

STUDIES TOWARDS A DESCRIPTION OF THE DEVELOPMENT AND FUNCTIONING
OF CHILDREN'S AWARENESS OF LINGUISTIC VARIABILITY

by

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ABSTRACT

Children's language acquisition does not consist solely of the mastery of linguistic form and structure, children must also acquire the rules for appropriate use of that form and structure. To become competent speaker-hearers children must learn how to handle linguistic variability.

Almost nothing is known about how children acquire the sociolinguistic skills and patterns of sociolinguistic variability which have been reported for adult speakers. This thesis therefore investigates some aspects of the structure and functioning of linguistic variability in children's speech. It is shown that non-segmental variability in children's speech constitutes an area of prime importance for study. Children systematically employ the resources of non-segmental variability for a variety of social and affective purposes. The structured nature of this non-segmental variability is revealed by a quantitative analysis of the prosodic and paralinguistic features in children's speech.

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INTRODUCTION

In recent years, sociolinguistic variability in the speech of adults has received considerable attention from linguists. However, almost nothing is known of how children acquire and develop the sociolinguistic skills and patterns of sociolinguistic variability which have been observed and reported for adult speakers. It is important that these sociolinguistic skills and their acquisition by children should be studied. Firstly, such studies can contribute to our understanding of the nature of linguistic variability and of the change of variable systems through time. Secondly, such studies are crucial to our knowledge of the relationships between language, socialisation and social behaviour.

This thesis takes up some of these issues, and presents an examination of some aspects of the structure and functioning of linguistic variability in young children.

The first chapter offers a highly selective review of the literature dealing with children's language acquisition, and argues for the need to situate descriptions of children's language development within a sociolinguistic framework. Some of the problems raised by the modelling of sociolinguistic variability in children's developing language systems are discussed, and some directions outlined for a study of 'developmental sociolinguistic competence'.

The remainder of the thesis is organised into four data-based chapters. Chapter 2 is based on tape-recorded material collected from children in one junior school in the Tyneside area of north-east England. It presents an investigation of

the relationship between perceived sex-type and linguistic variation in young children aged 4 to 9 years. The experiments reported in this chapter are directed towards determining the existence of systematic variability in the speech of young children. The existence and systematicity of this variability is revealed by the judgemental reactions of hearers (children and adults) who were required to identify the sex of children from samples of tape-recorded speech.

Analysis of the hearers' responses and of the tape-recorded children's speech reveals that an important part of the structured variation is to be located at the level of non-segmental phonology (sensu Crystal, 1969). Accurate identification of the sex of the tape-recorded children is shown to depend on the presence of clusters of particular prosodic and paralinguistic features in their speech.

The significance of non-segmental variability in children's speech revealed in Chapter 2 is further explored in Chapter 3 by an examination of the relationship between segmental and non-segmental variation in the speech of two children. Despite the considerable body of research concerning the nature of sociolinguistic variation, remarkably little is known about the relative importance of the contributory variable systems. Because of the ways in which variables are selected in most sociolinguistic surveys, we do not know, for instance, what dependencies might exist between variability at different levels of linguistic structure; nor do we know how important segmental variation is, as compared with syntactic,

lexical or non-segmental variation. Consideration of the segmental data presented in Chapter 3 suggests a possible ranking of variable systems. The importance of prosodic and paralinguistic features in children's speech is further established by demonstrating that for some children variability in segmental realisations is, in several respects, significantly determined by variation in co-occurring non-segmental features.

The reactions of hearers reported in Chapter 2, which were used to reveal the existence of structured variability in the speech of young children, indicated non-segmental phonology as an area of prime importance. However, because the reactions of hearers, by definition, do not necessarily indicate the actually signifying elements of variation, it is necessary to identify such elements by some other means. Chapter 4, therefore, attempts to identify such elements in terms of their function within different interactions. It presents a detailed analysis of prosodic and paralinguistic features in interactive 'episodes' whose salient ends were independently observed. It is shown that children make systematic use of non-segmental variability for a range of social and affective purposes. Prosodic and paralinguistic features are shown to be employed to negotiate strategies for control, strategies for self-focussing and other-focussing, and dramatic displacement in both desultory and in more sustained play acting.

Having informally established, in Chapter 4, some of the social functions of co-occurrences of prosodic and paralinguistic features in children's speech, Chapter 5 attempts to formally

determine those systems without reference to function.

The data examined consists of selected 'episodes' from the speech of two children, aspects of whose linguistic behaviour were discussed in Chapters 3 and 4. These episodes are analysed in terms of a number of prosodic and paralinguistic features (Crystal and Quirk, 1964; Crystal, 1969). It is shown that this treatment successfully elicits significant patterns of variation from the data, and demonstrates the possibility of establishing systems of prosodic features in the speech of young children. Interactions between grammatical features, systems of tone, and pitch-range features are presented in quantified form. Such an analysis allows comparisons to be made between the non-segmental behaviour of the two children. It is further shown that there are significant similarities between the non-segmental systems of the children and independently established non-segmental systems of adult Tyneside speakers (Pellowe and Jones, 1978).

By focussing on the structure and functioning of non-segmental variability in children's speech, this thesis seeks to investigate some sociolinguistic aspects of language acquisition and development.

**Chapter 1: A SOCIOLINGUISTIC APPROACH TO CHILDREN'S LANGUAGE
ACQUISITION: A REVIEW OF THE LITERATURE AND SOME
PROPOSALS**

The study of children's language acquisition has a relatively brief, if varied history. Some main trends are, however, discernible. It is possible to distinguish several 'periods' in terms of their main theoretical and methodological emphases. The first is that of the diary-record approach, dating from the mid-nineteenth century; the second, that of large-sample studies of children's language, which developed in America in the nineteen thirties. In both of these 'periods' we find a general emphasis placed on the study of the acquisition of the form of language. Following these, we can distinguish those more rigorously 'linguistic' studies, stimulated by the work of Chomsky in the late nineteen fifties and early nineteen sixties, where attention shifts to an examination of the acquisition of the (mainly syntactic) structure of language. More recently, researchers have begun to redirect their attention away from the earlier emphasis on the acquisition of linguistic form and structure, to a consideration of children's acquisition of the uses of language.

According to Leopold (1948), the detailed study of children's language development began in Germany in the middle of the nineteenth century. Earlier, however, we find such writers as Tiedemann (1787) keeping a careful day to day record of his son's development from birth. Although the diary is largely concerned with psychological observations, Tiedemann does occasionally comment on aspects of his child's language development such as his ability to comprehend an utterance before he is able to produce it; the relative ease (and difficulty) of producing certain sounds, as well as some brief observations on the acquisition of dialect features by the child.

The pioneering work of such observers as Schleicher (1861) and Franke (1899) in Germany, and Taine (1877) in France, helped prepare the way for the more comprehensive diary works of Clara and William Stern (1907), and Leopold (1939-1949). These latter two longitudinal studies are of major importance in the general development of research into children's language acquisition. The Sterns' work covers the details of three children's language learning, but concerns itself largely with the later stages. It focusses predominantly on the appearance of grammatical forms and the development of the sentence, and provides little information about phonological development. Leopold's work on infant bilingualism follows in considerable detail the language development of his first daughter through the first two years of life, giving central importance to phonological development. Of particular interest in the present context are Leopold's comments on his transcription of the child's phonology:

The purpose of the transcriptions used in this study is not the scientific one of establishing the phonemic pattern of the child's speech (which can however be deduced from them), but the practical one of giving as accurate an idea as possible of her sounds and word forms. A phonemic transcription, valuable as it is for the analysis of standard languages, would defeat some of the aims of a study of child language. (1939: 9)

In this lies the unique value of Leopold's work, for he presents 'raw' data amenable to reworking and reinvestigation by other interested parties (as in Moskovitz, 1970). Moreover, as I will argue later (Chapter 3, p.110), such an approach is essential if we wish to come to a clear understanding of the development of sociolinguistic variation in children's language. (For instance, the 'free variation' and 'minor changes' which Smith (1973: 182, 10)

excludes from the study of his son's phonological development, and the phonetic variation which Halliday (1975) 'sometimes slightly regularised', may well be the kinds of data which could contribute to an understanding of the development of sociolinguistic skills in young children).

The appearance of McCarthy's monograph on the language development of preschool children (1930), marked a distinct shift in direction in the study of children's language acquisition. The data-base was no longer the extensive longitudinal records of the speech of a few children, but small samples of speech from large numbers of children of varying ages; the aim of which was to produce a general characterisation of the pattern of language development. McCarthy's own work, for instance, was based on the recording of fifty consecutive verbal responses from 140 children whose ages ranged from 18 to 54 months. These were analysed on the basis of length of response, complexity of sentence structure, and the relative frequencies of various parts of speech. McCarthy attempted to standardise the sampling procedure by employing father's occupation as a criterion of selection. The children's responses were analysed with similar regard to 'scientific rigour' giving due consideration to the now well established non-linguistic variables: age, sex, mental age, and father's occupation.

Contemporary with the early large-sample studies is the work of Lewis (1936), which combines details and reanalyses of the work of earlier researchers with his own longitudinal investigations of his son. This study is of note not only because of the wealth of detailed phonetic data presented, and the attempted psychological explanations of the phenomena under investigation, but also

because of the influence it has had on recent researchers interested in 'functional' approaches to language acquisition (notably Halliday, 1975).

The growth of the notion of 'normative' developmental studies can probably be traced to this same period, where elicitation of the data (rather than the recording of spontaneous utterances) assumed a greater importance. It is here too that we see language acquisition being more and more related to other aspects of development, with a growing interest being paid to the effects of different 'environmental' factors, particularly socio-economic class (eg McCarthy 1954: 584ff, and references therein).

A work which stands out from the general trends of child language study during this period, is that of Jakobson (1941). Its particular importance lies in Jakobson's attempts to unite the work of a number of researchers concerning language development, and to produce a coherent phonological theory. Drawing particularly on the important work of Grégoire (1937), Jakobson attempts to delineate a predictive order for the acquisition of sounds on the basis of 'maximal contrast' (eg 'front' versus 'back' consonants), suggesting that universal elements of the phonological system are learnt prior to those which are not universal. This work is one of the first to accord children's language a central role in the formulation of linguistic theory.

A series of important articles and reviews of the literature on the early stages of infant vocalisation began to appear in print during this period. The work of Irwin and his associates

focuses on the importance of employing an accountable methodological base for investigation of early linguistic phenomena, and on the pressing need to establish measures of observer reliability. They further attend to the problem of adequate sampling in language acquisition research, not only in terms of the number of children observed, but also in terms of the frequency of observations of a particular child over delimited periods of time (Irwin, 1941, 1942; Irwin and Chen, 1941; Irwin and Curry, 1941). These matters continue to be of particular interest, although frequently in studies of children's language acquisition, they are not accorded the importance due to them. We can note, for instance, the approach of Smith (1973), who, in describing the phonological development of his son, writes of his method of data collection:

Data were collected systematically . . . sometimes at intervals of a week, sometimes every day; depending partly on the (in)stability of his system, partly on the time available. If I detected any change at all in what he said, I always made a note of it, with the result that I am confident only minor changes can have been missed over the period studied. (10)

The great impetus to shift the orientation of language acquisition studies came in the late nineteen fifties, with the publication of the work of Chomsky (1957). Whereas before any reorientation in language acquisition research had largely only affected the method of data collection, this latest shift involved a considerable change in the theoretical orientation of description. Emphasis was now increasingly placed on describing not merely the language output of the child, in terms of frequency counts, lexical and phonemic inventories, and so on, but rather in determining and describing the acquisition of structure - the acquisition of

the linguistic 'rules' which were taken to underlie the utterances produced. These studies frequently combined the use of longitudinal investigations of a few children, and large-scale sample studies (Berko, 1958; Brown and Fraser, 1964; Klima and Bellugi, 1966).

The influence of the work of Chomsky on research into children's language acquisition during the early nineteen sixties was considerable. However, more recently a growing body of work is expressing an increasing dissatisfaction with what are seen as the rigid and restricting limits of the so-called 'innatist hypothesis', the narrowly defined notion of linguistic 'competence', and the many undefended assumptions upon which Chomsky builds his model of linguistic structure and of the acquisition process (Bruner, 1975; Hymes, 1971; Olmsted, 1971; Wells, 1974). Many of these concerns have been rehearsed elsewhere (Derwing, 1973; Vorster, 1975), but in the context of the present research I would like to examine some of them again, to suggest briefly why, although Chomsky's proposals highlight some of the problems, they seem inadequate for dealing with the phenomena; and to propose a somewhat differently oriented approach to the study of children's first language acquisition.

The first of the major problems resulting from Chomsky's suggestions about language acquisition is that they have produced a rather one-sided picture of the process, stressing as they do the formal structure of language, and placing emphasis on syntax at the expense, particularly, of semantics and pragmatics. This bias can be clearly seen in the work of McNeill (1966, 1970), one of the strongest proponents of Chomsky's ideas concerning

language acquisition. In general, Chomsky offers a rather cautious and abstract characterisation of children's language acquisition. McNeill, on the other hand, makes strong, clear claims:

Not only do children acquire knowledge of sentence structure - itself an important fact - but virtually everything that occurs in language acquisition depends on prior knowledge of the basic aspects of sentence structure. (1970:2)

He claims further, that 'Children everywhere begin with exactly the same initial hypothesis: sentences consist of single words' (1970:2). These claims rest on a very curtailed notion of what the form(s) and function(s) of language, and language acquisition might be. For McNeill the child is an aspiring analytic grammarian 'striving to discover' how grammatical relations are 'expressed locally' (1966:47).

Centrally placed in McNeill's arguments concerning the nature of language acquisition, is the model of the 'Language Acquisition Device' (LAD) taken over from Chomsky (1965). McNeill's comment on this model is enlightening

LAD is, of course, a fiction. The purpose in considering it is to discuss real children, not abstract ones. (1970:71)

Having located the real subject matter, it is disappointing to find McNeill then raising the convenient 'fiction' of the LAD from hypothesis to fact, and rarely discussing 'real children' and their language capabilities. It is not sufficient to simply have a theoretical model. Sooner or later the model and the data must be persuaded to converge. McNeill (1970) proposes the following expanded description of the Language Acquisition Device:

It is useful to distinguish two major components of LAD. One is a set of procedures for operating on a corpus . . . The other is a body of linguistic information . . . It is conceivable that LAD contains only one of these components. LAD might contain a set of procedures for discovering grammar, or it might contain a set of assumptions about the form of grammar or, of course, it might contain both.

(1970:70-71)

The development of these notions in the work of McNeill and other followers of Chomsky has had somewhat unfortunate consequences. Given the notion of innate predisposition towards language, and the stress placed on the specification of syntactic rules, the LAD has necessarily focused attention on, and is primarily concerned with the beginnings of, 'language proper' (the two- and three-word 'stages'). The theory is thus obliged to ignore the fact that children enter into meaningful communication with others before they have mastered the syntactic system of the language. Such meaningful communication is proving to be of great importance for an understanding of the acquisition of language in general, and of such aspects as the acquisition of syntax and semantics in particular (Bruner, 1975; Carter, 1974; Dore, 1973; Halliday, 1975). (The implications of such early interaction for the acquisition of the functions and structure of non-segmental phonology are considered in Chapter 4).

Various versions of the LAD and the 'innateness hypothesis' have been proposed, both from within and from outside the Chomskyan framework. Slobin (1966), for instance, expresses dissatisfaction with the Chomsky-McNeill 'content' model, favouring a 'process' one in which the child

. . . is born not with a set of linguistic categories but with some sort of process mechanism - a set of procedures and inference rules if you will - that he uses to process linguistic data. (1966:87-88)

Thus linguistic universals, on which the Chomsky-McNeill model places such importance, would be 'the result of an innate cognitive competence rather than the content of such competence' (1966:88). Fodor (1966) suggests

. . . the child must bring to the language learning situation some amount of intrinsic structure. This structure may take the form of general learning principles or it may take the form of relatively detailed and language-specific information about the kind of grammatical system that underlies natural languages. (1966:106)

Fodor further and more interestingly posits that the 'learning principles' themselves might be learnt. Given the state of knowledge about psychological and neurophysiological functioning, and in the absence of any general thoroughly documented theories of learning and memory, the 'innateness hypothesis' is not empirically refutable, and time spent adding fuel to the 'innateness versus learned' fire is time wasted. It hardly seems necessary to state that some sort of relevant innate abilities exist in humans which assist in language learning, but to label something 'innate' is not to explain it. It would appear to be of the greatest advantage to children acquiring language if such 'innate' abilities were linked to the development of other cognitive skills; indeed, it would be strange if they were not.

The work of researchers in the field of cognitive development is clearly pertinent here, particularly that of Piaget (1959), Bruner (1974, 1975), and Sinclair-de-Zwart (1969). It is clear from the work of these researchers that the child is far from being a passive learner. To enter into effective verbal interaction it is necessary for the child to make some kind of sense out of

his experience, within which the utterances of others can become meaningful, and which can provide a frame for his own utterances. His systems of constructs thus must treat the language he hears and produces as part of his general experience. The work of Piaget, in particular, suggests that the child has already organised a range of schemata for sorting out his experience by the time he begins to produce minimally structured utterances. There is ample evidence to indicate that the pre-linguistic child is able to discover regularities in the relationship between his actions and the objects on which he acts, and that he is able to draw on his range of past experience of similar regularities, in making systematic adaption of his present behaviour to the effective completion of his various purposes (Piaget, 1957; Schaffer, 1971; Stern, 1977; Vygotsky, 1962). Thus, it is more than likely that the child has already established a variety of meaning categories when he begins to learn the linguistic forms through which these meanings are encoded (Morehead and Morehead, 1974; Schlesinger, 1971; Slobin, 1971).

One of the central reasons which seems to underlie the establishing of the Language Acquisition Device, and the need to postulate an 'innateness hypothesis' is the characterisation of the linguistic input to the child, from which he creates a 'rich and highly specific grammar', as 'degenerate' and 'limited' (Chomsky, 1969:87-88). In itself this is reason for dissatisfaction with the Chomsky-McNeill kind of proposals, for an increasing amount of work is demonstrating that speech directed to children by adults is both quantitatively and qualitatively different from

other kinds of speech. Attention was drawn to this fact by Bellugi and Brown (1966), in their discussion of speech between adult and child, when they state that the child's introduction to his language 'ordinarily comes in the form of a simplified, repetitive, and idealized dialect'(136). Similarly Drach, Kobashigawa, Pfuderer, and Slobin (1969) report that speech to children is syntactically less complex, more repetitive, and contains fewer pauses and errors than speech directed to adults. Blount (1972) and Berko-Gleason (1973), also emphasise the special nature of adults' speech to children. In his examination of Pacific languages, Blount argues that Samoan and Luo adults 'tailor their speech so as to correspond to the children's ability to handle semantic distinctions' (126), while Berko-Gleason refers to this specially patterned language as 'directive socializing language' (162). It is thus becoming clear that although the language input to children acquiring language may be 'limited' vis-a-vis the syntactic and lexical range of adult language, it is certainly not of 'degenerate' quality; indeed, it is frequently highly structured specifically for the benefit of the child. Bruner (1975) also reports on mothers entering into such structured interactions with pre-linguistic children, by which the child is assisted in the interpretation of the mother's intentions in gestures and speech - '. . . joint experience and joint actions are also full of hints as to how we should proceed from sense to sound' (18).

The essence of all the foregoing point of criticism lies in the failure of the Chomskyan model of language acquisition to take account of the behavioural and functional bases of the data under consideration. Chomsky's hypotheses about the Language Acquisition Device are inadequate, because he is excessively, almost exclusively

preoccupied with adult language. Language acquisition is seen by Chomsky in terms of linguistic analysis carried out by the child, rather than as a subset of learning procedures within the general context of child development. It is to be regretted that Chomsky did not exploit the implications of his own words in developing a model of language acquisition.

Thus an essential property of language is that it provides the means for expressing infinitely many thoughts and for reacting appropriately in an indefinite range of new situations. (1965:6. My emphasis)

Put simply, Chomsky's theory of language acquisition overdetermines the data. In contrast to this, Bloom (1970), in her treatment of syntactic acquisition, was one of the first contemporary researchers to take behavioural and functional information into account. Bloom defines her approach to the study of language development as reaching the 'meaning' of children's utterances by 'focussing on the correlation of linguistic and contextual features, by concentrating on what the child said '. . . in relation to what he was talking about' (2). She concentrates largely on using semantic information from the children's speech to make inferences about the underlying structure - about their linguistic competence. The transformational grammar approach which she employs, is, however, interestingly placed in a framework of 'speech events' (Hymes, 1964). Bloom's desire to spread the net of language acquisition studies beyond the purely formal aspects which concern many of her contemporaries is refreshing - especially in the context of the transformationally based description which she employs. Bloom's work elegantly demonstrates the possibility of making coherent

statements about linguistic structure, and of relating these functionally to features of the non-linguistic domain in which the child's speech is embedded. (Chapters 4 and 5 of this thesis attempt to explore and relate the functional and structural characteristics of non-segmental phonology in the language of young children).

Although researchers such as Bloom and Schlesinger have attempted to add a dimension of 'behavioural reality' to the Chomskyan model of language acquisition, perhaps the most compelling reason for dissatisfaction with it remains. Chomsky's model of language acquisition (like his model of linguistic structure in general) excludes from consideration differences in the varieties of language and the uses of language exhibited by different groups in the speech community. Dealing as it does with the 'ideal speaker-listener in a completely homogeneous speech community', Chomsky's model idealises away 'grammatically irrelevant' linguistic variation (1965:3-4), and relegates it to what Labov has called the 'wastebasket' of performance. Chomsky, however, is by no means alone in this respect. In spite of the work of Labov and others who have demonstrated the importance of linguistic variation for the formulation of adequate theories of linguistic behaviour, studies of children's language acquisition have paid little attention to such matters. Virtually nothing is known about how the kinds of sociolinguistic variation observed in adult speech develop in the language of children. Ervin-Tripp has drawn attention to the lack of knowledge about the acquisition of 'social dialect skills'. In a programmatic paper she writes:

We need much more work on the social conditions which alter the frequency of social variants in speech. . . . We need more research on the development of children's subjective reactions to language . . . How early and by what features, do they identify categories of speakers? How early can children, depending on their social experience, differentiate the Standard English of various ethnic groups? (1971:289)

Fraser (1973) echoes this concern, that linguists on the whole, have shown reluctance to investigate this area of linguistic behaviour. He writes

The acquisition issue needs further clarification before any comment can be made, since we don't know at what point a child in learning a language actually acquires the systematic variation found in the studies of Labov and others. (1973:11)

Although there have been some attempts to characterise linguistic variation and its non-linguistic correlates in the speech of children, this work is still very much in its infancy. Romaine (1975) and Reid (1976) employing the methodology developed by Labov (1966), investigate sociolinguistic variation in the language of young Edinburgh schoolchildren aged 6 to 10 years (Romaine) and 11 years (Reid). Both of these studies reveal degrees of social and stylistic variation in certain segmental phonetic aspects of the children's speech. Weeks (1971) has identified a number of 'speech registers' (varieties which differ according to use) in the language of children aged 3 to 5 years. Berko-Gleason (1973) reports briefly on the 'code-switching' abilities of children aged 4 to 8 years, noting that 'even the tiniest children make some distinctions' (163). Studies by Shatz and Gelman (1973) and Sachs and Devin (1976) both indicate an awareness in young children of 'age-appropriate speaking styles'. Sachs and Devin, for example, find that for the children they studied

the age of their interactants had a considerable effect on the ways in which the children spoke.

The children's speech was different . . . when talking to a baby or doll as compared with the speech to a peer or adult. Speech to a baby doll was similar to that addressed to a real baby . . . (1976:81)

However, in terms of developing a model of sociolinguistic behaviour in children, little substantive advance has been made since the speculative attempt by Labov (1964). In outlining 'six stages' in the acquisition of the 'full range of spoken English', Labov comes to the somewhat surprising conclusion that children do not reach the important stage of 'social perception' (where they develop an awareness of the social significance of linguistic variation) and that of 'stylistic variation' (where they learn how to modify their speech towards the prestige standard) until 'early adolescence'. (Evidence refuting the first of these claims by Labov is offered in Chapter 2. There it is shown that systematic variation exists in the speech of young children, and that children themselves can recognise this variation considerably before 'early adolescence'). Despite the unsatisfactory nature of Labov's proposals, his outline of 'six stages' still represents the major attempt to provide an explanatory model of the development of sociolinguistic variation in children's speech.

Thus, while studies of language acquisition have generally not placed any great emphasis on the investigation of linguistic variation (of the kind discussed in Labov, 1966), those studies which have considered such variation in children's speech, have not really attempted to integrate it into an account of linguistic

development. Granted that language is one of the principal ways in which children become involved in making sense of social reality (Berger and Luckman, 1971; Bruner, 1977; Cook-Gumperz, 1977; Wells, 1974), then it is clearly important to investigate children's learning of language in relation to their learning of the 'rules' of social interaction within their community. Moreover, if we are to provide an adequate basis for the understanding of (adult) speaker-hearer behaviour, there is a need for more thorough investigations of the development of systematic linguistic variation in the speech of children. However, when linguistic variability is treated as a central parameter of the language acquisition process, several important definitional problems arise. We are, for instance, confronted with the problem of distinguishing between the different kinds of variation which are presented to us in children's speech. There are at least two major sources of variability in the speech of children. First, there is variation which can be attributed to the development of sociolinguistic skills (eg the 'code switching' variations reported by Weeks (1971) and Berko-Gleason (1973)). See also the data presented and discussed in Chapters 4 and 5 of this thesis). Second, there is 'fortuitous', transitory variation which may be attributable to the developing nature of the child's linguistic 'system' (eg some of the phonetic 'instability' of lexical items reported by Farwell (1976), Ferguson and Farwell (1975), Moskovitz (1970), and Peters (1976)).

Separating out these different kinds of linguistic variation in children's speech is no simple matter, and the difficulties of doing this are compounded by a surprising lack of normative data

on almost all but the most elementary aspects of children's language. If we wish to investigate linguistic variability in children's speech, it is obviously of some importance to be able to establish which features of the child's language are stable at particular times.

Although there are frequent references in the literature to 'stages of acquisition' of language (Brown, 1973), the concept of 'acquisition' remains relatively unexplored. We find, for instance, a wide range in the strictness of criteria used by different researchers to delimit what inferences can be made about 'linguistic competence' from spontaneous and elicited speech. Bloom (1970) presents, in considerable detail, the set of criteria which she believes should be met before a child can be credited with 'knowledge' of a linguistic rule. Halliday (1975) is not alone in standing far removed from this position, in his casual references to the child having 'mastered' 'an instance of language' (38). Likewise, Menyuk (1971) comments on the important problem of the appearance of various structures in children's language:

. . . the particular ages at which the various base structures and transformational rules appear in the utterances of children vary, but a similarity in the sequence of acquisition has been observed in all children whose language has been collected and described.

(111)

Yet in her discussion of language development, which ranges over phonology, syntax and semantics, Menyuk offers no definition of what she means by the term 'acquisition'.

It is to be regretted that such a central issue as the delimitation of the concept 'acquired' should have received so little attention from linguists concerned with the investigation of developmental phenomena. Brown (1973), in examining the acquisition of (fourteen) grammatical morphemes, highlights some of the problems in studying the developmental process. He notes especially the difficulties raised by the fact that

. . . a considerable portion of time elapses between the first appearances of a morpheme and the point where it is almost always supplied where required. (257)

Following Cazden (1968), Brown adopts the strong criterion of ninety percent accuracy in environments where use of a particular grammatical morpheme would be considered obligatory, though this, of course, begs the question about notions of knowledge (both the child's and the linguist's) of 'obligatoriness'. (Compare the discussion in Chapter 3 (p.117ff) of this thesis, concerning the identification of 'intentional' deviations in children's segmental phonology).

Olmsted (1971) places the problem of the definition of 'acquisition' at the centre of his investigation of the development of children's phonological systems. Olmsted sets out to formulate a theory about the possible prediction of errors in children's efforts to produce utterances modelled for them by adults. He argues that the child learning to speak will experience more difficulty with perception and imitation than with the task of articulation itself. Chapter 5 of Olmsted's book is of particular interest in the present context, for it underlines the fact that the acquisition process is not an all-or-none process, but that

children continue to make errors after they begin to produce a phone, or cluster of phones, correctly. Performance thus improves gradually, and rather slowly. Olmsted writes

. . . suffice it to note that the principal problem in connection with testing is to know when a distinction has been ACQUIRED. . . . This question is crucial because it leads on, if one isolated instance is NOT enough, to the necessity to establish standards of performance that will be taken as indicating ACQUISITION. These questions have either been ignored or side-stepped by most workers heretofore. (111)

In part, Olmsted's solution is to adopt a method of calculating an 'Index of Acquisition'. This is achieved by expressing the number of phones judged to be accurately produced, as a fraction of those not accurately produced by the children in any given age-group. The judges used by Olmsted to assess the accuracy of the children's production of the phones were adult native speakers of the language. Olmsted's concern with methodological rigour in this respect is to be welcomed; indeed, some kind of 'index of acquisition' could be of considerable assistance in attempting to model 'sociolinguistic competence' and the development of linguistic variability in children's speech. When Bloom (1970) writes

There is strong evidence that the child's language is systematic, but the system is in a state of flux, and violations occur. (18)

we need to know (from a sociolinguistic point of view), if and when a stable 'system' has been acquired. Otherwise there is no principled way of deciding which of these 'violations' are mistakes, and which, systematic variability, or attempts at systematic variability. (Some of these problems are taken up in more detail in Chapter 3 of this thesis).

Drawing together the main points of the preceding discussion, a perspective for a sociolinguistically oriented approach to children's language acquisition and development begins to emerge.

The model of language acquisition outlined by Chomsky (1965), in focussing too exclusively on the formal aspects of language, is unable to provide an adequate characterisation of the processes involved. We should note that language acquisition does not proceed categorially, by simply additive steps, as the Chomskyan model might suggest, but rather proceeds in a systematically variable way (Brown, 1973; Ferguson and Farwell, 1975; Nelson, 1975; Olmsted, 1971). Nor is the language which children learn that static, homogeneous entity on which Chomsky erects 'linguistic theory' (1965:3) (cf Andersen, 1975; Bailey, 1973; Bickerton, 1973; Labov, 1969; Labov, Yaeger and Steiner, 1972). Variation is at the heart of language acquisition, in terms of what the child learns, and how the child learns it. Any model of acquisition which makes claims to adequacy must take account of this.

Of crucial importance in any study of children's language, is the acknowledgement that language is not learned 'in vacuo', but is embedded in the 'social context' of the community in which the child is growing up. Children do not simply learn linguistic structure, they learn at the same time how to use that linguistic structure. The study of language acquisition and development, then, require a framework which will take account of functional and behavioural aspects as well as formal features of linguistic structure (Bloom, 1970; Ervin-Tripp, 1971; Hymes, 1971; Slobin, 1967). We note Hymes' comments in this respect:

What is essential is that concepts of the nature of language and its use be not pre-empted in the name of 'linguistic theory' by a narrow view. The understanding of language use involves attention not only to participants, settings and other extra-linguistic factors, but also attention to purely linguistic phenomena, and the discovery and statement of new features, organization and relationships in the data of language itself, when viewed from the more general perspective of social relationships. What is essential is that conceptions of speakers, listeners and competence takes into account, as quite normal in the world, the situation of diverse codes. One must see the child as achieving narrowly linguistic and broadly sociolinguistic (and communicative) competence together. (1971:24)

Ervin-Tripp (1971) has suggested renaming this area of linguistic investigation 'sociolinguistic competence', in order that other, non-linguistic forms of communicative skill may be excluded from consideration. In adopting Ervin-Tripp's terminology in what follows, I will focus it by prefixing the label 'developmental'. Thus I take the study of 'developmental sociolinguistic competence' to refer to the investigation of children's acquisition of different speech varieties, and the 'social rules' for the use of these varieties.^{Fn}

Fn. The expression 'speech variety' derives from the work of the Tyneside Linguistic Survey (Pellowe, Nixon, Strang and McNeany, 1972). 'Speech variety' cuts across traditional notions such as 'accent' and 'dialect' and subsumes all kinds of (social and affective) linguistic variation - 'stylistic', temporal, spatial, and regional variation. I use it as a non-committal term for any bundling together of linguistic phenomena. (We can compare the use of 'lect' in Bailey (1973) and Bickerton (1973)).

The linguistic environment of children exposes them to a range of different speech varieties. They encounter the language of speakers of different ages - grandparents, parents, peers, younger and older

siblings - and that of speakers of different regional and social backgrounds, as well as varieties of language differentiated on the basis of affect. Children come to understand this range of varieties, and are able to produce a range of 'social' and affective varieties themselves (Chapters 4 and 5 offer some exemplification of these claims). If we are to understand the processes involved in the acquisition and development of language, then it is essential to take account of abilities such as these.

In outlining what I have claimed are some of the requirements for an adequate modelling of the development of linguistic behaviour, I have been making the following assumptions:

- (1) that the 'rules' for the use and realisation of sociolinguistic variability (Labov, 1970), are not acquired late in the child's linguistic development (contra Labov, 1964), but are acquired as the child learns linguistic form and structure. They form an indispensable part of that development, allowing the child to become a competent speaker of his language (in the sense of Hymes, 1971).
- (2) that the systematic variation observed in the speech of young children (eg that reported by Sachs and Devin, 1976; Shatz and Gelman, 1973; Weeks, 1971), is directly related to that variation which has been documented in adult populations (Labov, 1966; Pellowe and Jones, 1978; Trudgill, 1974). There are no good grounds for proposing a model of discontinuous development of 'sociolinguistic skills'. (We can note that there is no clear evidence to suggest that those linguistic features which together say, diagnose geographical origin, are different from those which provide information about other non-linguistic characteristics of speakers).

- (3) that in order to begin to explain children's ability to produce different speech varieties, and to understand speakers having different varieties, there exists a relationship between 'receptive' and 'productive' competence of the kind indicated by Shipley, Smith and Gleitman (1969) and Slobin (1973). That is, 'productive' competence is a sub-set of 'receptive' competence, and 'new forms' (in speech) encode 'old functions'. It is assumed that children continually revise their internalised representations of linguistic forms (at least) when they encounter different varieties of language from their own, and that these revisions trade off onto their range of productive varieties.

It is clearly outside the scope of any single study to meet all the requirements, and test all the assumptions I have outlined above. However, certain important steps towards a satisfactory model of 'developmental sociolinguistic competence' can be made, and these are treated in this thesis.

First, it is necessary to establish the existence of systematic sociolinguistic variability in the speech of children, and to identify at what age this variation appears. It is also necessary to determine the interactive salience of such variability for young children. (Chapter 2 addresses itself to these problems. Employing a simple experimental design, it is shown that systematic sociolinguistic variability can be located in the non-segmental features of the speech of young children, and that young children are sensitive to such variability).

Second, it is important to discover what the relationships are between different kinds and different levels of variability in children's language. It is known that children do not acquire competence at all levels of linguistic structure at the same time. The stage of acquisition reached at one level can affect performance at other levels (Ferguson and Farwell, 1975). Thus, the existence

of systematic sociolinguistic variability at one level of linguistic structure does not necessarily imply the existence of it at another level of linguistic structure. Not only do we need, therefore, to attempt to distinguish between 'truly acquired' variation and 'transitory' variation at a particular level of linguistic structure, but we also need to discover what dependencies might exist between variability at different levels of linguistic structure. (Chapter 3 attempts to explicate some of these issues. Consideration of the relationship between segmental and non-segmental variability further emphasises the importance of non-segmental variability in children's speech. It is demonstrated that variability at the level of non-segmental phonology plays an important role in determining the nature of variability at the level of segmental phonology. It is also shown that hearers rely considerably on non-segmental variability in order to decide about the significance of linguistic variability at other levels of linguistic structure).

Third, in developing a model of children's sociolinguistic competence, we need to discover something about the nature and range of the functions of linguistic variability in their speech. (Having demonstrated some aspects of the importance of non-segmental variability in children's speech, in Chapters 2 and 3, Chapter 4 turns to a consideration of the functions of non-segmental variability in the speech of children. An examination of some interactive episodes, reveals that children systematically employ non-segmental variation for a range of social and affective purposes).

Fourth, in attempting to characterise the development of children's language, it is important to discover the extent to which it is possible to model the variability we find in terms of

'systems'. Moreover, from a sociolinguistic point of view, we need to know the extent to which we can compare different children in terms of the 'systems' we establish. (Chapter 5 examines the structure of non-segmental variability in the speech of children, and attempts to determine prosodic and paralinguistic 'systems'. Consideration of data drawn from a variety of naturalistic situations demonstrates that it is possible to establish such 'systems' in children's speech. It is also shown that it is possible to effect comparisons between the non-segmental systems of different children, and between the non-segmental systems of children and those of adults).

In order to begin the detailed investigation of the development of sociolinguistic competence in young children, I turn now to a consideration of the first of the 'steps' outlined above. Chapter 2 presents an experimental investigation of sociolinguistic variability in the speech of young children, and explores the significance of this variability for children and adult hearers.

**Chapter 2: AN EXPERIMENTAL INVESTIGATION OF VARIABILITY IN
THE SPEECH OF YOUNG CHILDREN**

In spite of the great amount of work carried out since the early 1960's investigating children's language acquisition, the literature reveals that surprisingly little is known in detail about the normal course of development. The lack of information reveals itself particularly in the area which I have previously labelled 'developmental sociolinguistic competence', where investigation has only recently begun in earnest. In this area, where it is difficult to know the status of the various kinds of variation we find, it would be of the greatest help if some means could be found of establishing a measure like Olmsted's 'Index of Acquisition' (1971), discussed in Chapter 1. Such a measure could be used to identify a base-line of the acquisition of the productive and apprehensive abilities which are relevant for distinguishing different varieties of language. With such a device we would be able to discover whether or not at a particular time a child had acquired a particular sociolinguistically variable feature, or bundle of such features. Knowing when a child had acquired any such 'core-features' in his linguistic repertoire would then allow us to begin to locate and study the range of variation exhibited in his speech, as well as allowing us to offer a description of the structured nature of that variation. In order to find some way of establishing such an 'acquisitional base-line' the problem was framed as the question 'How early do children signal and perceive the non-linguistic significance of linguistic variation?' However, while capturing the essential generalisation, this question was too loosely and broadly framed to allow for a satisfactorily limited investigation. It was necessary to

delimit the range of linguistic and non-linguistic features which might be investigated. After a preliminary reading of the literature, I decided that the putative signalling and perception of sex-typed differences in speech might well provide a suitable area for investigation.

For some years anthropological literature, and more recently linguistic literature, has made increasing references to linguistic differences between men and women's speech in a wide range of cultures. These linguistic differences in different societies have been reported as involving variations in lexical items between the sexes, variations in segmental realisation, as well as variations in non-segmental phonology (Crystal, 1971; Devereux, 1949; Driver and Driver, 1963; Fischer, 1958; Haas, 1944; Trudgill, 1972). Moreover my preliminary investigations had suggested that the first 'socially associated' linguistic variation features to appear in children's speech were related to gross situational or 'setting' contrasts (Ervin-Tripp, 1964), and to addressee contrasts. The signalling and perception of sex, or sex-types role, by means of linguistic variation would accord well with this.^{Fn}

Fn. My preliminary investigations consisted of observations and informal 'tests' carried out at playgroups at Whitley South Junior School and Marine Park First School, Whitley Bay, Tyne and Wear, between January and March 1974.

I thought I had observed some linguistic variation of this kind in interaction between pairs of children (same and mixed sex pairs), and between pairs and groups of children involved in sex-typed role play. I had observed young children, aged 3, 4, and 5 years, involved in play which necessitated the adoption of different roles,

and apparently a systematic use of various linguistic features which seemed to be associated with them. These roles very frequently included 'mothers' and 'fathers' which were most obviously differentiated by dressing up differently, and by attempts to produce a lower pitch register for the 'father' role. This linguistic feature was also employed in the characterisation of policemen by at least two children (a 4 year old girl, and a 5 year old boy), although both also employed stereotyped phrases such as 'hello, hello, hello', and 'come along then now'. Although many of these features are of a stereotyped nature, and possibly form unique limited sets, of which I witnessed the whole perhaps - the young girl playing the policeman certainly did not attempt to sustain the lowering of the pitch of her voice beyond the first few words of her characterisation - they nonetheless indicate an early use of different varieties of language with possibly consistent changes of features. This would seem to imply an early awareness of the 'social' significance of linguistic variation, in contrast to the claims made by Labov (1964), where he argues that awareness of the social significance of linguistic variation does not begin until 'early adolescence'. Moreover, the possibility of such use of different linguistic features being typical of children's behaviour would provide evidence to challenge the unsubstantiated claim made by Quirk, Greenbaum, Leech and Svätvik (1972) that

The young native speaker at the age of five or six has broadly speaking one form of English that is made to serve all purposes, whether he is talking to his mother, his pets, his friends or the aged president of his father's firm. (24)

As I have indicated, much of the linguistic variation I had noticed seemed to be closely linked to the sex (or sex-typed role play) of

the interactants. Moreover, the findings of psychologists suggest that by the time children reach the age of 4 or 5 years they have already learned to make culturally expected behavioural sex-typed discriminations appropriate to their sex, as well as to the opposite sex (Brown, 1956; Danziger, 1971; Emmerlich, Goldman and Shore, 1971). Thus I thought that an experiment, designed to elicit information from children of 4 years and upwards on this matter, might allow me to determine whether or not they had also acquired the linguistic means of signalling and recognising appropriate sex-typed differences. The original question I had posed was therefore reframed thus: 'How soon are sex-differentiating features acquired productively by children in the course of acquiring their language; and how early are children capable of identifying such linguistic features for the purposes of sex-typing?'

Most adults find it possible to distinguish between the speech of normal adult male and female speakers of English. The most obvious perceptual factor cited in this respect being the difference in the pitch of the speaker's voice. Now with prepubescent children, this pitch difference is largely neutralised. The anatomical research which has been carried out suggests that the larynx size of preadolescent children is likely to be similar, given similar height and weight (Kirchner, 1970). Thus, regardless of sex, preadolescent children can be expected to have reasonably similar fundamental phonation frequencies, and hence no such significant differences in pitch of voice. If it proved possible to identify such children, with respect to sex, from vocal cue alone, then this could reasonably be taken to indicate that linguistic

features other than purely anatomical ones were involved in the marking of sex in children, and that these features were being learnt in the course of language acquisition. The acculturation processes at work, which were reflected in the way children spoke, and which provided linguistic features by which they were identified, would indicate that the children were in the process of learning at least one gross type of linguistic variation: sex-differentiated linguistic variation.

To examine such possibilities, a simple experiment was designed which would test children's ability to identify accurately other children with respect to their sex, by means of vocal cue alone.

EXPERIMENT 1. Short samples of speech were recorded from 24 subject-children who ranged in age from 4 to 9 years. There were 14 boys and 10 girls. Originally, I had planned to elicit speech samples from twelve pairs of children matched for age and sex, but this proved not to be possible. I found not a little difficulty in persuading the 4 year olds to participate, and was only able to include one 9 year old girl in this sample. The eventual number of children from whom speech was elicited, and their respective age groups and sex, is shown in Table 1 below.

Table 1. Sample number, age and sex group distribution of subject-children recorded for Experiment 1.

Boys:	Age	Number	Girls:	Age	Number
	4	2		4	1
	5	3		5	2
	6	2		6	2
	7	2		7	2
	8	3		8	2
	9	2		9	1

The children in the sample recorded were all attending a junior school in Whitley Bay, Tyne and Wear. All but one child had been born and had lived continuously in the immediate area.

The children exhibited a range of speech varieties which ranged from 'very localised' Tyneside, to 'marginally non-localised' in the case of the 9 year old girl.^{Fn}

Fn. The terms 'localised' and 'non-localised' are used in the sense of Pellowe et al (1972):
'We may characterise, for the sake of shorthand convenience, British speech on a scale from non-localised (exhibiting no evidence of geographical provenance) to localised (being ascribable in varying degree to a particular locality). The term 'other-localised' is also useful shorthand, when we come to talk of linguistic in- and out-groups.' (3)

(The 9 year old girl in the sample, who had only lived in the area for three years, was later described by some of the children involved in the judgemental part of the experiment, as 'talking funny' and 'talks posh'. In fact she was of Home Counties origin). Given the preliminary nature of the experiment, I did not feel that such a crude sampling of speech varieties would affect the outcome in any crucial way. None of the children had any apparent speech defect which might have interfered with the conduct of the experiment.

Each of the children was asked to repeat a previously recorded sentence: 'I came to school this morning', and to say a nursery rhyme of their own choice. (I avoided the use of spontaneous speech in an effort to minimise the possible effects of specific topics or lexical items providing overt cues for sex-typing). Both of these short pieces of speech were recorded by all of the children. The children were recorded by myself, individually in a small

'quiet-reading' room in the school.Fn

Fn. The recordings were made at Marine Park First School during April 1974, using a Uher 4000 IC automatic recorder, at 7½ inches per second. The microphone stood on a table-stand approximately 18 inches from each speaker, although this distance was difficult to maintain with some of the younger children.

The model sentence which the children were asked to repeat had been previously recorded by me in order to ensure that all the children would hear it produced in exactly the same way, thus hopefully avoiding any interference or bias which might have resulted from my own variable 'live' productions of the utterance.

When the recordings were complete, a tape was constructed consisting of the 24 imitations of the test sentence, in randomised order, followed by the 24 nursery rhymes in a different order. At the end of the tape 6 adult voices (three male, three female), were also recorded. Children judges, none of whom had been recorded for the experiment, listened to this tape individually, and attempted to identify each child's voice as either 'boy' or 'girl'. In addition, the children-judges were asked to classify the adult voices at the end of the tape as 'man' or 'woman'.

The responses of the children-judges were given verbally after each of the sentence repetitions and nursery rhymes, and recorded by me on index cards. The number and mean ages (in years) of the children-judges in the experiment are shown in Table 2.

Table 2. Sample number and age group distribution for children-judges in Experiment 1.

Mean age*	Boys	Girls
4:5	3	3
5:4	4	4
6:3	4	4
7:5	4	4
8:6	4	4
9:2	4	4

Total number of judges: 46

*Throughout this thesis, where age is given in years and months, the following convention is employed, '4:5 years' indicates an age of 4 years and 5 months.

(In the analysis which follows, the results for the group of 4 year old children-judges, and those of one boy and one girl from the group of 5 year old judges, have been excluded for reasons outlined below).

The children-judges listened to the tape recordings of the subject-voices in the quiet-reading room where the tape had originally been recorded. Two of the boy-judges and two of the girl-judges from each age group listened to the nursery rhymes before hearing the sentence-repetitions in order to discover any possible bias in the results due to increased confidence in identification having heard the longer stretches of speech first.

While preparing the experiment, my attention was drawn to a paper by Sachs, Leiberman and Erikson (1973). This paper was concerned with investigating very much the same area as the experiment I have outlined above. All the judges used in the experiment by Sachs et al, however, were adults. The Sachs' experiment involved 26 children aged 4 to 14 years, who were tape recorded saying 'I thought I saw a blue meanie outside', and also producing the sustained vowel sounds /i/, /a/, and /u/.

Eighty-three adult judges were asked to state the sex of the children whose tape recorded voices they heard. The sustained vowels were subjected to spectrographic analysis. The results of the experiment indicated that children's sex was very accurately identified from their voices by adult judges (81% correct judgements). When misidentifications did occur, they concerned girls who were wrongly judged to be boys. The results of the spectrographic analysis showed significant correlation for the most boy-like voices between higher fundamentals and lower formants. The results for the girls proved to be a mirror image of this. However, the correlation between height of formants and probability of identifying a girl's voice as being that of a girl, was not found to be significant.

In order partly to replicate the Sachs' experiment, I played the tape of the subject-children's sentence repetitions to three groups of adults: 8 first year University students (four male and four female) from the School of English Language and Literature, Newcastle upon Tyne, 16 members of a Post-Graduate Linguistics Seminar Group at the same university (eight male, eight female), and 10 local inhabitants of the Tyneside area aged 35 to 68 years (four male, six female). The adult-judges recorded their responses in writing.

The mean percentage correct identification of children's sex from vocal cue achieved by the groups of children and adult-judges is given below. The results for the children-judges in Table 3, and for the adult-judges in Table 4.

Table 3. Mean percentage correct identification of sex of subject-children achieved by children-judges in Experiment 1.

Judgemental Groups Mean Age	Mean Percentage Correct Identification
5:4	56
6:2	61
7:5	59
8:6	65
9:2	68

Total number of judges: 38

Overall mean percentage correct identification: 62%

Table 4. Mean Percentage correct identification of sex of subject-children achieved by adult-judges in Experiment 1.

Judgemental Groups	Mean Percentage Correct Identification
First Year University Students	68
Post-Graduate Seminar	74
Local adults	69

Total number of judges: 34

Overall mean percentage correct identification: 69%

During the experiment, it proved clear that the required task presented considerable problems for the youngest group of children judges involved. Only five out of the six potential 4 year old judges actually responded, and they all found the task of identification too demanding. In anticipation of just such a problem, a modified version of the experiment had been planned. This was to employ only the first eight voices of each part of the recorded material (sentence repetitions and nursery rhymes), but even this proved to be unworkable with the 4 year old group. Of the children-judges in this age group, one boy participated in the shortened identification task only up to the ninth voice on the tape. One 4 year old girl-judge lost interest after

listening to only three of the sentence repetitions; another lost interest after four of the nursery rhymes. The two remaining judges in this age group, a boy and a girl, listened to ten of the 16 voices in the shortened version of the experiment, but identified the sex of all the children incorrectly, although eight of these first ten children were reliably and accurately identified with respect to sex by the groups of children-judges from the 5 year olds upwards. Consequently I decided to exclude the 4 year old group of judges from the eventual analysis.

Two of the judges in the 5 year old group, a boy and a girl, were also excluded from the analysis, as they both failed to respond to any of the nursery rhymes, and only spasmodically offered responses to the sentence repetitions.

Analysis of the judges' responses revealed the following results. For the total group of children listened to, the judges of all ages, with the exception of the youngest group (5 year olds) identify sex from vocal cues alone significantly better than chance. The percentage correct identification for the groups of judges must, however, be considered along with 'measure of consistency' shown in the tables below.

Table 5. Mean consistency of identification of sex between the two halves of Experiment 1. Children-judges.

Judgemental Groups Mean Age	Mean Consistency of Identification(%)
5:4	51
6:2	65
7:5	63
8:6	68
9:2	68

Table 6. Mean consistency of identification of sex between the two halves of Experiment 1. Adult-judges

Judgemental Groups	Mean Consistency of Identification(%)
First Year University Students	65
Post-Graduate Seminar	70
Local Adults	68

The percentages shown in Tables 5 and 6 represent the consistency of identification which the judges attained in identifying the sex of any given child in the same way in both parts of the experiment (sentence repetitions and nursery rhymes).

It can be seen that for the children-judges this consistency shows a tendency to increase with age. This can be attributed, to some extent, to the decreasing interference of cognitive task-specific difficulties. More importantly it is also an indication that the children are responding in an increasingly systematic way to variable linguistic features. Taken along with the percentage accuracy of identification shown in Table 3, this indicates an increasing ability to identify accurately children's sex from vocal cues. It is difficult to account for the lower than expected success rate of the 7 year old group of judges. It is possible that the smallness of the sample has contributed to this result, but it is of note that the consistency level of identification for this group of judges is relatively high, in spite of the low success rate in identifying and categorising the children's voices.

The results of this experiment show that it is possible to identify the sex of prepubescent children from their speech.

However, the overall percentage accuracy of identification achieved by the adult and children judges, 65% (children-judges 62%, adults 69%), is still significantly less than the 81% correct identifications produced by the Sachs, Leiberman and Erikson experiment. Moreover, if the responses for the nursery rhymes are extracted from the final calculation, the overall success-rate for all groups of judges drops down to 59%.

In order to facilitate comparison with the findings of Sachs et al, the results of the experiment reported above were tested for significance. With the exception of the 5 year old group of judges, the results were found to be significant, though with considerably lower degrees of significance than those of the Sachs' experiment (Children-judges' scores: $t=2.23$, $df=38$, $p= .5$; compared with Sachs et al, for adult judges, where $t=51.13$, $df=83$, $p= .001$).

The correct judgements by children and adults in the present experiment for all the subject-children they listened to on the tape, are non-randomly distributed. Again, in contrast to the Sachs' experiment the children in the present experiment who were significantly misidentified, were boys. Six of the 14 subject-boys on the tape were mistakenly identified as girls 63% of the time. These subject-boys were marginally more accurately identified from their nursery rhyme speech, than from their sentence-repetitions. This is largely to be expected, as the judges were exposed to longer stretches of speech, with many more features present on which to base their judgements. Table 7 below presents an analysis of the responses of the children-judges to the various subject-children

on the tape. The first column gives the experiment number of the subject-child, the second and third columns list the sex (M=male, F=female) and age of the children. The fourth column presents the percentage frequency of accurate identification of the sex of the subject-children.

Table 7. Percentage accuracy of identification of the sex of the subject-children in Experiment 1. Children-judges.

Subject-children			Percentage Correct
	Sex	Age	Identification
1	M	4	60
2	M	4	27
3	F	4	95
4	M	8	41
5	M	8	88
6	F	9	93
7	M	9	76
8	M	9	95
9	M	7	46
10	F	6	69
11	M	7	63
12	F	6	81
13	M	5	43
14	F	7	93
15	M	6	27
16	M	5	85
17	F	7	80
18	M	8	78
19	F	8	83
20	M	6	47
21	M	5	27
22	F	5	65
23	F	5	80
24	F	8	83

The children-judges, as well as all the groups of adult-judges, proved to be much more accurate in their identification of the sex of the subject-girls than that of the subject-boys. For the 24 children whose voices were recorded, the children-judges identified the subject-girls correctly 67% of the time, and the subject-boys correctly 59% of the time. The possible implications of this will be discussed later, but it is important to note that for the groups of children-judges there is a significant difference between the total number of 'boy' and the total number of 'girl' judgements made. Indeed all the judges were more likely to respond 'girl' than 'boy' to the subject-voices on tape. The total number and percentage of 'boy' and 'girl' judgements made by the children-judges are presented in Table 8.

Table 8. Percentage distribution of 'boy' and 'girl' responses made by the children-judges.

Total number of 'boy' Judgements	Total number of 'girl' Judgements	Possible total
712	1112	1824
39%	61%	100%

This clear bias towards categorising a voice as a 'girl' is obviously important, given the fact that the population of children whose voices were recorded consisted of a higher number of boys than girls (14 boys and 10 girls). I thought at first that this predominance of 'girl' responses might be related to the sex of the judges involved in the experiment. However analysis of the data failed to reveal any significant preference in opting for 'boy' or 'girl' categories on the basis of the sex of the judges.

Nor was there any significant difference in accuracy of identification of children's sex by male or female judges.

Analysis of the judges' responses to the task of identifying the sex of children from vocal cues alone demonstrates that judges are able to perform the task with reasonable accuracy. The accuracy of identification and consistency in identifying a particular child increases with the age of the judges. It is shown too that all judges are more likely to respond 'girl' than 'boy' in listening to the subject-voices on the tape, and that partly as a consequence of this, the subject-girls are more accurately identified than are the subject-boys. All the children-judges, including those excluded from the final overall analysis, accurately identified the sex of the six adult speakers recorded on the tape.

Before considering in more detail the implications of these results for my research, I would like to spend some time examining some points which obtrude from the preceding discussion.

The significance of the experimental results is somewhat limited. There are a number of reasons for this. Having to exclude the six 4 year old judges from the analysis deprived me of making generalisations about the lower-bound of apprehensive abilities in the recognition of sex-marking from vocal cues. However it must be noted that some notion of 'adult sex-typed speaking style' seems to be well enough established for them all to have correctly identified the adult voices on tape. Perhaps the greatest limitation on the significance of these results derives from my having required the judges to respond to the subject-voices on tape in binary terms - to classify them as either 'boy' or 'girl'.

The scores might have been more meaningful if the judges had been allowed at least a three-term response (for instance, 'boy', 'girl', 'don't know') (cf Quirk and Svartvik, 1966). I suspect, however, that had the children-judges not been obliged to make a yes/no decision regarding the sex of the subject-children, that a category such as 'don't know' might have been misleadingly predominant in their responses.

In addition to this, the responses of the judges could well have been distorted by the artificial nature of the experiment. This 'artificiality' may be located in two aspects of the experiment. First, in the speech of the subject-children whose voices were recorded, and second in the tasks required of the groups of children and adult judges. The samples of subject-children's speech, being partly imitated, and partly traditional rhymes, it could be argued, could have produced a 'performance' rather than natural, spontaneous-sounding speech. The situation in which the subject-children were placed then could have had an important effect on the judges, in that their responses might relate more to their stereotypes of how boys and girls sound in a performing situation rather than a speaking one.^{Fn}

Fn. I did in fact encounter some problems in the initial recording of the children, especially with the younger children. These problems appear to be related to the performance nature of the situation in which they were required to speak. Most of the children in the 4 year old group, and some in the 5 year old group seemed to experience difficulty in simply speaking the nursery rhymes, preferring to sing them.

The judges' task also places them in a peculiar kind of performing situation. Part of the problem here lies in the use made of tape recorded material. Although it is commonplace to employ tape

recorded material in experiments such as the one I have described above (Giles and Powesland, 1975), the validity of such procedures is by no means well established. I thus decided to attempt a small non-taped replication of the experiment. I selected four of the subject-children who had been predominantly misidentified in the first experiment (subject-children numbers 2, 4, 13, and 15 in Table 7), and three of the subject-girls who had previously been accurately identified (numbers 3, 6, and 14 in Table 7). I also selected eight judges, four boy-girl pairs aged 5, 6, 7, and 8 years. The four boy-subjects and three girl-subjects were individually placed behind a visual barrier (an old fire-screen), and the children-judges, none of whom had participated in the first experiment, were brought into the room individually, placed on the other side of the screen, and required to identify the sex of the subject-children from the same two types of speech used in the first experiment. In spite of the fact that the subject-children provided 'live' speech for the judges the results were surprisingly similar to the original taped experiment. The accuracy of responses did however improve marginally when based on the longer stretch of utterance (the nursery rhyme), in that one of the subject-boys was accurately identified four times out of twelve - 6% more accurately than on the taped experiment. At a very superficial level of validation then, it would seem that at least in respect of judging sex from voice, taped versus live material did not produce significantly different results.

In addition to this small replication, I also re-recorded the voices of all the misidentified boys from the first experiment,

speaking both the sentence and the nursery rhyme they had originally produced. I played these recordings to the most accurate boy and girl judge from each age group in the original experiment. Like the 'live' replication, the results of this proved to be almost identical to the first experiment. Only one child-judge, an 8 year old boy, changed his original response to the sentence of the 8 year old subject-boy (number 4 in Table 7). When the children-judges were told that the subject-voices they had been listening to were all boys, the two youngest judges made no comment. When asked how old the children were, the 5 year old boy-judge replied 'young' and the 5 year old girl-judge suggested 'babies'. The pairs of children from the other groups of judges, 6, 7, 8, and 9 years of age, made some comments spontaneously, mostly expressing disbelief. A frequent comment was 'they all sound the same'. Two children-judges, a 6 year old boy, and an 8 year old girl both independently remarked that the voices sounded 'squeaky'. When asked how old they thought the children were, the most frequent response of the 6 to 9 year old judges was 'young', 'not as old as me', although the 8 and 9 year old judges did suggest specific ages ranging from 3 to 5 years. When pressed further to say why they thought that the voices sounded like those of girls, the 6 year old judges replied 'they've got the same voice' and 'I don't know', but all of the 7, 8 and 9 year old judges made reference variously to the pitch, speed and loudness of the voices they had listened to. These remarks again indicate that the children show an awareness of the significance of linguistic variability.

Analysis of the results of the experiment reported above clearly indicate (1) that there are appropriately sex-marked linguistic features present in the speech varieties of prepubescent children; (2) that these features are learnt rather than biologically determined, and, as I shall argue later (3) that because such possible 'clues' as lexical items were largely controlled, these sex-marked features are of an interesting phonetic nature. The results further suggest that for most children these appropriately marked linguistic sex-typing features have been learnt early in the course of their language acquisition. These results, then, appear to show that processes of socialisation, in this case, sex-typing, are being reflected by differences in the speech varieties of young boys and girls. As I suggested earlier, what evidence we have indicates that the physiological differences between the vocal tracts of prepubescent children are of a minor nature, and would not account for such an overall accuracy of the children and adult-judges in identifying the sex of the children on tape. Some support for this contention, that central sex-typed features in speech derive from processes of socialisation, is provided by studies of adult male and female speakers (Mattingly, 1966). Mattingly tested the hypothesis that differences in formant frequency value-sets among speakers of the 'same dialect' were dependent on variation in individual vocal tract size. Mattingly reanalysed formant frequency-data obtained in work by Peterson and Barrey (1952). He found that the separation between male and female distributions for some vowel formants was much sharper than variation in individual vocal tract size could

reasonably explain. He suggested that this variation was therefore 'stylistic' rather than physical, and hence represented a 'linguistic convention'. Mattingly's reanalysis indicates that the adults in the sample were modifying phonetic features of their speech in the direction of appropriate adult male and adult female stereotypes.

Other studies too, have shown that it is possible to differentiate adult male and female speakers of English on the basis of phonetic cues when such information as that concerning size of vocal tract, or fundamental phonation frequency are absent. Schwartz (1968), and Schwartz and Rine (1968) found that judges could accurately identify the sex of adult speakers of English on the basis of isolated voiceless fricatives, and isolated whispered vowels. These results are further reinforced by studies of œsophageal speakers conducted by Weinberg and Bennett (1971), and by Coleman (1971) who employed samples of adult male and female non-phonated speech, produced by the use of a single-frequency electrolarynx. The work of Weinberg and Bennett and that of Coleman demonstrates that listeners can reliably identify the sex of speakers without the diagnostic cue of pitch.

In the light of these experimental results, it is hardly surprising to find the acquisition of sex-marked linguistic features showing up in children's speech. It is reasonable to assume that if there are non-biologically determined, phonetic markers in the speech of adults, then at least some of these features will be acquired in childhood, when the relevant processes of socialisation are arguably at their strongest (Kagan, 1971; Schaffer, 1971).

However, while the experiment I have described, using children and adult judges, demonstrates that sex-marked features are acquired by most children in early childhood, the problem still remains as to when the apprehension of these features becomes stabilised in the children's linguistic development. That all the children-judges in the experiment accurately identified the sex of the adult voices on the tape, shows that they have certainly acquired knowledge of the relevant linguistic differences between adult male and female speech. It seems likely however, that this simply indicates that the children have learnt that a major diagnostic linguistic feature of adult male and female speech is the pitch difference discussed earlier. Even this, however, is an important indication that children, at least by the age of four, have learnt the social significance of a particular kind of linguistic variation.

The developmental pattern related to the acquisition of sex-typed speech variation features, suggested by the results of the present experiment, indicates that girls acquire the relevant features earlier than boys. The use of the term 'acquire' in this context however, may well be misleading, for the experimental results further suggest that for judges the marking of female-typing in young children is a 'neutral' or 'negative' state of affairs. A partial explanation could lie in the children and adult-judges' socially acquired stereotypes of adult male and adult female speech. It would appear that the 'neutral' or 'unmarked' case for children-judges, and possibly for adults in identifying children's sex from speech, is 'female'. This presumably is based on the assumption that there is less difference between the preadolescent girl's

voice and the adolescent/adult female voice, than there is between that of a young boy and a post-pubescent male. Thus, when in doubt judges identify the voice as that of a girl. This argument tacitly assumes that for both boys and girls there exists an earlier, much less differentiated speech variety from which those marking 'boyiness' and 'girliness' develop. Several patterns of development suggest themselves, involving loss of the features of such an earlier 'shared' children's variety, and acquisition of new features, and/or lack of significant change of features with respect to the earlier less differentiated speech variety. (That is, either boys change or girls change in terms of sex-marked linguistic features; or both take divergent paths from the earlier 'shared' variety). The results of the present experiment, however, direct attention to the most likely course being one in which boys lose features of the earlier 'shared' variety and both boys and girls gradually acquire new differentiating features, but that the acquisition of 'new' features is most marked in the case of boys. The misidentification of boys as girls in this experiment provides some support for this hypothesis, in that the boys wrongly categorised as girls can be seen as not having acquired appropriately sex-marking features which are identifiably different from the original 'shared' variety. Such a developmental pattern could be further substantiated if the boys thus misidentified were at the younger end of the age-scale. However, one of the most frequently misidentified boys in the sample is aged 8 years. Nonetheless, it is interesting to note that there were specific comments made by some members of all the adult groups to the effect that this boy sounded like an 'older girl', whereas

the other misidentified boys (aged 4, 5, and 6 years) all sounded like 'young' girls. The implications of this are not entirely clear, but it could be that we have here a complex interaction of predominant sex-typing features with the gradual physiological effects of age and body-size on larynx development (the latter being felt by the judges as significant cues for age-marking, but not overridingly significant to cause a change of sex identification). Such an explanation is consonant with existing notions of female speech-variety stereotypes being identified, for instance, as 'immature' (Key, 1972, 1975; Kramer, 1974).

The responses of the judges suggest that they have fairly clear hypotheses about the nature of 'girlness' and 'boyness' in children's voices. That is, they have constructs of children's linguistic behaviour which to some extent correspond to the actual behaviour of particular children, or groups of children. What then might be the linguistic features from which such hypotheses are constructed, and which give rise to the systematic judgements we have observed in the experiment? The most obvious phonological features which are candidates for this role would appear to be those which have been called 'non-segmental' (Crystal, 1969). Non-segmental phonology is here taken to refer to intonation, rhythm, stress, and other such 'prosodic' phenomena, as well as the many vocal effects frequently encompassed by the expression 'tone-of-voice' ('paralinguistic features' in the sense of Crystal, 1969). In order to see if there were any correlations between identification or misidentification of boys and girls and specific aspects of non-segmental phonology, a second experiment

was designed. The aim of this experiment was the investigation of hearers' abilities to locate certain putatively relevant dimensions of non-linguistic features of children's voices, and to see if their classification of the children on the basis of these features bore any relationship to classification of the children on the basis of analytically derived non-segmental features.

EXPERIMENT 2. The experiment was designed in two parts, and employed the children's imitations of the sentence 'I came to school this morning' used in the first experiment. These imitations were re-recorded in the same order as the previous experiment, making sure that the recording level remained the same throughout the re-recording. Each child's sentence repetition was recorded twice, with a short pause in between, and preceded by my voice giving the appropriate order number of the subject-child's voice. The complete set of the 24 voices was recorded twice on the same tape, each of the complete sets being preceded by the voice of a child numbered 'Child Nought'. This voice (Child number 5 in the experiment proper) was to be used to provide a 'trial run' of the two parts of the experiment for the judges.

The judges for this experiment were 27 first year University students. They had been studying linguistics for two months. There were 21 female students and 6 males. The mean age of the students was 19.3 years; the oldest student was a female aged 23 years, the youngest a female aged 17.11 years.

The experiment was designed as a subjective judgement test, as a preliminary step to obtaining some reliable assessment of those linguistic characteristics which might correlate with the sex of the children-subjects.

In the first part of the experiment the judges were required (1) to estimate the age of the child whose voice they were listening to, and (2) to identify the child as a boy or a girl. They were further required to rate the confidence with which they made their age and sex judgements on 5-point scales (where a score of 5 would indicate absolute confidence in their judgements).

In the second part of the experiment the judges again listened to the same tape recorded voices and were required to rate these on seven separate 5-point scales. The first three of these scales involved socio-psychological judgements about the child on the basis of the voice heard: whether they thought that the child sounded 'shy-confident', 'bored-involved' (with respect to participation in the experiment), and 'masculine-feminine'. The remaining four scales required the judges to rate characteristics of the child's speech itself: whether 'low-high', 'slow-fast', 'quiet-loud', and 'smooth-jerky'. Although this latter scale is not properly 'linguistic' it was included because of the frequency with which adult judges in the first experiment referred to such features being of importance to them for the identification of sex. (Part of the aim of the experiment was to discover if there existed any relationship between the features which the judges claimed to be of importance, and accuracy of identification of the children's sex.) For instance 'jerkiness' was claimed to

be a diagnostic feature of 'boyness' by a number of adult judges in the first experiment (8 of the judges referred to this 'feature'). I thought it would therefore be of interest to see if accurately identified boys were also highly rated on the scale of 'jerkiness'. (Such a correlation, of course, would not indicate what linguistic features might be being subsumed under the descriptive label. For further discussion see below, p. 81 ff). Each of the points on the scales was given a descriptive label to reduce possible ambiguity. Thus, the numbers 1 to 5 on the 'speed' scale were labelled at the head of the response sheet given to judges: 'very slow, quite slow, average, quite fast, very fast'. Clearly there can be considerable problems in the use of such labels as those given here to the scales (cf Crystal, 1969, Chapter 7), where there can arise difficulty in their precise interpretation by both the judges and the experimenter. However the present labels and scales (with the exception of the 'smooth-jerky' scale already mentioned) were not thought to present insurmountable problems in this respect. It seemed likely that the relevance or comprehensibility of these scales would be recoverable from internal evidence in the experiment - by an examination of the range of scores for any one child, and/or from inter-judge consistency, for example.

The judges listened to the children's voices through headphones in an individual-booth language laboratory. They were instructed to set their booth volume controls for comfortable listening, and not to readjust them during the course of the experiment. The judges were instructed to listen to the two

repetitions of each sentence, in both parts of the experiment before stopping the tape and filling in their responses. They were directed to make their judgements in both parts of the experiment as quickly as possible after the two repetitions. The judges were given detailed instructions on how to fill in the response sheets, both orally and in written form. Before the two parts of the experiment they were required to perform a trial run appropriate to that part of the experiment, after which they were allowed to ask any questions relating to their understanding of what was required of them. In addition, at the conclusion of the experiment the judges were asked to give details of their age, sex, place of birth, area of longest residence, whether they considered themselves to speak a localised variety of English, and whether they had any regular contact with young children. The two parts of the experiment were run consecutively.

The results of the first part of this experiment showed an overall increased accuracy of identification of the sex of the children when compared with those of the first experiment. The overall mean percentage correct identification was 75%; the most accurate student-judge achieved 22 correct identifications out of 24. The least accurate student-judge achieved 15 correct identifications. The results of the accuracy of identification of the subject-children's sex in part one of this second experiment are presented in Table 9. For ease of comparison with the earlier experiment, the percentage accuracy of identification of particular children by the children-judges is shown in the last column.

Table 9. Percentage accuracy of identification of the sex of the subject-children in Experiment 2. Student-judges.

Subject-children			Percentage Correct Identification Experiment 2	Percentage Correct Identification Experiment 1
	Sex	Age		
1	M	4	48	60
2	M	4	44	27
3	F	4	89	95
4	M	8	0	41
5	M	8	100	88
6	F	9	100	93
7	M	9	75	76
8	M	9	100	95
9	M	7	78	46
10	F	6	89	69
11	M	7	67	63
12	F	6	100	81
13	M	5	28	43
14	F	7	75	93
15	M	6	92	27
16	M	5	100	85
17	F	7	89	80
18	M	8	100	78
19	F	8	100	83
20	M	6	48	47
21	M	5	18	27
22	F	5	63	65
23	F	5	96	80
24	F	8	100	83

Table 10 below, shows the total number of 'boy' and 'girl' judgements made in this experiment.

Table 10. Percentage distribution of 'boy' and 'girl' responses made by the student-judges. Experiment 2.

Total number of 'boy' Judgements	Total number of 'girl' Judgements	Possible total
241	407	648
37%	63%	100%

The predominance of 'girl' judgements over 'boy' judgements again indicates the trend, shown in the first experiment, of misidentifying boys as girls. Unlike the first experiment, however, the sex of the student-judges does appear to have some effect on the accuracy of identification of the sex of the subject-children. Female student-judges are slightly better than male student-judges in identifying boys accurately (female judges were 69% accurate, male judges achieved 63% accuracy). There does not seem to be any significant difference in accuracy of identification of girls, however, by judges of different sex (female judges achieved 77% accuracy, male judges 76% accuracy). Interestingly there was no apparent difference in the accuracy of identification of the sex of the subject children between those judges who had intermittent or regular contact with young children and those who did not (12 of the student-judges claimed regular contact with young children).

To facilitate a clearer understanding of the differences in accuracy of identification between the first and second experiments, Table 11 presents the subject children ranked in order of accuracy of identification in the two experiments. The percentage figures given in brackets after each subject-child's number, represent the percentage accuracy of identification of the child's sex in the experiments.

Table 11. Subject-children ranked in order of accuracy of identification by children-judges in Experiment 1 and by student-judges in experiment 2.

Rank Order	EXPERIMENT 1	EXPERIMENT 2
	Subject-Child Number	Subject-Child Number
1	3 (95)	5 (100)
2	8 (95)	6 (100)
3	6 (93)	8 (100)
4	14 (93)	12 (100)
5	5 (88)	16 (100)
6	16 (85)	18 (100)
7	19 (83)	19 (100)
8	24 (83)	24 (100)
9	12 (81)	23 (96)
10	17 (80)	15 (92)
11	23 (80)	3 (89)
12	18 (78)	10 (89)
13	7 (76)	17 (89)
14	10 (69)	9 (78)
15	22 (65)	7 (75)
16	11 (63)	14 (75)
17	1 (60)	11 (67)
18	20 (47)	22 (63)
19	9 (46)	1 (48)
20	13 (43)	20 (48)
21	4 (41)	2 (44)
22	2 (27)	13 (28)
23	15 (27)	21 (18)
24	21 (27)	4 (0)

Table 11 shows clearly the general overall increased accuracy of identification of sex achieved by the student-judges in the second experiment. The rank ordering of children shown here, however, can be somewhat misleading unless considered in conjunction with the percentage figures for accuracy of identification. (For example, the ranking of subject-child number 3, in the two experiments, is 1 and 11 respectively, but there is actually only a small 5% difference in accuracy of identification). The improvement of identification of subject-children numbers 9 (46% to 78%) and 15 (27% to 92%) is most probably a consequence of the difference in age between the two sets of judges being considered here (children and students). (A similar improvement in identification of these two children was achieved by the groups of adult-judges in the first experiment - the adult-judges overall achieved 62% accuracy of identification of subject-child 9, and 60% accuracy of identification of subject-child number 15). It seems likely, however, that a large part of the improvement of accuracy of identification of sex by the student-judges is attributable to hearing the sentence-repetitions twice.

Perhaps more interesting than the improvements in accuracy are decreases in accuracy of identification of sex of children numbers 4 (41% down to 0%), and 14 (93% down to 75%). In spite of such differences as these between the two experiments, which probably reveal inadequacies in experimental design, and typical variability of judges, it is important to note that the six most frequently misidentified children in the second experiment

(children numbers 2, 4, 13, 20, and 21) are among the seven most frequently misidentified children in the first experiment (by both children and adult judges). Moreover, eight of the best identified children in the second experiment (children numbers 5, 6, 8, 12, 16, 18, 19, and 24) are among the nine best identified children in the first experiment, although accuracy of identification in the first experiment is not as high as in the second. It should be noted further that all the children accurately identified 100% of the time in the second experiment were so identified with confidence by the student-judges. This is revealed if we consider the judges' ratings of their own confidence in identifying the sex of particular children. Table 12 presents the student-judges' confidence ratings of sex identification for the eight children identified with 100% accuracy. Table 13 below, presents the student-judges' confidence ratings of sex identification for those children accurately identified less than 50% of the time.

Table 12. Judges' ratings of own confidence in identifying the sex of subject-children. Children identified with 100% accuracy.

Subject-children		Spread of confidence rating scores	Mean confidence rating	
Sex	Age			
5	M	8	5 (22), 4 (5)*	4.8
6	F	9	5 (21), 4 (6)	4.7
8	M	9	5 (20), 4 (6), 3 (1)	4.7
12	F	6	5 (19), 4 (7), 3 (1)	4.6
16	M	5	5 (22), 4 (4), 3 (1)	4.7
18	M	8	5 (21), 4 (6)	4.7
19	F	8	5 (21), 4 (6), 3 (1)	4.7
24	F	8	5 (20), 4 (7)	4.7

* The figures in brackets indicate the number of student-judges scoring their confidence at a particular point on the rating scale. Thus 5(22) indicates that 22 judges scored their confidence in their judgement of that child's sex at 5 (ie absolute confidence).

Table 13. Judges' ratings of own confidence in identifying the sex of subject-children. Six children least accurately identified.

Subject-children		Spread of confidence rating scores		Mean confidence rating	
Sex	Age				
1	M	4	if judged boy	4(3),3(1),2(3),1(6)	2
			if judged girl	5(4),4(5),3(2),2(2)	3.8
20	M	6	if judged boy	4(1),3(2),2(3),1(7)	1.7
			if judged girl	5(3),4(5),3(3),2(3)	3.5
2	M	4	if judged boy	4(2),3(4),2(5),1(1)	2.5
			if judged girl	5(4),4(6),2(3),1(2)	3.4
13	M	5	if judged boy	3(2),2(3),1(3)	1.8
			if judged girl	5(6),4(6),3(2),2(4),1(1)	4.1
21	M	5	if judged boy	4(1),3(1),1(3)	2
			if judged girl	5(4),4(6),3(3),2(7),1(2)	3.1
4	M	8	if judged girl	5(14),4(9),3(1),2(1),1(2)	4.1

The most obvious difference between the eight best identified children and the six worst identified children, revealed by a consideration of Tables 12 and 13, is that shown in the range of confidence rating scores. The children most frequently misidentified show a much wider range of judges' confidence ratings than do those children accurately identified in respect of sex. This can best be understood, I think, as an indication of the judges' uncertainty about the sex of the child whose voice they were listening to. Note, however, the confidence with which the worst identified child (number 4 who was never accurately identified by student-judges), was judged to be a girl. The mean confidence rating score for this child was 4.1, which is the highest mean rating score for any of the misidentified children. Nonetheless, there is a distinct tendency for judges to be more confident about their judgements of 'girlness' in these misidentified children than they are about their judgements of 'boyiness'.

This suggests that unless there are positive markers of 'boyness' present in the speech of a given child, the judges consider it 'safest' (in attempting to accurately identify the child's sex) to judge the voice as being that of a girl. This may be the case for subject-child number 11, the worst identified of the accurately identified boys. Student-judges who identified this child accurately, as a boy, were more confident about their judgements than those who identified the child as a girl (see Table 14 below). The higher confidence in the judgements of 'boy' for this child, may reflect the fact that while the judges were not entirely certain about the sex of the child, there were features about the voice which positively suggested 'boyness'.

The judges' confidence rating scores for the subject-children ranked 9 to 18 in Experiment 2 (Table 11) are presented in Table 14. The sex of these children was correctly identified better than chance, but not with 100% accuracy.

Table 14. Judges' ratings of own confidence in identifying the sex of subject-children ranked 9 to 18 in accuracy of identification in Experiment 2.

Subject-children	Sex	Age	Spread of confidence rating scores	Mean confidence rating
23	F	5	if judged boy 1(1) if judged girl 5(11),4(8),3(4),2(2)	1 4
15	M	6	if judged boy 5(6),4(7),3(2),2(4),1(6) if judged girl 1(2)	3.1 1
3	F	4	if judged boy 2(2),1(1) if judged girl 5(10),4(5),3(6),2(3)	2 3.8
10	F	6	if judged boy 2(2),1(1) if judged girl 5(9),4(8),3(2),2(4),1(1)	1.6 3.8
17	F	7	if judged boy 3(1),1(2) if judged girl 5(12),4(8),3(4)	1.6 4.3
9	M	7	if judged boy 5(3),4(7),3(8),2(3) if judged girl 3(3),2(3)	3.4 2.5
7	M	9	if judged boy 5(6),4(5),3(5),2(4) if judged girl 4(1),3(2),2(4)	3.6 2.5
14	F	7	if judged boy 4(2),3(3),2(1),1(1) if judged girl 5(7),4(8),3(4),1(1)	2.8 4
11	M	7	if judged boy 5(1),4(12),3(3) if judged girl 5(1),4(1),3(1),2(4),1(2)	3.8 2.4
22	F	5	if judged boy 3(3),2(3),1(4) if judged girl 5(3),4(5),3(2),2(6),1(2)	2 3.1

From this table it can be seen that those judges who accurately identified the subject-children's sex opted for the appropriate category with more confidence than those judges who misidentified the children. Generally, those judges who misidentified these children opted for the wrong category with less confidence than those judges who identified the subject-children's sex correctly. The relationship between accuracy of identification of sex and confidence of judgement is not, however, a simple one. Confidence does not increase as overall accuracy of identification increases. The spread of judges' confidence rating scores pictured here probably tells us more about the variability of judges' perception,

and their differing perceptions of the same acoustic event, than it does about the presence or absence of linguistic cues to the sex of the subject-children. We may have an indication here that, for instance, when hearers are required to derive non-linguistic information of this kind in an experiment, they have a range of heuristic procedures available to them. That is, they can scan the utterance for diagnostic linguistic cues in different ways at different times, and do not necessarily match each child's voice against the same 'ideal model' or stereotype, all the time. That this is not the case is suggested, perhaps, by the differential accuracy of identification of the sex of the children by male and female judges discussed previously (p.55). From the tendencies observed there, it could be supposed that the judges were simply and straightforwardly making decisions on the basis of an 'in-group/out-group' classification (Sherif and Sherif, 1969): that is, identifying the children as possessing (being in-group members) or not possessing (being out-group members) the relevant features of the judges' own linguistic in-group (the relevant dimension of 'in-groupness' here being that of sex). The argument would run that the female judges accurately identified boys more often than the male judges, because, in making the decision about whether or not the child was a member of their own group, they were assisted by the boys having acquired more marked features than the girls. However, when we examine the judges' confidence rating scores, it becomes clear that the matter is not as simple as this, for we find that there is no significant consistent pattern of high confidence scores by female judges, which such an in/out-group classifying

process might lead one to expect. The female student-judges do not rate their confidence in accurately identifying boys significantly differently from male student-judges: they do not rate themselves 'high' in confidence when they accurately identify boys as boys. Such a lack of direct correlation between the differences of accuracy in identification by different-sex judges, and corresponding differences in confidence scores, again suggests that the judges are employing different techniques at different times, for deciding what the sex of any particular child might be. In itself, this is not at all surprising; indeed, it would be rather odd if hearers did not have at their disposal a range of ways of deriving non-linguistic information about speakers from their speech. One problem associated with the present experiment impinges on such matters. It may be that the student-judges do have well-established stereotypes of 'boyiness' and 'girliness' in children's speech, and that they do employ them in tasks such as those involved in this experiment, but that these stereotypes are not well adapted for dealing with the language of children who speak different varieties of English to those spoken by the judges. (There was in the sample one female judge who was born, and had lived in an area close enough to that of the children, for her to have had knowledge of possible regionalised stereotypes for 'boyiness' and 'girliness'. However, apart from the general tendencies associated with the accuracy of identification of boys by female judges, her score in identifying the children's sex was not significantly better than any of the other judges).

Evidence from the second part of this experiment indicates that the student-judges were operating with linguistic stereotypes at least some of the time, when they attempted to identify the sex of the children. I turn now to a consideration of the second part of this experiment.

The second part of the experiment required the student-judges to rate the children's voices on seven 5-point scales. As indicated previously, the first three of these scales were 'socio-psychological', being assessments of whether they thought the various subject-children sounded 'shy-confident', 'bored-involved' (with respect to participation in the experiment), and 'masculine-feminine'. In order to explore the possibility that the student-judges were operating with stereotypes in attempting to identify the children's sex, I begin with a consideration of the judges' assessments of the children on the 'masculine-feminine' scale. Table 15 presents the subject-children ranked in order of mean masculine-feminine ratings. A low score indicates the 'masculine' end of the scale, a high score the 'feminine' end. The table also indicates the subject-children's actual sex, and gives the scores (in percentages) for accuracy of identification achieved in the first part of this experiment.

Table 15. Subject-children ranked by masculine-feminine rating (mean). Experiment 2.

Subject-children	Sex	Masculine-Feminine rating (mean)	Percentage Correct Identification
5	M	1	100
8	M	1.2	100
16	M	1.5	100
18	M	1.5	100
9	M	2	78
15	M	2.3	92
7	M	2.5	75
11	M	3	67
22	F	3	63
1	M	3.1	48
2	M	3.1	44
20	M	3.2	48
13	M	3.2	28
21	M	3.4	18
14	F	3.6	75
4	M	3.7	0
17	F	3.7	89
23	F	3.9	96
10	F	4	89
12	F	4	100
3	F	4	89
19	F	4.2	100
24	F	4.4	100
6	F	4.5	100

While there is not a simple linear relationship between accuracy of identification of sex in the first part of this experiment, and appropriate high or low masculine-feminine ratings in the second part, Table 15 does reveal some clear trends. The best identified subject-boys and girls in the first part of the experiment (those children whose sex was identified with 100%

accuracy) are given the highest appropriate masculine and feminine ratings by the judges. The six worst identified boys are assigned the highest 'feminine' ratings of all the boys. Moreover, the rank order of the most often misidentified children in the first part of the experiment (subject-boys 1, 20, 2, 13, 21, and 4), is preserved, with only one transposition, in the ranking on masculine-feminine ratings.

As with the judges' confidence rating scores discussed earlier (p.58ff), it would be dangerous, however, to overgeneralise from what are, after all, relatively small differences between smoothed mean scores. Nonetheless, requiring judges to rate children on a 'masculine-feminine' scale, on the basis of their speech, represents an exploration of the judges' constructs or stereotypes of this dimension. The extent to which there is a link between accuracy of identification of sex, and appropriate ratings on this 'masculine-feminine' scale, suggests that the judges were to some extent operating with a 'template' of 'boyiness' or 'girliness' against which they matched the children's voices for goodness to fit. It also suggests a good degree of consistency between the two parts of the experiment, and indicates that we can accept with reasonable confidence that the results of the first part of the experiment were not merely artifacts of the experimental design.

A further test of such consistency is available through the

'trial runs' which the student-judges undertook before each part of the experiment. The trial run was numbered 'Child Nought' in each case, but was, in fact, subject-child number 5 in the experiment proper. The consistency between the trial runs and the scores for child 5 in both parts of the experiment are in close agreement with each other. The trial run for the first part of the experiment produced 100% accuracy of identification with a judges' confidence rating of 4. The discrepancy between the confidence rating here and that achieved during the experiment proper (4.8), can be attributed, in part, to the student-judges having become 'attuned' to the experimental requirements. The trial run before the second part of the experiment yielded scores not significantly different from those for the same child in the experiment proper. Again the slight variation present is attributable to the judges assessing the trial run voice in isolation, without having assessed any other children on these rating scales.

Let us now examine the judges' ratings of the children's voices on the 'voice characteristic' scales : 'low-high', 'slow-fast', 'quiet-loud' and 'smooth-jerky'. The ratings for the subject-children on these scales are presented in Table 16. In this table the subject-children are ranked in order of masculine-feminine rating scores (Table 15). The scores for the children on the 'voice characteristic' scales are mean ratings. The letters above the 'voice characteristic' ratings indicate the polarities of the particular scales. Scores below 3 are treated as indicating the 'lower' end of the scales, thus: L(ow), S(low), S(mooth), Q(uiet). Scores above 3 are treated as indicating the 'higher' end of the scales, thus: H(igh), F(ast), J(erky), L(oud).

Table 16. 'Voice characteristic' ratings for subject-children ranked in order of masculine-feminine ratings (Table 15). Experiment 2.

Subject-children			Voice characteristic ratings			
Sex	Age		low-high	slow-fast	smooth-jerky	quiet-loud
			L	F	J	L
5	M	8	2.3	3.8	4	4
			L	F	J	L
8	M	9	2	3.6	3.8	3.8
			L	F	J	L
16	M	5	2.3	3.7	3.8	3.4
			L	F	J	L
18	M	8	2.1	3.4	4	4
			L	F	J	L
9	M	7	2.1	3.3	3.2	3.4
			H	F	J	Q
15	M	6	4.6	3.2	3.5	2.7
			L	S	S	L
7	M	9	2.4	1.6	1.1	3.4
			L	F	J	L
11	M	7	2.7	4.3	3.8	3.5
			H	S	S	L
22	F	5	3.2	2.4	2.9	3.2
			L	S	S	Q
1	M	4	2.6	1.5	2.8	1.8
			L	S	S	Q
2	M	4	2.2	1.2	1.5	2.5
			H	S	S/J	Q
20	M	6	3.2	2.6	3	1.4
			L	S	S	Q
13	M	5	1.5	1.4	2	1.8
			H	S	S	Q
21	M	5	3.9	2.1	2	2.4
			H	S	S	L
14	F	7	3.8	2.9	2.5	3.7

Table 16 (continued)

Subject-children			Voice characteristic ratings			
Sex	Age		low-high	slow-fast	smooth-jerky	quiet-loud
			H	F	J	L
4	M	8	3.2	4.3	3.2	4
			H	S	S	Q
17	F	7	3.4	2.3	2	2.4
			H	F	J	Q
23	F	5	4	3.8	3.2	2.6
			H	F	J	Q
10	F	6	4.1	3.2	3.6	2.6
			H	F	J	L
12	F	6	4.1	3.5	3.2	3.5
			H	F	J	Q
3	F	4	3.7	3.4	3.4	2.1
			H	F	S	Q
19	F	8	4.1	3.5	1.5	2.6
			H	F	S	Q
24	F	8	4	3.2	2.3	2
			H	F	S	Q
6	F	9	3.2	3.2	2.9	2.4

If we now take these 'voice characteristic' ratings, and treat them as 'profiles' of the subject-children's voices, we can begin to investigate in more detail the perceived sex of the children. Using the 'profiles' yielded by Table 16, it is possible to group children together on the basis of similarity between such profiles. Table 17 pictures such a grouping. For the purposes of Table 17 the actual rating scores are not distinguished, similarity being assessed in terms of generalised poles of the rating scales. Children who are 'identical' in this sense, are shown as being associated in groups indexed by the profile letters. Thus, H F J Q identifies those children who were judged to have 'high, fast, jerky, quiet' voices.

Table 17. Overall groupings of subject-children on the basis of 'voice characteristic' profiles.

	'Voice profiles'	Subject-children
	H F J Q	3, 10, 15, 23
	H F S Q	6, 19, 24
	H F J Ld	4*, 12
<u>A</u>	H S S Q	17, 21*
	H S S/J Q	20*
	H S S Ld	14, 22
	L S S Q	1*, 2*, 13*
	<hr/>	
<u>B</u>	L F J Ld	5, 8, 9, 11, 16, 18
	L S S Ld	7

(Asterisks indicate boys whose sex was misidentified by student-judges in Experiment 2)

On the basis of this very gross grouping technique, it is possible to divide the children into two major groups indicated as A and B above in Table 17. With the exception of subject-child number 15 (in the profile-group H F J Q) group A represents those children who were predominantly identified as girls - either correctly or incorrectly. Group B represents correctly identified boys. The judges' classification of subject-child 15 as having the profile 'high, fast, jerky, quiet', which so obviously groups him with the girls in the sample, is clearly unsatisfactory, if we wish to use these scales in the discrimination of sex, for this child was accurately identified as a boy in the first part of the experiment (92%). In addition, this child obtained an acceptably low mean rating on the masculine-feminine scale (2.3) in the second part of the experiment. Both these points suggest the grouping together of the subject-children on the basis of the present four rating scales is somewhat unsatisfactory. It is of note, however, that subject-child 15

was overwhelmingly misidentified as a girl by the children-judges in the first experiment. It may well be that the profile adequately characterises those features of the child's voice which the judges were required to respond to. The accurate identification of sex achieved so reliably by the student-judges, could then be attributed to the judges responding to a wider range of linguistic features than they were able to categorise by means of the present scales. This suggests that features of the children's voices might be 'weighted' in respect to one another. That is, some may be more important than others in arriving at judgements about nonlinguistic characteristics of the children speakers. In some cases the presence or absence of a single feature (overall pitch of the voice, for instance) may be sufficient to trigger a particular judgement. In other cases more complex proportions between features, or combinations of various features may need to be established before a particular judgement can be made. It is on such an assumption as this that the 'major groupings' in Table 17 were established, and that certain of the children are apparently arbitrarily located in the 'girl' group rather than the 'boy' group. Thus, on the basis of the present classification, although subject-children 1, 2, and 13 have a profile which might associate them with child 7, and are judged, for instance, to have 'low' voices, they presumably display other, more girl-like linguistic characteristics which are sufficient to override this perceived lowness of pitch, which appears to be an important diagnostic feature for the identification of boys. No accurately identified girls were

judged to have low-pitched voices, and, with the exception of subject-child 15, no accurately identified boys were judged as having a high-pitched voice. Likewise, although some girls and misidentified boys were judged to have 'loud' voices, no accurately identified boys were judged to have 'quiet' voices. The consistency with which the judges categorise most of the accurately identified boys is somewhat surprising, when compared with the variation in categorisation of the girls. The reasons for this are not at all clear, and are not really deducible from the information yielded by the experiment. It could be postulated that much less variation is 'allowable' in boys speech, than is allowable for girls (cf the discussion p 92ff). In part, however, this lack of variation reflects the inadequacy of the discriminatory power of the scales. Nonetheless, it is clear that certain of these perceived dimensions are more significant than others from the judges' point of view in identifying the sex of the children. The most girl-like voices are labelled 'high, quiet', while the most boy-like voices are labelled 'low, loud'. This is hardly surprising, in terms of what is known about folk-linguistic stereotypes of children. More interestingly, children who are judged to have 'high quiet' voices are also judged on the shy-confident scale to be 'shy' rather than 'confident' (Table 18).

Table 18. Ratings on the 'shy-confident' scale for subject-children with 'voice characteristic' profile 'high/low, quiet'.

Subject-children	Sex	Age	Shy-confident rating	Mean shy-confident rating	Correct identification
1	M	4	4(2),3(10),2(14),1(1)*	2.6	48%
2	M	4	4(3),3(8),2(8),1(8)	2.2	44%
3	F	4	4(1),3(2),2(5),1(19)	1.4	100%
6	F	9	4(1),3(4),2(19),1(3)	2.1	100%
10	F	6	4(4),3(8),2(11),1(4)	2.4	89%
13	M	5	5(2),3(1),2(5),1(19)	1.5	28%
15	M	6	3(4),2(11),1(12)	1.7	92%
17	F	7	4(6),3(8),2(8),1(5)	2.5	89%
19	F	8	5(1),4(4),3(8),2(7),1(7)	2.4	100%
20	M	6	4(2),3(1),2(15),1(9)	1.8	48%
21	M	5	3(10),2(1),1(16)	1.7	18%
23	F	5	5(2),4(4),3(6),2(6),1(9)	2.7	96%
24	F	8	4(2),3(4),2(14),1(7)	2	100%

* The figures in brackets indicate the number of student-judges who rated children at a particular point on the shy-confident scale. Thus 4(2) shows that 2 student-judges thought the child sounded 'quite confident'.

Table 19. Ratings on the 'shy-confident' scale for subject-children with 'voice characteristic' profile 'high/low, loud'.

Subject-children	Sex	Age	Shy-confident rating	Mean shy-confident rating	Correct identification
4	M	8	5(15),4(11),2(1)	4.4	0%
5	M	8	5(19),4(7),3(1)	4.7	100%
8	M	9	5(7),4(18),3(1),1(1)	4.1	100%
9	M	7	5(9),4(14),3(3),1(1)	4.3	78%
11	M	7	5(4),4(13),3(5),2(5)	3.6	67%
12	F	6	5(8),4(18),3(1)	4.2	100%
14	F	7	5(4),4(20),3(2),2(1)	4	75%
16	M	5	5(27)	5	100%
18	M	8	5(27)	5	100%
22	F	5	5(12),4(13),3(1),2(1)	4.3	63%
7	M	9	5(9),4(16),3(1),2(1)	4.2	75%

We can see from Table 18 that the subject-children judged as being least confident include girls and misidentified boys. No boy whose sex was accurately identified in the first part of the experiment was judged to be 'shy' (in terms of mean ratings on the 'shy-confident'scale) (Table 19).

Whether judges' decisions about sex or shyness preceded and/or influenced their decisions about pitch of voice, loudness and so on, is an intractable one. Perhaps the most satisfactory view to take of the relationship between these features is that they participate in an interaction which might be characterised as a two-way 'resonance system'. The voice profile 'high, quiet' which shows an association with judgements of 'shyness' is also associated with judgements concerning the age of the subject-children. Children judged to have 'high, quiet' voices were overwhelmingly judged to be the youngest children in the experiment. The profile 'low, loud', on the other hand, shows positive associations with children judged to be the 'older' ones in the experiment (Tables 20 and 21 below).

Table 20. Judges' assessments of the age of subject-children with 'voice characteristic' profile 'high/low, quiet'.

Subject-children	Sex	Age	Age assessments in years	Mean age Assessment	Correct identification
1	M	4	3(4),4(18),5(4),6(1)*	4	48%
2	M	4	3(10),4(10),5(7)	3.8	44%
3	F	4	3(10),4(16),5(1)	3.6	100%
6	F	9	4(5),5(12),6(7),7(3)	5.3	100%
10	F	6	3(5),4(11),5(10),6(1)	4.2	89%
13	M	5	3(8),4(14),5(4),6(1)	3.5	28%
15	M	6	3(7),4(19),5(1)	3.7	92%
17	F	7	4(9),5(9),6(7),7(2)	5	89%
19	F	8	4(5),5(11),6(9),7(2)	5.2	100%
20	M	6	3(10),4(9),5(8)	3.9	48%
21	M	5	3(11),4(13),5(2),6(1)	3.7	18%
23	F	5	3(1),4(14),5(11),6(1)	4.5	96%
24	F	8	3(1),4(13),5(10),6(3)	4.5	100%

* The figures in brackets indicate the number of student-judges who assessed the children's ages at a particular number of years. Thus 3(4) indicates that 4 student-judges assessed the child as being 3 years old.

Table 21. Judges' assessments of the age of subject-children with 'voice characteristic profile 'high/low, loud'.

Subject-children	Sex	Age	Age assessments in years	Mean Age Assessment	Correct identification
4	M	8	6(5),7(8),8(7),9(5),10(2)	7.6	0%
5	M	8	6(3),7(4),8(9),9(3),10(7),11(1)	8.4	100%
7	M	9	6(3),7(6),8(9),9(6),10(3)	8	75%
8	M	9	8(4),9(6),10(4),11(9),12(4)	10	100%
9	M	7	5(1),6(6),7(4),8(10),9(3),10(3)	7.6	78%
11	M	7	6(2),7(3),8(6),9(10),10(6)	8.5	67%
12	F	6	5(4),6(3),7(8),8(8),9(3),10(1)	7.2	100%
14	F	7	6(3),7(5),8(7),9(8),10(4)	8.2	75%
16	M	5	6(2),7(3),8(8),9(7),10(6),11(1)	8.5	100%
18	M	8	7(4),8(4),9(6),10(7),11(6)	9.2	100%
22	F	5	4(1),5(4),6(8),7(8),8(4),9(2)	6.6	63%

We can summarise the results show in Tables 18 to 21 as follows: if a child achieves a low score on the 'shy-confident' scale, is also judged as being 'young', and is in fact a boy, then it is very probable that the judges will not identify that child's sex correctly. If the child is a girl, and achieves similar scores, then the chances of accurate identification of sex are high. On the other hand, if a child is rated as being 'confident', and is also judged to be an 'older' child, and is a boy, then the probability of correct identification of sex is high. A high rating on the 'shy-confident' scale leads us to expect a high rating on the age scale, and vice versa. Thus, most of the girls in the experiment, and the misidentified boys (excluding subject-child number 4), are judged to be young and shy. In contrast to this, the accurately identified boys (with the exception of subject-child number 15) are judged to be older and 'confident'. (Child 15 is a constant exception in terms of accuracy of identification of sex and ratings on the scales discussed here - yet another indication that the scales are revealing different kinds of information about the children.) We can postulate that categorisation of the children on a scale such as 'loudness' reflects more than one kind of non-linguistic information about the children. 'Loud' (whatever its linguistic correlates might be) may well contribute to accuracy of identification of boy-subjects, but is also probably encodes information relating to judgements of confidence). It should be noted that the groups of children rated as having 'high quiet' voices, were not composed

exclusively of the physically smallest or youngest children in the sample. Nor were all the children in the group judged to have 'low, loud' voices physically the larger or older children. Thus it is not the case that the judges were simply responding to the absolute size of the children's vocal tracts and judging all the small children as being 'high-pitched' and therefore 'shy' girls, or judging the large children as 'low-pitched' and therefore 'confident' boys. Apparently from the judges' classifications, children who are judged to be older and 'confident' can possibly be categorised as girls, but it is most unlikely that children judged as being 'shy' and young will be accurately identified as boys.

While the foregoing discussion has concentrated on the classification of the children produced by manipulating the perceived dimensions of their voices, it has not brought us much nearer to discovering what the linguistic features are on the basis of which the judges made their identifications of sex. It would appear from the grouping of the children just discussed, that overall pitch height and loudness of the child's voice are significant diagnostic features in this respect. However, there are difficulties in assessing the relevance and adequacy of the scales employed to produce these groupings. First, although the scales derived initially from comments made by judges, they were not derived empirically in elicitation tests using the children's voices as stimuli. This leaves the experiment open to the criticism that the groupings which are derived from the scale-ratings are merely artifacts of the experimental design. Secondly, the difficulty arises of coping with the relativity involved in the ways in which the judges rated

the children on these scales. As I suggested earlier, it is unlikely that the judges simply rated each child's voice 'in vacuo', but that their understanding of the points on the various scales was being continuously modified for each child, in terms of the children's voices which the student-judges had heard previously. They may also have employed the experimenter's voice, which preceded every child's sentence-repetitions, as some kind of calibration device. Third, and most obviously, none of the scales employed correlates in any simple way with acoustic/linguistic 'facts'. It is well-known, for instance, that judgements in the perception of pitch are affected by dimensions other than frequency. Similarly the 'smooth-jerky' 'rhythmicality'-scale used, could be taken to refer to any number of prosodic features of rhythm, pause, or variations in word stress. In order to try and clarify matters, and to investigate what range of linguistic features might correlate with these scales, and to see whether such sets of features actually were diagnostic of the children's sex, the children's sentence-repetitions were transcribed in a full prosodic and paralinguistic transcription (Crystal, 1969). In addition, because many of the judges reported that they considered pitch to be important in forming their judgements, some rudimentary instrumental investigations of the pitch of the children's utterances were performed.

On the basis of the instrumental investigations of the children's sentence-repetitions, each child's voice was ranked in terms of its mean fundamental frequency.^{F_n}

Fn. Mean fundamental frequency (F_0) was determined by processing the subject-children's tape recorded sentences through a Transpitchmeter, connected to an 'Oscillomink' for registration. Transpitchmeter calibration tones were reproduced on clear plastic templates, and were used in the determination of specific frequencies on the Hertz (Hz) scale.

In spite of the often mentioned strictures concerning the usefulness of measurements of F_0 in discussion of relative pitch (Crystal, 1969; Lehiste, 1970), in the present context this exercise is by no means pointless. Even if we allow for some imprecision in the calculation of F_0 , certain trends are clearly evident when we compare the judges' ratings of the pitch height of the children's voices with the ranking of those same children in terms of F_0 . The details of F_0 for the children are presented in Table 22. This table also provides, for comparison, a ranking of the subject-children in terms of the judges' ratings of pitch on the 'low-high' scale.

Table 22. Subject-children ranked in order of mean F_0 (in Hz) for sentence-repetitions, and in order of mean judged pitch height on 'low-high' rating scale.

Subject-children	Mean F_0	Subject-children	Mean 'low-high' rating
15	326	15 M	4.6
16	318	19 F	4.1
14	310	12 F	4.1
21	309	21 M*	4.1
19	308	10 F	4.1
17	305	23 F	4
10	300	24 F	4
3	298	14 F	3.8
20	296	3 F	3.7
12	295	17 F	3.4
11	293	20 M*	3.2
6	292	4 M*	3.2
18	289	6 F	3.2
5	283	22 F	3.2
4	281	11 M	2.7
24	280	1 M*	2.6
9	279	7 M	2.4
7	275	5 M	2.3
22	272	16 M	2.3
8	270	2 M*	2.2
23	268	9 M	2.1
2	266	18 M	2.1
1	265	8 M	2
13	226	13 M *	1.5

(The sex of the subject-children is identified with the letters M=male, F=female. Misidentified boys in part one of the experiment are asterisked).

From Table 22, we can note first, that subject-child number 15 was found to have the highest mean F_0 in the sample, and was rated by the student-judges as having the highest pitched voice of all the children. Likewise, subject-child number 13 was found to have the lowest pitched voice in terms of F_0 , and was appropriately rated by the student-judges as having the lowest pitched voice in the sample. The children with the highest mean F_0 's in the sample (those with 300 Hz+), are all rated by the judges as having high-pitched voices. The ranking of the children simply in terms of F_0 , however, is not entirely satisfactory in view of the small differences in Hz between the ranks. Nonetheless, a comparison of the children in terms of their rankings by F_0 , and by judges' ratings of pitch of the 'low-high' scale, reveals that there is a tendency for those children most accurately and consistently identified as boys to be rated as having low pitched voices, whether or not this is so in terms of F_0 for the sample as a whole. We see, for instance, that subject-child number 16, accurately identified by all the judges as a boy, and rated appropriately low on the 'masculine-feminine' scale, has a mean F_0 higher than any of the girls in the sample, and yet is rated by the judges as being towards the 'low' pole of the 'low-high' pitch rating scale. Conversely, subject-child 23, who was accurately identified as a girl, has a lower F_0 than all the other girls, and a lower F_0 than all but three of the boys, but is rated as having a voice towards the 'high' pole of the pitch rating scale. It would appear, then, that in the process of identifying the subject-girls, there is a tendency to judge them as having higher pitched voices, whether or not this

is so in terms of their mean F_0 when compared with the sample as a whole. Note, however, that although the judges rate the overall pitch of subject-child number 13 as being 'low' in terms of the sample, and this corresponds with ranking in terms of F_0 , he is nonetheless misidentified as a girl 75% of the time. Similarly, although subject-children numbers 1 and 2 are rated as having low pitched voices, and this too corresponds with their rankings in terms of F_0 for the sample as a whole, they too are misidentified as girls more than 50% of the time. The case of subject-child number 15 is in direct contrast to this. He is rated as having the highest pitched voice in the sample (and as indicated earlier, this accords with his ranking in terms of F_0) but is accurately identified as a boy 92% of the time. This is yet another clear indication that judgements made about the sex of the subject-children are made in terms of a number of co-occurrent linguistic features, and pitch is only one of these, which is sometimes employed, and sometimes disregarded. We can compare Uldall (1962)

. . . the same kind of information is carried by several systems all present at all times: pitch, voice quality, tempo, gesture, facial expression, any one of which may be dominant at a given moment. (783)

We can summarise the data presented in Table 22 as follows: accurately identified boys are rated as having low pitched voices whether or not this is an accurate reflection of F_0 in terms of the sample as a whole. There is also a tendency for misidentified boys to be rated as having higher pitched voices than ranking in terms of F_0 would lead us to expect. Although the cases of

subject-children numbers 1, 2, and 13, indicate that misidentified boys can be rated as having low pitched voices, in cases where perhaps, the lowness of pitch is so obvious as to preclude a 'high' rating. Presumably, in such cases, other more girl-like features override what appears to be a predominantly boy-identifying characteristic. Child number 15 presents a parallel case, but one in which other predominantly boy-like features can be considered to depress the importance of high pitch, and thus allow him to be accurately identified as a boy. It seems likely that the predominant misidentification of this child by the children-judges in the first experiment can be attributed to them having used pitch cues as primary classification features for the identification of sex.

Examination of the judges' ratings of the relative pitch height of the subject-children's voices, then, suggests that these ratings reflect the influence of the judges' sex-stereotypes of children. However, while perceived pitch may play a part in identifying the sex of the children, the judges clearly form their assessments on the basis of other equally important linguistic features. To see if this is the case, we now turn to a consideration of the prosodic and paralinguistic transcriptions of the children's sentences, in an attempt to see if any sets of linguistic features can be established to account for the judges' assessments of the sex of the subject-children.

Table 23 gives some examples of the prosodic and paralinguistic transcriptions. The system employed derives from that of Crystal and Quirk (1964), and Crystal (1969), where full details can be found. The transcriptions, however, differ in some respects

which require comment. Whereas Crystal and Quirk (1964), and Crystal (1969) employ marginal labels for prosodic and paralinguistic effect, here they are marked above (paralinguistic) and below (prosodic) the orthographic text. (This is done mainly for clarity, and in order that inter-child comparisons may be made more easily). The beginning and end of a prosodic effect are marked in the orthographic text with single quotation marks. Below the beginning of a particular prosodic effect its label is enclosed in quotation marks, below the end in square brackets. The beginning of a paralinguistic effect is marked above the text with a left square bracket and its label, the end with a right square bracket.

The principles of analysis also differ in some respects from Crystal (1969). The simple systems of tempo and prominence (loudness) operating over polysyllabic stretches are analysed with respect to the norm established by the tape recorded model sentence which the subject-children were required to repeat, and not with respect to the children's own norms of prosodic realisations.

The following prosodic and paralinguistic features are noted when they occur.

Tone unit boundary: //

Onset syllable: / 'boosted' onset /: 'dropped' onset /, (see below)

Tone types (marked above nuclear syllable):

Simple: \ / - (fall, rise, level)

Complex: ^ v (rise-fall, fall-rise)

Compound: \ + / \ + - v + -

Nuclear syllable pitch range: narrow (n); wide (w)

Subordinate tone: []

Stress, weak: unmarked

other stress: '

strong stress: "

Pitch-range (simple), stressed syllables

slight step-down from preceding syllable ('norm'): unmarked
marked step-down from preceding syllable ('drop'): , (comma)
very marked step-down from preceding syllable ('low drop'): ; (semi-colon)
level with preceding syllable ('continuance'): · (raised stop)
step-up higher than preceding syllable ('booster'): : (colon)
step-up much higher than preceding syllable ('high booster'): !
step-up very much higher than preceding syllable ('high booster'): !!

Pitch-range (simple) unstressed syllables

high: ¯ (raised dash)
low: _ (lowered dash)

Syllabic tempo

'clipped': ˙ (raised stop above segment)
'drawled': ¯¯ (double dash above segment)
'held' : = (double dash below segment)

Polysyllabic pitch-range: narrow (nar), wide (wide), monotone (monot)

Loudness ('prominence'): forte (f), fortissimo (ff), norm (unmarked),
piano (p), pianissimo (pp), crescendo (cres),
diminuendo (dim)

Speed ('tempo'): allegro (a), allegrissimo (aa), norm (unmarked),
lento (l), lentissimo (ll), accelerando (accel),
rallentando (rall)

Pause:(silent): brief (·), unit (-), double (- -), treble (- - -)

Rhythmicality: spiky /or \ (spk), glissando /or \ (glis),
staccato (stac), legato (leg), rhythmic (rhyth),
arhythmic (arhyth)

Tension: precise (prec), tense (tns), lax (lx),
slurred (sl)

Paralinguistic features: whisper (wh), breathy (br), husky (hsk),
creak (crk), falsetto (fls), tremulousness (trm),
resonant (res), laugh (lau), giggle (gig),
sob (sb), cry (cry)*

* Unless otherwise specified, the prosodic and paralinguistic features referred to are those distinguished by Crystal (1969), where definitions and exemplifications may be found. Other prosodic and paralinguistic features are distinguished elsewhere in this thesis; where such features are distinguished, appropriate details are given.

Table 23. Examples of the subject-children's sentence repetitions to illustrate transcription procedure, and types of variability.

Subject-child 1. Boy aged 4 years. Correct identification 48%

^e I / came to ^e school this ^e ; morning // ^e
^e leg ^e 'dim' [dim] ^e p [leg
_p]

Subject-child 3. Girl aged 4 years. Correct identification 90%

^e / came to : school this morning // ^e
 [wh] [trm] [trm] [wh]
^e a nar p 'lix' [a nar
 lx p]

Subject-child 5. Boy aged 8 years. Correct identification 100%

^e I / came to "school this " morning // ^e
^e aa nar tns stac [stac] [aa nar
 tns]

Subject-child 7. Boy aged 9 years. Correct identification 78%

^e I / came to 'school this ' morning // ^e
^e L tns f [tns] [L
 f]

Table 23 (continued).

Subject-child 10. Girl aged 6 years. Correct identification 90%

[br
I/came to :school this ,morning //'
[rall
tʌs'
[rall
[tʌs]

Subject-child 12. Girl aged 6 years. Correct identification 100%

[crz] [wh]
"I/came to ,school this ,morning //"
[a
glis'
nar'
[a
[glis] [nar]

Subject-child 13. Boy aged 5 years. Correct identification 28%

[br [wh] br]
"I/came to school this [morning] //"
[l
leg
lx
p'
[sl'
[l
leg
sl
p]

Subject-child 16. Boy aged 5 years. Correct identification 100%

[hsk hsk]
"I/came to :school this "morning //"
[a
tʌs
spk'
f'
[tʌs
[spk'] [a
[f]

Table 23 (continued).

Subject-child 18. Boy aged 8 years. Correct identification 100%

^e I / came to , school this // - ^e / this ; morning //
^a [a] [hok]
^{tus} [tus] ^e low [low]
^f [f] dim? [dim]

Subject-child 21. Boy aged 7 years. Correct identification 18%

^e I / came to : school 'this' morning //
^L [glis'] [L]
^{glis'} [lx] 'sl' [sl]
^{lx'}

Subject-child 23. Girl aged 5 years. Correct identification 96%

[br [wh] br]
^e I / came to , school this morning //
^a [lx] [a nar]
^{lx} [p]
^{nar}
^p

Subject-child 24. Girl aged 8 years. Correct 100%

[br [wh] [wh] br]
^e I / came to , school this morning //
^e leg [leg]
^{nar} [nar]
^p [p]

Examination of the transcriptions of the sentence-repetitions indicates that certain prosodic and paralinguistic features do appear to enter significantly into the linguistic sex-marking of the children, and that the judges employ these features in identifying the sex of the children.

We can begin to identify the relevant prosodic and paralinguistic features by considering the possible role of tone-type selection in the identification of the sex of the subject-children. Several reports concerning the linguistic marking of sex have made reference to particular tone selections which, it is claimed, appropriately distinguish women from men (Brend, 1972; Lakoff, 1973; McConnell Ginet, 1974). Examination of the children's sentence-repetitions does not reveal any obvious simple relationship between the use of particular tones and the sex of the children, or between particular tones and judgements concerning the sex of the children. The accurately identified boys, for instance, exhibit no clear use of a particular tone (Table 24 below, summarises the selections of tone-type and tone placement in the sentence-repetitions). However, we should note that the largest group of subject-children formed on the basis of the use of a particular tone type is that comprised of five accurately identified girls (12, 17, 19, 23, and 24) and one misidentified boy (subject-child number 1) all of whom realise the nuclear tone on the word morning as level. No such clear pattern of shared tone selection is apparent for the other accurately identified girls, or misidentified boys. Moreover, the existence of such groups as those of children who use falls or fall plus level tones, which are composed of both accurately identified and misidentified boys, suggests that

tone selection, in isolation, is not being used by the judges as a diagnostic cue to the sex of the children.

Table 24. Summary of tone-type selection and tone placement by subject-children in the sentence 'I came to school this morning'.

Tone placement <u>school</u>	Tone placement <u>morning</u>
\ 3(F),14(F),18(M)	\ 15(M*),16(M),20(M*),21(M*)
\+ / 10(F),11(M),	— 1(M*),12(F),17(F),19(F),23(F),24(F)
\+ - 2(M*),7(M)	/ 6(F),9(M),18(M)
✓+ - 4(M*)	∪ 5(M),22(F)
	∧ 8(M)

(Subject-children's sex is indicated by the bracketed letters: M=male, F=female. Misidentified boys are indicated by asterisks. Subject-child number 18 appears twice in the table, as he produced the sentence as two tone units)

(We should note that there is an association between the use of level tone in the sentence-repetitions, and a 'bored' rating on the 'bored-involved'scale. Subject-children using level tone were given a mean rating on this scale of 2 or lower. However, such an association may reveal more about the judges' lack of acquaintance with level tone and its functions in localised Tyneside intonation systems (Pellowe and Jones, 1978), than it does about the attitude of the children towards participation in the experiment recordings. That is, judges have identified use of level tone as a diagnostic of 'speaker state' (boredom), rather than as a diagnostic of regional intonation systems (it may of course be both). Further discussion of the role of level tone in the intonation systems of Tyneside children can be found in Chapter 5, p.200ff).

Clearer associations than those exhibited by tone-type selection, can be found between other prosodic and paralinguistic features and the sex (and judgements concerning the sex) of the subject-children. These are presented in summary form below (Table 25). The children are divided into three groups on the basis of their sex and the accuracy of identification achieved by the judges in the experiment. Group 1 represents the accurately identified girls; Group 2 the accurately identified boys, and Group 3 the most frequently misidentified boys. Following the identification numbers of the subject-children are the labels of the prosodic and paralinguistic features which appear to enter significantly into the identification of the sex of those children. Features which are co-extensive with the whole utterance are presented without brackets; those features which are co-extensive with only part of the child's utterance are enclosed in brackets.

Table 25. Groups of subject-children and associated sex-marking prosodic and paralinguistic features.

Group 1. Accurately identified girls.

Subject-child.

- 3 allegro, piano, (lax), (whisper)
- 6 allegrissimo, (lax), (diminuendo), (whisper), breathy
- 10 (tense), (rallentando), breathy
- 12 allegro, glissando, (whisper)
- 14 lento, (tense), breathy
- 17 lento, legato, (lax), (diminuendo), breathy
- 19 allegro, breathy
- 22 lento, (tense), glissando
- 23 allegro, piano, (lax), breathy, (whisper)
- 24 legato, piano, breathy, (whisper)

Table 25 (continued)

Group 2. Accurately identified boys.

Subject-child

- 5 allegrissimo, (tense), staccato, (husky)
- 7 lento, (tense), forte
- 8 allegro, (tense), spiky, (husky)
- 9 allegro, (spiky), (husky)
- 11 allegro, (tense), staccato, husky
- 15 allegro, tense, (husky)
- 16 allegro, (tense), spiky, forte, (husky)
- 18 (tense), forte, husky, allegro

Group 3. Misidentified boys.

Subject-child

- 1 lento, legato, (piano) (diminuendo)
- 2 lento, (rallentando), piano, (lax), (breathy)
- 4 allegro, (tense), glissando
- 13 lento, (lax/slurred), legato, piano, (whisper)
- 20 glissando, (lax), breathy
- 21 lento, (lax/slurred), glissando

The easiest way of demonstrating the significance of these prosodic and paralinguistic features in terms of sex-marking of the children, is to consider their absence in the utterances of particular groups of subject-children in the experiment. (In the discussion which follows, the frequency of occurrence of prosodic and paralinguistic features is indicated thus: unbracketed figures refer to occurrences of features which are co-extensive with the whole of a sentence, bracketed figures refer to those occurrences of features which are co-extensive with part of a sentence).

We observe non-random differences between the subject-children in terms of their use of (1) paralinguistic features, (2) rhythmicity features, (3) loudness features and (4) tempo and tension features.

In terms of paralinguistic features, we note first that there is a clear tendency for the accurately identified girls and misidentified boys to realise all or part of their sentences with 'breathy' voice: accurately identified girls 7(1), misidentified boys 1(1). Accurately identified boys never use this feature. Similarly, we find the occurrence of 'whisper' in the speech of half of the accurately identified girls (5), and in that of the misidentified boys (1), but never in the speech of the accurately identified boys. The paralinguistic feature 'husky' (which Crystal and Davy (1969) gloss as 'tension in the pharynx produces a hoarse effect' (37)), occurs in the speech of the accurately identified boys 3(3), but not in the speech of the misidentified boys. 'Husky' does, however, occur in the speech of one girl (subject-child number 14, who was accurately identified 75% of the time). Its occurrence here, coincident with the word school on which she realised the nuclear tone of her sentence, may be a result of attempting to give extra emphasis to the word. However, this child also realises the whole of her sentence with 'breathy' voice, and the combination 'breathy-husky' produces a distinctly different effect to that of 'husky' in the sentences of the accurately identified boys.

When we examine the rhythmicality features of the children's speech, we note a marked difference between the groups. The accurately identified girls and misidentified boys show a preference for the use of 'legato/glissando' effects, while the best identified boys show a preference for 'spiky/staccato' effects. These features refer to particular kinds of transition between strongly and weakly prominent syllables.

These effects are characterised by Crystal (1969) thus: spiky/
glissando contrasts

involve a marked degree of pitch movement, either a step or a glide, in a rising or falling direction, there usually being a contrast between loud and soft syllable, though this need not happen. Spiky uses sharp and rapid jumps between syllables, glissando utilises smooth and usually fairly slow glides. (164)

Staccato/legato effects involve a similar kind of transition between syllables as that of the spiky/glissando effects

there being sharp contrasts between arsis and thesis in staccato and smooth in legato; but it is distinct in that pitch variation is non-identifying, loudness and duration variation being the important parameters, i.e. heavily prominent arsis and very light thesis (clipped and lengthened respectively). (164)

Legato/glissando effects occur in the speech of the accurately identified girls 4 times, and in that of the misidentified boys 5 times. They do not occur in the speech of the accurately identified boys, the marked rhythmical effects in their speech being staccato/spiky contrasts. Five out of the 8 sentence-repetitions of the accurately identified boys are realised with staccato/spiky rhythmicality. (Although these rhythmicality features do not correspond exactly with the judges' ratings of the children of the 'smooth-jerky' scale, it is likely that they played a significant role in those ratings. Subject-boys numbers 5, 8, 11, 16, whose sentence-repetitions have staccato/spiky effects, are all given 'jerky' ratings by the judges. Accurately identified girls, numbers 17, 22, and 24, who employ legato or glissando effects, are rated by the judges as having 'smooth' sounding voices. In the same way, misidentified boys, numbers 1, 13, and 21 using legato or glissando effects, were also rated as having 'smooth' sounding voices).

Variation in the loudness features of the sentence repetitions also appears to play a part in the identification of the sex of the subject-children. We can make a crude general distinction between the loudness features of the speech of the accurately identified boys, on one hand, and that of the misidentified boys and accurately identified girls on the other. The sentences of the accurately identified girls show a tendency towards 'quiet' loudness features (piano, and/or diminuendo effects, 4(1)). The misidentified boys too, show a slight tendency in this direction (piano and/or diminuendo effects 2(1)). With one exception, the speech of the accurately identified boys does not exhibit such 'downwardly' marked contrasts. The exception is subject-child number 18, who, having begun his sentence apparently confidently and 'boy-like' (forte, husky), makes a mistake when he gets to the word this; after repeating this he completes the sentence at a lower pitch than the first part, with diminuendo and a rising tone on morning - an effect which elicited the gloss 'tentative' from some of the judges. What loudness contrasts there are in the speech of the accurately identified boys are made in an 'upward' direction (forte), with frequent occurrences of strong stress. The sentences of some of the accurately identified girls also exhibit instances of strong stress. Subject-girls numbers 12, 14, and 22 all realise strong stress at onset (came), and on the words school and morning. It is possible that these occurrences contributed to the identification of these girls as 'older' and more 'confident' ('boy-like' ratings). In this respect, it is of note that, of the misidentified boys, only subject-child number 4 exhibits occurrences of strong stress in his speech,

and he too, was identified as 'older' and more 'confident', although misidentified in terms of sex.

Tempo contrasts have also been included in Table 25 as possible contributory features to the identification of the sex of the subject-children. While the speech of the children's utterances on its own is unlikely to provide diagnostic cues of sex, it is not unreasonable to assume that the judges used information derived from the interaction of tempo contrasts with other prosodic features, to identify the sex of the subject-children. That is, the judges can be seen as identifying the sex of the children, in part, from the extent to which the children produce appropriately sex-marked, situationally determined speech varieties. ('Situationally determined variety' can here be understood as a 'performing' variety (cf p.42 above), whose features are 'determined to some extent, by the nature of the situation in which the subject-children's speech was recorded. Tempo, along with such features as loudness and tension contrasts, may be important diagnostic features of such varieties (Crystal and Davy, 1969)). It is, for instance, very noticeable that the speech of four of the 6 misidentified boys is markedly slow (lento). Of the 4 other occurrences of slow tempo speech in the subject-children's sentences, only 1 occurs in the speech of the accurately identified boys, and there is accompanied by forte loudness. (The speech of this child, number 7, was glossed by some of the judges as being that of a 'slow', 'not very bright' boy. These judges made particular reference to the 'long', 'drawn out' vowels in the words came and school, as well as the overall lento speed as motivating

their judgements in this respect). Apart from this *lento* speech of subject-child number 7, such slow tempo contrasts do not appear in the sentences of the accurately identified boys. Slowness of tempo does, however, characterise the speech of the accurately identified subject-girls numbers 14, 17, and 24, and we find a *rallentando* effect in the speech of subject-girl 10.

When we consider the occurrence of particular 'tension' contrasts in the children's speech (the system of tension comprises vocal effects 'primarily produced by different degrees of muscular tension in the regions above the vocal cords' Crystal and Davy 1969:37), we find a rather similar distribution to that shown by particular tempo contrasts. While 'tense' effects occur in the speech of the accurately identified girls as well as in that of the accurately identified boys, 'lax/slurred' contrasts only occur in the girls' speech and in that of the misidentified boys. The distribution of such effects as these suggests that probably no single cue can account for the judges' accurate identifications and misidentifications of the sex of the subject-children. The range of non-segmental contrasts spread across the children's speech clearly indicates that we cannot appeal to a simple notion such as that of discrete sex-marked non-segmental effects. There is clearly a range of non-segmental variation which is appropriate for 'boy'-marked speech varieties, and a range appropriate for 'girl'-marked varieties. The speech of the misidentified boys in the sample falls, in varying degrees, within the range appropriate for 'girl'-marked varieties. We can conclude then, that the results of the experiments have shown that there are situationally determined

speaking norms which are sex-marked, and that these are realised, to a large extent, by particular co-occurrent prosodic and paralinguistic features. Individual subject-children achieve the same sex-marked speaking norm through the use of different, but not discrete, combinations of these non-segmental features.

* * *

This chapter has presented judgements, derived from two experiments, concerning the speech of young children, and has discussed some of their implications. An examination of the non-random identifications (and misidentifications) of the sex of subject-children whose speech was recorded, indicated that the judges were reacting to systematic variation in the speech of those children. The responses of the children-judges in the first experiment to the speech of the tape recorded subject-children, indicated that they too show an awareness of this linguistic variation. They exhibited patterns of identification of the sex of the subject-children which were very similar to those of the adult-judges in the experiments.

The accuracy of identification of sex achieved by different groups of children-judges was taken to indicate that awareness of sex-marked linguistic variation increased with age (Table 3). Consideration of a simple measure of consistency between the two parts of Experiment 1, further suggested that as the age of the children-judges increased, they reacted more systematically to the variation in the speech of the subject-children (Table 5).

I have argued that the judges' ability to identify the sex of the subject-children depended on the extent to which the children had learnt speech varieties considered appropriate for their sex in particular situations. Although the subject-children in the experiments were not matched for height and weight, and some differences in the pitch of their voices was apparent (Table 22),

the results of Experiment 2 gave indications that judges were not simply reacting to cues of pitch in identifying the sex of the children. It was shown that no simple relationship existed between the pitch of the subject-children's voices, and the judges' identifications of sex. Not all subject-children with high pitched voices, in terms of the sample as a whole, were judged to be girls, nor were all subject children with relatively low pitched voices always judged to be boys.

I have suggested that the cues to the identification of the subject-children's sex are subtle, and that they appear to be primarily located in the prosodic and paralinguistic features of their speech. However, while the presence of certain non-segmental effects appears to be important in distinguishing between sex-marked speech varieties (paralinguistic features and rhythmicality features, for instance), the absence of such features does not necessarily lead to misidentification. This suggests that the judges (children and adults) were responding not to individual features but to groups of features.

By the use of a simple experiment designed to elicit information concerning one social dimension of linguistic variation (sex of speaker), we have been able to show that such variation exists in the speech of young children, and that children themselves can recognise this variation. While we have not determined the age at which such variation (and the ability to recognise it) appears, we have shown that the claims of Labov (1964), that social awareness of linguistic variation does not begin until 'early adolescence', are clearly unsatisfactory. However, the discussion has been

limited to a consideration of systematic variability at just one level of linguistic structure (non-segmental phonology). Indeed, some controls were introduced into the experimental design to eliminate other kinds of variability which could possibly have provided cues to the sex of the subject-children. Lexical content, for instance, was controlled by use of the sentence repetitions, for it was found in preliminary observations that children employed such cues, often erroneously, in the identification of sex. (One 5 year old girl, for instance, on listening to a tape recorded in a naturalistic setting, where there was no attempt to control the content or lexis of children's speech, identified one particular voice as being that of a boy on the basis that the child had used the word bum. She offered in explanation the observation that 'girls don't say 'bum'').

If we are to understand the nature and development of systematic sociolinguistic variability in the speech of children, it is important to gain more information concerning the interactions and dependencies between different kinds of variability in their speech (cf the discussion of 'implications' between different linguistic variables in Bailey, (1973) and Bickerton, (1973)). Chapter 3 extends the investigation in this direction, by a consideration of segmental variability and its relationship to non-segmental variability in children's speech.

**Chapter 3: DEPENDENCIES BETWEEN SEGMENTAL AND NON-SEGMENTAL
VARIABILITY**

The data presented in the previous chapter indicated that there existed in the speech of the young children studied, systematic variation from which hearers could derive information concerning the children's sex. I claimed that this systematic variation was to be primarily located at the level of non-segmental phonology. However, a number of the judges who participated in the experiment also made reference to differences existing between the children's speech in terms of their segmental phonology. These differences, they claimed, had assisted their efforts to identify the sex of the children. Most notably, reference was made by some of the judges to 'dialect sounds' and 'broad speech', the presence of which had been taken to be an indication of the maleness of the particular child speaking. Examination of the judges' responses, and the the children's segmental realisations, however, reveals no apparent relationship between segmental phonology and the sex of particular children, or with the judges' accuracy of identification of sex. Nonetheless, these observations by the judges raise several important issues of general sociolinguistic interest.

Despite the considerable amount of research concerning the nature of sociolinguistic variation, remarkably little is known about the relative importance of the variable systems involved. Characteristically, sociolinguistic surveys have restricted their investigation of linguistic variation to one sub-domain: usually segmental phonology. Within this sub-domain, researchers have typically selected a small number of phonemic variables for study (Labov, 1966; Trudgill, 1974). Consequently, because of

such fragmentary selection of variables, we lack information concerning the relative importance of segmental variation, for instance, as compared with syntactic, lexical, or non-segmental variation, from the point of view of the kinds of information which can be derived from a speaker's realisation string. Moreover, as many reports of children's language indicate, children acquire competence in different aspects of their language at different times (Ferguson and Farwell, 1975; Bloom, Lightbown and Hood, 1975), and the existence of systematic variation at one level of linguistic structure does not necessarily mean that such systematic variation exists at another level. If we are to acquire an adequate understanding of the nature of linguistic variability in children's language, then it is clearly of some importance to explore the dependencies which may exist between variability at different levels of linguistic structure.

In order to clarify some of these issues, I decided to investigate segmental variation in the speech of children, and to explore further the significance of non-segmental variability by an examination of the relationship between segmental and non-segmental variation in children's speech.

The speech-data collected for the experiments in Chapter 2, however, was found by its restricted nature not to be capable of supporting such an investigation. Further data were therefore collected. Recordings were made of the speech of two children (Paul aged 5 years 2 months, and Claire aged 5 years 6 months), in naturalistic settings in their homes (full details of the procedures adopted are presented at the beginning of Chapter 4).

Initially, a detailed segmental transcription was made of the first four minutes of the first tape recordings made of each child's speech. The first tapes were chosen because at that time the children were not aware that their speech was being recorded. The arbitrary time-period of four minutes was found to yield a satisfactory amount of speech for the present discussion.

Examination of the transcriptions revealed an unexpected range of realisational variation, particularly in respect of stressed vocalic nuclei. Of particular interest were the realisations of the segments which in RP are associated with the phonemes /ʌ eɪ aɪ əʊ /. (These particular 'phonemes' have, of course, long been of interest to dialectologists concerned with British English. The presence or absence of an /ʌ / type vowel, for instance, is generally taken to be an indication of a southern or northern variety of English, and monophthongal realisations of RP /eɪ aɪ əʊ / are often cited as characteristics of various localised speech varieties (Wakelin, 1972; Wells, 1970)).

Illustrative examples are presented and discussed below. IPA conventions are used; the consonantal segments are only approximately represented for clarity of presentation. All the items presented occurred under similar conditions of phonetic stress (no unstressed realisations are included). Some of the items, however, do additionally carry tonic pitch movement. Where this is the case, it is noted in the transcription. For convenience of presentation, the variant realisations are grouped together thus: (1) on the basis of the phoneme usually associated with the lexical set in RP: /ʌ eɪ aɪ əʊ /, and (2) within the groups

so established, sub-groups are identified on the basis of 'phonetic similarity'. Associated with each of these sub-groups is an appropriate cover-symbol. The superscript letters accompanying these cover-symbols indicate whether the variants in a sub-group are typically (L) localised Tyneside realisations, or (NL) non-localised realisations (cf Pellowe, Nixon and McNeany, 1972a).

Stressed vocalic variants in the speech of Paul:

Group 1 A

/ʌ/NL

s^ʌm (some)

ʌ^ʔ (up)

'b^ʌk^ʔs^ʌdən

(Buxton)*

(The name of a cat figuring in The Magic Roundabout TV series)

'b^ʌp^ʔk^ʔs^ʌdən

(Buxton)

/ɑ/L

sɑm (some)

ɑ^h (up)

'lɑnd^ɑdən

(London)

bɑk^ɑstən^li

(Buxton)

'b^ɑk^ʔs^ɑdən

(Buxton)

/ə/L

sə⁺m (some)

gə⁺n (gun)

əs⁺ (us)

'b^ək^ʔstən

(Buxton)

'ləndən

(London)

/ɜ/L

sɜm (some)

ɜ^h (up)

'b^ɜk^ʔs^ɜdən

(Buxton)

* where tonic pitch movement occurs with these items, it is indicated above the relevant orthographic word.

Group 2 aɪ

/aɪ /^{NL}

ʔaɪ (I)

'tɬaɪɪn (trying)

lɑɪk (like (verb))

wɑ̃ɑɪ (why)

/ɛɪ /^L

fʊɛɪts (frights (verb))

lɛɪɪk (like (verb))

/a /^L

ʔa (I)

ʔaɪ (I've)

ʔam (I'm)

ʔam (I'm)

Group 3 eɪ

/eɪ /^{NL}

ʔeɪ (hey)

'wɛɪndʒɑ̃ (Ranger)

spʊeɪ (spray (verb))

/ɛɪ /^{NL} p^hɛɪnt (paint)

sɛɪ (say)

hɛɪ (hey)

spʊeɪz (sprays (verb))

'spʊeɪɪn (spraying)

dɛ̃eɪ (day)

/e /^L

ʔi (hey)

sɛ (say)

wɛ̃ndʒɛ (Ranger)

t^hə'di (today)

wi (way)

Group 4 əʊ

/əʊ/NL	p ^h oʊst	(post)
	'əʊnli	(only)
	ləʊn	(lone)
	'oʊnli	(only)
	bləʊ	(blow)
	'gəʊŋ	(going)
/o/L	blə	(blow)
	ləʊn	(lone)
	'oʊnli	(only)
	gəʊn	(going)
	dʌnt	(don't)

Stressed vocalic variants in the speech of Claire:

Group 1 ʌ

/ʌ/NL	'kʰʌvəl	(c <u>o</u> ver)
	'mʌmi	(mummy)
	'rʌbər	(rub <u>er</u>)
	'fʌni	(funny)
/ə/L	wən	(won)
	'məmi	(mummy)
	ləki	(lucky)
	kʰʌd	(cut)
/ə/L	kʰəvə	(cover)
	ləbər	(rub <u>er</u>)
	wən	(won)
	dʌk	(duck)
/ɜ/L	dʒʌst	(just)

Group 2

ai

/ aɪ /^{NL}

ʌ̇aɪ	(I)
ɪ̇aɪ	(eye)
sɑ̇ɪd	(side)
mɑ̇ɪti	(mighty)
dɑ̇ɪ	(dive)
hɑ̇ɪ	(high)

/ eɪ /^L

mɛ̇ɪnd	(mind)
sɛ̇ɪd	(side)
nɛ̇ɪs	(nice)
nɛ̇ɪt	(night)

/ a /^L

ɪ̇aʋ	(I've)
ɑ̇	(I)
ɪ̇aɪm	(I'm)

Group 3

ei

/ eɪ /^{NL}

ʃeɪm	(shame)
pleɪd	(played)
kʰeɪk	(cake)
geɪmz	(games)
pʰeɪdʒ	(page)
'bɜːθdeɪ	(birthday)
gɛ̇ɪmz	(games)

/e /^L

k ^h ėɪk	(cake)
'bɜθ'dė	(b ^{ir} thday)
s <u>e</u> m	(same)
'p <u>e</u> ʃ <u>ɪ</u> nt	(p <u>a</u> tient)

Group 4. əʊ

/əʊ/^{NL}

dəʊnt	(don't)
gəʊ	(go)
g <u>e</u> əʊ	(go)
n <u>o</u> ʊ	(know)
əʊ	(oh)

/o /^L

g <u>o</u>	(go)
d <u>o</u> nt	(don't)
n <u>o</u>	(k <u>no</u> w)
ʃ <u>o</u>	(show)
d <u>u</u> nt	(don't)

(Monophthongal realisations of diphthongs illustrated here, in the speech of Paul and Claire, are all 'long'.)

The nature and range of realisational variation which this data exhibits merits attention for a number of reasons - initially, because it suggests that the children are still in the process of acquiring stable use of the relevant sociolinguistic contrasts of the adult system(s). More important for my present purposes however, is that in several respects this segmental variation can be shown to be significantly determined by variation in co-occurrent non-segmental features.

In addition, it is noteworthy that such a range of segmental variation in the language of children of this age does not appear to have been previously reported in the literature. There are probably two main reasons for this: studies of phonological variation have tended to focus on the language of adults (eg Labov, 1966; Trudgill, 1974), or, where the language of children has been considered, the studies have been 'linguistic' rather than 'sociolinguistic' (Ferguson, Peizer and Weeks, 1973; Smith, 1973).

The majority of studies which have attempted to investigate the phonological development of children have begun by asking the question: 'At what point does the child's language show the distinctive functions of sound differences, and how does the child acquire the full inventory of adult oppositions?' (cf Ferguson and Garnica, 1973). Consequently studies have tended to focus on the acquisition 'process' from an adult-system point of view. Thus, we find researchers examining 'substitution errors' and establishing 'partial phonemic systems' ('reduced vowel phoneme systems', Weir, 1962; 'incompetence rules', Smith, 1973) for various stages of the child's linguistic development. From the standpoint of such

studies, the segmental phonetic variation I have presented might be considered unimportant for an understanding of the phonological development of the children, being perhaps merely an artifact of the sampling and transcription procedures employed. Such an observation, however, serves to highlight an important difference in purpose between 'traditional' linguistic phonological studies, and any attempt to model children's phonological development within a sociolinguistic framework.

Pike (1967) has stressed that 'etic' and 'emic' analyses reflect differences of the analyst's purpose (and his state of knowledge), and have nothing to do with any 'actual properties' of the data. Thus, remarks such as Weir (1962) that 'In this context, phonetics . . . is only auxiliary to phonemics. . . ' (21), reflects her main aim: to provide an outline of the child's 'phonemes' and their patterning, in terms of the relationship between the child's 'system' and that of the adult. However, from a sociolinguistic point of view, as emphasised by the work of the Tyneside Linguistic Survey, it is not the abstract (emic) representation of a variant's realisation, but its actualisation (etically) in the token which allows the hearer to derive non-linguistic information from a speaker's utterance. The implications of this emphasis for a consideration of the data presented above, hardly require expansion. Granted that 'small' phonetic differences in language may be important, sociolinguistically, and given that we do not know a priori which of the phonetic features are of sociolinguistic relevance, then we cannot simply ignore, or 'phonemicise away' such variation as I have presented above.

We may begin a consideration of the present data by examining the nature of some of the variation shown. In spite of the fact that I have illustrated variation for only four stressed vowels, /ʌ eɪ aɪ əʊ /, in a few lexical items, it is important to report that this kind of variation is representative of that occurring in other vocalic segments in the speech of these two children, and in those of other children observed, but not reported here. The occurrence of different realisations of the same segment in the same lexical item on different occasions, suggests that we are not simply dealing with variation which is conditioned by the immediate phonetic environment. We should also note, that some of the variation is not 'sub-phonemic', but seems to involve variation between 'phonemes' in different realisations of the same lexical item. For instance, Claire on other occasions realises about variably as [ə'bu:t əbʌət əbɑ:t], and Paul realises space as [speɪs spi:əs], and mine, white as [mɛɪn weɪt ~ maɪnwaɪt]

Some lexical items, however, do appear to be rather more 'stable' than others in respect of such variation; one such is look/looka (when used as an imperative), which both children characteristically realise as [lə'k lə'kʌ]. Likewise, although this kind of variation appears to be common for most of the vocalic segments, diphthongs and back vowels seem to be rather more susceptible to a wider range of variation. (Although we can note occasional realisations such as [hɛv] varying with [hʌv] have, in the speech of both children; [mi:] with [maɪ] my; and [ʃɔ:t dɔ:ti] varying with [ʃɪt dɪti] shirt, dirty in Paul's speech. All these may be word-specific). It may also be the

case that unstressed (particularly unstressed word-final) segments are rather 'stable' in terms of realisational variation, when compared with other segments. These unstressed segments, especially in Paul's speech, also tend to be more stable in terms of their resemblance to localised realisations found in the speech of adults on Tyneside (Pellowe, Nixon, McNeany, 1972a). We find, for instance, both children generally realising the final vowel in words such as pretty, gently, party (NL / ɪ /) as [i̇].^{Fn}

Fn. The terms 'localised' and 'non-localised' (abbreviated in places to 'L' and 'NL') are used in the sense indicated in Chapter 2, p. 31. 'Non-localised' (RP) realisations are taken to be those of the system discussed in Gimson (1970). When discussing the children's realisation of particular segments I occasionally add details of non-localised (RP) realisations for ease of reference. This does not imply that the system of RP contrasts is necessarily salient for the children, nor does it imply that the children's realisations are 'deviations' from an RP norm.

We also find final open NL / ə / in Claire's speech realised as [ə] or [ɜ] when non-reduced; for Paul [ɛ] and [ɜ] appear to be preferred realisations, although [ḁ] is occasionally found (as in one realisation of range in the data presented above).

Such variation is not simply confined to vocalic segments, consonantal segments, too, show variation which might also be of sociolinguistic import. To take an intuitively significant example, which is probably of some importance to (adult) speaker-hearers of Tyneside: both children variably realise intervocalic voiceless (fortis) stops with and without aspiration. These stops also vary in terms of being realised with or without co-ordinate glottal articulation, in word-medial and word-final position.

Other obvious variation in consonantal segments in the speech of both these children is the realisation of / ŋ / (when word-final) as both [ŋ] and [n], and variation in the realisation of / l / as both [l̥] and [l] (the former being a significantly more frequent realisation in localised Tyneside speech (Pellowe, Nixon and McNeany, 1972a; Wells, 1970)).

Preliminary examination of the data indicates a possible division of the variant vocalic realisations into two very general categories. While some of the variants resemble non-localised (RP, 'standard') realisations, some are more like localised variants found in the localised speech of the Tyneside area (eg localised realisations are: /ɔ /, /ə /-forms in lexical items which in RP would have /ʌ /, and long monophthongs where RP might be expected to have /eɪ əɪ əʊ /, as well as the realisation of RP /aɪ / as an /ɛɪ /-type diphthong). Given the age of these two children, such variation, perhaps between localised and non-localised phonological 'systems', might offer insights into the development of sociolinguistic competence (cf Fries and Pike, 1949: 'coexistent phonemic systems'; Pellowe et al, 1972a: 'diasystemic variants').^{Fn}

Fn. The parents of both children speak varieties of localised Tyneside English, although all show signs of 'interference' from standard forms. From a segmental point of view, such 'interference' is most marked in the speech of Claire's mother and Paul's father (a teacher at a local comprehensive school), and least obvious in that of Paul's mother.

Two possibilities immediately suggest themselves:

- either (1) this variation is structured, and preferential use of one 'class' of variant rather than the other can be shown to be conditioned by socio-linguistic factors. (For instance, the variation here, not only across items of the same lexical set, but also in different instances of the same lexical item, may be attributable to 'stylistic variation' (Labov, 1966), or 'code switching' (Blom and Gumperz, 1972)),

or (2) the variation is an indication that the children are at transitory stages in the acquisition of their phonological 'systems', and the variation is fortuitous. (cf Labov, 1971: 'In almost any language we can locate unsystematic 'subsystems' simply by moving down in age until we reach speakers whose grammars are in flux.' (453)).

Clearly, a combination of both these causes is quite possible. I shall ignore this possibility here, however, for ease of argument. (But see below p.117ff, where the responses of hearers are employed in an attempt to gain further information about possible 'classes' of variant).

When we are dealing with the language of very young children we may be able to persuade ourselves that any phonological variation which we observe is directly attributable to having located the 'unsystematic 'subsystems'' to which Labov refers. We can compare the remarks made by Moskovitz:

Ten renditions by a two-year old of the same word during the course of two hours may be as phonetically different as are ten words of the adult vocabulary. (1970: 427)

However, when we approach the linguistic behaviour of children of the ages represented here, it becomes increasingly difficult to accept that the variation which we observe is simply fortuitous. The difficulty of accepting such an explanation is further emphasised when we find evidence in the speech of these children that, at other levels of linguistic structure, they show considerable control of the resources of (socio)linguistic variation (for amplification of this claim see Chapters 4 and 5). Nonetheless, before examining the adequacy of the first of the

'explanations' proposed above, let us attempt to simplify the task of dealing with the range of segmental variation, and begin by asking if it is possible to account for any of it in terms of the second 'explanation' - that is, as fortuitous variation. If it is possible to identify any of the forms as 'mistakes' or 'random' variants, we can then eliminate them from further consideration.

One essential first step in trying to identify 'fortuitous' variants is to examine the data to see if any of the variant realisations are significantly less frequent than others. (Of course, even where such frequency data indicates a 'rare' variant, it may not simply be a 'mistake', for instance. The child may be intentionally 'breaking the rules' to create a particular effect (eg for humour, or to draw listeners' attention to what he is saying). In such a case 'linguistic' (say, segmental) information on its own is not sufficient. It needs to be supplemented by 'social' information of various kinds, as well as information from other levels of linguistic structure. (cf the discussion of Paul's realisation of buxton as $\left[\begin{smallmatrix} 'b_{\text{u}}k_{\text{s}}d_{\text{o}}n \end{smallmatrix} \right]$ p.132 below)).

We should note also, that even within the short time-period from which the data were drawn, we find that most of the variants occur in three or more items of the same lexical set. Moreover, all the variants here presented have been observed in the speech of these two children in items of the same lexical sets, on at least four different occasions.

In an attempt to expedite matters, the assistance of twelve 'hearer-judges' was enlisted. These judges consisted of

four non-localised adult speakers, and eight localised Tyneside adult speakers who included the parents of the two children. My decision to use hearer-judgements as a preliminary step in explicating the variation in the children's speech, was motivated by a consideration of the work of Olmsted (1971), which I have previously discussed in Chapter 1. Olmsted attempted to provide operational definitions for the concepts of 'mastery', 'acquisition', and 'correctness', of children's production of phones. Part of Olmsted's solution, as I have previously indicated, was a statistical determination of 'frequency of correctness' versus 'frequency of error' (learning a phone was judged to be accomplished when the child pronounced it correctly in context, as judged by an adult native speaker). However, the identification of possible 'errors' in the segmental realisations presented above, proves to be rather more difficult than Olmsted's work suggests, and than might be suggested by some other studies of children's phonological development (eg Menyuk, 1971; Smith, 1973). In the framework of a sociolinguistically oriented investigation, it would appear that the researcher cannot come to a straightforward assessment of 'correctness in context', for the realisation of a segment, as Olmsted can. We cannot simply assess the 'rightness' or 'wrongness' of the judgements of correctness, or of the other kinds of information derived by hearers, since this information is a complex function of very many aspects of the speaker-hearer's experience, and of his perceptions of that experience. (This is, of course, as true of the judgements of professional linguists as it is for those of the 'man in the street').

The realisation of NL / ʌ / as [ɿ] by Paul, in the word Buxton, is a likely candidate for consideration as a 'random' variant, being comparatively rare in the present sample. (Matters are somewhat complicated, however, as this variant realisation does occur, albeit sporadically, in other items of the lexical set where the non-localised form / ʌ / would be expected). At first sight this segment might appear to present us with a rather obvious 'mistake' which introduces another 'phoneme' into the stressed vowel position of this word. This is certainly a possible explanation, and one which was preferred by the four non-localised hearer-judges to whom I played the tape recordings of the children. (None of the non-localised hearer-judges had had any great exposure to varieties of English spoken in the Tyneside area). This was also the explanation preferred by Paul's mother, and Claire's mother. Claire's parents, however said that this realisation might not simply be a mistake, but could be an example of Paul *'talking broad deliberately' when he was *'shouting to make sure people were listening to him' (Lf 4).^{Fn}

Fn. The hearer-judges who participated in this informal 'experiment' were asked to listen to selected stretches of the tape recorded data, and to 'comment on any pronunciations you find interesting'. Their comments, if any, were recorded by me in writing. Whether or not they had identified particular pronunciations as 'interesting', I played over the tape recorded stretches again, and asked them to identify and comment on any 'mistakes of pronunciation which you have heard'; additionally I directed their attention to such specific realisations as that presently under consideration. The comments of the hearer-judges reported here, are those made either spontaneously by them, or in response to having their attention directed to particular variant realisations.

The comments of hearer-judges are indicated in the text with single quotation marks, preceded by an asterisk. In order that the comments of individual judges may be distinguished, judges are identified by the letters and figures in brackets after their comments thus: (Lf 4), indicates localised judge number 4, who is female; (NLm 2) indicates non-localised judge number 2, who is male.

Paul's father, too, was unsure about the 'mistake' status of this [ɹ̥] realisation of the vowel in the word Buxton. He said that although he did not think that Paul pronounced words in this way very often, he might have acquired such a variant from his grandfather (mother's father) who *'speaks like that-broadish' (Lm 1). The remaining localised hearer-judges were divided concerning the status of this realisation. One localised male, on listening to the tape, identified this as a 'mistake' (although he accepted the other variant realisations of Buxton) on the basis that Paul otherwise *'sounds like a well-brought up child' (Lm 7), and that the [ɹ̥] realisation *'sounds coarse' (further questioning of this judge revealed that he associated 'coarseness' with localised Tyneside speech). The other localised hearer-judges were not so certain about the 'mistake status' of this variant. One said she thought that Paul was just *'playing around with words and sounds' (Lf 5). Claire's father, who himself speaks a localised variety of Tyneside English where this realisation is frequent, said he thought that it might be a 'mistake', but that Paul might be *'doing it on purpose' (Lm 3), however, he did not offer any suggestions about what might have indicated such an intentional use of this realisation.

The differences in the judges' reactions to this variant realisation, not unsurprisingly, would appear to derive primarily from their knowledge (or otherwise) of possible variant realisations in localised Tyneside speech. Now, as Hoenigswald (1966) has indicated, the linguist does not have to pay serious attention

to folk-linguistic data (which these responses represent), or let them constrain his investigations. Nonetheless, the responses of these hearer-judges are of interest, not the least since it is hearers, rather than speakers, who assign 'social' meaning to speech variation, and since in terms of the research of the Tyneside Linguistic Survey:

. . . it is the interpretive and inhibitory activities of the hearer on speech variation which yield the most powerful functional insights into speech differences.
(Pellowe et al, 1972:5)

The reactions of these 'linguistically naive' hearer-judges are of interest, moreover, for I suspect that their ways of approaching this task of identifying putatively non-systemic variants is probably not greatly different from that of the 'professional linguist' who is attempting to establish the 'system of distinctive oppositions' for the child's speech.

Let us now turn to another possible example of production variation which might constitute a 'mistake', and consider the kinds of information which the hearer-judges seem to use in identifying the status of variants.

The example is again drawn from Paul's speech during the interaction from which the data given previously, were extracted. In the course of this interaction, Paul, who is pretending to shoot people with a toy gun, turns to Margaret (a neighbour in her mid-thirties who speaks a localised variety of Tyneside English) and says

I'm going to shoot me I'm going to shoot I'm going to
shoot me right in the to shoot through the chin

The first time Paul says shoot in this sequence, he realises the vowel as [ə]; the other realisations are [i_u], [u_u] and [u_u] respectively. All the hearer-judges identified the first realisation of shoot, here, as a 'mistake', although there was some equivocation concerning what kind of a mistake it was. This ambiguity centred around the decision as to whether it was an 'intentional' mistake or not. That is, all the hearer-judges believed that in terms of Paul's phonological system, this was *'a clear error' (NLm 2), *'a slip, he was trying to say something else but got mixed up because he was playing a game' (Lm 6). However, most of the judges could not decide whether or not Paul was *'deliberately trying to get noticed' (Lm 3), *'doing it for effect' (Lf 8), *'trying to shock her' (Lf 5), or whether, as Paul's mother said *'sometimes he doesn't listen to what he's saying' (Lf 2). Paul's father, who was present during the course of the interaction, but not directly involved, was not certain whether or not this realisation was *'meant' (Lm 1). However, on listening to the tape again, suggested that whatever it was (intentional or not), it occurred because Paul was *'excited', 'playing' and *'showing off in front of Margaret' (Lm 1).

When I asked the hearer-judges to attempt to say why they thought this realisation constituted a 'mistake', ten of the twelve judges pointed to the fact that the other three realisations of shoot which Paul produces subsequently, all have some kind of /u/ type vowel: *'he keeps repeating it properly after the first time - they're all the same' (NLf 4).

One localised judge, (Lm 6), said that while the repetitions were important, he was not sure that the *'consistent repeating' had provided *'the clue' which indicated that the first pronunciation of shoot was a mistake. He reported that it was the way in which Paul pronounced the subsequent versions of the word which had indicated that the first was an error. Two of the other localised judges (Lm 1; Lf 5), and three of the non-localised judges (NLm 1; NLf 2; NLM 3), also referred to *'other things' (NLf 2) in the way Paul spoke which had helped them to establish that the [ə] realisation was a mistake. These additional 'clues' appeared to centre around the *'tentative way' (Lm 1), *'uncertainty' (NLf 2), *'circumspect way' (NLM 1), and *'pensive tone' (Lf 5) in which Paul said shoot the second time in this sequence. If we examine the co-occurrent prosodic features of this utterance, it is possible to find some indications of what might have contributed to such glosses by the hearer-judges. The transcription below shows the prosodic and paralinguistic features which accompanied the first and second occurrences of shoot in this extract of Paul's speech.

^[hsk] \ ^{hsk]} ,
 'Im going to /'shoot, me// - - 'Im going to /:shóot, me//'
 'aa [aa] 'aa [aa]
 'aa [aa] 'aa [aa]
 'lx [lx] 'lx [lx]
 'p [p] 'p [p]
 'pp'

The glosses of the hearer-judges, concerning the second occurrence of shoot, would appear to have been crucially motivated by the

overall alterations in tension (tense to lax) and loudness systems (normal loudness to piano, and pianissimo co-occurrent with the second realisation of shoot), as well as the drawled initial consonant, and the additional placement of a boosted onset and rising tone on the second occurrence of shoot. The judges' use of these non-segmental cues in order to establish the nature of variation at the segmental level suggests a possible ranking of variable systems - one in which non-segmental phonology takes precedence over segmental phonology. Further evidence substantiating this claim can be derived from a consideration of some of the other segmental variation in the speech of Paul and Claire.

It is necessary to return to the first 'explanation' proposed above (p.113), and ask whether it is possible to account systematically for the range of segmental variation given here, in 'sociolinguistic' terms.

Examination of the data for co-variation of particular segmental realisations with features of 'social' or 'stylistic' context does not prove particularly helpful. It is possible to account for only a few of the variants in such terms, and then rather tentatively. If we continue for the moment with the initial rather crude division of variants into putatively localised and non-localised forms, it would appear that for both children the localised-type variants occur somewhat more frequently when they are talking to speakers who themselves speak localised varieties. In the present data, for instance, Paul's speech to Margaret (who speaks a variety of localised

Tyneside English) generally contains more instances of localised-type variants than does his speech to his parents (whose localised varieties are not quite so marked as Margaret's). Paul's speech to his sister also tends to contain frequent occurrences of such localised variants. Likewise, Claire's speech which is directed towards her sister shows a tendency towards more markedly localised characteristics than does her speech to her parents. A few illustrative examples are useful:

We can note the typical segmental realisation (localised) of the words I, blow and out, in the following request made by Paul to Margaret. Margaret has just lit a cigarette with a match. Paul turns to her, and says:

[kɪ 'a: 'blɔ: 'tʰɛʊtʰ]

(Can I blow it out)

(Interestingly, of the variant realisations of the lexical item only, in the data presented here from Paul's speech, the localised-type monophthongal realisations all occur in speech directed towards Margaret, while all but one of the diphthongal forms occur in speech directed towards his father).

The following example, with its typically localised vocalic realisations, is characteristic of Claire's usual speech to her sister. Claire and her sister, Angela, have been playing 'hospitals'. Claire has left the room and calls to Angela from halfway down the stairs:

[aɪ 'brɪŋɪŋ ə 'pɔ:zɪ 'pɜ:sn ə 'ɜm ə 'pɛ:ʃʊnt 'dɔ:ʊn]

(I'm bringing a poorly person - a patient down)

(Note the typical rounding of [ɜ] in person; the realisation of the final segment in poorly as [i], and the monophthongal realisation of NL /eɪ/ as [e] in patient).

The non-localised-type of variant is, particularly in the speech of Claire, more frequent in certain focussed speaking activities such as role play, than in other speech. For example, while engaged in creating the role of a nurse during play with her sister, Claire walks across the room carrying a doll who is a 'patient'. She comes to a box on the floor which contains toys, and in stepping over it she says, looking down at the doll she is carrying:

[aɪ 'hæv tʰə 'dɔɪlə 'stɛp kʰə'z 'jəʊ 'tʰu haɪ]

(I have to dive the step 'cos you're too high)

(It is noteworthy that not only are the segmental realisations of the vocalic nuclei here, of the non-localised type, but that the non-segmental features of this utterance are those which characterise one of Claire's range of 'dominant adult' voices which she uses in play. (Further details of such non-segmental varieties are presented in Chapter 4).

For both children, these non-localised type variants also appear to be used in utterances whose function is that of establishing superior status in interaction (by means of mockery or teasing, for instance) We can find such a case following Paul's request to Margaret, reported above, to blow out her match. Paul turns towards his sister, calls her name, sticks his tongue out at her, and accompanied by an exaggerated gesture of pointing, says:

['j_u fə'gɔ:z dɔ 'bləʊ ðə 'aʊt]

(You forgot to blow it out)

The contrast in the realisations of blow and out, when compared with those which Paul used when addressing Margaret, is particularly marked. Similarly, we find Claire sarcastically mocking her sister, Angela, who has just dropped a piece of birthday cake on the floor. Claire looks disparagingly at her, emphatically and exaggeratedly folds her arms, and says:

['zɔ 'wɔ:z ə 'ʃeɪm jʊ:v 'skwɔ:ʃt 'ɪt]

(Ah, what a shame, you've squashed it)

Again, we can note the use of non-localised-type variants in preference to localised ones (eg the use of [eɪ] rather than [e] in shame).

Apart from these few instances, however, it proves extremely difficult to find any significant co-variation between the use of particular variant forms and features of the non-linguistic context. We can perhaps reasonably argue, therefore, that these occasional and partial associations which we have been able to show between variants and non-linguistic features, are indications of the fact that the children are developing an awareness of the possibilities of sociolinguistic variation at the level of segmental phonology, but that this awareness is not yet stabilised in their speech. We could certainly derive some support for such an argument when we consider some fluctuations we find between localised types and non-localised types of variant. We find some of the non-localised-type of variant juxtaposed with localised type variants under apparently identical sociolinguistic conditions. In most cases the occurrence of these 'competing variants' is particularly

noticeable because of the frequency of repetition of the same lexical item(s) in the children's speech. We observe, for instance, such 'competing variants' or 'varietally mixed forms' as the following:

- (i) Paul is in the hall of the house as his father is preparing to go out to post a letter. Paul's sister asks her father if Margaret (a neighbour who is also there, and who also appears to be going out) is 'coming back'. Her father replies that she is, and Paul adds in explanation:

cos you're [gəwɪŋ 'ɪp] to the [p'ɔ:st] cos you're
[gəwɪn 'ɪp] the [p'ɔ:st] box aren't you dad

(The realisations of particular interest here are the forms of the NL diphthong /əʊ/ in the words going and post).

- (ii) Paul is running about the living room with a toy gun in his hands. He is shooting at imaginary individuals. (The non-segmental features of the utterances below, characterise them as being one of Paul's 'play varieties'. Further details of such varieties are given in Chapter 4). As he runs around, Paul shouts in commentary to his actions:

I'm the [lɔ:n 'we:ndzɪ] I'm the [lɔ:n we:ndzɪ]

I'm trying to catch the last little robber

(The 'competing variants' here are those in the stressed vocalic nuclei of Ranger, and in the forms of the NL diphthong /əʊ/ in the word Lone).

- (iii) Claire is here telling her mother about a birthday party from which she has just returned:

it was not just a party and ['bɜ:θ'deɪ]
it was a party and ['bɜ:θ'de]

(Both syllables of birthday receive stress. There is some difference between the two realisations of NL/ɜ/ in these words (that in the first instance is fronted and slightly rounded), but more obvious is the alternation between the realisation of the second vocalic segment of these words as [eɪ] and [e]. Both these words are followed by pause).

- (iv) Claire, in the same interaction episode as (iii) above, is relating, for the benefit of her mother, a long list of objects which she has won, or been given at the birthday party:

and I got the ['wɪsəl] I won the ['wɪsəl]

(The first realisation of whistle here, quite clearly has a vocalic end to the second syllable. The second is markedly different, with its second syllable being closed with a slightly palatalized [l̪]).

Nearly all the 'varietally mixed forms' of the type I have illustrated here occur in the children's speech in that 'style' which Labov distinguishes as the 'vernacular': '. . . the style in which the minimum attention is paid to speech' (1972:112). It is, of course, notoriously difficult to identify the locus of 'style shifts' and to differentiate analytically between 'styles' themselves in naturalistic texts.

Appeal to the usual conditioning factors of 'style switching', such as change in interlocutor, topic, or setting, to explain the variation I have illustrated, is clearly inappropriate. One possible explanation for the fluctuations of these variant forms might be that the differences in segmental realisation result from differences in interactional function. That is, in Labovian terms, some of the variants may be those which are appropriate in the children's speech for 'careful style under emphatic emphasis' (1966:71). Examples (i) and (iv) above, could be considered to be such cases, in which some kind of 'slip' has required emphatic repetition (and thus change of segmental realisations) for clarification/correction. In (i), the repetition of the phrase could be seen as being motivated by a need, on Paul's part, to correct the 'slip' at the end of the first phrase: [p^hɔːl] may be a 'slip' in attempting to say post box, or it may be an attempt to say pub, which Paul immediately realises is inappropriate, cuts short, and then tries to correct. In (iv), the differences in realisation of whistle, may derive from similar sources - that is, from a desire on Claire's part, to 'correct' the (distinctly uncharacteristic) realisation of the first version of the word. We could perhaps also consider the repetition in (iii) to be similarly 'emphatic', and account for the changes in this way. With a little imagination, we might extend this 'explanation' to account for the differences in realisation in (ii). However, we should note that if these fluctuations in segmental realisation are the result of 'careful style under emphatic emphasis', the 'direction of movement'

between the localised-type and non-localised-type variants is not always the same. We do not always find, for instance, the putative 'emphatic repetitions' being realised with non-localised-type variants.

A more interesting, and in many respects more powerful, explanation for many of these variant realisations, can be found if we consider the co-occurrent non-segmental features of the children's speech. It was shown above (p.121) that hearers made use of non-segmental features in arriving at decisions as to whether what appeared as a segmental 'mistake' was intentionally meant or not. The effect of non-segmental features in the speech of these two children is pervasive, for variation in non-segmental features appears to determine, in several important respects, many of the variant realisations presented in the data above. This 'determination' can take place in at least two ways:

- (1) determination of aspects of the phonetic form of segmental realisations.
- (2) determination of aspects of the distribution of particular variants.

(It is important to emphasise that the selection of these 'determining' prosodic and paralinguistic features is not random. They have been selected by the children for interactional purposes (see further Chapters 4 and 5), and in the case of the first kind of 'determination' indicated above, their characteristics 'spill over' onto the segmental realisations (cf Honikman, 1964; Laver, 1975). Such a relationship between segmental and non-segmental variation, gives supportive evidence to the claim I made earlier,

concerning the superordinate status of non-segmental variability in a ranking of variable systems (p.122)).

We can find examples of the first kind of 'determination' referred to above, if we examine the contrasting effects of the paralinguistic features 'lip-rounding' and 'lip-spreading' on the children's segmental realisations.^{Fn}

Fn. Although these features are not distinguished by Crystal (1969) in his final set of paralinguistic features, observations of the speech of children has indicated the necessity to include these labial settings in order to account for the range of vocal effects produced. (Some details of the distribution of these features in the speech of Paul and Claire can be found in Chapter 5). Lip-rounding (abbreviated to 'round') and lip-spreading ('spread'), cover a variety of labial settings. Most characteristically 'round' involves a setting of horizontal constriction, vertical expansion and protrusion; 'spread' typical involves a setting of horizontal expansion (cf Laver, 1975, from whence these parametric descriptions are borrowed).

Characteristically 'round' and 'spread' extend over polysyllabic stretches, and affect the phonetic details of the 'susceptible' segments involved (Laver, 1975). That is, where vowels and other segments are usually rounded, the effect of the paralinguistic feature 'spread' is to unround them (the opposite effect is produced by 'round'). Both 'round' and 'spread' (this latter often accompanied by 'laugh' or 'giggle' - also paralinguistic features in the sense of Crystal (1969)) are common 'facial sets' adopted by both children, for a range of interactive purposes. Claire, for instance, often adopts a vigorous lip-rounded set, accompanied by a scowl, in expressing anger, or, as illustrated

below, when reprimanding her sister, either seriously or in play. There is a particularly clear example of this, with consequent alterations to the overall phonetic characteristics of the utterance, in the present data. Claire discovers her sister, Angela, about to cut a page out of an exercise book.

Adopting the facial set described above, Claire shouts:

[round] [round round]
 ['dʌnt jəu 'dɛ 'kʌd tə 'pʰɛɪdʒ 'vɔɪ]

(Don't you dare cut the page off)

(In addition to the presence of 'round', the utterance is marked by 'forte' loudness throughout, with strong stress to add general emphasis to what she says, and with the paralinguistic feature 'husky' to provide local emphasis to the word dare). The effect of 'round' (the extent of which is indicated above the transcription) accounts for one of the apparently anomalous vocalic variants in Claire's speech: the realisation of cut as [kʌd] where [kʌt] might have been expected.

An example of the effect of polysyllabic lip-rounding on segmental realisation in Paul's speech can be found towards the end of the section of the tape from which the data presented above are taken. Paul is lying on the floor reading to himself from a large picture book entitled Dougal and the Blue Cat (the story involves characters from the television series The Magic Roundabout). Paul has been trying to attract his father's attention by grabbing at a guitar which his father is carrying,

and by making beckoning gestures towards him. His father begins to come towards him, but turns away having had his attention taken by something else. Paul, pointing to the pictures in the book says:

everything's blue hey dad look wh look at Buxton
the naughty cat

The underlined stretch here, is of interest. Having managed to reattract his father's attention with the words hey dad, Paul looks up at him, pouts his lips and articulates the whole of the underlined stretch with 'round' throughout. The effect of the paralinguistic feature 'round' on the individual segments is as follows:

['l_uɪ̃k 'm_uɪ̃ 'l_uɪ̃k yɪ̃t 'b_uk s d_əɪ̃n]

(Note in particular, the effect of 'round' on the realisation of Buxton, and the unstressed at, where an [ə] type vowel would have been expected). The hearer-judges to whom I played this sequence all thought that this segmental variation (eg in the realisation of Buxton) was somehow different in kind from the 'mistakes' discussed earlier: *'doing it for some sort of effect' (Lf 5), *'playing around' (Lm 3) *' making odd sounds to attract attention to himself' (Lf 4). Paul's father echoed this latter judge's opinion, and said it was one of Paul's *'childish ways of talking to get attention' (Lm 1). Paul's mother too, observed that Paul *'does it so often I ignore it', saying that he typically *' sounds like that when he's sloppy and wants forgiving, but not

so loud' (Lf 2). 'Round' is a paralinguistic effect which Paul employs for self- and other-focussing. As the comments of his mother indicate, it is one of his preferred facial sets (with very widely open eyes) when attempting to get sympathy, or be forgiven after reprimand. He also employs this set frequently when teasing his sister (sometimes accompanied or interspersed with thumb-sucking, which seems to be an attempt to tease her about the baby's dummy which she still sometimes sucks).

The effects of 'spread' in the present data, co-occurrent with (and perhaps resulting from) 'laugh' or 'giggle', can be observed in the realisation of the word just as [dʒöst] by Claire, where [dʒast], or [dʒə'st] (with a rounded centralised vowel) might have been expected (these forms occur elsewhere); and of some as [søm] by Paul. The words all occur in polysyllabic stretches marked with the feature 'spread'. The unrounding of the vowel in the anomalous realisation of shoot as [ʃət] by Paul, discussed earlier, can also plausibly be accounted for in terms of its occurrence in a stretch of utterance marked with polysyllabic lip-spreading. The use of 'spread' and 'giggle' which accompany the utterance I'm going to shoot me, are most probably an attempt on Paul's part to indicate the non-serious nature of his remark. (Paul sometimes uses 'spread' and 'giggle' when making a request which is unlikely to be granted).

A sub-set of the realisation of the diphthongs presented in the data above - those which exhibit a perceptibly changing first element- also offer evidence of the effects of non-segmental variation on segmental realisations. The prosodic features

co-occurring with these are as follows:

segmental realisations

(i) [wɑ̃ɑ̃r]

"!why //

co-occurrent polysyllabic features

'lento, tense, forte, wide'

(ii) [dɛ̃ɛ̃i]

"!day //

'tense, forte, wide'

(iii) [gɛ̃ɛ̃mz]

"!games //

'lento, tense, wide, high'

(iv) [gɛ̃ɛ̃o]

:go //

'forte, wide'

All these words occur before a tone unit boundary (symbolised //), and all carry nuclear pitch movement. The features which are of particular importance here, appear to be the tempo features 'drawl' and 'lento', and the widened tonic pitch movement occurring on all these words. All these items are also accompanied by 'step-ups' in the simple pitch range system (booster or high booster), and, with the exception of go all carry strong stress. Crystal (1969) discussing the identification of tone unit boundaries, writes:

The second criterion is the presence of junctural features at the end of every tone unit. This usually takes the form of a very slight pause, but there are accompanying segmental phonetic modifications (variations in length, aspiration etc) which reinforce this. (206)

The length and quality alterations which are exhibited by the diphthongal realisations above, are particularly marked examples of Crystal's 'second criterion', and can be attributed to the direct workings of the clusters of co-occurrent prosodic features. (I have observed such length and quality alterations frequently in children's speech which co-occurred with 'lento' tempo and widened tonic pitch movement. Such realisations frequently

are labelled by adults as 'childish whining').

These diphthongs illustrated above all occur in stretches of speech which are highly marked in prosodic and paralinguistic terms - stretches which appear to have been assigned an important interactional 'weight' by the children. Examples (iii) and (iv) (games, go), occur in stretches where Claire is, as her mother commented *'lording it over Angie', 'putting on her posh voice', after having returned from a party to which her sister, Angela had not been invited. Example (i), (why), occurs during a loud and extended recitation of a nursery rhyme by Paul (the 'forte' loudness which characterises this utterance, is probably motivated by a desire to be heard over other noise: a conversation between his father and younger sister, Catherine, who is banging a tin drum). Example (ii) (day), occurs while Paul is emphatically describing to his father some of the activities which he has engaged in during the day at school. (Compare the typical segmental alterations occurring in adult speech, where particular emphasis can be given to a word by the use of 'drawl', which overly prolongs a particular segment: eg a realisation of the word fañtastic, with 'drawl' on the segment /n/ making it markedly longer).

The prosodic system of tension, particularly the occurrence of the marked features 'tense' and 'precise' may also contribute to the determination of aspects of some of the segmental variants (not discussed in detail here). For instance, preliminary investigation suggests that voiceless stops with co-ordinate glottal articulation in word-medial and final position, are

more likely to occur in polysyllabic stretches of speech which are realised with the co-occurrent features 'tense' or 'precise', than in stretches marked by 'lax' or 'slurred' tension features.

Variation in the simple system of tempo also enters significantly into the determination of aspects of segmental variability. When we examine the distribution of diphthongs and their monophthongal variants in the children's speech, we find that the monophthongs are restricted in their occurrence with respect to tempo features. While the diphthongs occur in utterances marked with a range of tempo contrasts (allegro, norm, lento, lentissimo), monophthongs occur only in allegrissimo, allegro, or normal tempo speech, never in lento or lentissimo speech. Thus we observe, for example, the following alternations (tone unit onsets and tone unit boundaries are indicated; pause is shown by a dash; tempo contrasts, including the usually unnotated 'norm', are shown below the text):

Paul: 'cos/you're [gəwɪŋ] up to the [pɔːn] // - 'cos/you're [gɔːn] up the ' [a]
 'norm tempo' [norm] 'a'
 [p^hɔːst] box // '
 'ɛ' [ɛ]

Claire: 'well/I [dɔːnt nɔː] // - 'well/I [dɔːnt gɔː] to a party // '
 'a' [a] 'ɛ' [ɛ]

Alterations in the complex system of tempo (accelerando, rallentando) appear to affect the distribution of diphthongs and their monophthongal variants in a similar way to those illustrated for the simple system of tempo. Speeding up or slowing down (rather than sudden changes of tempo) probably account for some of the closely juxtaposed 'competing variants' discussed earlier (p.126f). For example:

Claire: ' / [dʏnt] you dare cut the [pʰɛ:ɪdʒ] off // '
 'a' [a] 'rau' [raʊ]

Paul: ' / I'm the [ɪɒn 'we:ndʒɛ] // /pʰɪ:ɹu // /pʰɪ:ɹu // '
 'norm tempo' (norm) 'accel' [accel]

' / I'm the [ɪɒn 'we:ndʒɛ] // '
 'a' [a] 'rau' [raʊ]

The restricted distribution of the monophthongal variants (which I have previously suggested are localised-type variants) may suggest that the functions of lento speech are more 'formal', and thus are accorded more 'formal' ('standard' diphthongal) realisations by the children. (Labov (1966) uses tempo changes such as these, along with other 'channel cues' (increase in breathing rate, overall alterations of pitch range, shift in mean pitch range, presence of laughter) to distinguish between 'casual' and 'formal' speech styles.) However, it is clear, even from the limited examples yielded by the present corpus, that lento speech can have a range of 'social functions' for the children not all of which can be satisfactorily labelled 'formal'. Clearly, before we can possibly hope to explicate such systematic interactions as those observed here between non-segmental and segmental variability, it is necessary to gain more detailed information about the functions of non-segmental systems in children's speech.

* * *

This chapter has presented and discussed some aspects of segmental variation in the speech of two young children. It has been shown that the occurrence of particular variant forms in the children's speech cannot adequately and systematically be

accounted for in 'sociolinguistic' terms. Although certain of the variant forms in the children's speech appeared to be related to forms in adult varieties of both localised and non-localised English, the variation observed in the children's use of these forms suggested that they had not fully acquired appropriate adult sociolinguistic norms (cf Labov, 1964).

I have indicated that a more satisfactory account of some of the variation observed in the corpus drawn from the children's speech can be achieved by a consideration of the interaction of segmental and non-segmental variation. (The importance of non-segmental phonology for an understanding of the processes operating in children's phonological development has been discussed elsewhere (Waterson, 1970, 1971), with a somewhat different emphasis to the one given it here.)

Consideration of the relationship between segmental and non-segmental variation in the data suggested that it was possible to propose a preliminary ranking of these variable systems, in which non-segmental phonology was accorded superordinate status. I have argued that non-segmental variation, employed by the children for a range of interactive purposes, enters significantly into the determination of the phonetic characteristics and distribution of some of the segmental variation presented. In addition, the responses of adult judges have further emphasised the importance of non-segmental variation in providing a primary source of information for the adequate functional interpretation of segmental variation (eg in the recognition of intentional/unintentional

'mistakes') in the children's speech.

The issues raised in this chapter (and those raised in Chapter 2) make it increasingly clear that non-segmental variability plays an important part in children's development of sociolinguistic competence. There is an obvious need to investigate in detail non-segmental variability in the language of children. There are two aspects to such an investigation (i) the examination of the range of functions expounded by non-segmental variability in children's speech, and (ii) the examination of the characteristics of the non-segmental systems themselves (eg their relative distributions and co-occurrence restrictions). The second of these aspects is treated in Chapter 5. Chapter 4 focusses on the social functioning of non-segmental variability in the speech of children.

**Chapter 4: SOCIAL FUNCTIONING OF NON-SEGMENTAL VARIABILITY
IN CHILDREN'S SPEECH**

Scattered throughout the literature on language acquisition we find references to aspects of non-segmental phonology. Researchers have noted, for instance, the capacity of young children to produce and discriminate between different types of pitch movement (Kaplan, 1969). Thus Raffler-Engel (1973) reports on the existence of two functional 'intonemes' at about the age of four months, before the onset of stable segmental vocalisations, one used for 'desiderative' purposes, the other for 'deictic' purposes. Tonkova-Yampol'skaya (1969), too, claims to have identified early functional uses of intonational contrast by children to differentiate between requests and questions. The functional importance of non-segmental contrasts has recently been discussed by Dore (1975) and Halliday (1975). Halliday, in his discussion of one child's development of the 'functions' of language draws attention to a systematic distinction which the child made at about the age of 19 months: 'Nigel used the rising tones for utterances demanding a response, and falling tones for the others' (53). Halliday comments on the importance of this distinction:

This distinction between two broad generalized types of language use, the mathetic and the pragmatic, that Nigel expresses by means of the contrast between falling and rising tone, turns out to be the one that leads directly in to the abstract functional distinction of ideational and interpersonal that lies at the heart of the adult linguistic system. (53)

Dore (1975) identifies the functional importance of intonation contours, in the holophrastic stage of development, as being that of distinguishing between the 'primitive' illocutionary force

of otherwise similar utterances:

. . . prosodic patterns accompanying the production of single words indicate that the child is able to communicate the primitive force of his utterance. (32)

That is, whereas the child's single word communicates the 'notion' he has in mind, his prosodic pattern indicates 'his intention with regard to that notion' (32). He gives examples of the word mama used with 'three different intonations':

. . . mama with a falling terminal intonation contour was used in circumstances where the child merely labelled his mother or some doll as the mother; mama with a rising terminal contour was used to ask if an object belonged to his mother or if a doll was the 'mama'; and it was used with an abrupt rising-falling contour to call his mother to him when she was some distance away but still visible to him. (31)

In general, however, as Crystal (1973) in an extended survey of the literature has indicated, treatment of non-segmental features in language acquisition research has been patchy and not always well informed. There has been a tendency, for instance, to consider non-segmental phonology (particularly in studies of English speaking children) solely in terms of a unitary system of pitch contours, where pitch direction and pitch location are the only features worthy of consideration. However, as demonstrated in Chapters 2 and 3 of this thesis (and as the work of Crystal (1969) and Laver (1975) has shown) a considerable amount of important (socio) linguistic information is carried by non-segmental systems other than tone-type and tone-placement. If we are to understand the (social) functioning of non-segmental variability in children's language, then we cannot afford to ignore these other features (cf Carlson and Anisfeld, 1969; Weeks, 1971). Gumperz and Herasimchuk (1975) in a discussion

of children's classroom interaction, emphasise the importance of the full range of non-segmental contrasts for an understanding of the 'social meaning' of the children's speech:

We would like to suggest that the prosodic component encompassing stress, pitch, and timing along with speech features usually termed paralinguistic is as important in interpreting the meaning of interactional exchanges as referential meaning or propositional content, and that it functions to maintain and control interactions in somewhat the same way as the coordination of gestures, facial movements, eye blinks, etc., . . . (94)

The importance of non-segmental variability to speakers and hearers in interaction, has been well documented. A speaker can use non-segmental variability to signal to a hearer his attitudes (Pike, 1945; Uldall, 1964), to draw the hearer's attention to those stretches of an utterance to which the speaker attaches particular informational importance (Halliday, 1967; Hultzen, 1959), and to delimit the syntactic interpretation of an utterance (Crystal, 1969; Halliday, 1967; Stockwell, 1960). Perhaps the most important aspect of non-segmental phonology, in the context of this chapter, is the way in which a speaker can marshall its variable resources, outlined above, to 'frame' his utterances (cf Goffman, 1975). That is, prosodic and paralinguistic features can be used to indicate which of a range of speech acts is intended by a speaker at any given point in an interaction: they encode much of the illocutionary force of utterances (Searle, 1969). Non-segmental features thus assist the hearer to recover in part, speaker-intent. If children are to become 'sociolinguistically competent' it is important that they learn this 'framing' function of non-segmental systems - in order that they may appropriately project their intentions

and adequately interpret the intentions of others. The ability to use non-segmental features in this way requires, however, that the speaker 'knows' that both he and his hearer can share the same set of 'framing cues', and can manipulate this shared knowledge to structure and control the course and outcome of interaction. In order to be able to manipulate this 'shared' knowledge effectively, the child must be able to adopt the perspective of the hearer. This is necessary, for he needs to 'know' which is the appropriate sub-set of non-segmental framing cues to use, so that particular hearers can recover the 'intention', 'meaning' of what he has said.

It is well-known that adults are capable of adapting their speech in various ways to suit the needs (or what they think are the needs) and expectations of their interlocutor-hearers - they can take into account the perspective of the hearer in interaction. However, it has often been claimed that the young child is unable to adapt his speech in this way, and engage in and sustain interaction satisfactorily, because he is unable to reverse the individual's perspective and adopt the perspective of the other person - of the hearer. Piaget (1959), for example, discusses this matter, and accounts for the young child's supposed inability to enter into dialogue effectively by positing 'egocentricity' on the child's part. He claims that this egocentricity exhibits itself in the child's speech in three major ways: (1) talk which is addressed to 'self' (eg commentary by the child on his own actions):

He talks either for himself or for the pleasure of associating anyone who happens to be there with the activity of the moment. (9)

(2) talk which takes no account of the perspective of the other,

and simply uses anyone present as an audience:

Anyone who happens to be there will serve as an audience.
The child asks for no more than an apparent interest
. . . He feels no desire to influence his hearer nor
tell him anything. (9)

(3) 'collective monologue' (which might appear at first sight to be 'dialogue' but on closer inspection reveals that each child is simply talking about himself, without listening to the others). In such talk there is a lack of reciprocity between participants:

The point of view of the other person is never taken into account; his presence serves only as stimulus. (9)

Although Piaget's account of the child's egocentricity and the development of socialisation and socialised speech has received some support from various studies (Flavell et al, 1968; Glucksberg, Krauss and Weisberg, 1966; Krauss and Glucksberg, 1969), more recent work suggests that this emphasis may be misplaced, and that such 'egocentricity' may well have been a product of the experimental tasks which these studies involved (cf Donaldson, 1978). Studies by Anderson and Johnson (1973), Sachs and Devin (1976) and Shatz and Gelman (1973) offer evidence that even very young children are able to adapt their speech in various ways to fit the requirements of their listeners. An examination of the 'social functioning' of non-segmental variability in young children's speech adds support to these latter arguments, and reveals some of the ways in which children do adapt their speech for their hearers. Through such an examination we can demonstrate that children make use of prosodic and paralinguistic variability both interpretatively and productively for the 'framing'

and communication of social meaning, and the negotiation of 'role'. Chafe (1976) provides an apt metaphor for such sociolinguistic uses of non-segmental variability by children. In the course of a discussion concerning some aspects of topicalisation, he remarks:

I have been using the term packaging to refer to the kind of phenomena at issue here, with the idea that they have primarily to do with how the message is sent, and only secondarily with the message itself, just as the packaging of toothpaste can affect sales in partial independence of the quality of the toothpaste inside. (28)

I turn now to a consideration of some of these 'packaging' aspects of children's use of prosodic and paralinguistic variability. My primary aim is to explore some of the social functioning of non-segmental variability in children's language, and to demonstrate some of the 'work' (Garfinkel and Sacks, 1970) which children accomplish in interaction by manipulation of this level of linguistic structure. I will focus on the ways in which children employ this sociolinguistic variability to handle particular kinds of situations and contexts, and to establish and develop particular roles and relationships within interaction.

The episodes of interaction which I will use to exemplify some of the range of social functions of non-segmental variability in children's speech are taken from tape recordings made over a period of 8 weeks in the homes of two families.

The difficulties of obtaining natural speech/conversation for linguistic analysis has been discussed frequently in the literature (eg Labov, 1970, 1972). The procedure adopted in the

present case was to approach two families, known to me through friends, and ask if they would be willing to participate in an investigation of children's language development. Both families readily agreed. The two families were constituted as follows:

Family 1. Both parents were in their mid thirties. The father was a music teacher at a local Tyneside comprehensive school. The mother gave her status as 'housewife', although she occasionally assisted with the playgroup which her youngest child attended at the local primary school. There were two children: Paul aged 5 years 2 months (some aspects of whose speech were discussed in the previous chapter), and Catherine, who was a year younger.

Family 2. Both parents were in their mid thirties. The father was a local government housing officer. The mother gave her status as 'housewife'. There were four children: Claire, the eldest, aged 5 years 6 months (whose speech was discussed, in terms of some segmental variability in the preceding chapter), Angela, who was 11 months younger, and Jane and Peter, twins aged 15 months.

Both pairs of parents had been born, and been continuously resident on Tyneside. Paul, Claire, Catherine and Angela were all attending the same local primary school; (Catherine spent three half days a week at the playgroup at this school).

In an attempt to collect naturalistic speech data, I made regular visits to both families, in order that the children should not find my presence there exceptional (these visits were spread over some 3 months). During these visits I attempted

to gain a general picture of the children's social and linguistic behaviour. It became apparent that both Paul and Claire talked far more volubly than either Catherine or Angela, and therefore a greater amount of data for study could be collected from their speech.

I attempted to ensure the naturalness of the data collected by adopting a technique of surreptitious recording. Towards the end of the 3 month period of my visits to the children's homes, I left a tape recorder (Uher 4000 Report) with the parents of Paul and those of Claire. I requested that they attempt to locate the machine as discretely as possible in any room where the children were, and to record a range of the children's normal daily interaction. I suggested mealtimes, bathtimes, pre-sleep conversations, and play activities as being potentially useful contexts for such recordings. The tape recorders were each fitted with an acoustic switch, which (by experimentation in each of the homes) was set to begin recording automatically when the ambient noise rose above a particular level. The tapes were recorded at a speed of 3½ inches per second; this was found to produce recordings of suitable quality for transcription, as well as allowing for adequate periods of speech to be recorded on the individual tapes. I collected the tapes each day on which recordings had been made - whether or not the whole of the tape had been used. These were transcribed as soon as possible after the day of the recording and any parts which were obscure were played to the parents to see if clarification was possible. Originally, I had intended to transcribe all the tapes so recorded (1) in conventional orthography and (2) to select extracts for segmental and non-segmental transcription.

However, the man-hours involved made this prohibitive. I eventually decided that while I would listen to all the tapes which were recorded, only the second of these transcription procedures would be followed. The episodes and shorter passages of the speech of Paul and Claire reported in this chapter are the result of this procedure. (Longer continuous transcriptions of the speech of these two children were made, and these are reported in Chapter 5).

The technique of surreptitious recording worked reasonably well and yielded some 10 hours of (variably) connected speech from each of the children. The quality of some of this material, however, suffers from being embedded in the usual assortment of background noise in the homes (particularly television and radio noise).

During the period of recording (8 weeks), I made regular visits to the homes of the children, and, where possible, made contextual notes and a commentary on any episodes of interaction which I could observe without participating.

The episodes of interaction which I will discuss in this chapter, then, represent naturalistic interaction, and situations and interchanges which arose in the normal daily activity of the two families. (Recordings of these episodes are presented on Tape 1 which accompanies this thesis, in the order in which they are discussed in the present chapter).

I begin with an examination of some of the uses of non-segmental variability made by Paul. The first two episodes have been chosen because I was able to observe their salient ends independently,

without apparently affecting the nature or course of the interaction. The rapid contextual and interpretative glosses which I made while the interactions were taking place, were supplemented by eliciting comments and 'interpretations' from different groups of 'hearer-analysts'. The recordings of the interaction episodes were played to:

- (1) the parents of the children, whether or not they themselves had participated in particular interactions.
- (2) hearers who knew at least one of the participants in the interaction.
- (3) hearers who did not know the participants in the interaction.

All the hearer-analysts were given the same instructions with respect to the tape recorded episodes. They were asked to 'listen to some extracts of children's talk' and 'comment' on them. The deliberately vague instruction to the hearers appeared to be successful and most proceeded quite happily with the task of providing an account of the interaction they were listening to. All the hearer-analysts were told that they could make notes if they wished, while listening to the tape recordings - all but two of the 18 hearer-analysts made notes of some kind. These notes were retained by me in order that the 'interpretations' of different hearers could be compared. In addition, when the individual interaction episodes on the tape had finished, I invited the hearers to make any further comments, and made detailed notes of any comments which they made. The comments elicited from these hearer-analysts were used partly as a 'check' against my own interpretations which I had made during the course of the interactions. Reassuringly, there were, in fact, only trivial

differences of 'interpretation' concerning the nature and course of the interactions, and the probable intentions of the speakers, between the various comments of different groups of hearers. Significantly the remarks of these hearer-analysts emphasise the functional importance of non-segmental variability for an adequate understanding of what was happening in the various interaction episodes. Where the comments of hearer-analysts are referred to in the text, the convention established in chapter 3 is followed: comments are prefixed by asterisks and enclosed in single quotation marks. For clarity of presentation, however, only the comments made by the parents of the children are specifically identified; thus (M) indicates mother, (F) indicates father. (Fuller examples of the comments of different hearer-analysts, both written and verbal, are given in the Appendix at the end of this chapter).

The first episode I will discuss is taken from a pre-sleep interaction between Paul and his mother. In terms of revealing some of the 'social functions' for which children employ non-segmental variability, this episode constitutes a particularly clear example. We can observe here Paul's attempts to 'regulate' the behaviour of his mother - to get her to pay attention to him - being achieved not primarily through lexical or syntactic means, but through a complex combination of non-segmental features.

Paul and his younger sister sleep in the same bedroom. Paul regularly talks to his mother just before going to sleep. His mother regards this as a means of *'quietening him down' (M) so that he does not disturb Catherine. Frequently this kind of interaction begins with Paul telling his mother what he has

been doing at school during the day. On this occasion, however, Paul's mother was attempting to pacify Catherine, who had not been well during the day, and to get her to sleep. She had just got Paul into bed, and was busy straightening out the sheets on Catherine's bed, and generally trying to comfort her. Paul had been receiving less attention than usual from her. He had been talking to his mother during this period, but receiving little more than minimal responses. Just prior to the beginning of this episode, his mother had told him emphatically that she was too busy to talk to him any more. When this episode begins, Paul is half sitting up in bed, while his mother is finishing off tidying Catherine's bed. When she has done this she begins to move towards the door, and makes to switch off the light.

Paul begins to speak, in an attempt to attract his mother's attention. He says:

do you / know what I was : doing at "school // - - to / day //
[res]
'a' 'gls' [gis]' 'tne' [a] [tne]

This is articulated at something slightly above his normal loudness, but certainly not as loudly as he can produce speech - as is evidenced from the rest of this interaction. Additional informational weight is given to the word school, which carries the tonic pitch of the first tone unit, by the use of strong stress, a high booster and 'tense' articulation. The double pause which follows school, and the wide fall on today accompanied by the paralinguistic feature 'resonant', seem to be a consequence of his mother not responding

at all to the tonic fall on school, and is a means of adding emphasis by giving tonic focus to the adverb, in an attempt to secure some kind of response. When his mother does not answer (I did not even record a kinesic response in my on-the-spot notes), Paul repeats what he has just said, word for word, but makes some obvious changes in the non-segmental characteristics of his utterance. He redistributes the placement of tonic syllables, locating nuclear pitch movement on know, doing, and school. There is also a step-up in the overall relative pitch height of the tone units, and a marked use of 'tense' throughout accompanied by 'forte' loudness:

'do you / know what I was // / doing at // / school to, day //'
 [aa] 'a' [tue] 'pree' [high a pree f]
 'aa' 'high' 'stac' 'stac' 'high a pree f'

He also introduces a rhythmicality change with the words doing at, realising them as 'staccato' in contrast to the 'glissando down' rhythmicality used previously. Paul's mother when listening to the tape said: *'he often does that when he doesn't get an answer or really wants something - says the same thing louder and louder' (M).

Other hearer-analysts also drew attention to this increase in loudness, and some suggested importance for other non-segmental features for an understanding of the interactional import of this stretch: *'jerky and louder when no attention gained; more urgent tone this time; quicker, demanding a reply'. (It is clear that the responses of the hearer-analysts cannot, by definition, indicate the actually signifying element of variation. Nonetheless, their

references to these features in explaining their glosses, adds supportive evidence to my claims concerning the functional importance of non-segmental variability).

After this repetition of the first utterance, Paul's mother does make a barely audible response ('low, piano' /m:/ with level tone), but from Paul's following utterance it is clear that he either has not heard what she has said, or has chosen to ignore it. He repeats his initial question again: do you know what I was doing at school today, adding at the beginning mam, apparently as an additional attempt to secure her attention and engage her in interaction (cf Atkinson, 1974; Keenan and Schieffelin, 1976). The most obvious interpretation of this stretch is that of an intensified demand for attention. Paul maintains the overall loudness, speed and tension characteristics of the previous stretch, but realises today with level tone and a typically localised Tyneside vowel:

' /mām// do you /know what I was// /dɔɪŋ at // ' /: skul to ,daɪ//
 'nar [m] 'desc [tɪs] [dɪs] [aa]
 aa [f]
 tɪs
 f

The level tone and the realisation of NL /eɪ/ as [i̇] received comment from most of the hearer-analysts, who took this to be a 'marked' realisation (Chapter 5 discusses the place of this tone-type in Paul's intonational system). Paul's mother, too, identified this as a marked use *'probably to annoy me', 'sounds just like the boy next door, horribly whiney . . . he knows he's not supposed to talk like that'.(M).

Paul's mother's response to these utterances is one of her typical forms of reproof. Indeed it can be seen as her interpretation of the non-segmental variability which Paul has just been exhibiting. She interrupts him as he is saying doing at, and says: stop shouting. These words are given particular emphasis by the use of a high onset to the tone unit, and the co-occurrence of a pitch range drop, forte loudness and strong stress on the word shouting. This word is additionally marked by the use of drawl coincident with the first segment [̄] . Paul's mother commented of this utterance: *' he's done enough, I'm properly irritated, I can hear myself saying that, it's a warning' (M). The interruption of what Paul was saying by his mother was picked up by two of the hearer-analysts as being relevant to the 'warning/annoyance' characteristics of the utterance: *' she's really irritated; you can tell by the way she interrupts him; that's a sure way of warning she'll do something if he doesn't behave and do as she tells him'.

Paul's response to this 'warning' is characteristic of his behaviour in such circumstances - he ignores it, and continues to repeat his previous utterance, almost as if his mother had failed to make any response at all and he were still trying simply to attract her attention.

'mam do you^[fals] know^[fals] !! what I was^[fals], doing at // - [trem] /ū //
 'high [high] 'high
 aa [aa] tns
 f' '<ff>' [f] [tns] tns'

This stretch of speech from Paul is very 'dense' in terms of marked prosodic and paralinguistic features, and constitutes a crescendo of Paul's insistent demands for attention.

As with Paul's previous utterance, his mother again interrupts him: what were you doing at school today. The placement of a falling tone on what, accompanied by a high, strongly stressed onset to the tone unit, indicates that although this utterance has the surface form of a question, its interactional function is obviously more than that of a simple request for information. The hearer-analysts showed considerable agreement concerning the interpretation of this utterance. For example: *'hidden warning; curt tone of voice, the emphasis on what means "alright I'll listen but be quick"', *'running out of patience fast . . . cuts him short angrily; irritated at him not stopping shouting; she's demanding an answer now, but she doesn't want to hear it, she wants to get it over quickly'. Paul's mother glossed her utterance similarly: *'I'm firm there, he's got my goat; I'm putting him in his place . . . I'm infuriated with being pestered' (M).

We can infer from Paul's next utterance that he, too, takes the non-segmental characteristics of his mother's utterance to 'frame' not so much an offer to take up his opening gambit, and enter into conversation, but as a reprimand. There is a very marked change in the segmental and non-segmental features of what Paul says next. He produces a stereotyped 'babyish crying', which is in marked contrast with the kind of variability evidenced earlier in this episode. Segmentally, this stretch consists of

four groups of reduplicated consonant-plus-vowel syllables, separated by 'unit pauses' ('the interval of an individual's rhythm cycle from one prominent syllable (arsis) to the next, within stable tempo' (Crystal, 1969:171)). A double pause intervenes between the third and fourth of the groups. The first pair of syllables are realised 'allegro, tense' with the tonic rising pitch movement beginning on the first syllable. This is accompanied by 'creak', which can perhaps be seen as an attempt on Paul's part to highlight the 'crying' effect. Both syllables are clipped. The occurrence of creak is picked up on the first syllable of the second couplet, and 'round' is coincident with both these syllables which are said much more slowly than the first pair. This lento tempo effect continues through to the end of the reduplicated syllables. The third pair of syllables [ma'ma], is marked by the occurrence of forte loudness, with the tonic fall located on the first syllable of the pair. The articulation of this pair of syllables is markedly tense. The co-occurrence of forte and tense contributes to the general impression of all the hearer-analysts, that this sequence of 'crying' was 'faked': *'. . . turns on crocodile tears - it's too loud and regular to be real crying', *'playing at babies just for the effect; the words are too clear and loud; not enough genuine sobbing'. The final pair of syllables is different again beginning with a marked high onset, with a wide falling tone occurring with the drawled final syllable:

^c / 2ə hɔ̃ // - ^r [creak] [round] / bæ : bæ // - ^c / ma ma // - - / :ku kɔ̃ // ^w [round] ^f [f] [ɛ]

(For clarity, the segmental transcription is only approximate)

The interactional function of this 'baby variety' appears to be an attempt by Paul to allay his mother's increasing irritation with him. In addition to the hearer-analysts' general agreement about the artificiality of Paul's crying, there was also considerable agreement among them that the alterations in segmental characteristics were a conscious and deliberate move on his part to cajole his mother into being *'nice' to him: *'he knows he's been told off, and is probably trying to save himself from a physical reprimand'; *'it equals "you've told me off, but I'm just a little baby, forgive me"'; *'subtle knowledge of what can be done with language . . . a conscious tactic for sympathy'.Fn

Fn. Paul often uses such 'baby varieties', characterised typically by reduplicated consonant-plus-vowel syllables, with wide falling tones accompanied by drawl. These varieties are employed for a range of different purposes - the most frequent being simply to play the role of a 'baby' with no interactional overtones of the kind involved in the extract under discussion. For example, one evening after bathing Paul, his mother offered to carry him down stairs. She picked him up, and Paul responded: no, I want to be carried down like a baby, flat, flat down. His mother obliged, and said:

$$\begin{array}{c} [br] \quad [br] \\ \text{'like that//} - \text{'little "baby//} \\ \text{'a} \quad [a] \quad \text{'tns} \quad [tns] \\ \text{tns} \end{array}$$

and Paul replied:

$$\begin{array}{c} [hsk] \\ \text{'/:da "dā//} - \text{/da "dā//} \\ \text{'e} \quad \text{'e} \\ \text{tns} \quad \text{tns} \end{array}$$

However, as his mother carried him downstairs, Paul saw his father coming up, and said:

$$\begin{array}{c} \text{'/dōn't//} - \text{'I/dōnt :wānt//} - \text{'anybody// to "see, me//} \\ \text{'tns} \quad [tns] \quad \text{'aa} \quad \text{'a} \quad \text{[a]} \\ \text{f} \quad \text{f} \quad \text{tns} \quad \text{[tns]} \end{array}$$

In spite of the hearer-analysts' agreement, in glossing Paul's 'baby-variety' as being intentionally managed within the interaction - 'faked' - so that he would not be reprimanded again, it is clear from his mother's response that functionally his strategy has succeeded. There is a marked change in the non-segmental characteristics of her speech. In contrast to her previous utterance, what were you doing at school, Paul's mother says: tell me pet, I'm here pet, tell me marked by the features low overall pitch range, lax articulation throughout, accompanied by 'breathy' and piano loudness. Interactionally, this shift in non-segmental features to 'frame' her utterance, seems to be an attempt to repair the direction which the interaction has taken: *'I sound cowed and sorry; I'm trying to comfort him' (M); *'she feels she's upset him and tries to make it up; drops the tone of voice very quietly to calm him down'; *'mother softens her tone, she sounds forgiving and affectionate . . . a way of saying "sorry I was angry"'. It is clear that the hearer-analysts place great emphasis on the change in Paul's mother's prosodic and paralinguistic features for an adequate interpretation of the interactional function of her speech. The placement of a tonic pitch movement on the two occurrences of tell also received comment from the hearer-analysts: *'the emphasis on tell is to let him know that he can speak and that she wants to listen'; *'gives him a chance to start again, to go back to the way things were, by emphasising tell me twice'.

His mother's utterance overlaps part of Paul's baby-variety, but he obviously interprets the 'framing' cues of the shift in her

non-segmental features as an indication of a change of attitude towards him, and the disappearance of her annoyance with him. The last part of his 'baby variety' - a high back vowel, with a widened rise-fall tone accompanied by drawl with tense and forte articulation - marks a change in his non-segmental realisations.

His next utterance, give me a kiss, is a kind of reciprocal attempt by him to acknowledge the restoration of an amicable mother-child relationship. It is articulated with high overall pitch range throughout, and exhibits very obviously the paralinguistic feature 'round' co-occurrent with 'tremulousness' which gives way to 'breathy' articulation of the last word, kiss:

$$\begin{array}{c}
 \text{e} \text{ " } \Lambda \text{w } \text{,} \\
 \text{ / } \bar{u} \text{ // } - - \\
 \text{ 'high} \\
 \text{ bus} \\
 \text{ f' }
 \end{array}
 \quad
 \begin{array}{c}
 \text{e} \left[\begin{array}{l} \text{round} \\ \text{trm} \end{array} \right. \\
 \text{ / give me a , kiss // } \\
 \text{ 'high' }
 \end{array}
 \quad
 \begin{array}{c}
 \text{trm} \left[\begin{array}{l} \text{round} \\ \text{br} \quad \text{br} \end{array} \right] \\
 \text{ [high] }
 \end{array}$$

(The lip rounding with protrusion was very noticeable at the time this interaction took place. Paul reached up with his arms, stretching up towards his mother's face, with lips pursed for a kiss.)

His mother appears to interpret the exaggerated facial set which produced the polysyllabic 'rounding', and its concomitant effect on the segmental phonology, as being 'overly marked' in some way. She later glossed this piece of Paul's speech thus: *'he's just fooling around . . . he knows I've given in; kisses are for making things better; he often pulls that kind of pursed face when he want sympathy or says "sorry"' (M). His mother's response is a mild reprimand: don't be silly. The first two words are

articulated lax and piano, with a tonic fall on don't, but a new tone unit for the word silly, with strong stress, a move towards tense articulation, and a 'held' initial segment [s̄], adds emphasis to her point that she does not want a repetition of what has gone before: *'mother reacts to the child's previous sentence; she knows she's been conned, but doesn't really want to tell him off again'; *'nearly reprimands him, but softens it'; *'a mild telling off, but there's no warning of any consequences to follow; compare it with the way she said stop shouting'.

Paul seems to take note that while his mother is wanting to repair the breakdown in relationship, there are limits to her tolerance of his behaviour, for his final utterance in this episode sees him altering yet again the non-segmental characteristics of his speech. Paul makes another request for physical reassurance that the normal mother-child relationship has been restored: give me a hug, right round. The utterance is 'piano' throughout, and marked by the occurrence of 'breathy' and a reinforcing 'husky' effect on the last lexical item, round. The adverbial phrase right round is given special focus by being accorded the status of a separate tone unit, and by the overall marked low pitch and wide rise-fall tone movement:

[br
 ' /give me a :hug // - [br [husk hsk
 ' /, right :round // br]
 ' low [glis'] [a] ' l [low]
 glis' [x] p]
 piano'

His mother commented on these prosodic and paralinguistic effects: *'I can't resist him when he talks like that - kind of quiet and

out of breath, all childish and cuddly; you've got to love them' (M).

This short piece of interaction which I have examined in some detail gives some indication of the systematic use of non-segmental variability in interactions by Paul. Schaffer (1977) has drawn attention to the difficulties inherent in any attempt to define 'intentional behaviour' in young children. However, it is interesting to note the comments generally expressed by hearer-analysts in respect to this episode, that Paul was 'intentionally' managing the non-segmental variation apparent in his speech, for a range of discourse functions: *'consciously manipulates his voice to get attention and to do what he wants; he dominates what his mother does, not really by words, but with the sound of his voice and tunes'. Paul employs a variety of non-segmental features to 'frame' his utterances, to effect strategies for control and self-focussing, for instance. We can examine further the use of non-segmental variability in such ways, by a consideration of another short episode of interaction involving Paul and his mother.

This second short piece of interchange is taken from Paul's pre-sleep talk with his mother on another occasion. Paul's parents have been attempting to get Paul and his sister into bed, and to sleep. Paul and Catherine, however, have been trying to avoid going to bed for some time. When they have eventually been directed into the bedroom, they have continued playing (singing) games, and have given few indications of wanting to get into bed and go to sleep. Paul's father, having brought both the children into the bedroom, has gone downstairs, and Paul's mother is about to go down to join him, once the children are in bed. When this extract begins, Paul has been intent on delaying his mother's

departure by taking an overly long time to put his pyjamas on, and by continuing to play the verbal part of the game he and Catherine had been playing earlier; (the singing part of this game involved intoning the words tingle tingle to the tune of Jingle Bells). Paul's mother has been trying to ignore Paul's reluctance to get into bed and moves towards the bedroom door and stands with her hand on the light switch. She indicates verbally that the time for play is over, and that she is about to put the light off. She says alright, light off. Paul either does not hear, or chooses to ignore this preliminary move (a frequent tactic he uses when something is about to happen which displeases him), for he continues to play the verbal-chanting game. His mother makes a second, firmer attempt to close the proceedings: light off, but Paul keeps on playing. His mother then switches the light off, and Paul's response is to begin to 'cry'. We observe the appearance of the paralinguistic effect 'tremulousness' co-occurrent with the words ting and mam, and then with an alteration in segmental phonology three syllables marked with precise forte articulation, with creak on the first syllable. This is then followed by an obscure two syllable item which is produced with high overall pitch and a rise-fall tone which moves at its point of change of direction into 'falsetto':

'l' /tingle // - 'high moude' /tingle // [tm tɪŋ] /tɪŋ // - [m m] /mam // - [ɛk] /ə : hə /hə //
 'aa pree f' [aa pree f]

[fals] /: x x // 'aa high' [aa high]

The use of these non-segmental effects prompts his mother to put on the light, and move across to Paul to see what he is doing. She begins to forcibly assist him to put the bottom half of his pyjamas on, giving him a clear directive: I have told you to get into bed. This utterance is marked by the prosodic features of low overall pitch range, tense articulation, and slow (lento) tempo. It is additionally marked by the occurrence of 'glissando down' rhythmicity. This non-segmental 'frame' is one which Paul's mother frequently uses, and which seems to function as a 'veiled warning': Paul's mother herself, glossed the way she said this as: *'that's my "do as you're told voice, or else"' (M).

Paul's response is to ignore the warning, and to scream at his mother get off, get off;

'mám // - /əhə // - [hsk] [fɪs] [hsk] [fɪs]
 'a' [a] 'high prec f wide' off // - /[gét] " off // - /[gét] " off // 'high prec f wide'

Paul occasionally uses this cluster of features, particularly the wide rising tone into falsetto register, when interacting with his sister or his peers, to indicate intense displeasure. Use of these features when interacting with adults is extremely rare.

(We can note, however, that in terms of the use of non-segmental variability, Paul has a tendency to employ highly marked features across a wide range of interactive situations (cf Chapter 5)).

Perhaps in recognition that this use of such highly marked features, when interacting with his mother, might constitute an interactional 'faux pas', Paul alters the non-segmental characteristics

of his speech, and returns to a 'crying' variety which is framed by the occurrence of creak, tremulousness, and complex rise-fall and fall-rise-fall tones:

^c[crk][trm] [trm] [br wh] [br br] [crk]
 /mámmy// /off// --- /tíng// - /:mám// - - /ám//
 ('high f) ('high f) ('bus) ('bus) ('low p)

Paul emphasises his unhappiness with the state of affairs in the proceedings by producing sob-like audible inspiration throughout the latter part of this stretch. On listening to the tape recording later, Paul's mother was in no doubt that, as in the first episode discussed, this crying was *'deliberate . . . he can turn the tears on and off at will'(M); she did, however, comment that in this case the effect was *'quite convincing'(M).

However, in the actual interaction, Paul's mother pays no attention to any projected intent embedded in the 'crying', for she negates it lexically, reiterating her earlier imperative: no, come on. Paul's response in this case, in his efforts to delay his mother's departure for as long as possible, is an attempt at bribery. The manipulation of non-segmental variability to achieve specific goals within interaction is again revealed here. The prosodic and paralinguistic features which are co-occurrent with Paul's attempted bribery, are considerably different from those he had employed previously in this episode. There is a narrowing of polysyllabic pitch range, and a decrease in overall loudness:

^c/I'll !be 'your 'friend if 'you reád// -
 ('a p) ('nar) ('rau) [nar rau p]

[crk]
 /:júst a ,shórt 'stóry//
 ('>p)

The second tone unit in this stretch, just a short story, gives the conditions of the 'bribe'. The tonic focus given to short, here, appears to be an attempt to indicate the reasonableness of his request. We can compare the remarks of some of the hearer-analysts: *'quieter than before, a more subtle approach . . . a modified demand'; *'negotiating trick; he goes quiet and seems to emphasise your and friend . . . emphasises short, as well, to show he doesn't want much; a nice conversational trick; he shows consideration for his mother - or is attempting to convince her he does'.

His mother refuses to be taken in by this ploy, and turns down his request; she says: no, no, I've left them downstairs. The negative forms are given emphatic emphasis, and realised as two separate tone units with level tone, the first has a markedly high onset. These negatives interrupt Paul, and he begins to 'cry' again producing the word, mam with forte loudness accompanied by tremulousness and husky effects. By this time, his mother has completed her justification of why she cannot read any stories, having left the books downstairs, but Paul is still not satisfied. Once again he changes the non-segmental characteristics of his speech, and effects a different interactional strategy - he makes a direct and unambiguous demand for a story to be read:

'a / short · story //'
 'high
 e
 pree
 ff'
 [high
 e
 pree
 ff]

The tonic focus is not located on short, as it was before, but on

story, any pretence at duplicity is gone. The accompanying prosodic features, particularly 'precise' and 'fortissimo', appear to contribute significantly to the unanimous gloss provided by the hearer-analysts of a *'shout': for example, *'a very loud aggressive shout . . . it shows he's not getting his own way'; *'he sounds very tense, very pent up; shouting must be a last resort when his other ploys have failed'; *'a deliberate shout in desperation, his tricks aren't working'. (From what follows in the interaction, it would appear that the increase in volume to fortissimo, and the slow tempo, represent an extreme beyond which he cannot go (cf the 'crescendo' reached during the first episode discussed), and hence must adopt a different interactive strategy).

Again, however, his mother refuses to accede to his demand, and directs him to get into bed, realised with the prosodic features low, allegrissimo, precise. She then puts the light out. The non-segmental features of this utterance indicate a meaning of *'growing annoyance', 'reprimand': *'low but controlled threat'; *'strict tone, full of hidden meaning, a proper warning to the child that if he disobeys, the consequences will be unpleasant' *'I'm really annoyed; I lost my temper there, and snapped that out very sharp' (M). Certainly the 'reprimand' interpretation, at least, seems to be made by Paul, for he begins to 'cry' yet again. Lexically, he glosses his mother's action of putting the light off, while the non-segmental 'frame' indicates his attitude towards that act, presumably with the intention of getting her to change her mind:

$\left[\begin{array}{l} \text{sob} \\ \text{hsk} \end{array} \right]$ $\left[\begin{array}{l} \text{sob} \\ \text{hsk} \end{array} \right]$ $\left[\text{hsk} \right]$ $\left[\begin{array}{l} \text{sob} \\ \text{hsk} \end{array} \right]$ $\left[\begin{array}{l} \text{sob} \\ \text{hsk} \end{array} \right]$
 $\left[\begin{array}{l} \text{cns} \\ \text{f} \end{array} \right]$ $\left[\begin{array}{l} \text{cns} \\ \text{f} \end{array} \right]$ $\left[\begin{array}{l} \text{cns} \\ \text{spk} \\ \text{f} \end{array} \right]$ $\left[\text{crk} \right]$ $\left[\text{sob} \right]$ $\left[\begin{array}{l} \text{hsk} \\ \text{sob} \end{array} \right]$
 $\left[\begin{array}{l} \text{cns} \\ \text{f} \end{array} \right]$ $\left[\begin{array}{l} \text{cns} \\ \text{f} \end{array} \right]$

$\left[\begin{array}{l} \text{sob} \\ \text{hsk} \end{array} \right]$ $\left[\begin{array}{l} \text{sob} \\ \text{hsk} \end{array} \right]$
 $\left[\begin{array}{l} \text{high} \\ \text{prec} \\ \text{f} \end{array} \right]$ $\left[\begin{array}{l} \text{high} \\ \text{prec} \\ \text{f} \end{array} \right]$

In spite of the 'density' of prosodic and paralinguistic features here which suggest 'crying' - in particular the occurrence of 'sob' - none of the hearer-analysts thought that this was *'genuine crying': *'he's not really crying, you can hear what he's saying'; *'obviously a crocodile crying trick to stop his mother going; aha sounds as if it's out of a comic'.

As an interactional ploy, however, this 'crying variety' is successful, for Paul's mother switches the light on again, and reinitiates her departure routine again; she says: one more time. Paul takes up this opportunity, and again attempts to persuade his mother to read a story:

$\left[\text{trm} \right]$ $\left[\text{trm} \right]$
 $\left[\begin{array}{l} \text{audible} \\ \text{inspiration} \end{array} \right]$ $\left[\begin{array}{l} \text{cns} \\ \text{f} \end{array} \right]$ $\left[\begin{array}{l} \text{cns} \\ \text{f} \end{array} \right]$ $\left[\begin{array}{l} \text{cns} \\ \text{f} \end{array} \right]$ $\left[\begin{array}{l} \text{a} \\ \text{cns} \end{array} \right]$

His request is reinforced by his use of residual 'crying' features: the audible inspiration before he speaks, and the use of tremulousness.

His mother ignores these features, and refuses to be drawn by his plea. Instead she begins a 'count-down-to-light-off' routine, starting ready, steady, and counting from one upwards. The deliberate use which Paul makes of non-segmental variability to 'frame' his utterances is demonstrated clearly in the marked changes of realisation which accompany his response to his mother's words. The changes he effects in the non-segmental characteristics of his speech, here, presumably represent a change in his negotiated position/role within the interaction. The use of slow, lento, tempo, and 'glissando down' result in an impression of remarkable control over what he is saying, in contrast to the 'shouting' and 'crying' evidenced earlier in this episode:

'/nō// - ' /don't count, yet// - 'you're/nōt //'
 'l' 'glis' [glis'] 'aa' [aa]

you're /going to count a 'long, time //'
 'monot' [monot]
 'rall' [rall]

The impression of 'control' given by this passage is in part attributable to the occurrence of the polysyllabic pitch range feature 'monotone' through the second tone unit, together with the level tone and rallentando effect at the end. His mother commented on listening to the tape recording: *'That sounds just like me laying down the law, he sounds much older than before . . .

he sounds as if he's got the high hand; as if he's in control of the situation'(M); *'that is controlled change from his crying before; it's an "adult voice" . . . he's beating his mother at her own game'. The occurrence of the 'downwardly marked' features, *lento*, *rallentando*, and *monotone*, which contrast with the 'upwardly marked' features from these prosodic systems which characterise earlier parts of this interaction, do not have their presumably desired effect on Paul's mother. She ignores his imperative, and continues counting. Paul, therefore, persists in trying to get her to accede to his wishes, and repeats his previous request, with somewhat different non-segmental realisation:

[br
 'high'] /nó// - /count a , long :time//
 [high]

The co-occurrence of high overall pitch range, breathiness, and fall plus rise tone seem to express some kind of amazement that his mother can have failed to pick up the relevant meaning of the 'framing' cues of his previous utterance. Almost all of the hearer-analysts felt that there was some kind of duplicity embedded here, which was cued for them by the non-segmental features: *'sly wheedling voice, particularly on time; he tries to emphasise what he wants but fails; he's surprised that his ploys aren't working'; *'mock amazement; I think he gets it from us when we're being sarcy [sarcastic.JKL] with him; he'll say something, and I'll say "Oh really" in that kind of voice'(F).

When his mother fails to pay attention to this repeated request, Paul returns to a variant of one of the strategies which he employed earlier, and produces another of his range of 'crying' varieties. This stretch is characterised by the occurrence of tense, forte articulation, accompanied by a widened rise, which terminates in his falsetto register, coincident with the first word, no, and 'sob' coincident with the second, don't. However, this still has no observable effect on his mother's actions, for she continues to count. Consequently, Paul reverts to his most frequent interactional ploy which he uses when he is denied something he wants - he produces a very loud utterance. Here it is simply the word no:

[fls] [sob] [crk]

'"/no, don't // - "/no // - "/ə //

'tns [f] 'tns ft' 'low p'

This at least has the effect of momentarily distracting his mother from the counting routine, for she says to him: what are you doing now. Having achieved this much, Paul interrupts her question, and reiterates his previous demand that she take a long time over the counting routine. In contrast to the preceding utterance, this is realised with a gradual decrease in loudness:

'"/wait a" long // "/time' to count //

'rhyth [f] 'dim' [dim] [rhyth]

f,

This is Paul's final gambit in this interaction, for his mother says: no I'm not standing here waiting, switches the light off and leaves.

This episode, like the first one discussed in this chapter, offers some indications of the ways in which Paul employs paralinguistic and prosodic variability to negotiate various aspects of interactional exchange. The ways in which Paul manages this prosodic and paralinguistic variability as 'framing devices' to achieve specific kinds of goals within interaction reveals an understanding on his part of some of the 'social' dimensions of this variability, and some of the functions which it can fulfill.

Paul is not unique in employing non-segmental variability in the ways I have discussed. Claire, the other child who was recorded for this investigation, also exploits the resources of prosodic and paralinguistic variability for a range of 'social' functions. We can observe, for instance, that she utilises non-segmental 'varieties' for dramatic displacement in both desultory and sustained 'play acting'. In playing 'soldiers' with her sister, Angela, Claire uses non-segmental features to characterise her role as the 'officer'. Commanding Angela to march around the living room of the house Claire gives the orders thus:

$\left[\begin{array}{l} \text{hsk} \\ \text{"/left :right //} \\ \text{low} \\ \text{tense} \\ \text{f} \end{array} \right]$
 $\left[\begin{array}{l} \text{hsk} \\ \text{"/left :right //} \\ \text{low} \\ \text{tense} \\ \text{f} \end{array} \right]$
 $\left[\begin{array}{l} \text{hsk} \\ \text{"/left :right //} \\ \text{low} \\ \text{tense} \\ \text{f} \end{array} \right]$

The adoption of 'husky' voice, with accompanying tense, forte articulation

is sustained, along with overall low pitch, and the systematic use of boosted level tone coincident with the second word in each tone unit, throughout this brief characterisation. When Claire plays the role of 'officer', she typically indicates it with this set of features, although she does not usually sustain them throughout her playing of the role. Most often, she simply resorts to the use of forte utterance during such role play.

Claire appears to make much more use of non-segmental variability in role-play than does Paul. Particularly when playing with her dolls, Claire gives them different voices. For instance, playing 'tea parties' with her dolls, she attempts to differentiate between 'children' and their 'grandmother' by manipulation of non-segmental phonology. She adopts a high overall pitch range, and uses wide rising tones which terminate in 'falsetto', for the voices of the children, and lento, precise articulation co-occurrent with the paralinguistic feature 'round' for that of the grandmother:

^[f1s]
 'he"/llə "grāndmā// - he"/llə // - /oh// he/llə^{^w} 'my 'darling//'
 'high [h] [a] [tʌs] 'e [pree] [pree]
 a [f] [pree]
 f~

Claire frequently makes use of non-segmental variability for playing out dramatic roles in stories. On one occasion, for example, while relating a Brer Rabbit story, Claire focusses the climax of the narrative by altering her characteristic non-segmental realisations

and dramatises Brer Rabbit's exclamations:

^[hsk]
 "oh 'dear' 'mē // - he - " // she " ! shot 'mē // -
^[trm] ^[trm]
 'e glis' [glis'] [tus] 'high
 tus e
 f' pree'

^[trm] ^[trm]
 /she ", shot ":mē //"
 [high
 e
 pree
 f]

Particularly noticeable in this stretch is the use of drawled syllables with glissando down rhythmicality, and the use of tremulousness to emphasise Brer Rabbit's predicament.

As I suggested earlier, Paul does not make quite so much use of non-segmental variability to create roles in play. However, in the data recorded we can find some examples of the systematic organisation of non-segmental variability by Paul to establish the 'key' (Hymes, 1972) for play-situations, and to create and maintain particular roles in play. Paul enters into such role-play rarely with his peers, but is sometimes drawn into it by his sister, Catherine. In the bath one evening with Catherine he picks up a sponge and squeezes the water it contains over Catherine's head, and says:

' /you "are " :dead // - mm 'its /poisonous // -
 'll [glis'] [ll] [bus] 'desc [accel]
 bus glis' f'

'you're /dead // -
 'l' [desc]

The fantasy play, here, is not only established lexically, it is also framed in terms of the non-segmental characteristics of Paul's speech: very slow, loud utterance, with strongly stressed drawled syllables. Just prior to this, Paul has been employing non-segmental variability in the enactment of the role of an ice cream salesman. Paul and Catherine have been blowing the bubble-bath at each other. Paul picks up a loofah which is beside the bath, dips it in the foam, holds it out in front of him and pretends to lick the foam from it. He then stands up in the bath, still holding the loofah, and says:

[hsk] [erk]
 'ice // cre am // - [erk] 'ice / cre am // - - - 'ice / cre am // -
 'high [l] 'a [high] 'tus [tus]
 l f'

[trm]
 'ice//creām//' - - 'iced cream//'
 'low [low] 'high [high
 l' [l] tns ff' [l] tns ff]

A little later, Paul picks up the same strand of play, and offers Catherine the foam-topped loafah:

'do you/want some nice// - /ice "cōr nēts//'
 'aa [aa] 'low [trm tms]
 lax [l] 'high [hst] [l] tns ff'
 f' [l] tns ff]

[trm]
 'ice "cōr nēts//' (Catherine: [au]) 'do you/want one//'
 'accel' [high accel tns ff] 'low nar' 'l' [low nar l]

This example shows Paul making use, in a very explicit way, of a particular sub-set of prosodic and paralinguistic features for sustained role-play. Most obviously we can note the disyllabic realisation of cream, with level 'calling' tone, and the frequent use of forte/fortissimo loudness.

Interestingly the recordings of Paul's speech provide an example of him apparently attempting to 'work towards' a particular prosodic 'frame' which he feels is required for a particular utterance.

Paul is conversing with Margaret (an adult neighbour), and has been relating to her the events in a picture book which he has been reading. He has reached the climax of the story where the villainous Blue Cat has just fallen into the moat of a castle, and is beginning to turn 'all sorts of colours'. Paul attempts to draw out the 'moral' for Margaret:

'that/serves' - 'that/serves' -
 'a' [a] 'l' [l]
 [x] [x]

'that"/serves 'him' > right //'
 'l' 'bus' [glis'] [l bus]
 glis'

The particular feature which Paul appeared to have been trying to achieve is the rhythmicality feature 'glissando up'. In neither of the first two attempts which Paul makes at this utterance is there the characteristic upwards pitch movement on serves. Paul does not seem to be satisfied with either of the first two attempts, but having achieved glissando (with markedly slow tempo), seems quite happy that he has appropriately framed his interpretation of the events in the story, for he closes the book and puts it to one side.

The use of non-segmental variability to create and maintain a particular kind of speaking situation, and to establish within it particular kinds of interpersonal roles, has previously been exemplified by an examination in detail of some interaction involving

Paul. Similar uses of the variable prosodic and paralinguistic systems can be found in the speech of Claire. Returning from a party to which her sister, Angela, has not been invited, she begins to relate what happened there to her mother. Angela is sitting at the table in the living room apparently paying no attention to the very loud, excited listing of objects which Claire has acquired at the party, and is displaying. Claire, while seemingly talking to her mother, draws various of these objects, some of which she has won in party games, from a large bag she is carrying, and places them emphatically on the table directly in front of Angela. As well as appropriately employing variation in the system of tone to signal that she is giving a list of items - Claire uses a range of rise-type tones; / √ \ + / all of which indicate here that there is 'more to come' - Claire adds particular emphasis to her achievement of having acquired so many things, by the use of forte utterance, variations in tempo to add local interest to the items she is producing from her bag, and the general 'excitement' highlighted by the overall wide polysyllabic pitch range. The sequence begins with ten tone units all of which are realised with a rising tonic pitch movement:

^clive/got a ballⁿoon^w mummy // ^clive/got a ballⁿoon // ---
^cfn^s ^cra^u ^{<ff>} [ra^u] ^cmonot ^{low} [mon^u] [low] ^{'a}
^f ^{wide} [fn^s] ^{wide} [a]

^[F1s] ^[F1s] ^[F1s] ^[F1s]
 'and I've' / got "that // --- / and // --- / 'I've, got': that // --- and "that // ---
 'aa' [aa] tns f' 'l' [l] [tns] f'

The emphatic listing of objects here, is further accentuated by the occurrence of strong stress, frequently accompanied by a marked term from the simple pitch range system, coincident with the tonic syllable of each tone unit. The use of and, which is frequent in this sequence, and which establishes lexical connectivity between items and tone units, is on one occasion here, especially marked not only by drawl on the vowel (which is fairly frequent in Claire's speech - particularly as a hesitation 'filler'), but also being accorded separate tone unit status. The prosodic marking of this item here was occasioned by Claire delving about in her bag in order to find something else - a toy frog - to bring out for display.

A similar use of tempo variation, but on this occasion affecting a polysyllabic stretch, can be observed in the incomplete tone unit which follows. The words are articulated forte, tense, with strong stress, and at a level pitch (monotone). In addition, they are marked by the occurrence of very slow tempo. Claire, apparently, had decided what it was she wanted to produce next from her bag, but could not find it immediately. In order that she can co-ordinate her words with the production of the item, she slows down the tempo while she looks for it, retaining the formulaic and I've got which she has established as her way of introducing items, earlier in the episode. When she does locate what she is seeking - a piece of birthday cake - there is an

immediate change in tempo to allegrissimo, as she lifts it out of the bag:

'and I've got' -- 'and I've/got' my, ^wcake // 'and my/ring //'
 cmonot [monot] 'aa [aa] <f> 'a' [a]
 tns [tns] stac [stac] [a]
 ll [ll] [a]
 f' [f]

This is followed by two further tone units, both with rising nuclei, which continue the list: and I've got my rubber, and a whistle. The first of these is obscured somewhat by Claire's mother's expressions of amazement that Claire has come home with so many things, and Claire repeats it, this time with a falling nucleus:

'and a /: rubber // 'with a /, eye in it //'
 'l [hsk] [hsk]
 f' [f] 'a [a]
 [f] bus [bus]

Special emphasis is given to the 'uniqueness' of the rubber (which for some weeks following, Claire wore as a pendant around her neck) by giving tonic focus to the head word of the postmodifying phrase. Additional stress is placed on the particular identifying feature of the rubber - a eye (ie a typewriter rubber with an open metal stud through its centre) by the occurrence of strong stress, huskiness, and low onset to the tone unit. These features also serve to mark the end of the first part of Claire's 'list', the lexical cohesion of which has been largely achieved by the use of and, but which has also been supplemented by the sequence of non-final nuclei, up to and including the falling tone on rubber.

The 'finality' achieved by the tonic nucleus on eye, derives partly from the low beginning of the falling pitch movement (the previous falling tone is accompanied by a boosted onset), and partly from the effect of the preceding high unstressed pre-onset syllable, a.

In this episode, we also find Claire exhibiting an awareness of some of the dimensions of non-segmental variability in her manipulation of tone-type selection in contiguous tone units for particular stylistic effect:

'and I, got' : ^[hsk]that // - 'that's my, book' //
 'f' <ff> [f] 'low a' [low a]

'and I, got' ^[hsk]the:rubber // . to/go' with, it // -
 'a' [a] [f]

'and I, got' ^[hsk]the:pencil // . to/go' with, it //
 'a' [a]

In this stretch, Claire adds to the linking function of final rising nucleus an 'echo' effect between the last two pairs of tone units. The pitch characteristics of the pairs are the same, with co-ordination between a boosted rise in the first of the pairs, followed by a fall-plus-rise nucleus in the second tone unit of the pairs. The tempo contrasts, too, are echoed, with the first three words of either pair, and I got, being

realised with allegro tempo, and followed by a change back to normal speaking speed. The echoing of tempo effects also extends here to the occurrence of a 'brief pause' which intervenes between the tone unit boundaries and the high unstressed pre-onset syllable, to.

The end of this whole 'listing' sequence is marked by Claire both gesturally and non-segmentally. When she reaches what proves to be the final utterance in this passage, she turns her now empty bag upside down showing that there is nothing more left in it, drops it to the floor, sits down, leans back, and folds her arms. Prosodically, the conclusion of the list is marked with a general narrowing of polysyllabic pitch range, from the 'wide' contrasts which characterised the early part of her speaking, and a gradual decrease in loudness and slowing down of tempo in the final tone unit:

^{[hsk}
^{erke}]
 'and I - / I :won' - / I got , hū's // - -
 'a
 stae
 tns
 arhyth
 f'
 [a
 stae
 arhyth]
 [hsk
 hsk]
 [tns]
 [f]

[hsk
 hsk]
 'and I've // : got " ! that // - / that's my • cake // '
 'a' 'tns
 f'
 [a
 tns
 f]
 'rall
 decres'
 [rall
 decres]

The feature 'arhythmical', which characterises the first four words of this stretch, is most probably a consequence of Claire having experienced some difficulty in selecting the appropriate verb, got.

Claire's use of non-segmental variability takes on a somewhat different form, shortly after this 'listing' sequence, in the reply which she gives to her mother's question: was it a good party, then. She adopts a cluster of features to 'frame' her utterance which usually characterise her attempts to role-play sophisticated adult females. She replies emphatically to her mother's enquiry:

[br]
 ' / ũ / ' " / :migh'ty' good //
 'low / x / p'] 'p'

Of particular note here, is the use of drawled syllables, and the occurrence of 'held' - delayed release - of the [t] in mighty, where the final syllable is clipped. The nucleus of the second tone unit, located on mighty, is followed somewhat unusually, by a levelling out of pitch coincident with the word good. Unusually that is, in this kind of role-play, for such level pitch (whether a component of a compound tone, as here, or in its own right as simple nucleus) is common in Claire's other speech. (The function of level tone in the speech of both Paul and Claire is discussed more fully in Chapter 5 p.200ff.) The lax, breathy articulation of the first tone-unit, with the complex rise-fall nucleus (used most frequently by Claire with such exclamations - see Chapter 5 p.218ff) assists in the dramatic displacement of the utterance. The extent to which

this realisation is marked as having a particularly focussed interactive function for Claire, can, in part, be deduced from her mother's following response. Accompanied by breathy laugh, with a nuclear fall on the first word, Claire's mother echoes: mighty good, and laughs again.

Somewhat later in this same interaction episode, we find further examples of Claire managing the non-segmental characteristics of her speech for particular interactional purposes. For instance we observe her attempting to achieve a *'disdainful', *'haughty' response to a comment, which is mostly indecipherable, made by Angela concerning the birthday party from which Claire has returned. Claire appears to take exception to what Angela says, and interprets it as casting a slight on the party, for she retorts:

'there was /lɔts // of / children //
 'aa [aa] 'tus'] [round] [erk]

Here the occurrence of drawled syllables, creak, and complex fall-rise nucleus help frame Claire's attempt to *'put down her sister'. Claire's mother glossed this, among other of Claire's remarks to Angela, as being an example of Claire *'lording it over Angie'. We can compare another stretch from this same episode. Claire has just reprimanded Angela for attempting to cut a page out of an exercise book (previously discussed in Chapter 3, p. 131), and in an attempt to prevent any ensuing unpleasantness, has given Angela a piece of the birthday

cake which she has brought home from the party. In her eagerness to accept this peace offering, however, Angela grasps the cake too firmly; it breaks in half, and most of it falls to the floor. Claire's attitude to Angel's 'accident' is signalled by her gestures and the non-segmental 'frame' which she gives to her utterance. Folding her arms across her chest, and pursing her lips (cf p.130 above), Claire says:

$\left[\begin{array}{l} \text{round} \\ \text{crk} \end{array} \right]$ round] [round round]

^c/ah// - what ā / shāme // you've ^c/squashed ⁿ'it //

^clow ^cdecel [decel]

lx <f> >p

p prec' prec

We can note again the occurrence of creak, and low pitch range, and the realisation of parts of the utterance with the paralinguistic feature 'round'. The alteration in the system of tension, from norm to tense in the last tone unit, gives local emphasis to the word carrying the tonic pitch movement, and helps to add a *'cutting edge' to her words.

Claire's uses of non-segmental variability to frame the interactional import of her utterances, also include special varieties which are reserved for talking to her young twin brother and sister. On one occasion, looming over Peter, her 15 month old younger brother, Claire takes hold of his hands in hers and moving them up and down rhythmically, says:

(round
 round)
 [vib]
 'he / 110 // ə / : 110 // ə / 110 // - - / what a : big' ! boy //
 tns
 f
 wide
 [tns
 f
 wide] 'glis'' [glis']

[br br]
 [hsk hsk]
 / there // - ' / there // ' / look at his
 'low
 glis'
 tns
 rhyth'

[br br]
 [hsk hsk]
 ' : look at his', feet // - - - / look at it //
 'deces' [glis'] [low
 tns
 decres
 rhyth]
 'low
 tns' [crk]
 [low
 tns]

When Claire speaks to either of the young twins, Peter or Jane, she almost always alters the overall pitch range of her voice, either upwards ('high'), or as in this example, downwards ('low'); she shows a slight tendency to prefer 'low' when addressing Peter, and 'high' when addressing Jane, but there is no clear-cut distinction. Speech to the twins is also frequently characterised by a wider intersyllabic pitch range ('wide') than is normal in Claire's other speech. In addition to these pitch range contrasts,

we also find frequent occurrences of markedly 'rhythmical' speech, often accompanied by glissando effects, and frequent use of a range of paralinguistic effects - especially 'breathy', 'husky', 'falsetto', 'giggle', and 'laugh'. Indeed, Claire's speech to her twin brother and sister generally evidences a much wider range of prosodic and paralinguistic features than does her speech addressed to other interlocutors. Some of this range can be seen in the following piece of speech directed by Claire to Peter. She is standing in front of him, attempting to get him to respond to her. She is pulling exaggerated faces, and says:

[round] [br br] [round
^
/oh // - (laugh) - /oh // - " / ho ho ho ho ho " !hō // - -
[high
prec
f'] [low
tns'] [prec
f'] [high
monot
aa
stac'] [monot
stac] [high
aa]

[round
fls] [round]
[crk]
- - - - /oh // - - - - / ho ho ho ho " !hō //
[prec] [high
stac
tns'] [monot
stac] [high
tns]
[dim]

The 'density' of prosodic and paralinguistic effects here is at once obvious. The stereotyped 'laugh' in the third and fifth tone units is 'framed' by the shift to high overall pitch range, staccato rhythmicity, and the wide, high boosted fall which is preceded by a monotone stretch. These 'laugh' varieties, along with the

occurrence of 'genuine' paralinguistic 'laugh', serve to indicate the playful nature of the situation.

The use of non-segmental features to 'frame' the non-serious nature of a particular remark, or to indicate that the interaction is to be understood as playful, can be found frequently in the data collected from the speech of Paul and Claire. In such cases the use of 'laugh' and 'giggle' are frequent (cf Paul's remark to Margaret, previously discussed in Chapter 3 p.133), but other prosodic and paralinguistic effects occur. Speech during play is often accompanied by the paralinguistic feature 'vibrato'.^{Fn}

Fn. 'Vibrato' is not a paralinguistic feature distinguished by Crystal (1969). However, as was the case with the features 'round', and 'spread', this effect occurred frequently enough in the data to warrant inclusion as a paralinguistic effect. This feature covers a range of 'vibrato effects' (Luchsinger and Arnold, 1965), but is distinct from the 'normal vibrato' which accompanies any given pitch sustention. It shows a tendency to co-occur with drawled syllables in the present data, but this is not an absolute dependency. Nor is its occurrence simply limited to play-settings; in the speech of both Paul and Claire it occasionally occurred in contexts which suggested that part of its functional range was 'emphatic'.

We find, for example, Paul employing 'vibrato' when playing with a toy boat in the bath. He picks it up, pretends to smell it, and says:

^w / uə / - ^c a / ^[vib] smelly // olə / ^w ^[vib] shōe //
 'tus' [tus] 'l' 'tus' [tus]

Claire too, employs 'vibrato' effects during fantasy play. The following example is taken from a game which Claire is playing with some dolls, and some toy household furniture and appliances.

Claire accidentally knocks a doll into a box which has been serving as a washing machine:

[vib] [hsk] [hsk] [vib]
 'oh my' / 'dear' // 'she's in 'that ma' // 'chine' //
 'a [a] 'monot' [mond] 'tns <f> }
 tns >

[br.] [br.] [br.] [br.]
 'oh' // - 'oh she's' // 'fainted' //
 'high nar lx p' [P] [high nar lx]

[vib] [hsk] [vib] [vib]
 'her' / 'hair and' 'everything's' // 'green' //
 'high nar' 'ep' [P] [high nar]

[vib] [vib] [vib] [hsk]
 'oh' // 'no' 'she' 'said' //
 'high tns e' '<f>' [tns] [high]

The function of 'vibrato' here, seems not only to be to help frame the play-nature of the activity and to express Claire's mock-horror at what has happened: oh my dear, but also to characterise the voice of the doll, and to express its imagined reactions: oh no. (The vibrato effect coincident with the latter part of the word machine, is considerably extended - hence the marking of 'drawl' twice - and begins somewhat after the onset of the vowel [i]).

* * *

In presenting the detailed analyses of 'episodes' from the speech of Paul and Claire, my aim has been to indicate some of the range of social functions for which children employ non-segmental variability. Consideration of these episodes has revealed that paralinguistic and prosodic variability is employed by the children to negotiate and 'frame' a variety of speaking strategies; these include strategies for control (eg anger, persuasion, conciliation), self-focussing, and other-focussing (egteasing mockery), and for dramatic displacement of various kinds (cf Weeks, 1971). The children achieve a considerable amount of interactional 'work' primarily by the manipulation of these non-segmental 'frames'. Their use of the resources of non-segmental variation in these ways is important for an understanding of the development of sociolinguistic competence, for it reveals the children's awareness of some of the social dimensions of linguistic variability. This awareness is apparent in their ability to interpret the non-segmental cues provided by others, and in their proficiency in adapting their non-segmental behaviour to relevant social cues.

It is clear from the episodes analysed, that the non-segmental features which the children employ in the negotiation and 'framing' of meaning are not simply limited to pitch movement and pitch location, but involve a wide (though determinable) range of prosodic and paralinguistic effects. Nor are these 'frames' achieved simply by the selection of different prosodic and paralinguistic features; it is clear that many of the particular interactive strategies and social functions which I have discussed in this chapter are achieved by variation in the patterns of relative distribution and co-occurrence of non-segmental features. Chapter 5, therefore, will investigate some aspects of the patterns of distribution and co-occurrence of prosodic and paralinguistic features, and will attempt to determine the structure and systems of non-segmental variability in the children's speech.

Appendix to Chapter 4

In this Appendix, I present some examples of the written and verbal comments of the hearer-analysts who listened to the 'episodes' of children's speech discussed in Chapter 4.

The comments relate to the first episode discussed (p.150ff). Below is a copy of the transcript which I originally prepared to give to the hearer-analysts. I eventually decided against offering this transcript, however, in order that the task of listening to, and commenting on the tape recorded interactions should not be made even more artificial.

Transcript of Episode 1.

P: do you know what I was doing at school today
do you know what I was doing at school today
mam do you know what I was doing at school today

M: stop shouting

P: mam do you know what I was doing at school today

M: what were you doing at school today

P: uh hu ba ba ma ma koo koo

M: tell me pet I'm here pet tell me

P: oo give me a kiss

M: don't be silly

P: give me a hug right round

Hearer-analysts' comments:

Male student, aged 20 years 4 months. (Written commentary)

A child (boy) using lots of tricks to attract his mother's attention. He doesn't really want to tell her what he did at school, but repeats it louder and louder until she says something to show that she's listening to him. She snaps at him 'what were you doing . . . ' and this telling off makes him change his tack. He begins to cry like a young baby, but it's faked. It appears to convince his

mother that he's upset and she gives in - says softly 'tell me' very smoothly, soothingly. The child senses that she's forgiven him and asks for a kiss in a sappy voice. His mother thinks he's taking advantage of her backing down, and puts him in his place but not very harshly, quite quietly. The child takes up this veiled warning and very softly and calmly accepts his mother's attention - 'give me a hug'.

(Additional verbal remarks): Consciously manipulates his voice to get attention and to get mother to do what he wants; many changes in tone - loud to soft; picks up clues from his mother's voice about her attitude - catches on that she's forgiving him at the end.

Female, a teacher-colleague of Paul's father; frequent visitor to the house. Paul refers to her as 'aunty Jane'. Aged 33 years

(Written comments): [Eileen is Paul's mother]

Paul is trying to get Eileen's attention and get her to listen to him - he can be very demanding. He makes repeated attempts changing his voice each time - louder, higher, it sounds as if he's got a cold. Eileen gets very annoyed by his shouting and speaks to him sharply. It's just like her, it's a hidden warning; curt tone of voice, the emphasis on 'what' means 'alright I'll listen but be quick'. Paul reacts to this by pretending to cry like a baby, he just turns on crocodile tears - its too loud and regular to be real crying, he does that a lot. Eileen realises that she's been too harsh with him and gives in- uses forgiving tone to show she'll listen to what he has to say 'tell me'. She's trying to comfort him. Paul doesn't tell her anything, but he tries to capitalise on the change in Eileen's attitude by asking for a physical response (kiss) - but it's one of his voices that Eileen doesn't like so she stops him talking like that, she's not too strict this time though. Paul listens to what she's saying (for a change) and asks for a friendly hug, in a low soft tone.

(Additional verbal remarks): Paul's a devious child, he's a good actor; he twists Eileen round his little finger to get her to do

what he wants; it's all in the way he says things; the tone of his voice; it's not really conversing, it's establishing roles and status - who's going to gain the upper hand; he often tries to do it by shouting, but if that fails he'll try other things like playing at babies to get sympathy; he's very aware of what he's doing.

Paul's mother. The verbal comments presented below, were elicited during a second hearing of the episode with the benefit of the transcript. I requested that she comment on the transcript line by line. The tape recording was replayed, and the tape stopped at the end of each line on the transcript in so far as this was possible. So that Paul's mother's remarks may be easily contextualised I present them with the appropriate line from the transcript:

	mother's comments
do you know what I was doing at school today	sounds quite ordinary; he often starts this routine at bedtime; I let him talk, it helps to get him off to sleep
do you know what I was doing at school today	he often does that when he doesn't get an answer or really wants something - says the same thing louder; I was bothering with Cath and couldn't be fussed with him
mam do you know what I was doing at school today	he won't shut up; he says 'today' like that probably to annoy me; sounds just like the boy next door, horribly whiney and broad Tyneside; he knows he's not supposed to talk like that
stop shouting	he's done enough I'm properly irritated, I can hear myself saying that, it's a warning
mam do you know what I was doing at school today	he goes on regardless doesn't he; he's whinging; it sounds like he's doing it to irritate me so I'll pay attention to him
what were you doing at school today	I'm firm there, he's got my goat; I'm putting him in his place. I don't often snap at them like that; I'm infuriated with being pestered

uh hu ba ba ma ma koo koo

he sometimes does that when he knows he's
in the wrong; I've tried to stop him
doing that but he won't

tell me pet I'm here pet
tell me

I'm giving in to him again, he's spoilt;
because I was too nasty with him just
before; I sound cowed and sorry; I'm
trying to comfort him

give me a kiss
don't be silly

he's just fooling around when he talks
like that; he knows I've given in; kisses
are for making things better; he often
pulls that pursed face when he wants
sympathy or says 'sorry'

give me a hug right round

I can't resist him when he talks like
that - kind of quiet and out of breath,
all childish and cuddly; you've got to
love them.

**Chapter 5: DETERMINING THE SYSTEMS AND STRUCTURE OF NON-SEGMENTAL
VARIABILITY IN CHILDREN'S SPEECH**

Having informally established some of the social functions of co-occurrences of prosodic and paralinguistic features in children's speech in Chapter 4, this chapter attempts to formally determine those systems without reference to function. My primary aim is to provide detailed, quantitative information concerning this relatively neglected aspect of linguistic structure in the speech of children.

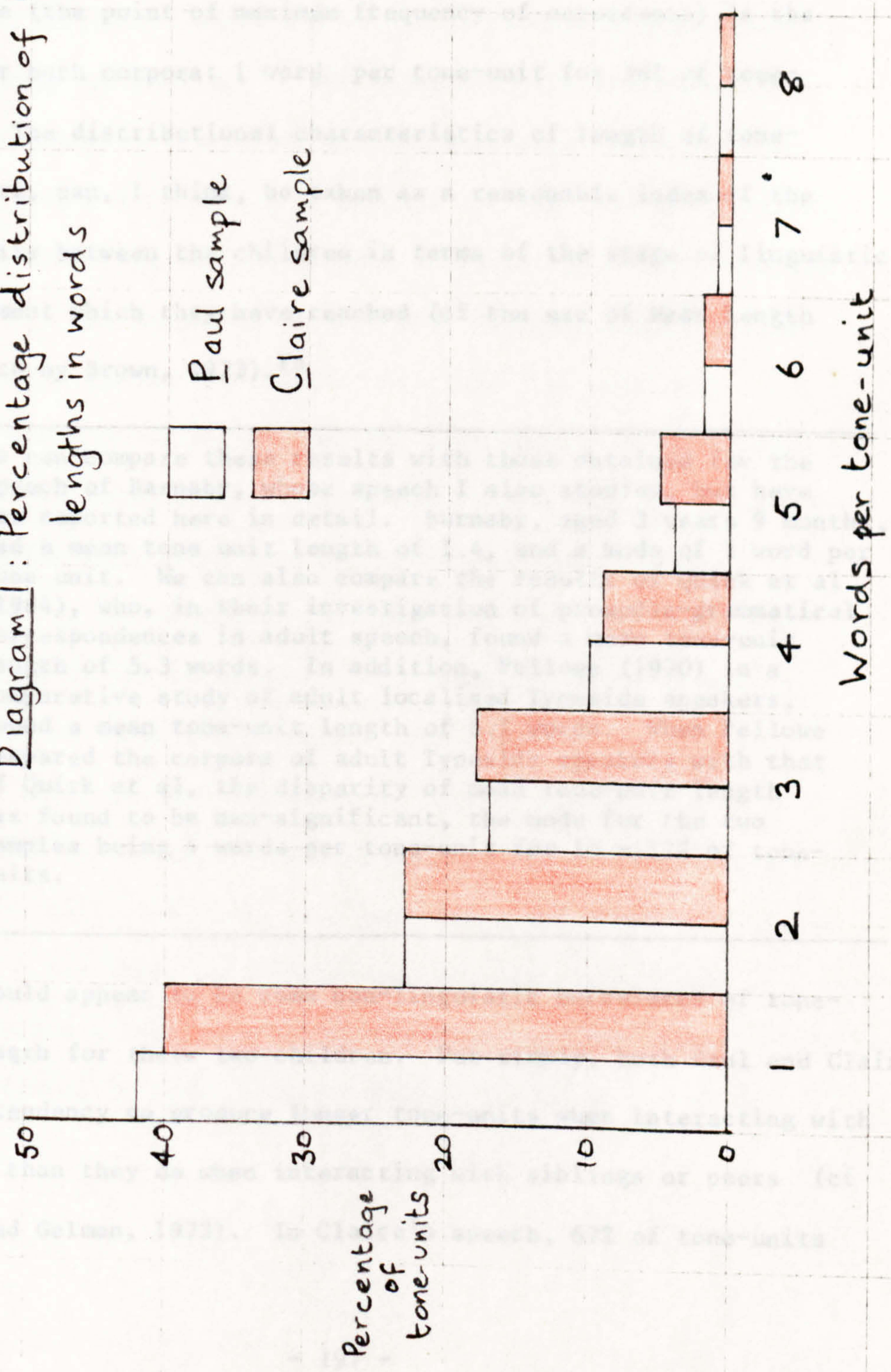
There are two important motivations for this enterprise. First, we need such information in order to establish the extent to which it is possible to effect (socio)linguistic comparisons between children, in terms of their non-segmental behaviour. Second, we need such information before we can hope to determine the range of social functions and social information which can be projected by particular (co-occurrent) prosodic and paralinguistic features.

The primary data used for analysis in this chapter consists of selected 'episodes' of connected speech of the two children, Paul and Claire, aspects of whose non-segmental behaviour were discussed in the previous chapter. These episodes are taken from tape recordings made during one day, in the homes of the children. The episodes were selected in an attempt to establish comparability across a similar range of interactive situations, and a variety of interactants, as well as to be representative of the speech produced by the two children (representativeness here being judged on the basis of my observations and the other tape recorded speech of the children). Such considerations placed some restrictions on the amount of data which could be analysed (different homes do not conduct their daily routines in the same way), and eventually

I decided to analyse episodes which were 'similar' in the following terms: (i) interactants involved - parents, siblings peers; (ii) settings involved - living room of home, bathroom, bedroom. These naturalistic constraints limited the data analysed to some 35 minutes of tape-time for Paul, and 25 minutes of tape-time for Claire. The situations from which this primary data derives are similar, but not identical. The corpora of speech which these situations provide is approximately 2,500 words which yield 801 tone-units for Paul, and 1,600 words yielding 618 tone-units for Claire. All references in this chapter to the children's 'speech' or 'the data' should be understood as referring to the corpora described above. Where I refer to speech-data from these two children which lies outside the scope of these corpora, this will be indicated in the text.

We can begin our examination of the non-segmental behaviour of these two children, by considering some details concerning the general characteristics of the tone-units which they realise in their speech ('Minimally, a tone-unit must consist of a syllable, and this syllable must carry a glide of a particular kind' (Crystal, 1969:207)). Diagram 1 gives the percentage distribution of tone-unit lengths in the speech of the two children, measured in institutional words.

Diagram 1: Percentage distribution of tone-unit lengths in words



The distribution of tone-unit lengths, shown in Diagram 1, is remarkably similar for the two children. The overall average number of words per tone-unit for Paul is 2.3, and for Claire is 2.5. (We can note that in the corpora analysed, Claire had seven tone units containing more than 8 words: two of 9 words, two of 10 words, and three of 11 words. Paul, on the other hand, had one tone-unit of 9 words, and two of 13 words.) The mode (the point of maximum frequency of occurrence) is the same for both corpora: 1 word per tone-unit for 36% of tone-units. The distributional characteristics of length of tone-unit here, can, I think, be taken as a reasonable index of the similarity between the children in terms of the stage of linguistic development which they have reached (cf the use of Mean Length Utterance by Brown, 1973).^{Fn}

Fn. We can compare these results with those obtained for the speech of Barnaby, whose speech I also studied, but have not reported here in detail. Barnaby, aged 3 years 9 months, had a mean tone unit length of 1.4, and a mode of 1 word per tone unit. We can also compare the results of Quirk et al (1964), who, in their investigation of prosodic-grammatical correspondences in adult speech, found a mean tone-unit length of 5.3 words. In addition, Pellowe (1970) in a comparative study of adult localised Tyneside speakers, found a mean tone-unit length of 6.1 words. When Pellowe compared the corpora of adult Tyneside speakers with that of Quirk et al, the disparity of mean tone-unit length was found to be non-significant, the mode for the two samples being 4 words per tone-unit for 15 - 17% of tone-units.

There would appear to be some non-linguistic correlates of tone-unit length for these two children. Put simply, both Paul and Claire show a tendency to produce longer tone-units when interacting with adults than they do when interacting with siblings or peers (cf Shatz and Gelman, 1973). In Claire's speech, 67% of tone-units

longer than 4 words occurred in speech to adults. Of the remaining 33% of all such utterances in Claire's speech, 14% occurred during interaction with her young sister, while she was telling a story to her and her mother; a further 8% of these tone-units occurred in speech to her sister while she (Claire) was engaged in playing the role of a nurse. This activity involved the adoption by Claire of an 'adult' role of superior status, where she generally ordered Angela about, instructing her what to do, and organising the direction which their play was to take. 79% of Paul's tone-units longer than 4 words occurred in speech to adults. At one level of analysis, then, in modelling the development of sociolinguistic competence in terms of non-segmental variability, it would appear that we need to take account of the characteristics of tone-unit length, modal distribution, and the distribution of tone-units of different lengths across different interactive situations.

Having considered some of the general features of tone-units in the speech of Paul and Claire, I turn now to an examination of the frequency distribution of nuclear tones in the speech of these two children. The system of nuclear tone analysed here is that discussed by Crystal (1969). It is represented by the following basic terms: fall, rise, rise-fall, fall-rise, fall plus rise, rise plus fall, and level (cf Chapter 2 p. 84, for their notation). Nuclear tones are viewed as kinetic pitch glides/jumps or sustentations (eg level tone); everything else differing in terms of pitch height may be described by

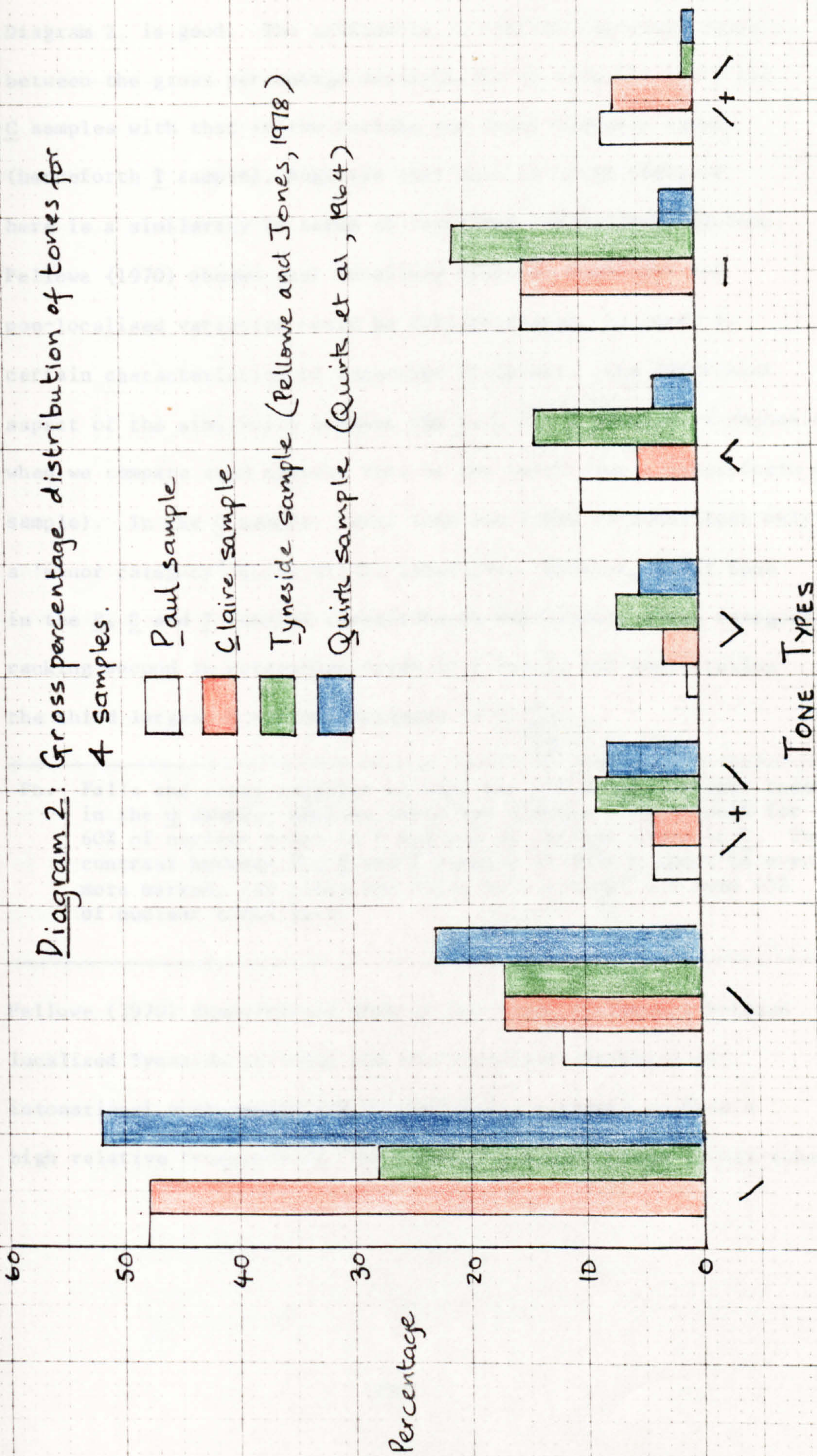
reference to the system of pitch range (see Chapter 2, p.85, and further below, p.210ff).

Diagram 2 presents the gross percentage distribution of each of these tones in the speech of Paul and Claire (henceforth P and C samples). These are plotted along with those for the sample of Quirk et al (1964), and with those representing a mean gross percentage of the same tones, drawn from two random samples of localised adult speakers from Tyneside (Pellowe and Jones, 1978). The histogram presents each in a different column; the rank order percentage frequency of tones for P and C revealed by Diagram 2, is as follows:

<u>P</u> :	\	—	/	^	/+\	\+/	∨	(^+ / ^+ - ^+ \)
	48	15	12	10	8	4	1	2
<u>C</u> :	\	/	—	/+\	^	\+/	∨	(^+ - ^+ /)
	48	17	15	7	5	4	3	1

The similarities which Paul and Claire show with the Quirk sample in terms of the percentage of falls in their speech may be more apparent than real. Two factors indicate such a conclusion. First, both children show differences in other parts of their tonic systems (particularly in the frequency of level tones) to the Quirk sample. Second, the percentage difference of falls to rises in the children's speech is higher than that for the Quirk sample. It seems likely, therefore, that the children are producing realisations of different tonic systems to those represented by the Quirk sample.

Diagram 2: Gross percentage distribution of tones for 4 samples.



In general terms, the match between the P and C samples shown in Diagram 2 is good. The similarity in certain important respects between the gross percentage distribution of tones in the P and C samples with that in the Pellowe and Jones Tyneside sample (henceforth T sample), suggests that what is being revealed here is a similarity in terms of localised intonational systems. Pellowe (1970) showed that localised Tyneside varieties and non-localised varieties could be differentiated, in part, by certain characteristics of tone-type frequency. One particular aspect of the similarity between the P, C and T samples is emphasised when we compare them against that of the Quirk sample (henceforth Q sample). In the Q sample, level tone was found to constitute only a 'minor category' (Quirk et al, 1964:124). However, level tone in the P, C and T samples constitutes an importantly large category, ranking second in percentage terms in P and T, and constituting the third largest tone-type category in C. Fn

Fn. Falls and rises together account for 75% of all nuclear tones in the Q sample, whereas these two classes only account for 60% of nuclear tones in P and 65% of nuclear tones in C. The contrast between the Q and T samples in this respect is even more marked, for rises and falls only account for some 45% of nuclear tones in T.

Pellowe (1970) demonstrated that an important difference between localised Tyneside varieties and non-localised varieties of intonational systems was the tendency for the former to have a high relative frequency of level tones as a percentage of all tones.

The high relative frequency of level tone in the P and C samples, as in the T sample, can, I think, only convincingly be accounted for as a characteristic of localised Tyneside intonational systems. This is not, however, a simple matter. As Pellowe and Jones (1977) have indicated, there exist a range of localised Tyneside varieties in which the function of and distribution of level tone, with respect to other tones, is ambiguous:

In some varieties, the distribution is equivalent to non-localised levels. In some varieties part of the distribution is equivalent to non-localised levels, part to localised rises. In some varieties part of the distribution is equivalent to non-localised levels, part to localised falls. (21-22)

The situation with respect to P and C is somewhat more complicated, and exhaustive explication is not possible here. More detailed investigation of other data from the speech of Paul and Claire is required to discover which, if any, of the above categories might account exhaustively for the distribution of levels here. Some comments, however, are in order. It is worth noting that level tones in P and C appear most frequently to have the function of non-localised falling tone; that is, they appear to have a similar distribution to non-localised falling tone across statements and Wh-questions. 71% of all occurrences of level tone in P and C can be accounted for in this way. 8% of levels in P and C, however, expound inversion questions. The remaining 21% can be divided roughly into four groups:

- (i) those having one typical function of non-localised level tone (cf Crystal, 1969:215-216) - 'continuity'.
- (ii) those which can be characterised as 'calling' tones (cf Fox, 1969)
- (iii) those which occur with discourse agreement markers (eg yes, mhm), or isolated question markers (eg what eh).

(iv) a group similar to (i) above, where level tone appears to be being used to signal continuity in a list of items (eg /orange// - - "/red// - - /black//blue//).

Group (i) all occurred with the lexical items then, and, well, said, nearly, and now (all, with the exception of nearly, accompanied with 'drawl' on the vowel, and all given separate tone-unit status). All but one of this group of level tones occurred in the C sample, during an episode of story-telling. Their occurrence there appeared to be a stylistic ploy used to build up peaks of interest in the course of the narrative. This group comprises 4% of levels in the P and C samples (6% of level tones in the C sample), and appears to be at least one of the differences between Paul and Claire in respect of the function which level tone can fulfill. The only occurrence of level tone obviously having this function in Paul's speech occurs in a piece of rather loud pre-sleep interaction with his mother:

/and it was nearly// - the/same :size// - as/that :many//

Group (ii), the 'calling intonation' use of level tones accounts for 7% of the remaining levels. 6% of these level tones occur in the P sample in a play episode in which Paul creates the role of an ice-cream salesman (see Chapter 4 p.174 ff). The remaining instances of this 'calling' use of level tone, occur in the C sample on proper names.

Group (iv), level tones used in 'lists' of items, typically terminated by a fall, comprise 4%, and group (iii) co-occurrent with agreement and question markers, yield 6% of levels for the

Fn. Preliminary analysis of further speech data from Paul and Claire, collected some 9 months after the present P and C samples, suggests that the gross percentage distribution of tones portrayed in Diagram 2, has undergone some changes. In particular, for P the ratio of falls to level tones changes, and there would appear to be an increase in level tones at the 'expense' of falls (the percentage of rises relative to other tones remains fairly stable). For C the percentage of level tones appears to remain fairly stable in relation to other tones, but the percentage frequency of rises increases, while that of falls decreases. This additional data requires more detailed consideration, however, before these observations can be anything more than tentative.

Two further features of the gross percentage distribution of tone-types for P and C are worthy of note. The first is the difference we observe in terms of the percentage of rising tones in the two samples. The second concerns the relatively high frequency of rise plus fall tones in the children's speech, when compared with the T and Q samples.

A clearer picture of the percentage difference of rises in the P and C samples can be gained if the tones are grouped into three types (cf Crystal, 1969: 203): generalised 'falling type' (where the final direction of pitch movement is downwards): fall (\), rise-fall (^), and rise plus fall (/+ \); generalised 'rising type' (where the final direction of pitch movement is upwards): rise (/), fall-rise (v), and fall plus rise (\+ /); and level tones, taken separately in view of their ambiguous relationship to falling and rising-type tones. Diagram 3 presents the percentage differences between the groups of generalised falling, rising and level tones in the P and C samples.

Percentage Difference
generalised / &

70

60

50

40

30

20

10

0

Percentage

Paul
(50%)

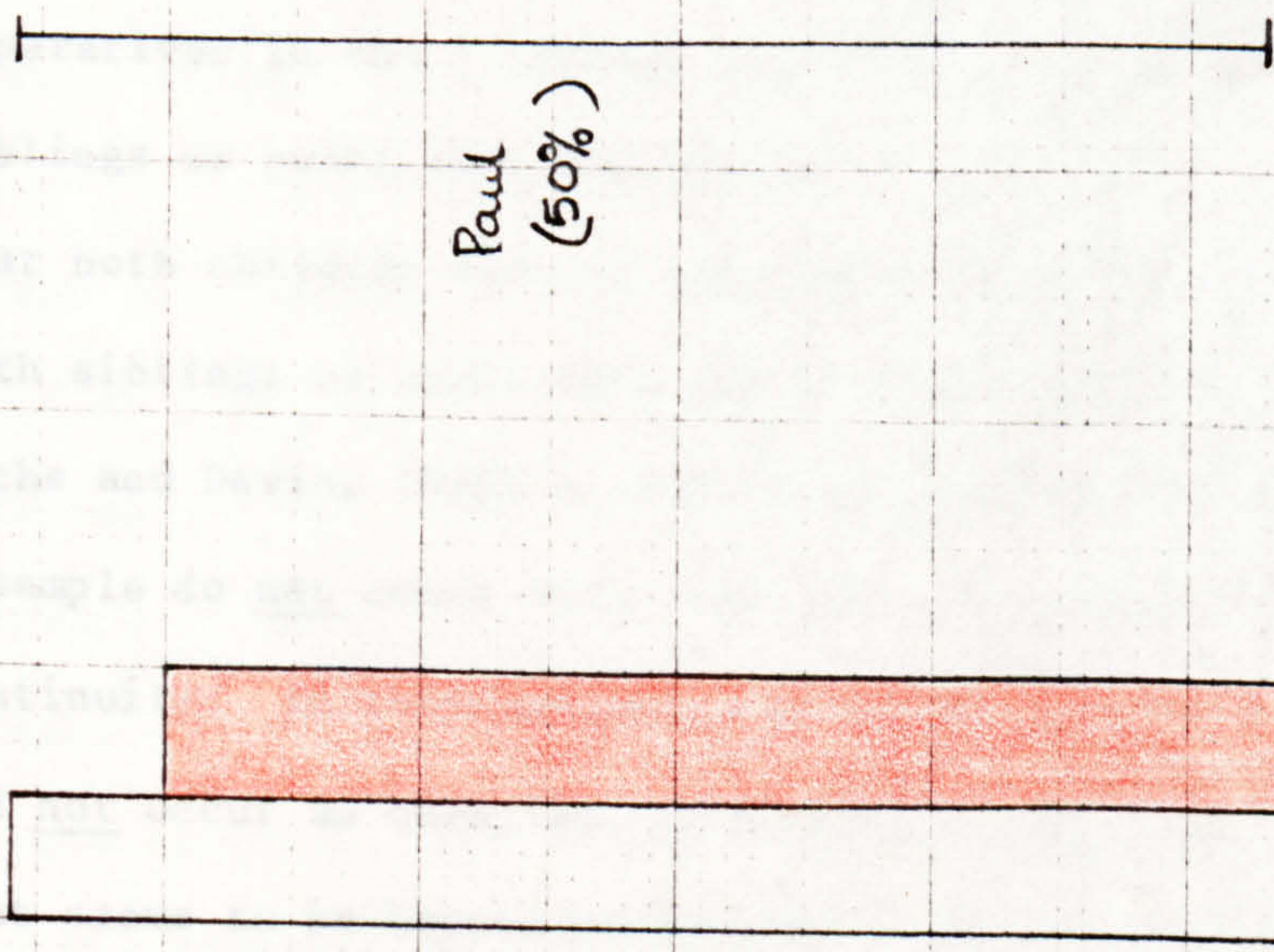
Claire
(38%)

Diagram 3: Percentage difference
between generalised
falls and generalised
rises



Paul sample

Claire sample



generalised

generalised

Diagram 3 reveals that there is a difference between the P and C samples which can be expressed in terms of the percentage difference between generalised rises and generalised falls. We observe that this difference is greater for the P sample than it is for the C sample (49% to 36%). The disparity shown here between the percentage of rises to falls might be thought at first to represent simply a difference between the two samples in terms of particular grammatical structures, say, questions which 'require' realisation with rising tones. However, a very general examination of the two samples reveals that this is not the case. There are no significant differences in the frequency of occurrence of such grammatical constructions between the two samples. (We might note in passing, that there are slightly more imperatives in the P sample, almost all of which are addressed to siblings or peers (but see Chapter 4 p.163ff). We can also note that both children tend to ask fewer questions when interacting with siblings or peers than when interacting with adults (cf Sachs and Devin, 1976).) 68% of the generalised rises in the C sample do not occur with questions or markers of discourse continuity. In contrast, only 36% of the generalised rises in P did not occur as questions or discourse continuity markers. What seems to be happening is that Claire is realising rises in tone units where Paul has a preferential realisation of falls or levels.

Interestingly, Pellowe and Jones (1978) found a similar percentage difference between rising and falling tones in the speech of adult male and female speakers in their two random

samples. The mean percentage difference between rises and falls was found to be lower for women (13%) than for men (25%), (where both men and women had a greater percentage of falls than rises), and suggested that for some speakers this might be a diagnostic of sex-differentiated sub-varieties. It may well be that such sex differences are being revealed by this aspect of the tonic systems of Paul and Claire. More detailed analysis of a wider corpus would be required for this observation to have more than a limited significance.

The high relative percentage of rise-plus-falls in the P sample (8%) and the C sample (7%) requires some comment. This class of tone-type constituted only 0.5% of the tones in the Q sample of adult speech and only 1% of the tones in the T sample. The frequency of this tone-type in the P and C samples most likely reflects a certain 'instability' in terms of the intonation systems of these two children. This tone-type nearly always occurs in situations which might have been expected to have been realised with simple falls - its use seems in some way to be 'emphatic', perhaps an attempt to achieve an equal focus for the two words on which the component parts of the tone occur. 84% of all occurrences of this tone were accompanied by strong stress on the first element, 37% of all occurrences co-occurred with a movement to high overall pitch for the tone-unit, and 31% of all occurrences were accompanied by the paralinguistic features 'tremulousness', 'falsetto', or 'husky'. In addition, 15% of these rise-plus-fall nuclei were realised with a widened first element. It is worth noting that on a number of occasions when he uses rise-plus-fall tone, Paul

repeats his utterance word for word, and substitutes for this tone a simple fall, preceded by a high unstressed syllable. For instance:

I've^{''}/blown in Catherine's// - /blow^wer thing//
''/blow^wer thing//

This type of pattern is fairly common in P, as is one in which the pre-nuclear step-up is achieved on a stressed syllable:

I'll /pull: some wallpaper off//

Similar relationships between tone types can be found in C. For instance, in the following utterances, the occurrence of the rise-plus-fall tone appears to be clearly 'emphatic':

and he^{''}/found a tree// - -
yes he^{''}/found a tree^w//

The relationships existing between such tone types in P and C suggest that the rise of the rise-plus-fall tone may be one way of achieving an emphatic 'rising head' (the head of the tone unit'. . . refers to the stretch of utterance extending from the first stressed and usually pitch-prominent syllable (onset) up to, but not including, the nuclear tone.' (Crystal, 1969:207)). It is worth noting a strong tendency for the rise-plus-fall tone to co-occur with changes in the system of tempo (rallentando, lento, and lentissimo), which tends to support the notion that this tone-type, at least in some of its occurrences, has a

particularly marked function. That is, the children seem to be using this tone as an emphatic variant of the simple falling tone (perhaps where adults might realise this emphasis by use of a complex rise-fall). The frequency of occurrence of this rise-plus-fall tone in the P and C samples, in the light of its infrequency in the T and Q samples, can probably best be seen as a reflection of the children's stage of development in the acquisition of their intonational systems.

Before moving on to investigate some of the correspondences between other prosodic and paralinguistic features, it is necessary to consider the implications, not yet explored, of the similarities between the P and C samples, and between P, C and T samples. The similarities between these three samples, in terms of the gross percentage distribution of tone types, are of some interest in the light of the rather different nature of the interactive situations from which they are drawn. The T sample represents speech occurring during the course of an informal, loosely structured interview, while both the P and C samples derive from a range of different kinds of interaction in naturalistic situations, surreptitiously recorded. One might have expected such different circumstances to have affected such non-segmental dimensions as frequency of tone-type. The results of Crystal and Davy (1969) certainly suggest that the realisational patterns of prosodic and paralinguistic features are likely to undergo a variety of changes when the nature and purpose of the interaction change. While every attempt was made to find 'equivalent'

interactive episodes in the P and C samples, it was not possible to be entirely consistent. For instance, a larger part of the speech in the P sample derives from 'play-situations' than does the speech in the C sample. The P sample also contains more speech addressed directly to the mother alone, than does the C sample. Moreover, the speech in the C sample which does derive from 'play-situations' involves rather more explicit role-play (eg teachers, nurses) than does the similar speech in the P sample. That such differences of interactive purpose as those exemplified in the previous chapter, do not appear to be reflected in the gross percentage distribution of tone-types in the speech of these two children, is therefore of some interest.

A number of explanations suggest themselves: we could perhaps begin by arguing that the similarities observed in tone-type distribution point to the fact that the children's use of non-segmental features does not vary between different types of interaction in any significant way. We can compare Quirk et al (1972):

The young native speaker at the age of five or six has broadly speaking one form of English that is made to serve all purposes, . . . it is understood that the invariant use of language is a limitation that the child will grow out of. (24)

Such a point of view is barely tenable if we take seriously the discussion, in the previous chapter, of the different kinds of interactive strategies exhibited by these two children.

A more plausible explanation might be that the children have

different underlying prosodic systems, and that the differences in the kinds of interaction between the P and C samples result in somewhat spurious similarities in the gross percentage frequency distribution of tone-type. Additionally, it may be that although the realisation patterns of prosodic features are likely to undergo changes in different situations, frequency of tone-type enters into such changes only minimally, the major changes being realised in terms of other co-occurrent prosodic systems. That is, any modifications in terms of the system of tone which do arise from, or are related to, differing interactive situations, are not such as would cause obvious perturbations to the localised systems of tone reflected in the overall percentage distribution of particular tone-types (eg modifications may be achieved, in different interactive situations, by widening or narrowing of the nucleus, or by differential location of the nucleus with respect to lexical items. See further below, p.216ff). It is highly unlikely that the striking similarities between the relative frequencies of tone-type in P and C (Diagram 2) are entirely spurious, and result simply from the workings of different interactive situations on different underlying prosodic systems.

In order to examine further the differences and similarities between P and C, it is relevant to consider the interaction of the systems of tone and pitch-range.

The simple system of pitch-range is described in detail in Crystal and Quirk (1966), and Crystal (1969). It is taken to consist of seven terms, six of which are marked movements away from a speaker's norm, whether upwards or downwards in pitch.

The simple pitch-range system affects stressed syllables, whether nuclear or non-nuclear; its features are admitted according to the relationship between the pitch of any syllable under consideration and that of the preceding syllable. The six marked terms are: extra-high booster, high booster, booster, continuance, drop, and low drop (see Chapter 2, p.85, for further details, and for the notation of these features). The unmarked term in this system is ' . . . the perceptible drop in pitch level that observers have often noted as characteristic of the progress of pitch in English' (Crystal and Quirk, 1966:45-46).

It is useful, first, to consider some general characteristics of the occurrence of pitch range features in the P and C samples. The overall occurrence of marked pitch-range features, whether co-occurring with nuclear syllables or not, is somewhat different in the two samples. This can be clearly seen if we divide the marked pitch-range terms into two major groups: (i) 'generalised booster' (extra-high booster, high booster, booster, continuance), and (ii) 'generalised drop' (drop, low drop). Table 26 compares the frequency of generalised boosters and generalised drops as a percentage of marked pitch-range terms in the two samples.

Table 26. Generalised boosters and generalised drops in the P and C samples, as a percentage of all marked simple pitch-range terms.

	<u>P</u>	<u>C</u>
generalised booster	90%	81%
generalised drop	10%	19%

From this we can see that both children show preferential realisations of generalised boosters, but that this tendency is somewhat more marked in P than it is in C.

Not only does Paul show more frequent occurrences of generalised booster in his speech than does Claire, he also shows a higher frequency of occurrence of the more marked boosters. If we break down the percentages for the generalised boosters shown in Table 26, and discriminate between different kinds of booster, this becomes apparent.

Table 27. Particular booster types in the P and C samples, as a percentage of generalised booster.

Booster types	<u>P</u>	<u>C</u>
!!	6%	1%
!	12%	4%
:	57%	71%
.	25%	24%

We can note first, that boosters (:), comprise the single largest group of booster-type for both children. In addition, both children are similar in terms of the relative frequency of continuances (.), which suggests that this may be a similarity between them in terms of the localised intonational systems which they are acquiring. (There is a marked similarity in the distribution of continuances in P and C between those which are nuclear and those which are non-nuclear. 59% of continuances in P, and 60% in C co-occur with nuclei. Moreover, nuclear continuances in the speech of both children, show a strong tendency to be associated with particular nuclei: with falls (43% P; 49% C), with levels (30% P; 32% C), with rises (25% P; 12% C.) The relatively low association of continuances with rises in C is one aspect of Claire's tendency to prefer generalised drops rather than generalised boosters with rises, and is probably an

indication that she is learning a somewhat different sub-variety of the localised intonation system to that being acquired by Paul. (Some further supporting evidence for this claim is given below, p.214 ff; p. 219 ff.)

The differences between P and C in terms of the occurrence of other booster-types (extra-high booster, high booster) may perhaps be related to differences in the kinds of interaction which comprise the P and C samples. However, we should note that Paul shows a general tendency to exhibit a greater range of variability in the realisation of prosodic (and paralinguistic) systems than does Claire, and that he frequently tends to 'overmark' all kinds of interaction by the use of the 'extremes' of prosodic systems (eg very loud, very fast, or very slow utterances). That is, apart from the system of tone, few of the other prosodic systems in Paul's variety at this time show the functional independence which is typical for most adult varieties (cf Crystal, 1969:175-176). We can see an example of this 'overmarking' if we examine the co-occurrence patterns between features in the simple pitch-range system, and syllabic features of the loudness system. All terms in the pitch-range system, by definition, involve one degree of stress, but they may in addition be marked with strong stress ("). Examining the co-occurrence of strong stress with terms from the simple pitch-range system in P and C, we find the following differences shown in Table 28.

Table 28. Percentage frequency of co-occurrence of strong stress with pitch-range features (nuclear and non-nuclear) in the P and C samples.

Pitch-range features	<u>P</u>	<u>C</u>
!!	100%	40%
!	60%	29%
:	75%	19%
.	33%	6%
norm		
,	10%	4%
;	10%	0%

We can see from this table that strong stress is associated with pitch-range features more frequently in P than in C. Moreover, the occurrence of strong stress with these pitch-range features is clearly structured in C in a way which is not apparent in P. In C, the probability of occurrence of strong stress increases the further the pitch-range feature is away from the norm (at least for booster-types). In the P sample, on the other hand, the co-occurrence of stress with these features is much more variable, and strong stress occurs frequently with upwardly marked pitch-range features, especially booster, high booster and extra-high booster. Interestingly, the 'downwardly marked' features for both children are much less likely to be realised with co-occurrent strong stress, which may indicate that these features have already acquired a marked function which does not require reinforcing by the addition of other prosodic features (see further below, p. 230 ff).

We may now consider some of the relationships between pitch-range features functioning at nuclear position, and the types of nucleus.

When we examine the data from P and C in terms of the kinds of pitch-range features which accompany nuclear tone, some of the individual differences between the non-segmental systems of the children begin to appear. Table 29 summarises some of these differences for the three most frequent tone-types in P and C.

Table 29. Percentages of the three most frequent tones in P and C accompanied by generalised boosters and generalised drops.

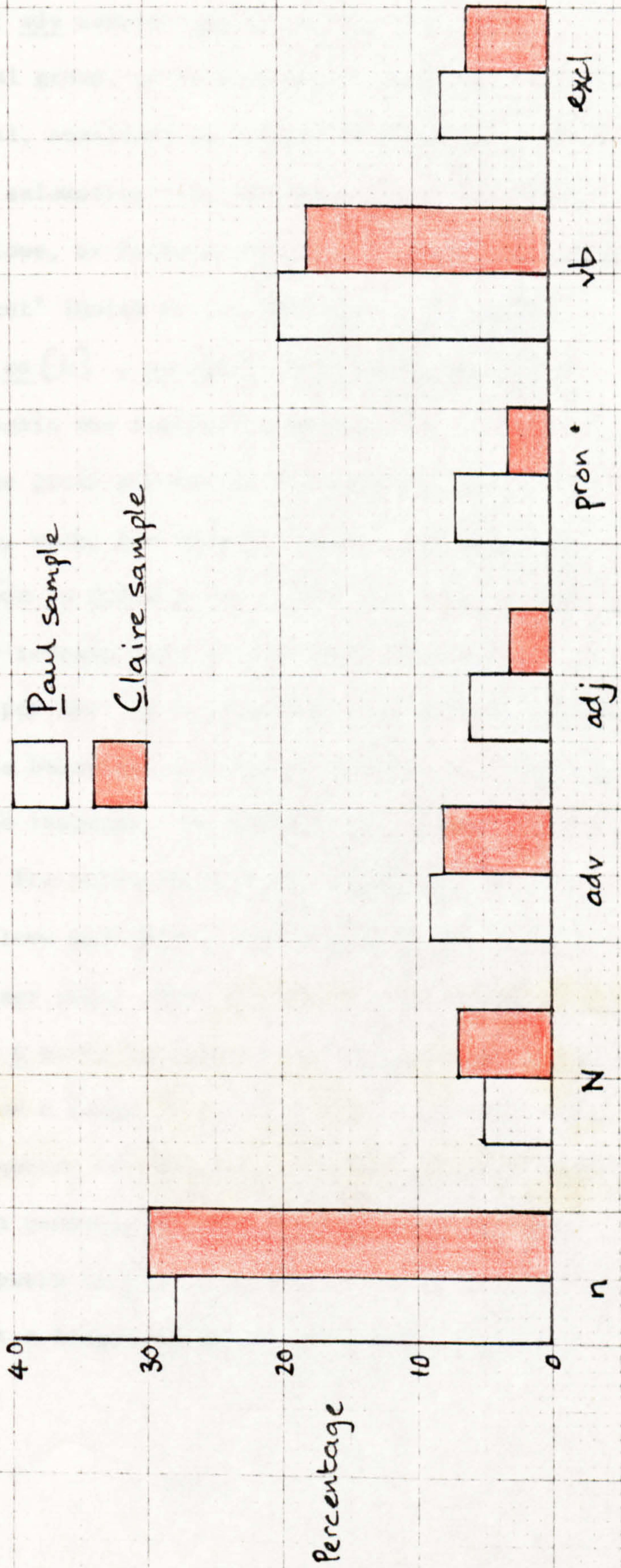
	Fall		Rise		Level	
	P \ C		P / C		P — C	
generalised booster	56%	50%	24%	8%	46%	38%
generalised drop	<u>8%</u>	<u>3%</u>	<u>7%</u>	<u>33%</u>	<u>20%</u>	<u>19%</u>
	64	53	31	41	66	57

This table reveals several interesting facts. First we can note the relatively high percentage of these nuclei which are accompanied by generalised drops and generalised boosters. We can compare Pellowe (1970), who indicates the likelihood for localised Tyneside adult speakers that '... all localised tones will tend to be realised with a pitch-range term at the nuclear syllable' (12), but also indicates that the occurrence of particular pitch-range features with particular tones appears to be gradient. It is not entirely clear whether the generally high percentage of nuclear tones in P and C which are realised with terms from the pitch-range system is a feature of the children's localised intonational varieties, or whether a feature of the state of their intonational varieties at this particular time (ie it may be a reflection of developmental variability - compare Paul's variability in terms of the distribution of generalised boosters (Table 27)). Certain patterns are apparent, however, which suggest that these percentages

reflect genuine differences and similarities between the children's underlying intonation systems. For both children we observe a strong association between generalised boosters and falling nuclei, and a slightly less strong association between generalised boosters and level nuclei. There is also an association between generalised drop and level nuclei for both children. Moreover, neither Paul nor Claire realise many falls with generalised drops, but there is a clear tendency for Claire to have a preferential realisation of rises with generalised drops as opposed to generalised boosters. The reverse of this is the case for Paul. The difference which we observe in terms of preference of generalised booster, or generalised drop with rises, would appear to be connected to the differences noted earlier (p.203ff and footnote p. 203)between the status of rising nuclei in Paul's and Claire's speech.

We may examine further some of the dependencies exhibited by prosodic systems in the speech of Paul and Claire, if we consider the interactions between the selection of nuclear tone and its location in terms of selected word classes. Quirk et al (1964) demonstrated that ' . . . there is in some measure an association between certain nucleus types and certain form-classes' (135) for adult speakers of non-localised varieties of English. When localised Tyneside adult speech was compared with that of non-localised adult speech, Pellowe (1970) was able to show that there existed certain significant differences of association between particular nuclei and form classes. Diagram 4 therefore plots the gross percentage distribution of nuclei by selected word class to ascertain if any such stable associations exist in the speech of the children.

Diagram 4: Gross percentage distribution of nuclei
by selected word classes



WORD CLASSES

The word classes have been selected so that comparison may be made with Quirk et al (1964), Pellowe (1970) and Pellowe and Jones (1978). The classes identified are as follows: n common noun; N proper name; adv adverb; adj adjective (operating as modifier in a nominal group, or as complement following a finite verb); vb verb (modal, auxiliary or lexical element of a finite verbal group); excl exclamation (not included for consideration by Quirk et al, Pellowe, or Pellowe and Jones) 'emotive words having no referential content' (Quirk et al, 1972:413), for example, oh [əʊ], ouch [aʊtʃ], ee [i:], ow [aʊ], hey [heɪ], eh [eɪ].

We note that again the similarity between the two children is quite marked. The gross percentage distribution across three classes (common noun, verb, and adverb) reveals the same rank ordering as that found in Quirk et al (1964) and Pellowe and Jones (1978), and probably reveals very little about the children's localised varieties per se; it is, however, interesting to note that the children are behaving in a manner similar to 'competent' adult speakers of the language. We should note, however, that the class 'exclamation', for which there is no comparable data in Quirk et al, or in Pellowe and Jones, enters significantly into the distribution of nuclear tone. This is almost certainly a reflection of the samples P and C being the speech of children, and being speech which was sampled from a range of naturalistic situations. The slightly greater frequency of nuclei falling on 'exclamations' in P is almost certainly a consequence of the fact that a somewhat larger part of the speech in P derives from 'play situations' in which we might expect a larger number of such items to arise.

Diagram 5: Percentage distribution of falling tone occurring with selected word classes.

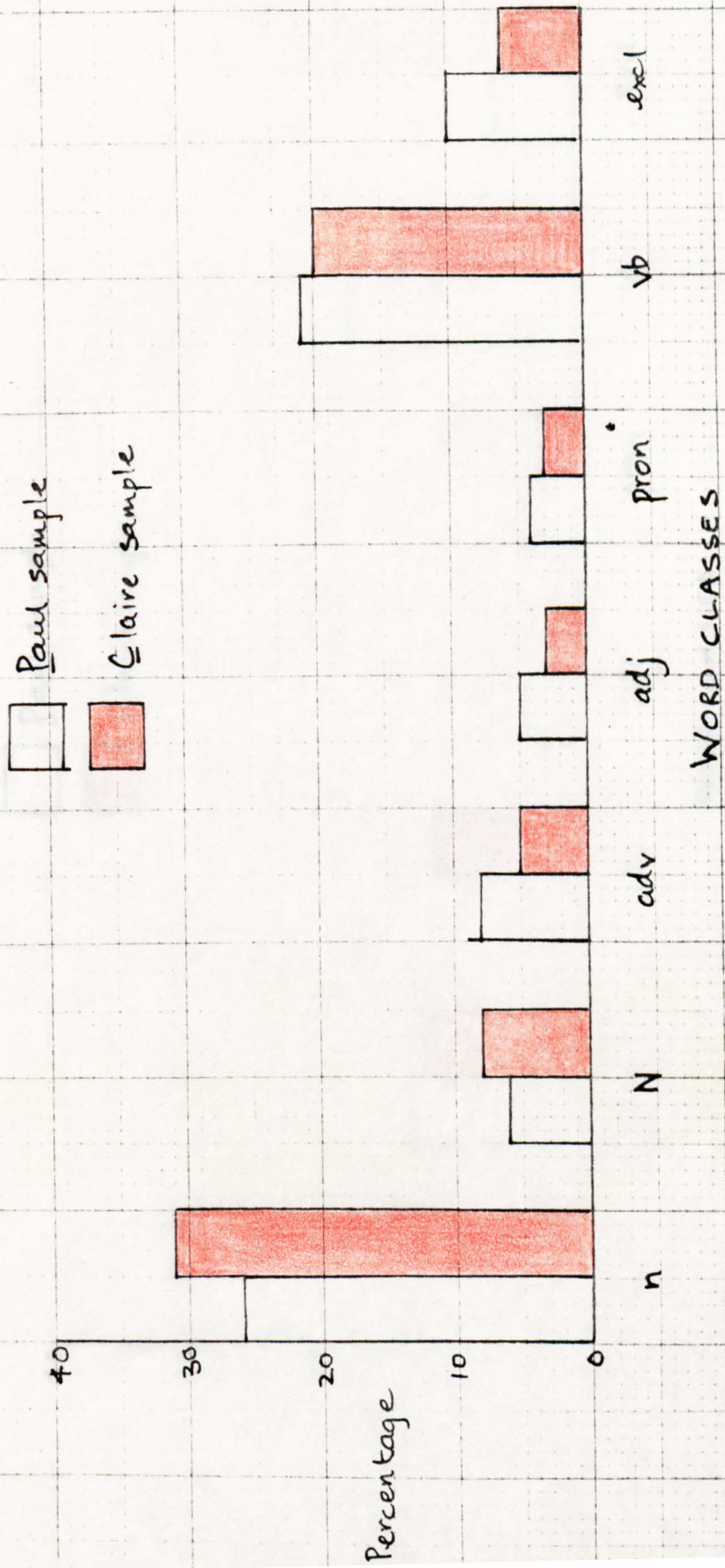
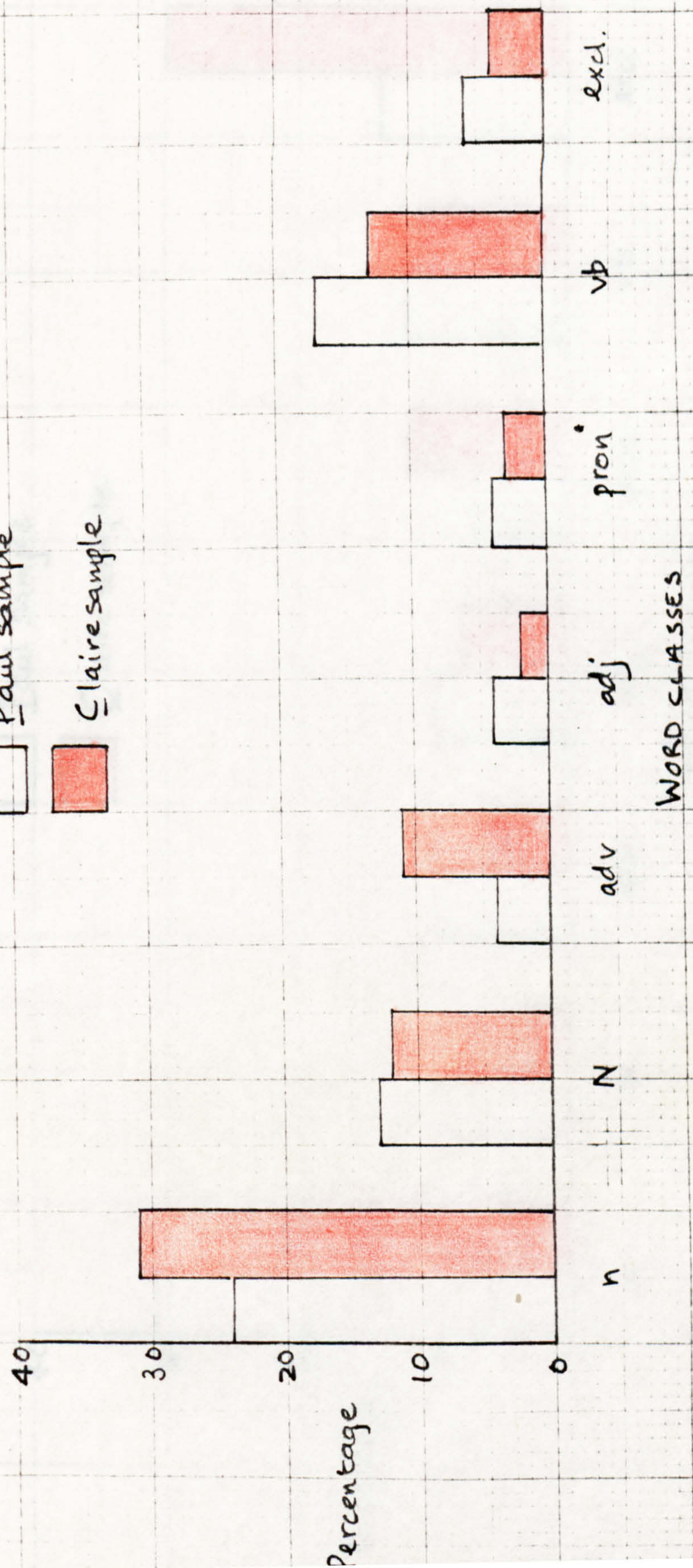


Diagram 6: Percentage distribution of rising tone occurring with selected word classes.

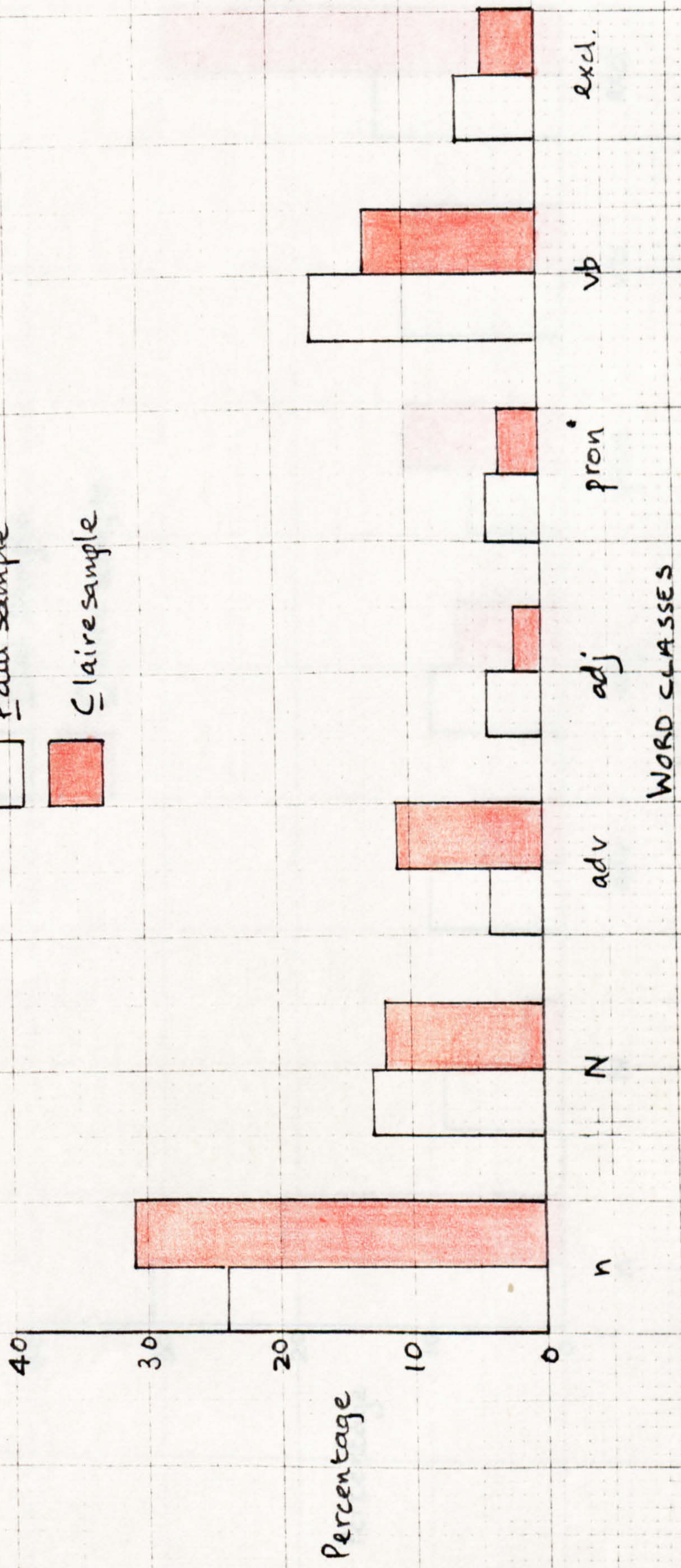
Paul sample
 Claire sample



WORD CLASSES

Diagram 6: Percentage distribution of rising tone occurring with selected word classes.

Paul sample
 Claire sample



WORD CLASSES

Diagram 7: Percentage distribution of rise-fall tone occurring with selected word classes

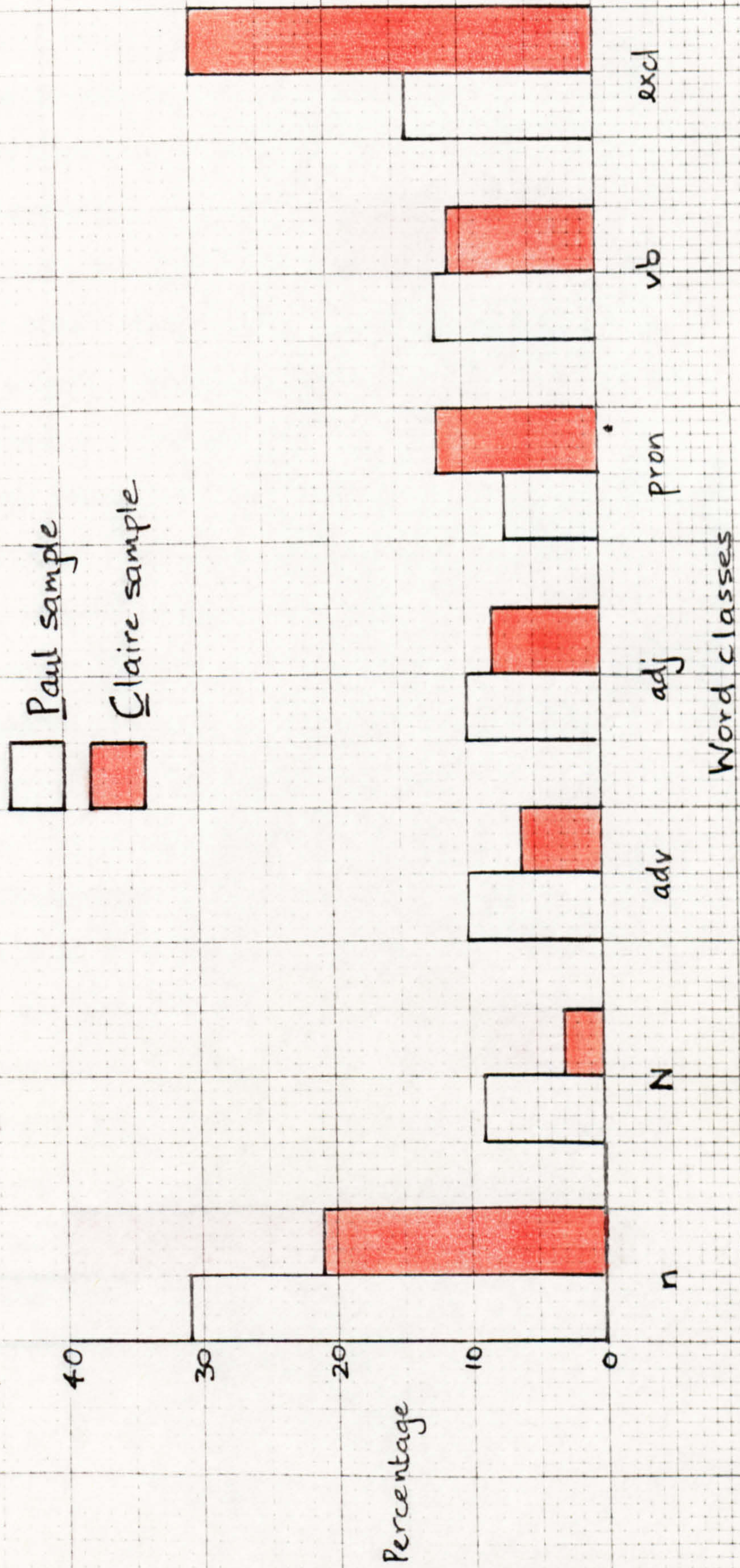
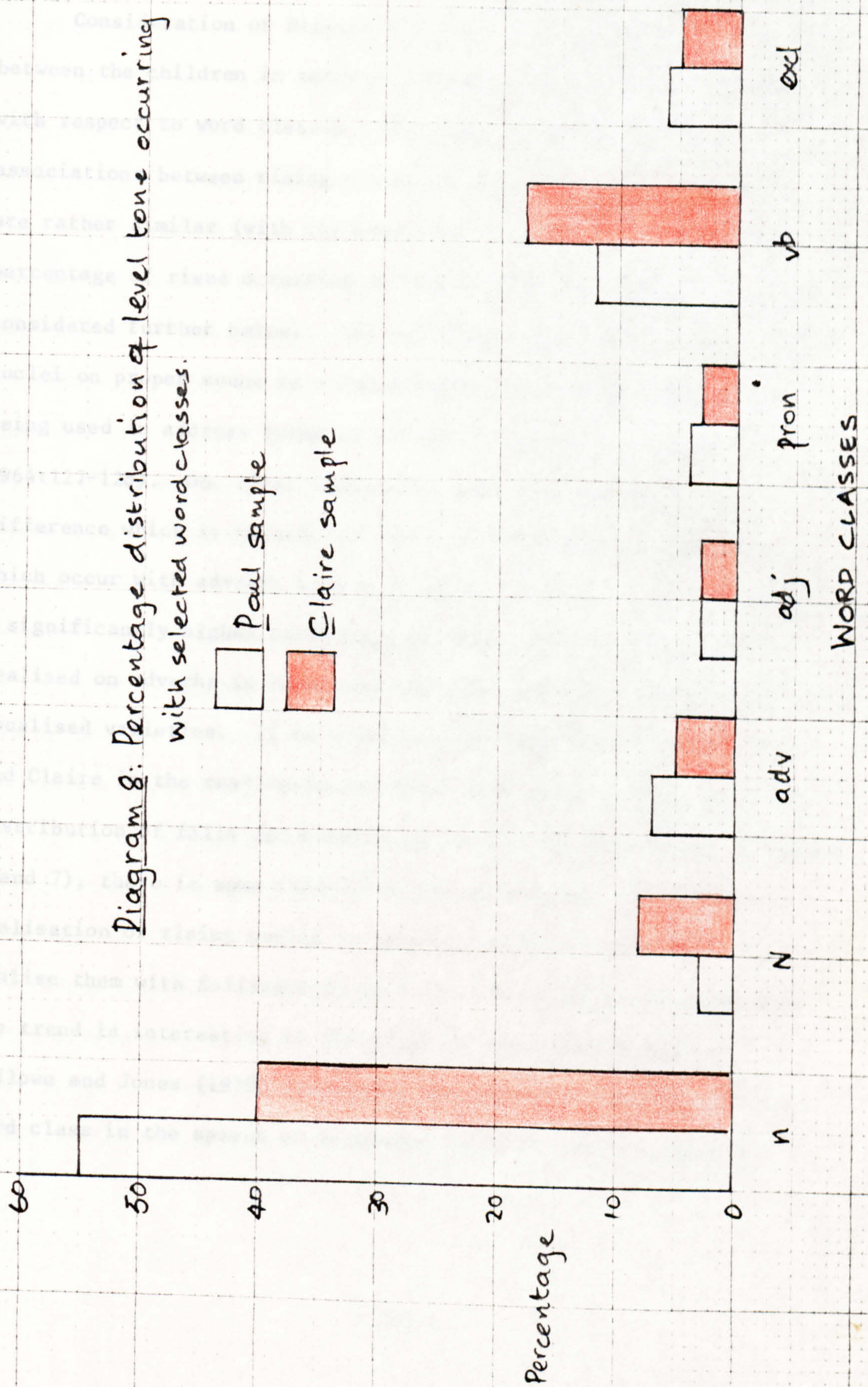


Diagram 8: Percentage distribution of level tone occurring with selected word classes.



□ Paul sample
 ■ Claire sample

WORD CLASSES

Diagrams 5, 6, 7, and 8, present the same information, broken down in terms of individual tone-types co-occurring with these word classes (for falls, rises, rise-falls, and level nuclei respectively).

Consideration of Diagram 5 reveals no significant differences between the children in terms of the distribution of falling nuclei with respect to word classes. Diagram 6, likewise, reveals that in associations between rising nuclei and word classes, the children are rather similar (with the exception of the higher relative percentage of rises occurring on common nouns in C. This will be considered further below). The relatively high incidence of rising nuclei on proper nouns is a consequence of the frequency of names being used in address forms of various kinds in P and C (cf Quirk et al 1964:127-128). One other feature of note in Diagram 6, is the difference which it reveals in terms of frequency of rising nuclei which occur with adverbs between P and C. Pellowe (1970) found that a significantly higher percentage of rises and fall-rises were realised on adverbs in localised Tyneside varieties than in non-localised varieties. If we consider the differences between Paul and Claire in the realisation of rises with adverbs along with the distribution of falls and rise-falls on the same word class (Diagrams 5 and 7), there is some indication that Claire has a preferential realisation of rising nuclei on adverbs, whereas Paul tends to realise them with falling-type nuclei. The evidence is slight, but the trend is interesting in the light of the comments made by Pellowe and Jones (1978) concerning the nuclei associated with this word class in the speech of localised Tyneside adult speakers:

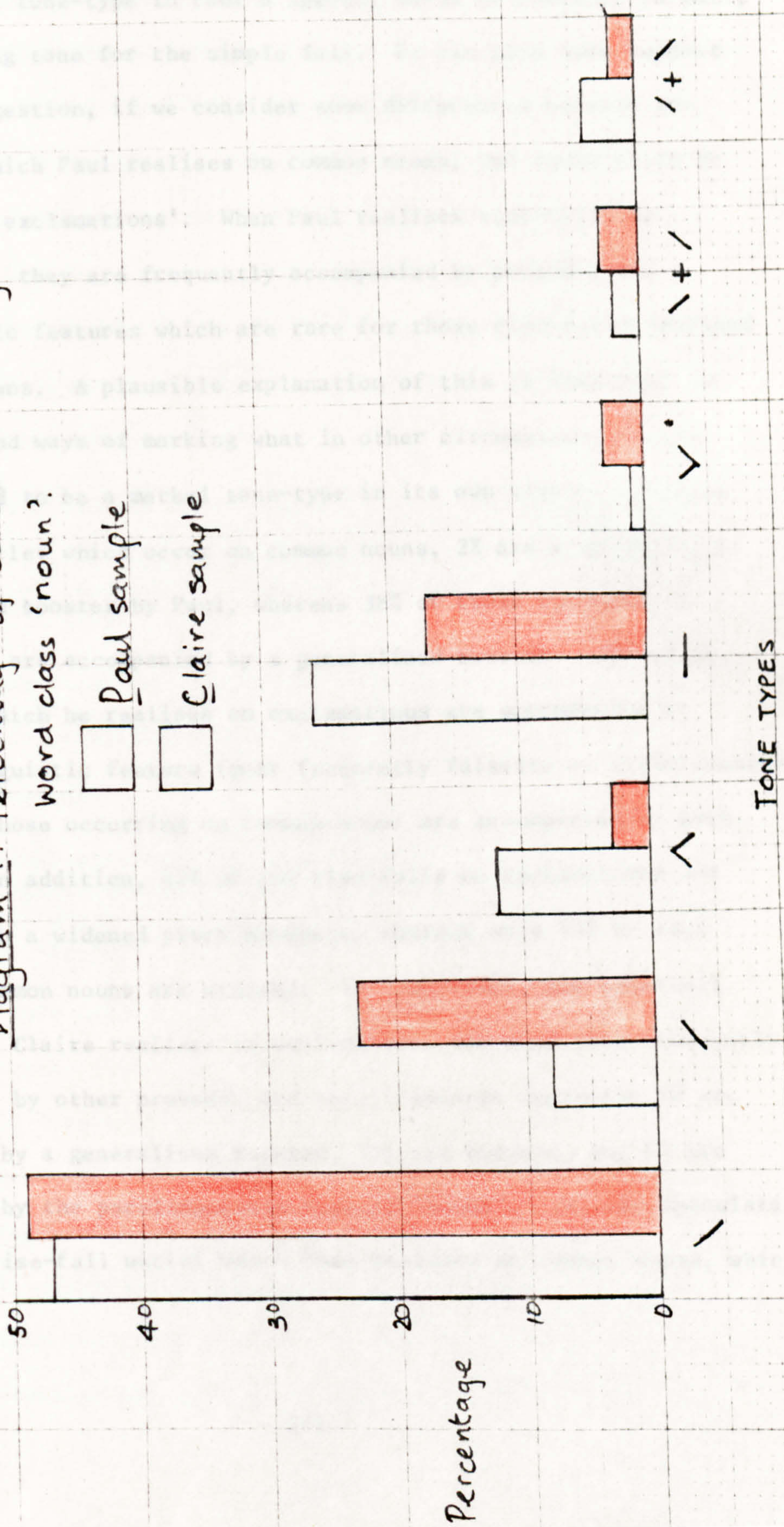
. . . men tend to have a high frequency of nuclear adverbs which are realised as falls and a low frequency which are realised as rises and fall-rises. Women show the converse tendency. (116-117)

It may well be that Paul and Claire are acquiring such a distinction in their intonational systems.

Diagram 7, which plots the frequency of word classes realised with rise-fall nuclei, reveals certain differences in the distribution of this tone between the two children. In particular, we note Claire's use of this tone with the word class 'exclamation', and the differential realisation of common nouns with this tone by Paul and Claire. These differences may well be explicable if we postulate different patterns of tone-replacement preferences for the two children (replacement preferences refer to groups or pairs of nuclei which may tolerate exchange in given circumstances). In order to see whether such an explanation is possible, we can consider the occurrence of different nuclei with the word class 'common noun' - the largest single word class with which nuclei are realised (Diagram 9). For falls, the children are again similar, but we can see differences in the realisation of rises, rise-falls and levels on nouns (the difference in fall-rises may be significant also, but the frequency of this tone-type in P and C is not great enough to allow us to draw any conclusions). This distribution does suggest that the children do have somewhat different preferences of realisation and that Paul makes use of rise-fall tones in a way which Claire does not. That is, he can use this tone-type (along with falls and levels) to realise common nouns whereas Claire's preferential realisations for nouns are falls, rises and levels.

Diagram 9: Percentage of tones occurring with the word class 'noun'.

Paul sample
 Claire sample



Rise-fall nuclei for Claire appear to have a restricted distribution, and probably a 'marked' function which they do not have for Paul. The rise-fall tone-type in Paul's speech, seems to operate, in part, as a replacing tone for the simple fall. We can gain some support for this suggestion, if we consider some differences between the rise-falls which Paul realises on common nouns, and those which he realises on 'exclamations'. When Paul realises rise-falls on exclamations, they are frequently accompanied by prosodic and paralinguistic features which are rare for those rise-falls realised on common nouns. A plausible explanation of this is that Paul is having to find ways of marking what in other circumstances might be considered to be a marked tone-type in its own right. Of those rise-fall nuclei which occur on common nouns, 2% are realised with a generalised booster by Paul, whereas 38% of those realised on exclamations are accompanied by a generalised booster. 68% of the rise-falls which he realises on exclamations are accompanied by some paralinguistic feature (most frequently falsetto or tremulousness), only 4% of those occurring on common nouns are accompanied by such features. In addition, 42% of the rise-falls on exclamations are realised with a widened pitch movement, whereas only 12% of such nuclei on common nouns are widened. In comparison, the rise-fall nuclei which Claire realises on exclamations are much less frequently 'reinforced' by other prosodic and paralinguistic features: 8% are accompanied by a generalised booster, 10% are widened, and 1% are accompanied by the paralinguistic feature 'husky'. (We may speculate that those rise-fall nuclei which Paul realises on common nouns, which

are accompanied by 'reinforcing' prosodic and paralinguistic features, are 'truly contrastive'. Further data presently under analysis may reveal whether or not this is a tenable hypothesis.) These distinctions tend, I think, to support the claim made earlier, that while there are significant similarities between the children in terms of their non-segmental behaviour, they appear to be acquiring somewhat different sub-varieties of localised intonation systems.

In conclusion, I present some generalisations concerning some of the paralinguistic and prosodic features not yet considered. Paralinguistic features, in the sense of Crystal (1969), are vocal effects which are considered to be:

. . . combinations of physiologically grounded parameters with pitch, loudness, duration and silence being variable in relation to their identification (for example, different degrees of loudness distinguish 'ordinary' from 'stage' whisper). (139)

Crystal distinguishes two phonetically different groups of such features: 'voice qualifiers' and 'voice qualifications'. These features consist of:

. . . vocal effects which are primarily the result of physiological mechanisms other than the vocal cords, such as the direct result of the workings of the pharyngeal, oral or nasal cavities . . . (Crystal, 1969:128)

They also include effects which other writers might refer to as 'phonation types' (Catford, 1964; Laver, 1975), such as 'whisper', 'breathiness', 'creak', and 'falsetto'. The distinction which is drawn between the 'voice qualifiers' (of which the above in the previous sentence are some examples), and 'voice qualifications', is consequent on the fact that because of their phonetic nature some voice qualifiers can co-occur, but for exactly the same reason voice qualifications may not co-occur with each other. They form

a continuum of effects: 'laugh, giggle, tremulousness, sob, cry'. The voice qualifiers and qualifications are given 'parametric' phonetic descriptions by Crystal (1969:133-137), which are useful but somewhat fragile guides to auditory characteristics. The paralinguistic voice qualifiers can conveniently be regarded as short-term realisational equivalents to the kinds of 'voice quality' features discussed by Laver (1975). The classificatory framework proposed by Crystal (1969) for the description of paralinguistic effects in the speech of adults has proved to be reasonably capable of handling the range of such effects in the speech of the two children under consideration.^{Fn}

Fn. The effects 'round', 'spread', and 'vibrato', which I have discussed previously (p.130; p.187), have been found to be necessary additions to Crystal's framework. It has also been necessary to extend the classificatory frame further, by the addition of the effects 'nasality' (nas) and 'denasality' (denas). These effects refer to nasalization and denasalization (continuing velic opening, and continuing velic closure respectively) operating over polysyllabic stretches. (When denasality occurs in the speech of Paul and Claire it tends to be accompanied by velarization). These effects are somewhat less frequent than the other paralinguistic effects in the recordings I made of Paul and Claire, but their inclusion is clearly necessary in order to account adequately for the range of contrasts which Paul and Claire exhibit. I have observed 'nasality' employed by a number of children in other-focussing mockery, and 'denasality' used when role-playing someone with a cold (with attendant nose-wiping gestures). One child, Barnaby, who was referred to at the beginning of this chapter (p.197 Fn), quite frequently realised stretches of speech which were accompanied by 'sob' with co-occurrent 'denasality', apparently to emphasise the crying effect.

The frequency of occurrence of paralinguistic features in the speech of Paul and Claire is in marked contrast to the frequency observed for adults. Crystal (1969) emphasises that in the speech of the

adults in his sample, paralinguistic features are 'infrequently used' (1969:137). He indicates that they occur about once in every 22 tone-units, or, 'in grammatical terms' about once in every hundred words. In the P and C samples paralinguistic features occur much more frequently: about once in every 4 tone-units for Paul, and about once in every 6 tone-units for Claire. There are two major reasons for this difference in frequency between the Crystal corpus and the P and C data. First, the nature and range of the situations from which the P and C data derive differ from those which yield the Crystal data. Second, there is a considerable difference in age between the speakers in the Crystal sample, and Paul and Claire. The frequency of occurrence of paralinguistic features in P and C characterises an important aspect of the language of children. We can note, for instance, the occurrences of the voice qualifications 'laugh, giggle, sob, cry' in the P and C samples (see below, Table 30). The features 'giggle, sob, cry' were not exemplified in the Crystal data, presumably because of the settings and interactants studied. The Crystal corpus consisted of 'informal discussions and conversations' between speakers, the majority of whom were 'male and middle-aged' (1969:12). As Crystal and Davy (1969) have shown, as soon as one investigates a variety of naturalistic speaking activities and situations, the range and frequency of paralinguistic features increases beyond that exhibited by 'middle-aged males' in 'informal discussions.'

The problems presented in attempting to quantify paralinguistic features deserve some comment. The difficulties are particularly

acute if we wish to employ paralinguistic features in attempts to compare speakers of different varieties of the same language. We lack information, for example, concerning the frequency with which an effect needs to occur before it is either taken to be part of voice quality, or recognised as indexing some specific meaning in what the speaker is saying. In order to effect some comparisons, therefore, between Paul and Claire, in terms of their use of paralinguistic features, I have adopted the policy of quantifying these features simply in terms of the number of words in each child's speech which are realised with a particular paralinguistic feature (whether or not the feature co-occurs simultaneously with other such features). Table 30 gives details of the paralinguistic features in the speech of Paul and Claire, in quantified form.

Table 30. Frequency of occurrence of paralinguistic features (in words) in the P and C samples.

Paralinguistic feature	<u>P Sample</u>	<u>C Sample</u>
	Frequency in words	Frequency in words
whisper	16	34
breathy	37	61
husky	158	27
creak	30	19
falsetto	49	10
resonant	3	0
round	29	25
spread	20	14
vibrato	22	17
nasality	10	0
denasality	16	8
laugh*	14	26
giggle	5	11
tremulousness	95	15
sob	9	5
cry	6	2

* the figures here for the 'voice qualifications' exclude natural laugh, giggle, sob, and cry which occur independently of institutional words.

As Crystal has indicated, figures such as those presented in Table 30 are not linguistically significant and should only be taken as another 'rough indication of expected frequency' (1969:137). Nonetheless, even this rather crude representation suggests some marked differences between Paul and Claire.

The first thing to note about the children's linguistic behaviour in this respect, is that Claire is more sparing in her use of paralinguistic features than is Paul. She also differs with respect to 'preferred' paralinguistic features. Claire shows a tendency to prefer the 'quieter' paralinguistic features: 'whisper' and 'breathy', whereas Paul exhibits tendencies towards realisation with the features 'husky' and 'tremulousness'. Claire's preferences for 'breathy' and 'whisper', and Paul's for 'husky' recall the sex-differentiating paralinguistic features discussed in Chapter 2. The children are fairly similar in terms of the occurrence of the features 'round', 'spread', and 'vibrato' (about 1% of their words). The differences between the children in terms of relative frequencies of 'laugh' 'giggle', 'sob' and 'cry' to some extent are related to the differences in interaction which comprise the P and C samples (most of the occurrences of 'laugh' in Claire's speech occur during an episode of humorous story telling). As might be expected, paralinguistic features in the speech of Paul and Claire show a tendency to cluster in particular kinds of speaking activity. Diagrams 10 and 11 give some very general indications of such tendencies in the speech of these two children. Diagram 10 plots the relative frequency of occurrence of paralinguistic features between two 'episodes' of Paul's speech. These episodes are contiguous.

Diagram 10: Frequency of occurrence of paralinguistic features in Pawl's speech in two contiguous 'episodes'

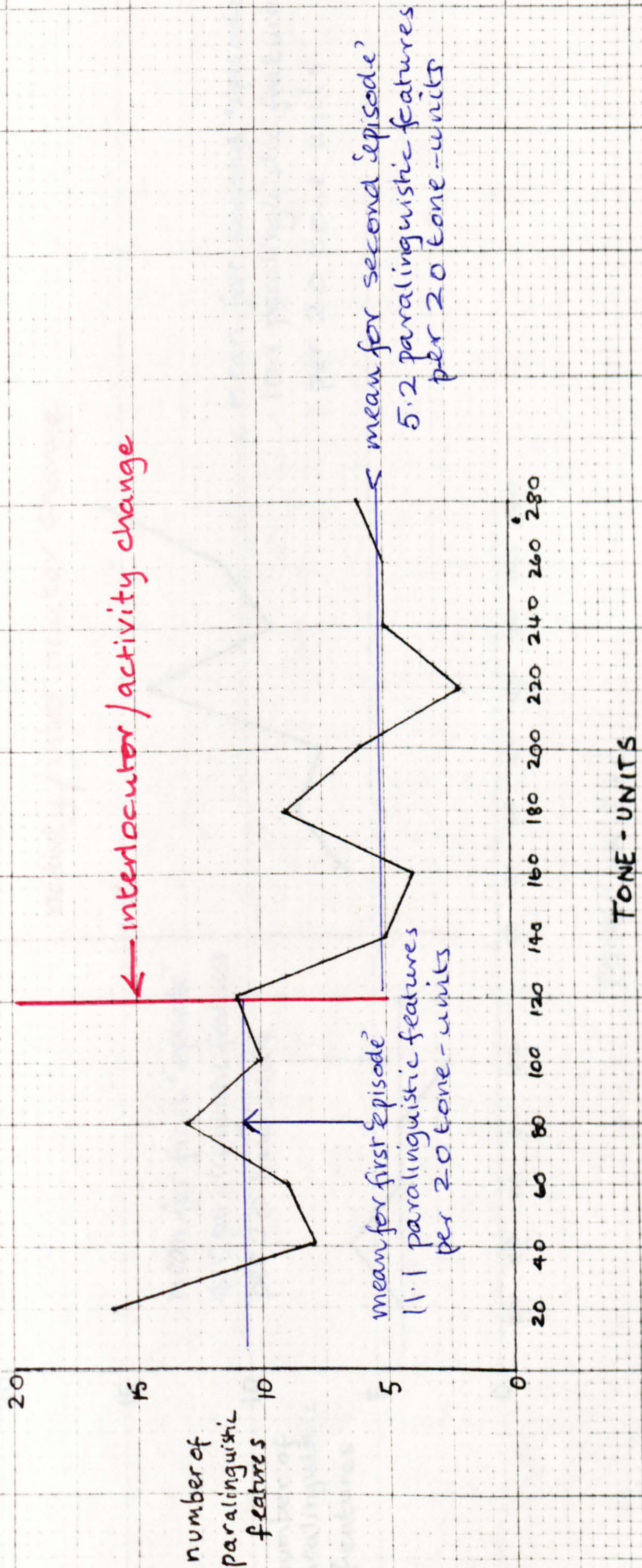
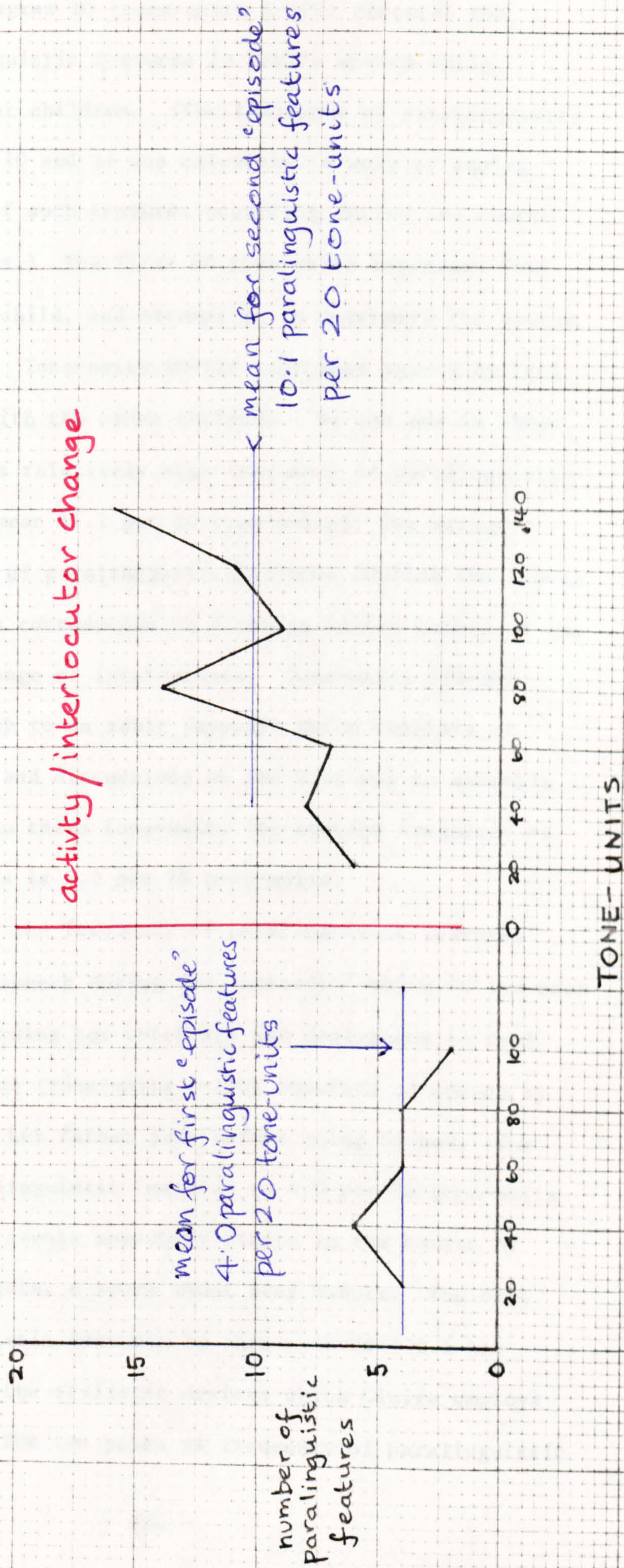


Diagram 11: Frequency of occurrence of paralinguistic features in Claire's speech in two 'episodes'



The first part of Diagram 10 (tone-units 1-120) pictures the frequency of paralinguistic features in Paul's speech while interacting with other children. (The frequency of paralinguistic features in Diagrams 10 and 11 was calculated simply by adding together the number of such features occurring during the course of every 20 tone-units.) The first 80 tone-units represent Paul arguing with another child, and attempting to determine the course of the play-activity. Tone-units 80-120 represent speech by Paul during general play with the other children. We can see in these first 120 tone-units a relatively high frequency of paralinguistic features (arithmetic mean 11.1 per 20 tone-units). The marked drop in the frequency of paralinguistic features (during the course of tone-units 120-140) corresponds to a change in the nature of the interaction, and a change of interactants. Tone-units 120-280 represent Paul's speech to an adult (myself) which consists of general conversation, and discussions on the best way to assemble a wooden toy truck. In these tone-units the average frequency of paralinguistic features is 5.2 per 20 tone-units.

Diagram 11 plots the frequency of paralinguistic features occurring in Claire's speech during two 'episodes' which follow each other on the tape recording but which are not contiguous in real time. The first episode (tone-units 1-100) consists of speech by Claire when talking to her father just before going to bed. The mean frequency of paralinguistic features is 4.0 per 20 tone-units. The second episode represents speech by Claire in the course of telling her sister, Angela, a story about Brer Rabbit. The high frequency of paralinguistic features in this episode (10.1 per 20 tone-units) reflect the stylistic devices which Claire employs in telling the story. The two peaks of frequency of paralinguistic

features in this story-telling episode (16 and 14 features per 20 tone-units) correspond to points of climax in the narrative.

As well as exhibiting situationally or contextually motivated associations, certain of the paralinguistic features in the speech of Paul and Claire show dependencies with particular prosodic features. The 'quieter' paralinguistic features, 'whisper' and 'breathy', in the speech of both children, show a tendency to be associated with the quieter contrasts in the prosodic system of loudness (details of the frequencies and co-occurrences of some of the prosodic systems in the speech of Paul and Claire are presented in the appendix to this chapter). The paralinguistic feature 'husky', for both children, shows strong associations with forte/fortissimo contrasts. In Claire's speech 79% of all occurrences of 'husky' occur in stretches marked with forte/fortissimo loudness, 63% of the occurrences of 'husky' in Paul's speech occur in such stretches. There is also a marked tendency for 'husky', in Claire's speech, to co-occur with strong stress. Over one-third of all the occurrences of 'husky' in Claire's speech are accompanied by strong stress.

As I have indicated earlier (p. 219), there also appears to be an association between the paralinguistic features 'falsetto', and 'tremulousness' and rise-fall nuclei in the speech of Paul. The extent to which such co-occurrences as these represent limitations on the 'functional independence' of the paralinguistic features, cannot as yet be determined.

One final point of interest concerning paralinguistic features in the P and C samples is the number of words over which particular

features extend. In comparison with Crystal (1969), who found it rare for paralinguistic features to be co-extensive with tone-units, such occurrences are common in the speech of Paul and Claire, although given the low mean tone-unit length in words, this, perhaps, is not altogether unexpected. More detailed information concerning the variable domains of paralinguistic and prosodic features is clearly required for both children and adults, if we are to make meaningful generalisations about children's development towards 'adult norms' of realisation.

I present now some general details concerning the prosodic systems of polysyllabic tempo, loudness, and pitch-range in the speech of Paul and Claire. Interestingly, and somewhat unexpectedly, the marked levels which Crystal postulates, in these systems, for the speech of adults, proved adequate to describe the contrasts in the speech of the two children. That is, it was not necessary to postulate any more than four distinct marked terms in the tempo and loudness systems (ie *allegro*, *allegro*, *lento*, *lento*; *fortissimo*, *forte*, *piano*, *pianissimo*). In terms of occurrence of features from these prosodic systems, Paul is again much more variable than Claire. In P, we find a higher percentage of the extremes of the prosodic systems of tempo and loudness, and rather more complex interactions in terms of co-occurrence dependencies. If we consider the frequency of occurrence of features from the systems of tempo, loudness and pitch-range, in terms of the percentage of words in the children's speech, a general trend emerges wherein Paul exhibits somewhat greater frequency of 'upwardly' marked features.

Table 31. Percentage of words in the P and C samples realised with 'upwardly' marked features of the polysyllabic pitch-range, loudness and tempo systems.

	<u>P Sample</u>	<u>C Sample</u>
high	18	9
forte/fortissimo	24	17
allegro/allegrissimo	20	14

Both children realise fewer of their words with 'downwardly' marked features (low, piano/pianissimo, lento/lentissimo):

Table 32. Percentage of words in the P and C samples realised with 'downwardly' marked features of the polysyllabic pitch-range, loudness and tempo systems.

	<u>P Sample</u>	<u>C Sample</u>
low	8	6
piano/pianissimo	5	12
lento/lentissimo	10	12

The trend is not so consistent as that shown by the 'upwardly' marked features, but there does seem to be an indication here that Claire realises more contrasts in a 'downwards' direction. We should also note that although Claire, like Paul, realises fewer contrasts with 'downwardly' marked features than she does with 'upwardly' marked ones, the percentage difference between these two groups is not so great as that shown by Paul. Here again, we have an indication that Paul is generally more variable than Claire in the range of contrasts he realises in his speech.

One important characteristic of these features of polysyllabic pitch-range, loudness, and tempo systems, in the speech of Paul and Claire, is their relative lack of 'functional independence'. That is, these features show high frequencies of co-occurrence and multiple co-occurrence (ie simultaneous co-occurrence with more than one other feature) with other prosodic features. This suggests that these features do not have sufficient independent functional 'weight' to achieve specific effects, without the support of additional contrasts. It is unlikely that this lack of 'functional independence' is a characteristic of the localised varieties which the children are acquiring (however, until comparable data for adults is available, it is not possible to be conclusive about this. Crystal (1969) finds, for non-localised adult speakers, considerably less dependency between prosodic systems than is apparent in the speech of Paul and Claire). It seems likely that this relative lack of independent function for these prosodic features, is another aspect of the stages of development which the children have reached in the acquisition of their language.

The present data in the P and C samples does, however, offer some evidence that there may be degrees of 'functional independence' amongst these prosodic features. We can get some idea of the dependencies existing between these prosodic systems, if we express the number of times a given feature occurs with other features, as a percentage of its total number of occurrences. Table 33 presents the relative percentage frequencies of co-occurrence, derived in this way, for the marked features of the polysyllabic systems of pitch-range, loudness and tempo. For clarity of presentation,

I have conflated the co-occurrence frequencies of the two degrees of 'upwardly' and 'downwardly' marked features of the loudness and tempo systems (eg the co-occurrence frequencies of allegro and allegrissimo tempo are not separately distinguished).

Table 33. Relative percentage frequencies of co-occurrence for the systems of polysyllabic pitch-range, loudness and tempo in the P and C samples.

	<u>P Sample</u>	<u>C Sample</u>
high	62	58
low	49	42
forte/fortissimo	60	49
piano/pianissimo	40	36
allegro/allegrissimo	45	38
lento/lentissimo	34	31

This table reveals several important facts. First, we can see that Claire shows relatively more 'functional independence' (less co-occurrences) across the range of these features. Second, it is clear that the 'downwardly' marked features of these systems are all relatively more 'independent' than the 'upwardly' marked features (they co-occur less often with other features). Third, there is a gradient of 'independence of function' which is similar for the two children. This can be seen if we adopt the rather crude method of calculating the mean percentage frequency of co-occurrence for the prosodic systems presented here. This calculation reveals the percentage frequencies of co-occurrence of the systems of polysyllabic pitch-range, loudness, and tempo, to be (to the nearest whole number); 55%, 50% and 39% in the P sample, and 50%, 42% and 34% in the

C sample. The most 'functionally independent' system in the children's speech, on this ranking, is tempo, and the least independent, that of pitch-range. Crystal (1969) postulates a similar relative ranking for these three systems in the speech of the non-localised adults he investigated. His ranking of these systems, however, does not reveal the relationships found here between the 'upwardly' and 'downwardly' marked contrasts. It may be that the relatively increased 'functional independence' of the 'downwardly' marked features of these systems is a characteristic of the localised varieties which the children are acquiring; however, without data for the relevant localised adult speakers, this must remain speculation. The relatively increased 'functional independence' of the 'downwardly' marked features of the tempo system, is, however, interesting in its own right, when we consider the earlier discussion concerning the effects of slow tempo contrasts on the distribution of diphthongs and their monophthongal variants in the children's speech (Chapter 3, p.136-137). Being relatively less dependent on 'reinforcement' from other prosodic features, we can argue that the slow tempo contrasts carry relatively more 'communicative weight' than the features of the other systems, and thus it is not surprising that it should exert dependency influences on other aspects of the children's (phonological) linguistic behaviour. Tempo contrasts also interact interestingly with other of the prosodic systems in the children's speech. If we consider the co-occurrence frequencies for the 'upwardly' marked loudness contrasts (forte, fortissimo), details of which are presented in the appendix to this chapter, it becomes clear that for both children there is a strong relationship between these features and the marked contrasts of the

tempo system. There are two distinct sets of co-occurrence - of forte with lento, and forte with allegro. This points to the possibility that both children operate with two distinct tempo-sensitive sub-sets of loud speech (cf Crystal, 1969:175).

The dependency relationships between the prosodic systems in the children's speech can be interpreted as further evidence of the structured nature of the non-segmental variability which they exhibit. As I suggested earlier (p.195) an understanding of such dependency relationships is of considerable importance if we wish to determine the social functions and social information which particular non-segmental contrasts can project. It is necessary to establish the extent to which co-occurrent features are interdependent (ie to establish their place in the structure of the non-segmental systems of particular varieties) before we can determine the significance of their distribution in different contexts. The significant similarities between the children in terms of the ranking of dependency relationships, discussed above, are particularly interesting when we recall that the P and C samples of speech are not comprised of identical kinds of interaction. Given the nature and range of the situations from which the samples of Paul's and Claire's speech were drawn (p.196), we can plausibly argue that the similarities displayed here cannot simply be attributed to the 'communicative requirements' of a particular kind of interaction, but that they reflect genuine similarities between the children's linguistic systems per se (cf my earlier comments concerning the similarities between the distribution of tone-types in the children's speech, p.207 ff).

* * *

Little is known in detail about the structure of non-segmental variability in children's speech. In general, where the non-segmental features of children's speech have been considered in the literature, attention has been focussed on function rather than on structure (eg Dore, 1973; Halliday, 1975; Lewis, 1936). The present chapter has attempted to redress the balance somewhat. I have presented and discussed the frequencies and co-occurrence distributions of some of the prosodic and paralinguistic features in the speech of two children taken from a range of interactive situations. Analysis of the speech-data in these terms has made it possible to determine some significant patterns of non-segmental variability in the children's speech.

I have argued that some of the patterns distinguished in this analysis (eg aspects of the children's tonic systems) are associated with 'varietal' variability (ie they are characteristic features of the localised nature of the children's non-segmental systems). Other patterns of variation distinguished, however, can be associated with variability due to 'communicative function' and to the fact that the non-segmental systems under consideration here are those of children (eg distribution of tone-units of different lengths, frequency of rise-plus-fall nuclei, range and frequency of paralinguistic features).

Quantification of the non-segmental data has enabled comparisons to be effected between the two children. It has been possible to show that while the children display certain similarities with each other (eg frequency of tone-types, distribution of features from the simple system of pitch-range, dependency rankings of prosodic systems

of polysyllabic pitch-range, loudness, and tempo) the structure and realisation of their non-segmental systems differ in a number of respects. Detailed examination of the interaction of tones with features from the simple system of pitch-range, and of tones with word classes gives indications that the children are acquiring somewhat different varieties of localised intonation systems. One difference between the intonation systems of the children can be seen in the differential associations of particular tones with word classes. This suggests that the children have somewhat different tone-replacement preferences, and hence different underlying systems.

If we hope to establish a precise picture of the structure (and functioning) of linguistic variation and its acquisition by children, then there is a pressing need for the kind of quantified treatment of children's linguistic systems such as I have presented in this chapter.

Appendix to Chapter 5

This appendix presents details of the occurrence and co-occurrence frequencies of the prosodic systems of polysyllabic pitch-range, loudness and tempo, in the P and C sample. Co-occurring prosodic features are given their abbreviated labels; the number of co-occurrences of particular features are shown in brackets after the label.

Polysyllabic Pitch-range

HIGH:

P Sample 140 occurrences (452 words), 87 multiple co-occurrences

+ loudness p(8), pp(2), f(51), ff(16)
 + tempo a(28), aa(17), l(10), ll(1), accel (6)
 + pitch-range nar(15), monot(4), wide(7)
 + tension tns(43), prec(4), lax(1)
 + rhythm stac(11)

C Sample 62 occurrences (167 words), 36 multiple co-occurrences

+ loudness p(10), pp(3), f(20), cresc(1)
 + tempo a(16), aa(4), accel(3), rall(1), l(8)
 + pitch-range nar(12), monot(2)
 + tension tns(12), prec(2)
 + rhythm stacc(4)

LOW:

P Sample 61 occurrences (192 words), 30 multiple co-occurrences

+ loudness p(10), pp(1), f(3), dim(1)
 + tempo a(10), aa(5), l(8), ll(1)
 + pitch-range nar(8), monot(2)
 + tension tns(1), lx(7)
 + rhythm stac(4), glis(2), rhyth(1)

LOW

C Sample 38 occurrences (101 words), 16 multiple co-occurrences

+ loudness p(11), pp(1)
+ tempo a(11), aa(3), l(4), ll(1)
+ pitch range nar(6), monot(4)
+ tension prec(1), lx(14)

Polysyllabic Loudness

FORTISSIMO

P Sample 26 occurrences (74 words), 21 multiple co-occurrences

+ tempo a(3), l(5), ll(1), accel (2)
+ pitch-range high(16), wide(4)
+ tension tns(8), prec(1)
+ rhythm stac(1)

C Sample 6 occurrences (19 words), 4 multiple co-occurrences

+ loudness decres(2)
+ tempo a(1), l(2)
+ pitch-range high(2), wide(1)
+ tension tns(1), prec(1)
+ rhythm stacc(1)

FORTE

P Sample 148 occurrences (533 words) 83 multiple co-occurrences

+ loudness cresc(5)
+ tempo a(32), aa(12), l(29), ll(9), accel (2)
+ pitch-range high (51), low(3), nar(6), wide(11) desc(3)
+ tension tns(40), prec(5)
+ rhythm stac(12), spk(6), glis(6), rhyth(3)

FORTE

C Sample

99 occurrences (288 words), 48 multiple co-occurrences

+ loudness dim(8)
+ tempo a(20), aa(1), l(11), ll(1), accel(3), rall(1)
+ pitch-range high (20), f(3), nar(2)
+ rhythm spk(2), stac(8)
+ tension tns(26), prec(3)

PIANISSIMO

P Sample

7 occurrences (14 words), 4 multiple co-occurrences

+ tempo a(3), aa(2), ll(1)
+ pitch-range high(2), low(1), monot(1)
+ tension lx(2), sl(1)

C Sample

16 occurrences (29 words), 6 multiple occurrences

+ tempo a(3), aa(2)
+ pitch-range high(3), low(1), monot(1)
+ tension lx(4)

PIANO

P Sample

48 occurrences (134 words) 18 multiple co-occurrences

+ loudness dim(1)
+ tempo a(9), aa(1), l(4), ll(2)
+ pitch-range high(8), low(10), nar(4), monot(3)
+ tension tns(2), prec(1), lx(10)
+ rhythm glis(4), rhyth(2)

PIANO

C Sample 72 occurrences (201 words) 26 multiple co-occurrences

+ loudness dim(1)
+ tempo a(16), aa(2), l(3), rall(2)
+ pitch-range high(10), low(11), nar(10), monot(1)
+ tension tns(1), lx(12)
+ rhythm stac(1), glis(3)

Polysyllabic Tempo

ALLEGRISSIMO

P Sample 46 occurrences (74 words), 14 multiple co-occurrences

+ loudness p(1), pp(2), f(12)
+ tempo rall(3)
+ pitch-range high(17), low(5), nar(1), wide(2), monot(4)
+ tension tns(4), sl(2)
+ rhythm stac(3)

C Sample 24 occurrences (59 words) 10 multiple co-occurrences

+ loudness p(2), pp(2), f(1)
+ tempo rall(5)
+ pitch-range high(4), low(3), nar(5), monot(3)
+ tension tns(1), lx(1), sl(2)

ALLEGRO

P Sample 136 occurrences (440 words) 68 multiple co-occurrences

+ loudness p(9), pp(3), f(32), ff(3)
+ tempo accel(3), rall(2)
+ pitch-range high(28), low(10), nar(9), wide(10)
+ tension tns(23), prec(1), lx(4), sl(3)
+ rhythm stac(11), spk(7), glis(4)

ALLEGRO

C Sample

69 occurrences (209 words), 25 multiple co-occurrences

+ loudness p(16), pp(3), f(20), ff(1)
+ tempo accel(3), rall(2)
+ pitch-range high(16), low(11), nar(8), mon(6)
+ tension tns(7), prec(2), lx(5)
+ rhythm stac(4), glis(3)

LENTISSIMO

P Sample

18 occurrences (46 words), 8 multiple co-occurrences

+ loudness p(2), pp(1), f(9), ff(1), decres(1)
+ tempo accel(3)
+ pitch-range high(1), low(1), nar(3), wide(1)
+ tension prec(1), lx(1)
+ rhythm glis(2)

C Sample

3 occurrences (12 words) 2 multiple co-occurrences

+ loudness f(1)
+ pitch-range low(1), monot(1)

LENTO

P Sample

67 occurrences (204 words), 22 multiple co-occurrences

+ loudness p(4), f(29), ff(5), cresc(5)
+ tempo accel(8)
+ pitch-range high(10), low(8), nar(7)
+ tension tns(5), prec(9), lx(3)
+ rhythm stac(4), spk(1), glis(8), rhyth(3)

LENTO

C Sample

39 occurrences (226 words) 12 multiple co-occurrences

+ loudness p(3), f(11), ff(2)

+ tempo accel(7)

+ pitch-range high(8), low(4), nar(2), monot(2)

+ tension tns(2), prec(4), lx(9)

+ rhythm stacc(3), glis(7)

CONCLUSION

If children are to become competent speakers of their language they must acquire mastery not only of linguistic form and structure, but also of the 'rules' for the appropriate use of that form and structure. They need to learn how and when to use which particular variety of their language, and to be able to interpret other speakers' use of different varieties of their language; they must learn how to handle competently linguistic variability.

In this thesis I have presented a series of studies which have been concerned with exploring the structure and functioning of linguistic variability in children's speech. The results of the experiments reported in Chapter 2, and the analyses in Chapter 4 of the interactive strategies employed by children, suggest that social awareness of linguistic variability and the acquisition of the rules for the appropriate use of that variability occur considerably before 'early adolescence' (contra Labov, 1964). It is clear that young children make systematic use of linguistic variability, and employ its resources to project a wide range of 'social information' in interaction.

Non-segmental variability in children's speech has been my main focus of interest in this thesis. My motivation for this was two-fold. Firstly, my experience of talking with and observing children, and the results of the experiments reported in Chapter 2, indicated non-segmental variability as a profitable area for study. Secondly, research concerned with language acquisition, and that concerned with sociolinguistics has, on the whole, paid little detailed attention to non-segmental features of speech. (Given

the range of social information which non-segmental features can project, this relative lack of attention is more than a little surprising.) By examining non-segmental variability in children's speech it becomes clear that this level of linguistic structure constitutes for the children a highly focussed channel for communication. The ways in which the children employ the resources of prosodic and paralinguistic variability in interaction reveal some aspects of their developing sociolinguistic competence.

The structured nature of the non-segmental variability in the speech of the children studied, is revealed by the quantitative analysis of prosodic and paralinguistic systems presented in Chapter 5. Such a quantitative analysis allows us to establish the patterns of variation in the prosodic and paralinguistic systems in the speech of the children. By the extension of such a treatment we have access to a means of monitoring the change through time of non-segmental systems (cf Fn p. 203), and of establishing their distribution with respect to different kinds of interactive situation (cf p.266).

In Chapter 1, I argued for the need to situate descriptions of children's language acquisition and development within a sociolinguistic framework. I have attempted, in this thesis, to explore some of the implications of such an orientation, and to discuss some of the problems which it raises.

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