went out
Stan: shutting the window afterward and locking the door =//
Karen: ++++ they went out the back door,//
+++++++ they um .
++++++ the back door wasn't [locked //
Stan: [I'm sorry they went out] //
Celia: [was home~ //
Stan: [did they take something light]
Celia: [How did you know they'd been there at all?]
What made you think //
Karen: how they'de been there? //
++++++ Well Dave,
David: ( )
Karen: ++++++ Dave came home. //
++++++++++ Dave had pneumonia.//
+++ That's + the first (thing slip)//
+++++++++++++++ Um +++++ and he was coughing //
Karen: basically, basically //
Karen: we were ALL up at the CAPE
MOST of this month,//
that's when the house was broken in //
++++++++++++++ um, and
++ we came back~
+++++ and this was //
++++++++++++++ after it was broken into the first time,//
+++++++++ and were staying there, //

```
        and uh +++++ Dave was  at work //
        +++++ and drove back
        in mid-afternoon //
        ++++++++++ And we had been trying to keep the house locked  up.$$
        +++++++++++++++ And he went out,
        ++++++++++ uh,++ he came in,//
        + and he went out to the kitchen.
        and went by the uh door //
        ++++++ to the back porch //
        ++++++ and registerd that it was open ++++(    )//
        ++++++++++ he didn't register enough
        because he was +++tired
        and had to go up ++++++and take a nap~//
Celia: ++++++++++++++ He COULD have been UPSTAIRs with a BLUDGEON//
Karen: ++ so he went up //
Celia: +++ they were the good kind
       that won't attack you.//
Karen: so he went up
       ++++ and took a nap, //
       + and woke up,
       ++++ and looked up to see +  what time it was,
       and said
       ++++++ "Hum,//
       ++++++++++++++++++++++++
Linda: the clock [radio isn't there] //
Karen:           [the clock radio isn't there ]
Karen: ++++++++++ and then he said,(the)
       ++ he called me, (up)//
       ++ he was, I was waiting to be taken home //
       L@ did you take //
Karen: I was packing to get a lot of things together
       to go to New York.//
       ++ Did you take the clock radio?".
       +++++++++++++++ I said "no"  UH  //
       ++++++++ "where IS  +the clock radio?//
       +++++$$$I don't know where $ the clock radio is.//
       $$$$ isn't it  $ where it always is"? //
       "no". //
       +$$ And uh he said ///
       ++$$$+++$$$ "funNY", he said,
       +++ I said, HUM. //
       +++$++++$+ So he came and got me//
       +++++ and (          ) "well //
       let's go and have a drink~
       ++ and I said  //
       let's go $$ find $$ out $$
       what happened to the clock radio.//
       +++$++++$ We went upstairs
       and the clock radio wasn't there.//
       +++ and we went into my study
       which was + just + across the hall,//
       +++++ and of course you know
```

++ the DRA:WERS were pulled out of my bureaus //
and things were overturned,
the waste basket was overturned.//
Celia: Why do they overturn wastebaskets? //
Karen: And I said ++ hm,
I said well//
Stan: that's not the normal condition I take it //
Karen: +++++++++@@@@ and he said
"what's wrong? //
and I said
++++++ well LOOK @@@ //
@@$$++++@@@@@@@@@
David: it looked like the normal condition //
Stan: oh it is huh //
Celia: @@@@++ WHY the waste
I don;t understand it //
people say the waste bask //
why would anybody turn over the wastebaskets? //
David: I'm not sure they were //
Karen: it WAS.//
David: Was it//
Karen: yes //
David: maybe just spilled //
Stan: were they empty?. //
Karen: +++++ no //
Stan: +++++++ you didn't empty the trash before you left? ha//
Karen: @@@++ and so we went into Linda's room. //
and there were,
there were a whole lot of things.
the clock radio //
with all these things would AROUND it .
Celia: +++ it was there //
Karen: (a couple of radios //
with things wound AROUND round it.
Celia: O:::::h
Karen: and other things.//
Karen: all sitting there //
+++++++ waiting //
Celia: ++ to be picked up //
Karen: + to be picked up~//
+++++++ and nothing (there) //
and the ++++ the +++ uh //
++++ So +++ the police came //
+++ (that that //
+ thats for the record
+ the SECOND time. //
And I showed them how they had gotten in //
and and of course
+++++ that they'd gone out the back door ( )//
Stan: (it was the)//
Celia: they had gone out//
you think they'd + just + LEFT when he walked by ?//

```
Karen: +++ Yes, yes. [BECAUSE= //
Celia:               [heard him drive up]
Karen:                      HOURS later= //
Stan:  +++++ during the (   )//
       [   =ONE of us had the sense //
       to look at the CLOCK RADIO]
Stan:  [                              ]
Karen: to see what time it was and=//
Celia: ++++How CLEVER//
Karen: + =(   )      at a minute after,
       + a minute before Dave had come home //
Stan:  +++ when it stopped you mean.//
Celia: +++ My WORD.
       +++++++++ They JUST ++++++ pulled it out.//
Karen: Yes //
Celia: How clever of you to look at it,
       this is so interesting $$//
Karen: ++++ so they obviously they //
Celia: I'd 'uv been terrified //
```

CONVERSATION KC79: Selection WOM

```
Celia: what HAPPENED was that,//
       uh  +++ I GOT a mm  +++++++++++
       I was GETTING pretty SICK of the NAme.//
       $$$$$$$$$$$$$ ++++++ and it was CAUSING me a lot of trouble//
       $$$  ++ I was TIRED of  $+ having //
       the FIRST thing tha happened
       when I was introduced was
       are you any $$$ relation TO uh//
       +++ so I uh got a +++ THING
       from the  UNIVERSITY
       (sssss) a FORM saying //
       what NAME do you want your dip
       + to be on your DIPLOMA //
       ++++++++++++ so  I had an IDENTITY crisis
       + and I thought //
       well + I CERTAINLY
       don't $$ want WILSON
       on MY DIploma //
  @@@@@@@@@@@@@@@@
Dave:  so you're BACK in the PHOne book now.//
Celia: ++++  YES
       I'm BAck in the PHOnebook, =
Karen: Yes she is.
Celia: =you see //

Stan:  ++++++++ is MARY?//
Celia: +++++ Is Mary? //
Stan:  Is she CARLSON
       or is she WILSON? //
Celia: Oh NO, no,
       THey're all//
Stan:  THey're they are all //
Celia: (    ) Robert and (           )  //
Dave:  I have a conjecture  that
       the thing would have blown over by now
       sufficiently
       so that uh you could HAVE it listed. //
Karen: Oh you wouldn't LIKE it.//
Celia: who WANTs it.//
Dave:  NO, no, of COURSe not,
       but I think
       the the unLISTed aspect //
       which  bothered  you  so   much
       earlier
       would no longer be a problem //
Karen: ACTUALLY tho
       its not quite TRUE. //
Linda: ++++++++ there're ALWAYS plenty of funny people
       around. @@@ //
Celia: He's STILL on TV
```

all the time
Dave: +++++ I see.//
Celia: ++++ anyway
it's not MY name //
Karen: +++++++++++ LL
Celia: So ANYway,//
$$$$$ it was +++ so NICE//
+++ so I changed my name
LEgally //
and MARY and ROBert
were VERy SUPPortive.
They were all FOR THAT you know +++
It WASN't as though
they were little CHILDREN //
so it would embarrass them
in SCHOOL//
+++++++++++ If they'd wanted to JOIN me
I'd have been GLAd to HAVe them
in the CARLSON family // @@@@@
@@@@@)
$ I didn't FEEL
that @@@@ it was a thing $ I should (PROPOSE/PRESS?) @@
though //
$$$ Yes,
I think
MARY thought of it //
as a ++++++++++++) STAnd for WOMEN uh//
+++++++++ (and was) the ONly thing to do. //
Karen: +++++++++ I NEVer REAlly +++ TALked to uh //
+++++++ I guess I DID talk to Mary
a little bit //
about uh ++++ her WOMEn's STUDIEs course //
++++++ which I gave a LECTURE to //
++ Did she ever TALK to you about that //
Celia: Oh did you? //
Celia: NO, ++++++ she never did +++ tell me about,
much about the COURrse //
Nora: What did you lecture
about women's STUDIES ++++++//
Karen: Well they PUT TOGETHEr this women's STUDIES course um//
Celia: Yeah
+++++++ Oh SHE was in some SUBset,
what was that //
Karen: Let's see uh I'M TRYing to= //
Celia: THird WOrld WOmen or something //
Stan: Oh that's like black STUDIEs //
Celia: Yeah, right //
Karen: =think how they CHARACTERIZEd it, + uh //
Dave: It hasn't gone that far //
Karen: +++++++ well uh //
I GUESS^ uh
it was just called wo:men's STUDIES^ //

```
       but uhI^ was trying to
       ++++  I^ was TAlking on SEX differences,//
       +++ and trying to put  together a VEry sophisticated
          developmental ARGUMENT~ // +++++++++ heh heh?
Celia: they  WANTed  (to) $$ + so  something $ they  could
          use  on the $ barriCADES //
Karen: for @ RIGHT @ EXACTLY a)you know aaa
       I @ had I //
Celia: a SLO:GAn or two //   +++
Karen: NO  //
       I was
       + ACTUALLY~ it was one of my most
       + ANI^mated LECTures~//
       It was REALLY^ all //
Celia: SCHOLARLY^ + (tho) //
       It WAs a bit +++
       it WASn't exactly scholarly //
Stan:  sparkling with (aa) footnotes //
Karen: NO, no, (aaaaa)
       but it was it was you know
       there WAS,
       there was a CERtain + COHERENCE to it $$$$$$ //
       I was,//
       there was //a $$$ theoretical + theoretical @@@ Idea
       [behind it
Dave:  [(                    )]   $$$
Karen: and uh//
       I saw these+++GLA:ZED faces $$$L@@@@@
       and as SOON as //
       [I got THROUGH    (Ssss)    uh//
Dave:  [(                    )
       $$ you know I DID't get through (I said )
       I cAme to the End +++
       and I said //
       +++  how about some QUESTIONS //
       and the FIRST question
       I GOT was //
       +++++++++++++  WHY do you keep TALKing about MOTHERS //
       ++++++++++++++++++  $$$$$$$$$$$$$$$$$$$$$$$$$$$
       instead of PARENTS // $$
Stan:  (like ) PARent persons //     LL@@@@@@@@@@@@@@
Karen: +++++ WELL uh
Dave:  (we know a parent(female) person) @@@@@@@@@@@@
       ya know ++++++++  SORRY about that //
       but uh +++++++ //
Celia: caretakers
Stan:  person parent //
Karen: um  MOthers=
Dave:  (  that's a question    )
Karen:   =are  GEN  are the people ++++++++++
we ++++  generally  see in the   LABORatories,
       with the+++++  BABIES
```

```
Celia: [sex symbols // ++++++++
Karen: [and uh= //
       +++++++++++ =in PREesent day+++ SOCIETY
       they are the ++++++++ most likely  PEople
       to be taking care of ++++ BABIES //
       ++++ $$$$  it went ON from there //
       DOWN HILL [@@@@@@@ //
Celia:           [down @@
Celia: they didn't LIKEit, huh //
     (     ) @@@
Karen: I'm  afraid
       this elegant  hah  theoretical ++++++ exposition just
       @@$$$$$$$$$$$+++ // went ++++++++++ by them somehow //
       it TUrned out huh @@@ (smiling) tO Be //
       entirely a class of @@ (        ) //  LLLLLLL ++++++
       I mean it was a,
       $ it's orientation was ah     SLIGHTLY to  the $ radical side
       of  wherel was++++ //
       +++++++++++++++ I'd always FOund myself ++ rather COMfortable.//
Nora:  +++++ WHo were these PEOPLE uh //
Karen: YALE undergraduates //
Celia: YALE un--//
Karen: +++++++  K SOMEof them men //
Celia: ++++  Oh REAlly?
```

CONVERSATION KC79: Selections WIN and DOG

WIN
Celia: you get FRUIT
and you CUT up your fruit
+++and you put it in a ++++ ba:
+++a plastic
no not a plastic bag //
++++++++++ a NYLON net bag //
+++++++ this is the easiest way of doing it //
++++++++++ and you put (in) +++ the fruit
chop it up
and put it in that //
+++++++++ and you pour WATER over it
and you add SUGAR
and um
+++++++++ YEAST //
++++++++++++++++ you may add some pectins //
(someof that too because uh
++++++++++++++++++++++++ and then you see
that's the AEROBIC stage //
you just put a //
++++++++++++16+ towel or something on it
and it +++? bubbles
++++ for about three or four days //
+++++++++ you stir it once a day //
++++++++++ you break this crust up //
and then
+++ you pour it into a great big Sparkletts bottle //
++++++++ and then
you put a waterlock
on the top //
+++ and it +++ goes into its Anaerobic +++ phase //
++++ and it BUbbles //
and for EVERY little bubble of
+++++ every little molcule of carbon dioxide //
that is going up
a little molecule of ALCOHOL is being made //
Karen: u:::m //
LLLLLLL
Celia: when it stops BUBbling
its made all the ALCOHOL
its going to make //
++++++ and you TASTE it.
++++++ it tastes TERRIBLE //
@@@@@@@@21@@@@@@@@@@
and you put it back
and think
I'm going to let it sit ++++ for a little while //
AGE a little longer //
+++++++++ and then finally //
++++ then you pour it off

+++ you know a lot of yeast (and stuff)+++ collects on the bottom //
you pour it off
about three times
you do that
and its called racking
and you put it in a fresh bottle //
++++++++++++ then when it finally //
Stan: do you pour something off
or is the whole stuff [transferred.//
Celia: [no you pour it off
Stan: Is there some residue?] //
Celia: you ah siphon the clear part
and you leave the yeast ()//
Stan: ++++ there is some junk then
Oh yeah //
Nora: what happens to this crust //
Celia: ++++++++++++++ Oh Oh I forgot to say
when you ( ) it,
when + +++++ you discard the fruit
at that point,
at the end of the aerobic //
David: you feeed it to the cats //
@@@@
Celia: yeah well ? //

DOG:
Celia: Oh THAT's a story //
@@@@@@@@@@26$$$$$$$$$$$$$$
that's $$ a STORY // LL
anyway you discard the fruit
and you pour the fluid off //
+++++ Yes it was such good stuff
+++++ all this rich stuff //
with the ++++ yeast and so forth
that one //
+++++++ Christmas eve //
+++++++ uh
+++ we gave our old ++++ dog //
+++ I mean both dogs
a big handful $ of this stuff $ to eat
+++++ ofthis crushed dates +++ you know //
Stan: (did the) dogs like it?) //
Celia: LLLLLLL well
it wasn't funny
$ Jim //
$ the younger one,
got drunk //
$$ and jumped up on the car and
fell off the seat and things //
LLLLLL and that was all //
L but the older one //

LL who was thirteen //
passed out //
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
and she became $ (sort of)comatose //
+++++++ and she, //
we'd ++++++++++ try to rouse her
LL and I'd pull her onto the rug
and she'd promptly wet //
@@@@@@@@@@@@@@@
urinating on the rug //
@@@@@@@@@@@@@@@@@@@@
and she //
she did not lift
she was a flaccid drowsy
LL didn't lift her @@ paws //
(she'd) just fall down //
+$$$+ uh +$$$+ she'd open her eyes //
++++@@@ and roll them //
$$ and it was $ terrible
it was Christmas eve //
@@ $$+ and I though she would die
++++ and what will I say to the vet //
$$$$ + she was just,
$$$$$ just fed her a little date wine
your honor //
LLL I thought I'd killed the children's dog //

@@@@ and just all ++ kinds of feelings
+++++ and uh this went on //
++++ for +++++++ for 24 hours //
Stan: ++++++ oh no //
Celia: 24 hours.
that dog did not lift //
+++++$$$$ she didn't move
I mean she wasn't ++++ dead,
obviously //
David: @@@@@@@@@ and you haven't had a drink since then //
@@@@@@@@@$$
Celia: it wasn't me. //
@@@@@@@@@@@@@@
and uh
++++++ she didn't ,she didn't move //
+10++ she'd urinate on the rug +++? of course
$$ without moving
( ) trickle down the hall //
Nora: ++++++++ you got her off the rug I hope //
Celia: +ii+ well she would still look at it
@@@@ we tried to make her $ comfortable //
and in the $$ moving //
all we did
$ was set off this $$ reflex //
@@@@ to get on the rug and

```
        there she'd go AGAIN //
Stan:   @@@@@@@@@@  oh no //
        and about ten 'clock on Sunday morning //
        I'd brought
        ++++$$ a little  $ hair of the dog to her //
        I forget
        $$ what I held $ under her nose
        LLL and she lifted her head sort of++++woozily //
        and came to life  ha ha
        @@@  but she almost died //
Linda:  O::::h
        did she have a hangover?//
Celia:  @@@@ no I don' (  )oh $$$$ //
    @@@@@@@@@@@@@@@@@@@@@@@@@@
Celia:  see I didn't realize
        there was that much +++ alcohol  //
        I thought  it was only squeezed ++++ date remains //
        I thought  it was just healthy++++ yeasty food.//
```

CONVERSATION PL87: Selection APE

```
Steve:  The planet of the apes
        turned out to be earth
Len:    +++++ right //
Laurel: right   //
Steve:  (and those great sort of??)//
Len:    well, //
        that that shows up
        at the end of the first movie //
Steve:  yeah + true
Len:    +++++ they made
Pete:   they [made a //
Len:    and [ then they could go on
        and make seven S more S movies//
Pete:   er um  (ach er che)
Steve:  (just keep flash back?) //
Pete:   i remember +
        when they were showing them all
        in one week
        on Channel 5. //
Steve:  Oh the whole ape series huh //
Pete:    ++++ Yeah.//
        I looked at it
        and it said,//
        ++++ Planet of the apes
        part 2
        1974,//
        planet of the apes
        part 3,
        1974 //,
        planet of the apes
        +++ part 4,
        +++ [1974 = @@@@//
Laurel: [(   )@@  //
Pete:   [        they got 4 of those things] out
        one year @@@@@ ]
Pete:   the next two in 75 && +++++++ //
Len:    ( ??)
Steve:  they really went into production     @@@@@@@@@@//
        they HAD
        they had all these different masks, @@@
        and they [had to use them $$$$ ]//
        $$$$@@@@@@@@@@
Laurel: ( - er field)
Len:    nobody else --
Steve:  did you notice
        Roddy McDowall getting very older and older?//
        $$$$$$$$$@@@@@@
Rodney: I SAW one of the APE suits
        in physics one time ++++++ //
Len:    That's right.// +++++
```

```
Steve:   someone had one
         (was it)  was authentic//
Rodney:  One of the professors was uh+++++//
Len      Oh ++++ //
Rodney:  the +++lecture hall was laid out
         +++? with three banks of blackboards - //
         the type that will ++++ slide up and down//
         so you can have them both down
         or both up but
         and when you're  +++++lecturing//
         you throw the (way out) up in front
Len:     (Yeah)
Rodney:  and write on the one on the back.
         Then throw it up//
         pull the OTHER one down~ +++//
Pete:    and behind it
         there's a counter and sink//
Rodney:  yes there's [a sink or =
Len:                 [ for chemistry ]
Rodney:                   [ =one side and a counter on the other//
Steve:               [Oh, so if you want to have a demonstration//
Rodney:  So the professor
         started his lecture
         and all the boards were in the bottom position.//
         ++++ So he'd lectured across,
         went across once
         and then back//
         and went across again
         throwing the bottom ones on top.//
         ++++ ( ) started going back
Len:     ( Eventually)//
Rodney:  So he was starting on his 9th blackboard//
Len:     (Yeah)
Rodney:  throws the bottom up.//
         (there's) this this GUY in an APE suit//
    @@@@@@@@@@@@@@@@@@@@@@
Len:     sitting
         waiting  @@@@//
         for almost the enTIRE HOUR
         to get out//        @@@@
Steve:   (saw one before )
    @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
Len:     that happened the year//
         that happened the year before our freshman year too.//
Pete:    (Someone )
Len:     Dave Godnew was involved in it  +++++++ //
Steve:   was this an authentic planetary ape suit
         or just //
Len:     ha yea  //
         one from the @@@@@
         it was all for the (show)//
Rodney:  It was an actor
```

that could get hold of it//
(8.0) @@@
Steve: Gee I wish
MY students would do that//

CONVERSATION PL87: Selection SUR

```
Rodney: For a long time,//
        +++the place where the four states meet~
Len:    [(the four corners])//
Rodney: [ the four corners?] //
        was missurveyed //
        it was off by a hundred yards or something //
Steve:  Isn't there a monument
        right at the four corners? //
Rodney: Yes theres //
Steve:  [  (*  ))//
Rodney: [so these people thought//
        they'd stood in the four states at one time//
        and they hadn't //
Steve:  ++  have they moved the monument now? //
Rodney: ++++++ I think SO.
Len:                  [(     )] //
Steve:  +++++++++++++[  A lot of these things] you know +++++aren't //  +++
        ++++++ by definition they cannot be mis-surveyed.//
        +++ the survey defines it//
Rodney: ++++  yeah //
Rodney: +++++++++++ this [was at//
Steve:                   [and not the description //
Rodney: +++++++++++++++ there [was a**//
Steve:                        [theres's this great issue on //
        the so-called straight line border
        between [California] and Nevada //
                [Canada] //
Len:    (yes  ut:  --- a ho //
Steve:  which is course is not
        is it a great circle or not.//
        ++++++++++ I'm talking about the diagonal border,//
Len:    ++ Oh,, OK //
        ++  and the description of it,
        when they made  the  territories,
        they take a point in the center of Tahoe,//
        this was defined by latitude and longitude, I think, //
Pete:   ++++++  they had a real line (    )//
Steve:  They had a longitudinal reading
        for  th for the vertical //    part
        of the border //
        ++++++++ north of  Tahoe //
        +++ and then at some point there
        +++ so a well defined point was taken
        at the beginning//
Pete:   uh huh //
Steve:  and then it said simply //
        "go due" //
        ++++++ you know what that means//
        +++++ quote, due  southwest, //
        south EAST, //
```

+++++++ until you get to the Colorade river,//
++++++++++++++++ you see that's that diagonal slash //

Len: Yes, that's that //

Steve: and the question is whether
what does "due southeast mean" //

Len: ++++++ yea, [the //

Steve: [I mean there are various kinds of lines //
called rhumb lines//
and different ++ surveyors terms for maybe //
not going on the coordinates //

Pete: +++ um hum //

Steve: or not on a great circles,
and it's long enough tomake a DIFFERENCe //
++++++ this was surveyed by back,
in 1940 or something //

Pete: ++++++++ is that when they thought the earth was flat,
and they [could -//

Steve: [anyway, at some point, //
+++++++ surVEyors had to go out, in the,//
before the thing became official
it had to be surveyed,//
which means I gues markers placed along the way //
various actual markers and so on.//
++++$+ And ++$+$++++++++++ Once that was done,
and the surveyors reported accepted by // ++

Len. Congress //

Steve: ++ (congress) it was at that time
because it was territories not states yet, //

Pete: + uh huh//

Steve: ++ then what was surveyed
is the boundary,
+++ regardless of whether it was ++$+ south or northeast //
++++++++++$ or great circle or anything else // $$

Len: [the survey]//

Steve: That IS the definition//

Len: by an act of congress
it became the boundary..//

Steve: Not only that,
but +++ the surveyed line //

Len: +++++++ yeah //

Steve: according to these, I mean
+++++++ gross errors would have been caught by (then) //

CONVERSATION PL81: Selection SCA

```
Nora:  Who are you going to hear tonight?
Len:   ++++ Stravinsky. ++++++  Stravinsky and //
Pete:  Stravinsky  going to show up? //
Len:   ++ no, he's dead. (      )//
Nora:  ++++++++++ I though it was your rock concert.
Len:   No //
Steve: +++++++++ in Hollywood bowl? //
Nora:  +++(    ) you're cultured! //
  +++++++++LLLLLLLLLL++++LLLLL
Matt:  No, it's the budget  buy.
       @@@@@@@@@@@@@@
       ++++++++++++they have some //
       ++++++++ that's  ) it's all its getting to be //
Steve: ++++++ Well, excuse me,
       did you wonder
       why  Peter wasn't going  //
 +++++LLLLLLLLLLLLLLLLLLL
Len:   I guess the rock concert was last week.//
Mattt: ++++++++++++ They said it was a real trick
       if you could get tickets to that  //
Len:   +++ I guess they has so many season tickets
       that it didn't matter  //       (     )
Pete:  ++ No that one was sold out//
       ++++++++++ before they went on sale //
Matt:  ++++ Even the seats way up in the the hills? //
Pete:  ++++++++++ Well let's see.//
       ++++ I'm pretty sure //
       the third show sold out -
       because  it was  just added //
       because the first two sold out.//
       ++++++++ And I know the seats
       ++++++ for the extra show,//
Len:   Oh //
       ++ you couldn't get the expensive seats, //
       with the
Matt:  ++++++ =with the tickets ( sold out ) //
Len:   yeah but I realize,//
       ++++ you could pick up. //
       +++ if you waited in line //
       you could get a hold of the upper seats. //
Pete:  +++++++++  Well then you could uv, //
       but +++++++++ they only had one ad for that //
       and then they had scalpers ads //
       ++++++++++26+++++++++++++
Matt:  I love that (     ) //
Len:   +++++++++  I don't know,
       I like the scalpers
       that     go to classics concerts. //
Matt:  ++++++++++20++++++++  D'you have a ticket? //
     DK   (huh     )
```

Matt: ++++++++++ Would you like a ticket? //
Len: +++++++LLL+++++++++++ We went Thursday.
and got a free ticket //
Nora: ++++++++ for you? //
Len: +++ um huh //
Pete: Somebody had a ticket //
that he wasn't going to use //
Nora: ++++ But how nice //
Len: ++++ I've done that five or six times. //
Nora: +++++++ Just standing outside and looking sad? //
Len: + No.
Just coming in off the bus.//
+++++ uh kid um
Pete: +++ =ready to buy a ticket //
Len: =going up to the ticket booths //
L: ++++++++21+++ someone went to a lot of trouble
to give away a ticket //

Len: ++++They got,
they got their tickets free,//
++++++++++ because they were punched.//
+++++++++ I don't know
how they get their tickets //
Steve:++++++++++++ they paper the house //
Matt: ++++++++18++++++++ The tickets were punched? //
Len: ++++++++ Yeah, like you know how
when you get a discount record
they clip off a corner? //
Matt: ++ Um hm. //
Ln. +++++ Punched tickets. //
++++++(with) a hole in them. //
Steve:+++++++++ So you can't turn it in //
Matt: It seemed like a very,
like the wrong place to try
to give away tickets.//
Ln. ++++++++ What, at the bowl? //
Matt: ++++++ Well, yes,
if you're giving away tickets
+++++ you should give to somebody //
+++++ who's liable not to go,
+++to get more people there. //
Pete: ++++++ Well, no,
this is just someone who's going //
Len: yes.. //
Pete: decided well
I have an extra ticket
and I might as well be nice //
+++++++++21+++ since if I try to get any money for it//
then I'm liable to be +++++ arrested
for scalping //
Len: ++++ Not likely. //
It's,+++++++++ you got to be kidding.//

The bowl holds ten thousand //
and there's ++
only five thousand people showed up? //
Len: ++++++ No.
Why bother trying to sell a ticket for money,
where there's +++ lots and lots of seats available //
Pete: +++++++++++++++ Simple. //
If it's a ten dollar ticket,//
I'll give it to you for five bucks. //
Steve:++ Yeah, half price //
Pete: ++++++++I've heard of ++++++++++ people
who were // uh +++++++++
caught outside the Foru. .
outside the Sports Arena, //
++++++++++ who were basically doing just that //
++++++++++ going to a show //
where they sold ten thousand seats,
and there're six thousand empty seats. //
++++++++++ Somebody says,
well, I have an extra ticket, //
++++ give me five bucks
and I'll give it to you.//
++++++++++ and the guy says
'sure',
gives him five bucks, //
takes the ticket,
and arrests him! //
Len: ++++++++++ You buy [this pen from me
for five bucks
[if you had I'llgive you this ticket]
Pete: [if you use this ticket]//
Steve: =Did he get his five bucks back? //
Len: ++++++++++ No, that's evidence.//
Pete: +++++ They've done that.//
Nora: +++++++++++++ That's not scalping, is it? //
Pete: +++++++ No.
Scalping, L.A. city //
+++++ the law is //
you can't resell the tickets
++++ for any price //
on the grounds of the event
on the day of the event.//
Len: ++++++++++++ So, like you'll go=//
Steve: yes //
Len: +++ =for the concert the next night //
and sell tickets.//
Pete: +++ Say- you want to go =//
Len: - or if you go the night after the concert //
++++++and sell tickets.//
Pete: if you want to buy it,//
sure, //
+++ let's go across the street

+ and I'll sell it to you.//
+++++++ That's legal. //
++++++++++++++ And that's what the real,//
what the real scalpers
make sure they do. //
++++++++23+++++ And this guy's just trying
to be nice to somebody,//
who didn't have a ticket.//
++++++++++++ You know they're having+++++ all this anti-
scalping +++++++ radio noise //
++++++++ uh, uh somebody else //
who was caught like that//
+++++++++ wrote in an angry letter
to the Times on //
+++ (ing) to enfore the scalping
against the scalpers //
and not against somebody like me. //
++++++++++++++ and it cost him something like a two hundred
dollar fine.//
???

Len: ++++++ You can always try to appeal the case.//

Nora: will you pass the corn please?

CONVERSATION Y85: Selection VES

Perry: Well ACTUALLY
+ this
this
+++ yes that reminds me of a story. //
uh ++ //
When`I was up in NEW YORK//
++++++ about three or four +++ months ago//
WELL +++++++++ it was in the WINTER so it //
so it so it MUST have been in DECEMBER //
and (I'd been) out at COLUMBIA (and)//
I visited uh +++++++ Barry FIELD
and his,// .
+++++ who is an economist
and his WIFE,
or live in,//
+++++ Constanza Waletski
who is ALSO an ecomomist //
Stan: ++++++ Constanza //
Perry: ++ and uh,
they had just BOUGHT +++ a house
++ a really QUITE remarkable town house //
+++++++ that is +++ VERY
I mean within a SHORT walk of Columbia
on RIVERSIDE Drive
mind you //
++++++++++++++++ with this ABsolutely SPECTACULAR view
of the Hudson river.//
+++ And it's WAY
at THAT point
you're really QUITE high up above the river //
++++++++++ and the thing IS though
that it needs a TREMENDOUS amount of ren + renovation
I mean // it's a REALLY beautiful place
but its its //
+++ I mean they've got a YEAR's work cut out for them //
+++++ At ANY rate, //
+++++++++ the IDEA was
that I was going to ++ //
uh +++ LET mys-
+++ Well
I mean that I would uh //
I had an early +++ DEPARTURE//
+++++++ So I,
beFORE they got up
I was just going to go downstairs //
++++++++ and go OUT. //
Well
$$$$$ uh um //
+++++++ you sort of COME down
through this, ++ you know, this ++ CASTLE //

```
        +++++++++ down the MAIN stair,
        I mean they live on the TOP two floors,
        and the bottom, //
        the WHOLE bottom area is being renovated
        so its sort of derelict //
        +++++++ and to get out the FRONT DOOR
        is just, you know I mean
        ++its like going through a TENEMENT or something.//
        +++++ But at ANY rate,
        you COME out  //
        +++ and there's a little old fashioned VESTIBULe type thing
        ++++++++ So you COME out +++++++ the FIRST door //
        +++++++ and then there's the OUTSIDE door //
        ++++++++++++++++ well //
        the door $$$$$$$$$$$$$$ CLOSED
        behind me //
        $$$$$$$ and the $$$$$$$$$ OTHER door to the street
        was locked //
      @@@@@@@@@@@@@@@@@@@
        so there ++ I was
        in this $ UNHEATED $ vestibule //
        $$in LITERALLY,
        I mean it was BITTERLY  cold weather
        It was,
        I don't know //
        ++it was ZERO @@@@@ or something outside //
        and you could SEE +
        it was a GLASS door
        but you're FAR enough away
        from the SIDEWALK //
        so @@@@@@@26@@@@@@@ grimacing and and so forth didn't work //
        ++++and I was TRAPPED there
        $ for about an $ HOUR and a HALF //
        I mean LITERALLY
        I could have FROZEN to death //
        @@@@@@@@@@ and FINALLY,
        FINALLY //
        @@@@@@@@
--------
no pitch for following 4 lines during turning of tape cassette
   Marietta came down in her robe,
   which was the event I had been waiting for.
   Of course she was just abso ... to see this pathetic figure
   She was taken aback, in a state of shock to see her guest,and
-----------------
    (went) to get the keys ++++++ and so on,//
    but it TURNED out I should've=
Carol:  (get out and get xxxx?) //
Perry:  LLLL No, the POINT is
    that there were two DIFFERENT  doors,
    of course =//
    ++++++++  I should've taken the OTHER door.
```

```
    The whole thing was my fault.//
    @@@@@@@@@@@@@@@
?:  (its everybody )
Carol:  NEXT time you'll know //
Nora:   That's a REAL NIGHTMARE //
Perry:  LLLL it REALLY was horrible //
Stan:   did you think of kicking out the GLASS or something? //
Perry:  ++++ WELL
        no I-I +++
        I ga, I mean
        ++++++ I-I assumed- I was RELATIVELY calm
        in the sense
        that I figured //
Bill:   LLL after an HOUR L and a HALF? LL //
        that after a REASONABLY short period
        I mean before the toes begin to freeze //
        @@@@@@@@@@ that SOMEBODY would appear.
        I mean from inside //
Stan:   yeah  //
Carol:  +++ They'd get UP //
Stan:   ++show you the way out anyway //
        ++++++++ It WAS $ the way out //
        $$$ but it turned out there was ANOTHER way out
        that I didn't $$ realize
        $$ I should have been taking.//
   $$$$LLL@@@@@@
Frances:They didn't give you a map//
Stan:   @LLLLLLL   Oh I see //
        you THOUGHT it was the way out ,
        @@@ and therefore the traffic would come through
        + and ( kae   a miiyy people + going  on) //
     @@@@@@@@27@@@@@@@@
Frances:do they live ALONE +++ o
        in this houseo //
Perry:  They have some uh +++ they have    ( )
        let us  say
        they  have some tenements //
    +++@@@@@@@@@@@@@32@@@@@@@@@@
Perry:  it's both.  I mean ,//
Stan:   when  they  get  it fixed up
        @@@ it'll  be  both  more  than  just tenements//
Perry:  @@@@@++++++++ I'm sorRY //
        ++ oh well
        there'll be several apartments//
Frances:(yeah )
Perry:  ++++++++++ Well, yeah  they have
        uh it HAD been divided
        with + each + floor having at LEAST one
        and in some cases + several apartments.//
        =I mean it's a huge thing,
        about 10,000 square feet.//
Frances: (      )
```

```
Perry:  ++++++++++++++ Oh yeah
        it's + about
        I don't know //
        +++++ I'd say three times the size of a large house //
Perry:  ++++++25++++++ u:h ++++++ FOUR times the size of a large house //
        ++++++++++LLLL++
Frances:I spend my liFE in these kinds of situations //
        putting you know +++
        one shoe
        +++  so that the door doesn't close entirely //
     $$$$$$$$$$
        while you go and check the + other one out.//
Stan:   ++++++++   That was pretty awful //
Perry:  +++++++ Yeah I was
        ++++ you know it WOULDN't have been so AWFUL-+
        it WOULD 've been //
        but it was it was doubly awful //
        because  it  really did threaten(  )  //
        ( I  ) really could have  frozen  to death.//
     @@@@@@@@
Frances:the hazards of the city.//
Perry:  the (  ) the (city's ) pretty substantial //
        ++++++++++.
Perry:  Still if you have to live in New York,//
        that's one of the nicest ++++++++++++ // places
        ++++++++++ because you have a sense of uh //
        ++++++++ because you have this big view
        I  mean  they really have a tremendous sense of open space.//
```

CONVERSATION JM86: Selection JOB

```
Stan:    do YOU HAVE have some good ALGEBRaists there 15 or something  like
         that? //++++26+++++++++++
         I can't think why.
         SOME one I KNOW //
         who's  partly an algebraicist
         he went there
         for a  while
         because  there was a big conference.//  ++++89
         I gather
         they have other strengths and weaknesses //
Jerry:   uh huh
Stan:    in their department.
Jerry:   Un hum  //
Jerry:   I BELIEVE
         you're right
         but but I don't remember.//
Marilyn: They DRED:dged the entire university
         to find people
         for Jerry's talk// LLL@11@
Jerry:   yeah (no pitchdata).
    LLL@@@@@@@@@@@@
Marilyn: and you know it was  CLEAR
         that people had been  // ++8+++++
         had had their arms twisted // +++
Marilyn: + hah ???
         I went to both lectures,
         and yesterday
         +++  NO One took notes.//
Jerry:   +++++++   huh //
Marilyn: nobody ++++ took notes //@@@@
     @@@@$$$$$$$$$$$$$$$$
         not one. //
         not EVEN,
         +++  you know a GRADUATE  student put a  NOTEpad out,
         but he  doodled
        then he fell asleep //
Jerry:  $$$$$$$@13@@$$  Thanks for telling me //
    @@@16@@@@@@@@@@@@
Marilyn: I listened.
         You know, I had a '/
Jerry:   (yeah ) //
Marilyn: Your lectures  were LOVELY //
Marilyn: I enjoyed them VERY much.//
Jerry:   the FIRST lecture people listened
Marilyn: yeah hah
Jerry:   [(second lecture really wasn't)] //
Jerry:   +++++10+++
         But I HAVE to give Maryilyn  +++ credit //
         because the uh +++++++++ the real
         ++++++  the MOST important thing she did was, //
```

++++++++ when I FIRST got a call
++++ about coming out and giving some lectures //
and (they said "come OUT for the week
and give four lectures. you know //
++++++ And +++++we TALKED about it
and Marilyn said, you know // +++++++
"PEOple can't be cordial //
for more than two DAYS. //
This is going to be //
NOT only a strain on you but,
+++ but a strain on on them.//
And (and) you could SEE it,
by the end of the second day~ //
I mean they PULLED it all through you know //
we gOT through the uh uh +++++++ the two days (stay in Hanlin??)
OK.//
+++ But I think that's really True,
I think (to go) out to a place~ //
SO *I 'm* making that a rule //

Nora: um hum //

Jerry: +++ two days is the maximim.

Nora: um hum //

Jerry: because to go OUT to a place for a week //
++++ they just can't keep up the. UH //

Marilyn: Sweetheart=

Jerry: [everyone do wants to do their BEST + //

Marilyn: [=THEY had trouble
with the second DAY~ //

Jerry: THEY had trouble with the second Day, yeah//

Marilyn: anu anu , uh (an // overlap
a number of people come

Jerry: (/or/But there were people):

Marilyn: A LOT of people came to the first lecture,
and they managed to have a TEA, //
and I don't think that (o came) //
@@@15$$$$$$$$$@ and in the middle of the tea,//
someone else S was scheduled to use $ the VERY same room,
and they moved in with cables //
and overhead projectors and so forth
they brought with them with them
and and the tea sort of got confused,//
and everyone had to leave,//
$$ and so the SECOND day
there was (low) NO TEA) //
+8++++++ there were about a third the number of people.//

Jerry: was there no tea? //

Marilyn: There was NO tea. //

Jerry: really? //

Marilyn: NO tea the second day. //

Jerry: Oh I didnt know that //

Marilyn: only a third as many people came] //

```
Stan:    they] used up their tea budget on //
Marilyn: uh huh //
Stan:    @@@@8@@@ the ha ha  ha thevery first day  //
Jerry:   one whole bags @ worth //@@
Marilyn: well   overlap +++++
Jerry:   [Gee Ididn;t know that]+==
Marilyn: and I KNEW they weren't accustomed to it //
         because the cookies      were Home made,//
         and NO ONE
         who has( Huh) TEA //
         @@@@@   +++++ once a Week,//
         or Every Day, //
         ++++  serves homemade cookies.//
 Nora:   +++++++++++ a:h hah  //
 Stan:   ( .... )..once a week
        and they rotate it then.//
Nora:    ++++++++++++++++ among [the men? //
Stan:    [the questionis how  (         )//
Marilyn: ++$$$$+++++ Ya, I mean they do //
Stan:    You have, you have a weekly colloquium
         +++ and someone makes things each week then //
Nora:    ++++++++ well but they've changed that finally//
Will:    Yeah but it lasted for a while didn't it//
Nora:    + I mean now  they just have and drinks and ++++ chips //
Will:    +++++++++ Yea
Marilyn  +++++++++ But in my: ++++++ memory //
         ++ in the last ten or fifteen years//
         +++++++++ where where Jerry's GONE to tea//
Marilyn: I REMemeber
         when you were at bell LABS,^//
         +++++++++++++ you were RESPO:Nsible for BUying the cookies //
         (.) one month.//
         ++ and I remember that because you $$ //
Jerry:   that's right //
         $$  you bought a month's worth of OREOS^.// Laught all.
      @@@@@@@@@@@@@@
         And by the $(second week) people$  said //
         "didn't you get anything
         @@@ besides Oreos for cookies? //
     @@@@@@@@@@@@@23@@@@@@@@@@
         and he said "I LIKE Oreos. //
     @@@@@@@@@@@@@@@@@@@
 Jerry:  My social consciousness
         hadn't @@yet been raised $$$$ to this (level) //
     @@@@@@@@@@@@@@
         it was my early stages of development // @@@@@
 Marilyn: (why on earth) people buy things    //
 Nora:   ++ Yeah you're right //
```