THE LINGUISTIC COMPETENCE OF

DEAF PRIMARY SCHOOL CHILDREN

A thesis submitted to the University of Nottingham

for the degree of Doctor of Philosophy by

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ABSTRACT

Observation of deaf children in conversation with their teachers might lead one to believe they are behaving in a somewhat contrived way in comparison with their behaviour when communicating with their their peers. Examination of the performance of deaf and hearing children on various reading tests has shown the deaf to be pursuing markedly different strategies from the hearing (eg. word association). Such observations lead us to ask, is the linguistic behaviour of these children then simply a selection of 'special tricks' developed to cope with everyday demands? Or, if various measures of their language intercorrelate, can we assume the existence of a unitary linguistic competence?

To answer this question and to investigate the validity of the measures chosen, a group of 50 profoundly deaf children from two schools for the deaf were studied (where necessary using videorecordings) in 4 situations. These were a) in conversation with their teachers, b) in a referential communication game with their peers, c) their performance on the Edinburgh Reading Test and d) their writing. Since degree of hearing loss, age, sex and intelligence have been shown to be influential, we included these together with teacher ratings of oral proficiency, general ability, attitude to school, written ability and speech intelligibility. The results showed all language measures intercorrelated with varying degrees of significance. Multiple regression analysis showed that the main measure taken from the conversation with teachers (namely, average length of turn) proved to be the most powerful predictor of reading. Written syntactic accuracy was the second most powerful predictor. Since reliable measures of deaf children's linguistic abilities are badly needed (especially in the wake of recent legislation advocating the education of deaf children in ordinary schools) the potential use of these measures is discussed. Since these language abilities are good predictors of each other, future research might investigate the possibility that concentrated teaching in one area of language use could have positive effects on other linguistic abilities.

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CHAPTER ONE

INTRODUCTION

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Design and analysis.

The research presented in this thesis concerns the linguistic abilities of a group of 50 deaf children. We looked at their language in four different situations, namely, in conversation with their teachers, during a referential communication game with their peers, their performance on a reading test and their writing. Each of these situations yielded one overall measure for each child. These were:

a) average length of utterance in conversation with their teacher.

b) syntactic accuracy of spoken utterances during a referential communication game with their peers.

c) total score on the Edinburgh Reading Test.

d) syntactic accuracy of written language.

However, the first and third of these overall measures can be broken down into several sub-measures. The average length of utterance during the conversation session can be broken down into those utterances that follow teacher questions, those that follow personal contributions or statements from the teacher and those that follow utterances from other children. Also available from the conversations sessions were data concerning the nature of the teachers' behaviour. Their contributions could be analysed according to how much control was exerted over the children's next utterance and by looking at the functions they pursued in conversation. Similarly, the reading test contains four subtests which tap vocabulary, syntactic, sequencing and comprehension skills. Each of these subtests can be scored separately. All these variables will be discussed in much more detail later on, but suffice it to say at this stage that there were at least 15 measures in all.

As well as these 'correlator' variables, there were various 'predictor' variables included in the design. These were degree of hearing loss, age, measured intelligence, and sex. Also included were five teacher ratings of the children's ability, namely, oral proficiency, general ability, attitude to school, written ability and speech intelligibility. We hoped to explore the relationships between all three sets of variables, namely our linguistic measures, the predictor variables and the teacher ratings. One major question to be addressed was whether or not it would be reasonable to infer the existence of an overall linguistic ability in deaf children.

The statistical analysis needed to answer such questions required careful consideration. As far as multiple correlations are concerned, some would say one simply needs more subjects than variables, but Edwards (1976) recommends a ratio of at least 10 subjects to each variable. This presented no problem when investigating the four overall measures since we had, in most cases, 50 subjects. However, we should emphasise that when looking at the breakdown of these main measures, we are only looking for <u>patterns</u> of relationships between these variables. This issue is currently one of concern to other researchers. Hinde (in Porter and Collins, 1982) discusses similar problems in his study of temperamental differences in children from 40 families. He too has many measures taken from one group of children.

The present study was intended both as an investigation of the relationships between the four main measures as well as an exploratory exercise, rather than one in which we hoped to establish the existence of hard and fast relationships between deaf children's various linguistic abilities. Any patterns we found were then to be used as a basis for future research and to establish the usefulness of our measures both for research and classroom purposes. The data obtained from the teacher-child conversation sessions, however, were to be used for an additional purpose, namely to replicate some former research we had undertaken in this area. In this section of the study, therefore, we did have certain hypotheses. These will be outlined in the relevant chapter.

The use of correlational data presents several other problems for the researcher. When considering many correlations, it is hard to escape the possibility that some of these will be a result of chance. We also have to be aware of the problem of the causal relationships involved in correlations. The fact that two variables appear to be highly correlated does not necessarily mean that they are causally connected. This is an issue we shall consider in more detail in Chapter 5. In Chapter 8 (and in Appendix VI) we shall present a more detailed consideration of the methodological and statistical problems we encountered. Some of these (eg. establishing the independence of measures) are as yet insuperable, and are an inevitable consequence of analysing 'real' behaviour as opposed to the more easily defined and measured events that occur within the formal and experimental tradition. However, it appears that new analyses are currently being developed to cope with such difficulties.

It would not be useful to discuss the interrelationships of these linguistic abilities without having first discussed them individually. We shall therefore, first of all, devote four chapters (numbers 4, 5, 6 and 7) to a detailed consideration of each area. However, in study such as this that covers such a very wide field of child language, it would be impossible to introduce a complete survey of the previous research relevant to each of the four areas. Each chapter will therefore begin with a brief introduction to the area, followed by details of the measures used, the children's performance and the importance of the predictor variables (degree of hearing loss, age, intelligence and sex). This introduction is therefore only brief since most of the material one might usually discuss at this stage is presented in these four chapters. We shall then (in Chapter 8) draw all the linguistic measures together in order to investigate in detail their inter-relationships and the involvement of the variables mentioned above.

Chapter 2 concerns the variables known to affect the linguistic development of children (both deaf and hearing) that should be borne in mind when interpreting our results. In a study of this size, it would be an impossible task to account for differences in linguistic ability with reference to these variables. One would need thousands of subjects and we have only 50. Chapter 3 is really a short methodological digression from the main theme of the research and concerns the measurement of hearing loss.

Practical details of the study.

Two schools for the deaf were approached in the hope that they would participate in the present investigation and both agreed. Details about these schools are available in the next chapter. Initial permission having been gained from the headteachers, handouts (reproduced in full in Appendix I) were sent on to be distributed to all teachers in those schools with children in the 7-12 year age range with a view to recruiting them to participate in the study. The first sheet was an introductory letter outlining the sort of research we had done and were doing. The second sheet gave details of the study proposed, together with an outline of the aims. I thought it useful for the teachers to know that the ultimate purpose of our research was of a practical and applied nature rather than a 'data-swoop', the results of which would never be communicated to them. Response and attitudes to the research were very positive; teachers were interested and helpful. The emphasis in the handout was laid on looking at the _child's_ behaviour: if the teacher felt that her conversation style was going to be under scrutiny as well (which, indirectly at least, it was) this may have affected her behaviour above and beyond the effects produced by the mere presence of a researcher in the school. I do not underestimate the 'threat' that some teachers may feel when their children, and ultimately themselves, may appear to be under scrutiny from psychologists. Every opportunity was taken to avoid the formation of such notions.

It was explained that we wanted to obtain a set of 4 language measures for as large a group of children as possible in order to explore the relationships between their linguistic skills. Our ultimate aim was to piece together as elaborate a picture as possible about the problems a deaf child faces learning language as well as the techniques that teachers use to try and overcome them. It was proposed to spend one week with each class, during which I would attempt to obtain all 4 measures for each child as well as gather information (along the lines described in Chapter 2) about the children. The following extract is taken in full from the teachers' handout and provides brief descriptions of how we hoped to obtain these measures.

1. News/Conversation Session

We have found the 'News Session' useful as a starting point for investigating the language used by 7-12 year old deaf children. Here, the teacher typically has a small group of children with which she conducts a conversation about their activities over the weekend and other matters. It is therefore useful to record these sessions on a Monday, when the weekend is still fresh in the children's minds. However, not all teachers use this method, and we are anxious to look at conversation sessions as they occur naturally, since we feel that teachers will gain most from information which relates to real classroom situations. In practical terms, this involves putting a small video-recorder in the corner of the classroom to record what happens. If at the end of a session the teacher is unhappy with it, or feels that it is not typical then she/he should not hesitate to say so and the tape can be erased. Needless to say, all tapes remain strictly confidential and are not shown to outside parties unless the teacher involved has given express permission.

2. Child-Child Communication

We have found the communication game outlined below a useful tool for studying the language used by deaf children with each other. Since the ensuing conversation revolves around a known subject (a picture) we have some clues to aid later transcription. Two children sit facing each other each with a copy of the same book. A small screen on the table between them makes it impossible for one to see the other's book. One child then describes a picture in the book so that his partner can find it in his book. Each child does this several times.

We have used this game with both deaf and hearing children and have found that the deaf are surprisingly successful, in some ways more so than hearing children. Furthermore, they usually enjoy it. Several teachers have expressed interest in using these games themselves in the classroom.

3. Writing

We are also interested in obtaining samples of the children's writing. After the pairs of children have completed the child-child communication game, they will be asked to describe one other picture to their partner in writing. We will then see how effective these messages are when handed over to partners.

4. Reading Test

We propose to give the Edinburgh Reading Test (Stage 1) to each child, either singly or in pairs, preferably in a quiet room where they can concentrate. The Edinburgh Reading Test has been chosen because as well as giving a reading age, it provides more information about the nature of a child's reading ability than more common reading tests. We hope to gain more insight into the deaf child's reading problems by looking at the profile of his score on the subtests (vocabulary, syntax, sequencing and comprehension). The test manual recommends a break in the middle of a test ; if possible the first half will be given in the morning and the second in the afternoon.

For convenience, I refer to the children in this study as 'deaf'. I appreciate that the latest tendency is to use the term 'hearing-impaired' but in a study such as this such terminology adds appreciably to it's longwindedness. In similar vein, when referring to individual children I shall adopt 'he' as pronoun and when referring to the teacher shall use 'she'.

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CHAPTER TWO

THE CHILDREN AND THEIR SCHOOLS

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An assumption has often been made, by researcher and layman alike, that the deaf child is basically the same as any other except that he cannot hear. In this chapter, as in the previous one, we shall briefly attempt to show this to be a very questionable view and that many factors need to be taken into account in any study of the performance of deaf children, especially, although not exclusively, when considering their language. It is no longer excusable for a deaf sample to be included as 'controls' in studies of the role of hearing in the performance of other groups of individuals without a hearing loss. We shall also outline other factors that are known to affect both deaf and hearing children's linguistic development.

Previous research has shown that the linguistic and academic abilities of deaf children are constrained by a number of factors. These, together with other information (such as teacher ratings of child ability) are listed below.

1. hearing loss
2. additional handicaps
3. ethnic background
4. sex differences
5. handedness
6. home and language environment
7. intelligence
8. social class
9. teacher ratings
10. schools.

Although we attempted to gather as much of the necessary information as possible for each of the children in the study, success was not always possible. Frequently, for example, the cause of deafness, an important indicator of academic achievement, remains unknown. In this chapter we shall discuss each of these factors. Although any investigation of the linguistic abilities of deaf children needs to bear these factors in mind, it is not always possible (especially with sample sizes of 50) to include them all in subsequent statistical analyses.

Hearing Loss.

There appear to be 4 major relevant aspects to a child's hearing loss which may have an effect on his linguistic development. These are:

1. cause
2. age of onset
3. degree
4. delay in diagnosis and
   hearing aid provision.

Major causes of deafness are rubella, prematurity, meningitis, rhesus incompatibility and heredity. The EEC report on childhood deafness (Commission of the European Communities, 1979) found maternal rubella to be the largest identifiable cause of deafness in all countries studied. The tragedy of this, of course, is that maternal rubella is easily prevented. However, for a very large proportion of deaf children, cause of deafness is never established. Both Conrad (1979), in England and Jensema (1975), in the United States, give a figure of 45%. There have been suggestions that these 'unknowns' comprise large numbers of rubella children (EEC Report, 1979) and those with hereditary deafness (Nance and McConnell, 1973). The reasons why cause of deafness are relevant are interesting. As discussed in the 'Handedness' section below, the hereditary deaf, when compared with other deaf groups, have far more similar profiles to hearing children along certain dimensions (eg. intelligence, incidence of left-handedness and other handicaps). This may reflect the lack of neurological disturbances thought to be associated with conditions such as maternal rubella. There is evidence to show that 'rubella' children are less intelligent than others (see Jensema, 1975). Maternal rubella is also associated with heart disease, visual disorders and emotional or behavioural problems in children (Jensema and Trybus, 1975). This last group of problems is almost twice as common in boys than in girls.

Usually, the earlier the occurrence of the loss, the more severe is the effect on cognitive development. Obviously any language acquired by the child before the onset of hearing loss will be of tremendous value to his subsequent progress. Children whose deafness is caused by mumps, for example, tend to do better educationally than other deaf groups because their hearing loss is not present at birth and they therefore have had some normal exposure to language. The position is not totally clear cut, however. Jensema's data, for example, showed that children with a hearing loss at birth actually did better than children whose loss occurred after birth but before age 3. This, however, probably reflects the inclusion in the former group of children with hereditary deafness who are known to have fewer additional handicaps (Jensema and Mullins, 1974) and have a higher mean IQ (Brill, 1960, 1970). These children are also most likely to have parents or relatives who are familiar with the problems of deafness.

It seems highly likely that the sooner the loss is discovered, confirmed and hearing aids provided, the better are the child's chances of learning language (EEC Report, 1979). We know that many preverbal skills (such as turn taking and shared reference) are learnt before the hearing child even begins to speak and much of this is communicated to the child by the mother using language and other sounds. Gregory, Mogford and Bishop (1979) found that these turn-taking skills are not well developed between mothers and their deaf children. Clearly, any amplification available during these very early stages might be of great help. The EEC report (1979) found that only 50% of deaf children have had their hearing loss confirmed by their 3rd birthday and only 70% of children had hearing aids by their 6th birthday. This is partly due to a system operating in France and Belgium where parents and children undergo a period of 'special training' before hearing aids are supplied. The nature and purpose of this 'special training' are not divulged. Of course, even if a child has hearing aids, this is no guarantee that he will wear them. How much a child is encouraged to use his aids and how well they are maintained are two further important variables (EEC Report, 1979, Jensema, 1975).

Degree of deafness is not always as 'given' or stable as many, including Conrad (1979), would believe. He found that it was very rare for children to show an improvement in their measured hearing loss of more than 30 dB and rejected notions that a child's hearing loss is affected by experience. However, as Wood (1980) points out, this is a very stringent criterion since an improvement of 30 dB would move a child through 3 of Conrad's own hearing loss bands which Kyle (1977) has shown to be associated with significant differences in speech intelligibility. Teachers would say that with time and encouragement, children can become much more sensitive to sound with experience and there is some evidence that improvements of up to 10 or 15 dB do occur throughout the school years (Hine and Furness, 1975).

It is generally accepted, as a rule, that the more severe a child's hearing loss is, the more severe will be his language impairment. However, whilst generally true, there are important exceptions. It is the existence of such exceptional children who, despite a profound hearing loss, make remarkable progress in their linguistic development, that inspires us to try to discover which factors are associated with success.

There is now a new generation of children coming into schools for the deaf whose hearing loss is being detected (in some areas of the country) far earlier than ever before. Experienced teachers and associated professionals say that the speech quality of these children who have had their loss detected and aids provided very early on is <u>excellent</u> and quite unlike that of previous generations. This has yet to be confirmed by objective methods. Research is currently going on to discover the possibilities of detecting hearing loss in neonates. Although the current method (the Linco-Bennett cradle) is looking promising, its reliability is yet to established objectively. One also needs to consider the possible effects of 'false positives'. There are also considerable problems yet to be overcome in enabling such young babies to support hearing aids.

In the present sample, the cause of hearing loss is only confirmed for 17 of the 50 children (33%). 10 are thought to be deaf because of maternal rubella, 2 from jaundice, 1 from meningitis, 1 from rhesus incompatibility and 3 from hereditary factors. All are thought to have been deaf from birth or, at least, very soon afterwards. The usual cut-off point for determining a child as being prelingually deaf is 3 years old. For the remaining 66%, cause of deafness was either unknown or no data were available. This is a higher figure than that given in some other studies, such as Conrad's (1979), where 45% of the children had unknown causes of deafness. In a recent study of the mathematical abilities of deaf school leavers (Wood, Wood and Howarth, 1983), the figure is 51%. The high figure in the present study may reflect the inclusion of a number of immigrant children (22%) whose mothers may well be relatively uninformed about Western standards of prenatal care; cause of deafness has only been established for 1 of the 11 immigrant children in this study. Exact data were not available for all children about age of diagnosis and hearing aid provision. In the next chapter we shall discuss the degree of deafness and its measurement in more detail, but suffice it to say at this stage that most of the children are very deaf, 92dB being the average loss.

Additional handicaps

It is frequently reported in the literature that any population of deaf children includes a large proportion of children with additional handicaps. In his sample of 6,871 children, Jensema (1975) found 27% with at least one educationally significant handicap. A recent report published by the Commission of the European Communities (1979) puts the figure at 29%. It is particularly important to bear this finding in mind when considering both the interpretation of research data as well as the nature of educational provision for these children. Major categories of such handicaps include mental retardation, visual deficits, cerebral dysfunction (such as cerebral palsy, epilepsy and hydrocephalus). The figures above only include those children with major and easily identifiable handicaps. However, there are likely to be cases, such as minor brain damage (often suspected to be associated with deafness as described in the section below on handedness) that go undetected and yet still may be of educational significance. Jensema found that in all categories of additional handicap, students achieved scores on all tests that were well below those of deaf children of similar age but without additional handicap. It also appears that the problems increase when there is more than just one of these handicaps. Jensema and Trybus (1975) report a higher incidence of emotional and behavioural problems among those children with other handicapping conditions. In the present sample, only 1 of the 50 children showed evidence of an additional handicap (spasticity).

Ethnic Background

A report on the mathematical and reading abilities of 16 year old hearing immigrant children was compiled from data from the National Child Development Study (Essen and Ghodsian, 1979). Overall, these children were found to achieve lower scores than 'indigenous' children, but when social and financial circumstances were taken in to account, the pattern changed. It was then found that when first-generation immigrants (those children born abroad to foreign-born parents) were considered, they had lower scores on both tests than indigenous children, but only the West Indian children had significantly lower scores in the second-generation group (children born in Britain to foreign-born parents). Among first-generation immigrants, length of stay in Britain was found to be related to reading achievement but not to achievement on the maths test.

In the United States, Ries, Bateman and Schildroth (1975) found that each of the major ethnic groups is represented among the deaf population in similar proportions to those found in the hearing population. They quote evidence, however, which suggests that the hearing losses of these children from ethnic minority backgrounds tend to be identified at a later age than those of white children. In Jensema's study (1975) of deaf children in the USA, 65% of his sample were white, 30% from minority backgrounds and 5% had no ethnic background reported. White children achieved higher scores on the tests than those children from ethnic minorities, thus following the same pattern shown in similar studies of hearing children. Among the various groups of ethnic minorities, Asian Americans had the highest achievement levels, whereas the Spanish American group (where spanish is frequently the language used in the home) had the lowest reading and vocabulary scores.

It would therefore seem possible to conclude that certain immigrant children who are also deaf will, in effect, be dealing with two handicaps to their educational achievement. Essen and Ghodsian conclude, however, that this setback that some immigrant hearing children experience is "relatively short-term and language-specific" (p.428). One wonders if the prognosis for the immigrant deaf is as optimistic. The American data would suggest not, although is is difficult to disentangle the effects of socio-economic background. Jensema's report does not give a breakdown of the social and financial circumstances of his immigrant deaf group so we are not able to form any firm conclusions. Certainly any delay in diagnosis of handicap, such as that found in the United States, may well, according to some recent theories (see below) severely impede rapid linguistic development.

Many of the deaf children in England are from Asian or West Indian homes. Reports from schools in areas with a particularly high proportion of immigrant populations (some put the figure at 30%) suggest that the incidence of deafness among Asian families is increasing, a fact which is partly ascribed to their custom of inter-marriage. At present we are not aware of any large-scale study which has compared the performance of immigrant and indigenous deaf children in Britain. Conrad (1979), for example, did not include children who came from non-english speaking backgrounds in his survey of the reading ability of deaf children. Presumably, therefore, he did include West Indian children. As mentioned above, Essen and Ghodsian (1979) found that even second generation (hearing) West Indian children appeared to be educationally handicapped although their home language is english. One cannot predict the effects that deafness would have on the patterns of immigrant children's achievement as found by Essen and Ghodsian. Deafness might attenuate the problems of "the strange language and the culture shock" or it might interact to form a double handicap.

In the present sample, drawn from two towns of relatively high immigrant populations, 22% (11 out of 50) children were of immigrant backgrounds where english, in 5 cases, was not spoken in their homes.

Sex differences

The literature on hearing children abounds with references to the linguistic superiority of girls and the reputedly superior abilities of boys on some spatial tasks and in tests of arithmetic and numerical manipulation (Maccoby and Jacklin, 1974, Nash, 1975, Fairweather, 1974). In the past, it is likely that such differences have been overemphasised and that "over the years differences in the language ability of the two sexes have actually become less pronounced in keeping with the shift towards a single standard in child care and training in the last few decades" (Templin, 1957, p.147). Cherry (1975) reaches a similar conclusion in a review of teacher-child verbal interaction. Wells (1979) describes a study in Bristol in which it was found that adults initiated a far greater proportion of conversations in contexts of play with boys than with girls, whereas more conversations during helping and non-play activities were initiated with girls than with boys. "This suggests that adults emphasise more 'useful' and domestic activities in their interaction with girls, whilst the emphasis with boys is towards a more free-ranging, exploratory manipulation of the environment" (p.385). This may well go some of the way towards explaining the origins of incidences of boys' superior spatial ability. Theories of the aetiology of sex differences include those of an environmental nature (such as this last one), those involving heredity (there is some evidence for familial patterns of spatial ability) and those involving physiological differences such as hemispheric lateralisation. There is evidence to show that both language and spatial abilities are more bilaterally represented in females than in males (McGlone, 1978). Exactly how these differences in functional asymmetry add to our understanding of sex differences in linguistic and spatial abilities is not yet clear. Bilateral representation of verbal functions is associated with verbal superiority in females, yet bilateral representation of spatial functions is clearly not associated with spatial superiority in this group. Waber (1976), in a study of the verbal and spatial abilities of early and late maturers suggests that it is not sex itself which is responsible for these differences but a variable which is associated with sex, namely rate of maturation.

Sex differences in the linguistic ability of deaf children have also been reported (Myklebust, 1964), so whatever the reasons for such differences they clearly persist to some degree in deafness. Myklebust reports significant sex differences on certain measures of written language, speech and lipreading but not in reading (using the Columbia Vocabulary Test). Similarly, Jensema (1975) found no sex difference in vocabulary and concluded that there were no significant sex differences in academic achievement for deaf children with the exception of reading comprehension. Norden (1975), on the other hand, found that deaf girls were superior in all the verbal tests she administered, but that there was no sex difference among the 'hard of hearing' group (ie. the less deaf). She concluded that there was a stronger relationship between hearing loss and language impairment for the boys than for the girls. Unfortunately, Conrad (1979) does not give any information about sex differences in reading in his study of deaf children. He does report, however, that there is no difference between boys and girls in the incidence of inner speech. Norden (1975) reports that the boys in her sample were superior in mechanical and technical tests. We have recently undertaken a study of the mathematical abilities of deaf school-leavers (Wood, Wood and Howarth, 1983) and found that although deaf boys achieved higher scores than deaf girls, the difference failed to achieve statistical significance. With the hearing control group there was a significant difference. The authors suggest that "whatever influences the relative performances of hearing adolescents in mathematics to produce sex differences is attenuated by deafness". There was a significant, but small, correlation between hearing loss and maths age.

Using the data from this study (originally in order to look at the different ways of calculating audiogram averages as described in chapter 3), I found that when the sample was divided into groups of boys and girls, there was no significant relationship between hearing loss and maths age for the boys, but there was for the girls ($p < .01$). This provides an interesting parallel with Norden's data (described above) which showed that when we are considering language abilities, the opposite pattern holds true, namely that there is a stronger relationship between deafness and these abilities for boys. Perhaps one might argue (Wood et al, 1983), admittedly in the absence of any data on the linguistic abilities of this group, that there is a stronger relationship between verbal functioning and mathematical ability in girls than in boys. Perhaps girls actually solve these problems in a different way from boys. Norden concludes that there is a lack of relation between language ability and thinking, especially in the case of deaf boys, whereas the deaf girls' performance was consistently more even (p.68). She found that measures of language ability intercorrelated more highly for girls than boys: for girls any one measure was a better predictor of performance on another measure than it was for boys. The question she asks is whether this result is due to girls having a stronger general desire to do well or whether there is a greater interdependence between language and intellectual development in girls. Moores

(1967) provides data which suggest that this latter possibility may well be true.

It was possible that the scope of the present study was too small (only 50 children) for us to be able to say anything definite about sex differences. In their review of the lateralisation of functions, Springer and Deutch (1981) point out that there is a lot of variation within each sex and it is often difficult to detect small (but real) differences when one is considering small groups. The same point is probably relevant when considering differences in abilities. However, it was a variable that we took into account in all our analyses to see if any interesting differences emerged. Our sample consisted of 20 girls (with an average hearing loss of 94 dB and an average age of 10 years 7 months) and 30 boys (with an average hearing loss of 92 dB and an average age of 10 years 9 months).

<u>Handedness</u>

It is generally accepted that the right and left hemispheres of the brain tend to have specialised functions (Springer and Deutsch, 1981). The left hemisphere is largely involved in " verbal, sequential, analytic, logical and computer-like" processes whereas the right hemisphere is more concerned with "non-verbal, spatial, synthetic, insightful and Gestalt-like" processes (Sperry, 1971, p.34). However, this is an over-simplification of the case. Studies of split-brain patients have shown that in fact the right hemisphere possesses "a remarkable...variety of linguistic abilities" (Beaumont, 1981 p.197) although speech is not included among them. Bryden, Hecaen and DeAgostini (1983) cite studies which show that although for most right-handed males the hemispheres seem to serve quite different processes, in the case of left-handers (Hecaen and Sauguet, 1971, Herron, 1980) and right-handed females (McGlone, 1980) there is a certain amount of bilateral representation. Sperry cites studies in which an anatomical asymmetry has been found that corresponds to the lateralisation of language and cerebral dominance (Geschwind, 1970) and is also present at birth (Wada, 1969).

In an interesting paper, Kimura (1981) reviews studies of brain damaged deaf individuals and from these as well as anecdotal evidence concludes that, at least for right-handed people, manual signing is just as dependent on the left hemisphere as is vocal communication. Left hemisphere damage tends to be associated with disorders of speech, motor control of arms and hands and of the oral musculature. These disorders are apparent both when the intended movements are representational and when they are meaningless (Kimura and Archibald, 1972). "The fact that errors in speaking and in manual signing are at least superficially similar to each other is not an argument that the similarity stems from the fact that both are linguistic systems....We know that speech aphasia is nearly always accompanied by difficulties in the production of nonverbal oral movements as well (Mateer and Kimura, 1977). If one considers both the oral and manual apraxia as motor selection deficits in the broad sense of the term, then it is quite reasonable to consider them not as associated deficits but as the major basis for most aphasic disorders, whether in spoken or signed languages" (p.308).

Sperry (1971) concludes that environmental influences are unlikely to be important in the origins of handedness. However, the very high incidence of left-handedness among clinical populations (Satz, 1972) would lead one to suspect that <u>prenatal</u> environmental influences may well be in operation. Satz himself concludes that much of the incidence of left handedness is of pathological origin. The incidence of left handedness among twins is twice as high as that in the normal population. Twins also have a high incidence of neurological disorders thought to result from damage due to intrauterine crowding (Howard and Brown, 1970). However, twins are not very useful examples when considering asymmetries since pairs tend to exhibit "mirror imaging" in various ways. It is true, however, that the incidence of left handedness is high among individuals known to have suffered minor brain injury before or at birth, such as the mentally retarded, children with learning disorders and epileptics (Springer and Deutsch, 1981, p.115). There is also evidence that early left hemisphere damage results in a shift of both hand preference and language hemisphere (Rasmussen and Milner, 1977). Springer and Deutsch quote studies which showed that left handers have a much higher incidence of bilaterally represented speech than right handers and that left handers recover from the aphasia caused by a stroke much better than right handers.

The literature about the deaf and handedness is very interesting. Conrad (1979) finds that the incidence of left-handedness (17%) in his sample is almost twice what one would expect (10.6%) in the normal population (Annett, 1970). The criterion used for both these figures was hand-preference for writing. However, if one looks only at the hereditary deaf, the incidence is the same as that of the normal population, namely 10.7%. Myklebust (1964) cites various studies that established disturbed laterality as being associated with certain learning disorders (eg. Orton, 1937) and confused laterality being associated with disabilities in speaking, reading and writing (p. 197). When disturbances of laterality are present there are usually motor disorders too. It seems reasonable to suppose, as Myklebust points out, that deafness is associated with a higher incidence of neurological disorders. In his own research Myklebust found that deaf children were twice as likely to be left-handed as hearing children. The actual percentages he gives are half the size of Conrad's but criteria for establishing handedness have not always been consistent (Annett, 1970). The proportions however, are the same for the two studies. Unfortunately, Myklebust does not give a percentage of left-handedness for his hereditary deaf. As he says, the causal relationship between handedness and deafness is not clear from his data. "It seems unlikely, however, that deafness per se is influential in the development of laterality...A more logical presumption is that the higher incidence of atypical laterality in the deaf can be attributed to a higher incidence of disorders of the central nervous system" (p. 198). In the light of Conrad's more recent data, revealing that the hereditary deaf have a similar incidence of left-handedness to the hearing, it seems likely that Myklebust's 'presumption' has some factual basis. Additional support for this view can be found by looking at the deaf children in Conrad's study with further handicaps since these are also the ones most likely to have neurological disturbances. 26.7% of these children are left-handed. This figure is three times that found for hearing children and twice as high as Satz's figure (1972) for other clinical populations.

If the pathological model of the origin of handedness is true, one might predict that left handers would not perform as well as right handers on tests of cognitive ability. Springer and Deutsch (1981) review the evidence for the hearing population and conclude (p.120) that "despite the suggestion of deficits in left handers...it is evident that any differences in the cognitive abilities of left and right handers in general are very small and of little practical importance." In his own sample of deaf children, Conrad (1979) found no differences between right-handers and left-handers using Raven's Matrices. Certainly the evidence to date does not enable one to conclude that left handers are cognitively inferior to right handers. In this connection Conrad (1979) looked at the relationship of handedness to the use of internal speech. He found that 47% of left-handers use internal speech and 57% of right-handers do. When looking only at children with acquired deafness, however, these figures change to 35% and 56%, although neither of these sets of figures reaches statistical significance. This may provide partial support for the view that acquired deafness is associated with a higher incidence of left handedness which may also associated with neurological disturbance, which may turn be associated with less intelligence which is known to correlated highly with use of internal speech. The argument becomes somewhat tortuous.

In the present sample, 14% of the children were left handed.

<u>The child's home and language environment</u>.

This is an area that we shall pursue in some detail in chapter 5 in our discussion of the effects of various conversational strategies on the child's linguistic development. However, there are many other such factors that could be described as relevant to his development. Family size is associated with social class, results of intelligence tests, nutrition and physical growth (Plowden, 1967, para. 153b). A late birth order and increasing family size have been generally held to have a negative effect on intelligence (Altus, 1966, Zajonc and Markus, 1975) although Marjoribanks and Wallberg (1975) conclude that birth order may be a superfluous variable and that the child's intellectual ability depends on the amount of parental attention available to him, which in turn depends on the number of children in the family. This theory of available attention is interesting in the light of a study concerning families of Asian-African origin in Israel (Davis, Cahan and Bashi, 1977). They report that the usual correlation between birth order and the child's ability is reversed in this group, whereas if the families were of European origin the normal pattern was found (ie. a late birth order is associated with lower intelligence). This finding is attributed to the effect of older brothers and sisters on the younger child in families where the parents are uneducated. At least 83% of the children of Asian-African origin (as compared with only 31% of the European group) say that they ask older siblings for help with their homework.

Such studies are rare in their attempt to focus on individuals other than mothers or teachers as being instrumental in a child's development. Cicirelli (1972), for example, found that older sisters were significantly more effective at teaching their younger siblings a concept learning task than were older brothers. Particularly interesting was that there was no difference in effectiveness of older boys and girls as teachers of unrelated children. Furthermore, it appears that the different way in which children react to instruction or help from older siblings transfers to situations where the mother is offering help (Cicirelli, 1976). Recent research by Dunn and Kendrick (1982) also shows that there are many interesting and subtle relationships between different 'arrangements' of siblings and their mother. Wells (1974) suggests that the expression of possession is likely to emerge earlier in children who have older siblings than in those who do not. Evidence for the importance of other individuals in the home is cited by Creber (1972) who reports that in one particular negro culture, the presence of grandparents in the home was shown to relate to superior linguistic performance of the children.

Bradley (1968) found that first-born children (as well as only children) in universities and colleges in the United States were massively over-represented. Unpublished studies (cited by Clarke and Clarke, 1972) from the psychology departments of Sheffield and Hull Universities confirm these findings.

We are obviously dealing here with extremely subtle environmental differences. Quite how much effect they would have on the development of deaf, as opposed to hearing, children is a matter for speculation. It is certainly not possible to include, for example, birth order or sibling 'constellations' in analyses for the present study, although we did gather the data.

Intelligence

It is not within the scope of the present study to debate the nature and usefulness of intelligence tests. However, measured intelligence is known to be a relevant factor when considering a child's linguistic achievements. Children's performance on intelligence tests has been shown to be related to parental occupation. This difference in measured intelligence between children from working class and middle class homes (as defined by parental occupation) increases over both the preschool (Hindley, 1962) and the primary years (Douglas, 1964).

It would appear that when given a test that does not rely too heavily on verbal ability, deaf children perform equally well as do hearing children. Children who are deaf because of hereditary factors have been found to have significantly higher IQ's than those with acquired deafness (Brill, 1960 and 1970, Conrad, 1979). It is likely that this difference reflects the neurological disturbances associated with acquired deafness. We have discussed this more fully in the section on handedness above. An alternative explanation is that intelligence is instrumental in the cause of deafness. This seems unlikely. It has also been found that profoundly deaf children are no less intelligent than partially hearing children (Conrad, 1979).

There is a marked tendency for measured IQ to be regarded as a 'given'. Conrad (1979), in his survey of the reading ability of deaf school leavers, says "virtually all studies which have made any comparisons of the performance of groups of deaf children have treated intelligence test scores as an independent variable which needs to be controlled. We have done no more than follow this convention. Erring then - if error it is - on the side of prudence and convention, we have also regarded intelligence as 'given', in the same sense as cause of deafness is, or degree of deafness, or sex, etc." (p.53). This is something with which we take issue. Intelligence is a <u>measurement</u>. It is now well documented that measured intelligence can vary enormously in the same child with variations in the environment (Clarke and Clarke, 1976). "In growth of all kinds, the interaction of powerful genetic forces and powerful environmental forces is at work cumulatively over long periods of development. In optimum environments genetic factors will appear predominant and environmental will appear less important because its influence is roughly constant. In sub-optimum environments, environmental effects will appear more obvious" (Clarke and Clarke, 1972, p.321).

VandenBerg (1971) found no correlation between deaf children's intelligence and their language or educational achievement. She considers this to be in line with findings of previous researchers and that nonverbal assessments of intelligence do not usually bear any clear relationship with verbal abilities. She agrees with Levine (1956) that although deaf children characteristically obtain very low scores on verbal tests of intelligence, verbal tests are better predictors of their academic progress than are nonverbal tests (as is the case for hearing children). Clarke-Carter (personal communication) found no correlation between deaf children's intelligence and their scores on a vocabulary test. Conrad (1979), however, considers that a child's reading ability, as measured by the Brimer Wide-span Reading Test (1972), is virtually solely determined by his degree of deafness and his intelligence (we shall return to this in chapter 4). In fact, his data show that although, at most, 26% of the variance in reading ability is accounted for by intelligence and hearing loss, there still remains a considerable amount unaccounted for. Also, in assuming that intelligence and hearing loss are givens and in concluding that reading ability is virtually solely dependent on hearing loss and intelligence, Conrad might well be saying that factors such as variations in teaching technique have no effect at all either on the children's ability to read or on their general ability. Many teachers would take issue with this view. One cannot just 'abandon' 75% of the variance without further question. Furthermore, any group of individuals selected for homogeneity in intelligence at one particular moment will show many variations with time and become increasingly heterogenous. Interestingly, later in his book, Conrad considers one of the reasons why deaf children of deaf parents are more intelligent than those of hearing parents is that they have been exposed to language (in this case, signing) early in life. This seems somewhat at odds with his argument that intelligence is as 'given' as is degree of deafness and is also unlikely to be the sole reason, as indicated by other research outlined in the section on hearing loss and its causes.

Children in the present study were given Raven's Progressive Matrices (Raven, 1958) to provide a measure of intelligence. The reasons for this choice were firstly, that the test is basically nonverbal and secondly, that it is easy and quick to administer. A third consideration was that it was also used by Conrad (1979) who provides the most thorough recent review of the reading ability of deaf children in Britain. We discovered, however, that the children from one school had recently done this test. Rather than submit them to further testing (so as to avoid test practice and so on) we accepted these results for use in the present study. It should be borne in mind, however, that in these cases the children were tested by their teacher, whereas the rest of the children were tested by a researcher. Since the children were not given an intelligence test at the same time as the other measures of linguistic performance were taken, we did not use raw scores in our subsequent analyses, but percentile scores, calculated from the normal distribution curve. In all, information about the children's performance on Raven's Progressive Matrices was available for 44 of the 50 children. We found the average percentile point to be 46.5. Also available were teacher ratings of general ability. These are discussed more fully towards the end of this chapter.

Social Class

The existence of a "class" factor has been well-documented in the literature concerning the development of hearing children. Middle class mothers make more use of medical facilities, visiting post-natal and ante-natal clinics more often than working class mothers (Newson and Newson, 1968). Wedge and Prosser (1973) give an account of the physical conditions in which a child lives and relate them to attainment: the poorer the conditions, the lower the attainment. Douglas (1964) cites a study which controlled for the family size, parental interest and the academic record of the school and yet still found that both working class and middle class children from poor housing conditions achieved lower scores on tests than

than those living in "good" homes. Two interesting findings emerge from the National Child Development Survey (Davie, Butler and Goldstein, 1972). Firstly, the difference in reading performance between children from class V and non-manual homes increases with age. In other words, that education (the alleged "great equalizer") is not having the same effect on all children. We shall return to discuss this point in chapter 5. Secondly, upward social mobility appears to have a positive effect on reading ability.

The literature on class differences in discipline techniques and the nature of the language experienced by the child at home is extensive (eg. Becker, 1964, Newson and Newson, 1968). It has often been thought that the differences in the language used by children from different backgrounds, as reported by Bernstein (1964), may be due in some part to the nature of the language they encounter at home and other associated variables such as parental interest in school life. More recent research on these apparent class differences, however, would suggest that the picture is not as simple as previously painted. Furthermore, research of this nature can often be criticised on the grounds of being formulated within an educational ideology that appears to be "conspiring" to make the working classes emulate the middle classes. Dittmar (1976) provides an extremely useful discussion of these problems. As far as differences in grammatical complexity are concerned, Wells (1979) considers that "Insofar as this question has been properly investigated, the evidence does not support the hypothesis that lower class children show a general developmental delay" although he does mention a study (Edwards, 1976) which suggests that "they do not habitually exploit their grammatical resources to as full an extent as their middle class peers" (p.389). Tizard, Carmichael, Hughes and Pinkerton (1980), found that although children from both working and middle class backgrounds have similarly extended and egalitarian conversations at home, at school the picture was quite different. In other words, there was no consistent relationship between the way a working class child was talked to at home and at school. These children seemed to bring different attitudes to school and this may well be partly responsible for the nature of their discourse with the teacher; they ask fewer questions, give information less often, make smaller contributions to conversations and appear generally less confident than the middle class children. We shall discuss this, and other relevant research in more detail in Chapter 5.

As far as the deaf are concerned, although we are not aware of any large-scale research concerning social class and incidence of deafness in this country, we do have some data from the United States. Jensema and Trybus (1978) found that both teachers and parents used more speech (as opposed to sign) in their communications with children from higher income families than they did with with children from lower income families. In the Unites States, however, this difference probably reflects the fact that different types of educational programmes (with established preferences for different communication modes) serve very different kinds of deaf children. Rawlings and Jensema (1977) found that deaf children come from families whose distribution of income is lower than that of the general population. Children from higher income homes were also appear less likely to become deaf <u>after</u> birth. This could mean either that they have better post-natal medical care or that, in fact, children from lower income families have their hearing loss detected at a later age. Deaf children from higher income families were more likely to use their hearing aids, to come from a 'white' background, to attend preschool programmes and to do better academically.

Of the children in the present sample, data were not available from school records as to the exact nature of all their parents' occupations. Most parents, however, appeared to be working in local industry (usually at shopfloor level) or were plasterers, welders, mechanics, lorry drivers, gardeners, labourers and some were unemployed.

Teacher Ratings.

The teachers provided ratings for each child on 5 aspects of their ability and performance. These were:

1. oral proficiency
2. general ability
3. attitude to school
4. written language
5. speech intelligibility.

It should be emphasised that these ratings were only obtained as a very rough guide to the teachers' views about their children. We thought it might be interesting, for example, to see how well the teachers' ideas of their children's ability correlated with their scores on Raven's Progressive Matrices (Raven, 1958). We were also interested in discovering which, if any, of the two indices of a child's intelligence correlated more significantly with our functional measures of his linguistic performance. Vandenberg (1971), in a study in New Zealand, found that ratings of children's intelligence actually correlated better with their academic achievement than with objective measures of intelligence. Thus, these teachers' assessment of their children's ability seemed to be based on achievement rather than current potential. Interestingly, although objective measures of the ability of Maori children showed no significant differences to that of 'European' children in this study, teachers' ratings showed that the Maoris were considered less able. Norden (1975) discusses whether differences in teacher ratings about boys and girls have some basis in reality or whether they reflect different expectations. In her study, carried out in Sweden, she found that these differences in the teachers' views about boys and girls were not always reflected in the children's performances. Ratings clearly need interpreting with great caution but we may reasonably suppose that those which correlate consistently with objective measures may well have some real basis, providing that we are confident about the validity of the measures themselves.

The schools.

Educational provision for deaf children can be broadly divided into 8 different categories. These are:

1. traditional boarding schools, often run by charitable trusts.

2. local education authority schools, usually

established in cities, at the end of the nineteenth century.

3. private, fee-paying schools.

4. local authority schools, established in the post-war period, usually to cater for special needs (eg. grammar or technical schools).

5. schools established in the 1950's especially for 'partially hearing' children (usually boarding).

6. schools for the dually or multiple-handicapped children.

7. partially hearing units attached to schools for hearing children. These, together with peripatetic teachers of the deaf, proliferated in the 1950's and 1960's.

8. the integration of deaf children into hearing schools with specialised support from the peripatetic service.

The children in the present study attended one of two schools, (let us call them schools A and B), both of which can be described as belonging to the category 2 above. School A caters only for nursery and primary age children, with all seniors going on to attend a partially hearing unit, while School B caters for the entire age range. The latter school does, however, send some of its senior pupils into local units. Both schools are situated in large industrial cities, each with a catchment area of some 20 miles in radius. These cities are characterised by a large immigrant population; approximately 15% of School A's children are from immigrant backgrounds, while the figure for School B is rising towards 30%. The makeup of these populations is not the same; the former includes children from both West Indian and Asian cultures while the latter comprises mostly Asian children. Most of the Asians in both schools come from the northern regions of the Indian subcontinent (Kashmir, Pakistan) and are therefore Muslims. A few children are of Seikh origin. The languages spoken in their homes are gujerati, punjabi, urdu and pushtu.

Teaching in both schools is ostensibly oral in nature, although School B does offer signing classes for the less able children. Essentially, however, the two schools are of very similar character.

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CHAPTER THREE

HEARING LOSS

CHAPTER THREE

HEARING LOSS

INTRODUCTION

As with any other study of deaf children we needed to provide a rough guide to the child's hearing loss for statistical purposes. Since Conrad's study (1977, 1979) is the most recent large-scale investigation of deaf children's linguistic ability, we had decided to use the same conventions for calculating the average hearing losses. However, there appeared to be three methods currently in popular use. The first takes the average of losses at 250, 500, 1000, 2000, and 4000 Hz in the better ear using 110, 125, 125, 125 and 140 dB in calculations where the child has shown no response at those particular frequencies. This method follows a convention suggested by Hine (1973) who gives a statistical argument for such a procedure, based on his analysis of many audiograms. He argues that such a method is likely to give a more realistic description of hearing losses. Providing that the distribution of hearing loss is normal and that "the no responses represent a relatively small proportion of the total number of cases" (p.19) one can use parametric statistics. The national executive committee of BATOD (the British Association for Teachers of the Deaf) recently suggested that teachers and associated professionals should adopt this latter method in an attempt at standardisation (1981).

The second method is similar to the first except that it uses 120 dB as a no response value at all frequencies. Conrad (1979) adopted this system. The third method (Hirsh 1952) takes the average of 3 points on the audiogram (500, 1000 and 2000 Hz), also using 120 dB as a no response value at all frequencies. Quigley and his colleagues in the United States use this system in their extensive studies of the language of deaf children. While most research to date has in fact used this third method, Conrad (1979) provides an argument for using the average of <u>five</u> rather than three frequencies, based on some research reported by Kyle (1977). Using speech intelligibility as a measure, Kyle found that although most of the predictive information can be provided by the average of three frequencies, significantly more can be found by using the average of five. Looking at the data from various of our research projects at Nottingham, we have found that the average of five frequencies makes children appear, on average, 2 or 3 decibels deafer than the average of three. Conrad reports the same finding.

Each of these methods, however, leave much of the variance in linguistic ability unaccounted for. Risberg (1976) reports that often children with identical audiograms have very different speech discrimination abilities. No doubt other factors such as IQ, type of education, parental support and so forth come into operation here as well, but to the best of our knowledge there is no study which has investigated the various methods of audiogram calculation in order to see how much of the variance they each account for when other important variables have been partialled out. Norden (1980) wonders whether some of the hitherto unexplained differences in speech discrimination between deaf individuals with equivalent audiograms (as reported by Martony, 1975) might be clarified by the fact that some individuals might have usable hearing in the left ear only. There is evidence from several studies that there are differences in sound perception between the right and left ears (Kimura, 1967, Nagafuchi, 1970, Knox and Kimura, 1970, Bever, 1971, Morse, 1972, Hiscock and Kinsbourne, 1977). The right ear has been found to have better speech-sound perception. Glanville et al (1977) report a right ear preference as early as three months of age. One would suspect however, that the number of children with significant differences in hearing losses between right and left ears is too small to make any difference. In the present study only one child (out of 50) shows a difference of more than 10 dB between right and left ears and "better ears" appear to be evenly distributed; 27 out of 50 children show their left ears as being less impaired than their right.

There are situations where two individuals can be allocated the same average hearing loss (90 dB) and yet whose audiograms look very different. One child may show a 'flat loss' at 90 dB over the frequencies concerned whereas the other may have a 'ski-slope' shaped loss which, when averaged, also gives a figure of 90 dB. These children are likely to have different speech hearing abilities. The latter will hear fewer fricatives ('f' and 'k' for example) but will be better equipped to perceive prosody and rhythm than the former. There is also evidence that differences in audiogram shape are indicative of different medical histories (D.E.S 1967, O'Neill and Oyer, 1970).

Risberg and Martony (1972) describe a system which goes some way towards dealing with the problems outlined above. Their categorization of audiograms accounts for not only the degree of loss at five frequencies but also the shape of the audiogram, providing 20 categories of hearing loss. Conrad (1979) reports that 15 of these groups were needed to describe all of his sample and that this was "far too many for statistical purposes" (p.45). Conrad's study involved 468 children, and since the present one only involves 50, this system unfortunately provides too many categories for our purposes as well. However, Bamford (personal communication with D.J. Wood) finds that only 8 of the 20 categories are, in fact, common. Large-scale studies of the linguistic abilities of deaf children, such as those undertaken in the United States, could analyse the the amount of extra variance this system provides for, but to the best of our knowledge this has not been done. Bamford's data also provide partial support for the view that it is the lower frequencies (ie. up to and including 1000 Hz) that are the most functionally important ones.

In the face of all this confusion, we decided to use all three methods described above in our analyses, hoping to discover whether any one of them correlates more highly than the others with the sort of functional measures we are using. These measures are likely to give a more "global" view of the child's linguistic ability than those used in studies to date.

As well as looking for differences in correlations between these hearing loss measures and certain variables, we were obviously also interested in the relationships themselves. As mentioned in the previous chapter, some believe that a deaf child's linguistic performance is virtually solely dependent on two factors, namely his hearing loss and his intelligence (Conrad, 1979). In this chapter, however, we shall concern ourselves only with looking at which, if any, of the three averages correlates more highly with our current measures of the child's linguistic ability. In the chapters concerned with these measures themselves (chapters 4 to 7) we shall look at the significance of the actual relationships, using the hearing loss average that we found to be "the best" (see below). In Chapter 8 we will go on to examine the relative importance of each predictor variable (IQ, age and sex as well as hearing loss) and how much variance in linguistic ability each one accounts for.

METHOD

Hearing losses were calculated for each of the 50 children in the study according to the following three methods:

METHOD 1: using the average of five frequencies
(250, 500, 1000, 2000 and 4000 Hz)
and 110, 125, 125, 125, and 140 dB
as no response values

METHOD 2: using the average of five frequencies
(250, 500, 1000, 2000 and 4000 Hz)
and 120 dB for all no responses

METHOD 3: using the average of three frequencies
(500, 1000 and 2000 Hz)
and 120 dB for all no responses

The ear with the least hearing impairment (ie. that gave the lower of the two averages) was used in analyses.

RESULTS

The means and standard deviations of each hearing loss measure are shown in Table 3:1 (below). As with other samples we have looked at, method 3 gives an average hearing loss 2 dB higher that the other two methods.

Decibels

	Mean	Std.Dev.
Method 1	92.0	14.7
Method 2	92.6	15.4
Method 3	94.1	14.9

Table 3:1 : Means and standard deviations for each hearing loss measure.

We correlated each of the three hearing loss averages with all the measures of linguistic ability found in the study. Not all 50 subjects were involved in all these correlations. In the teacher-child conversation section, for example, data are unavailable for 8 children. Similarly, not all children completed every subtest in the reading section. The reasons and details concerning these numbers (as well as details of the actual measures) are available in the relevant chapters.

However, we used as many children as the data from each section would allow. Using an analysis of variance, we attempted to discover whether any one average measure of hearing loss provided significantly different sized correlations with the language measures than any other. The result indicated that the differences were not statistically different (p=.23). However, if one "eye-balled" the data, it was apparent that in the vast majority of cases, the average of three method did correlate slightly more highly with the language measures than did the other two methods. Interestingly, there was one case where the average of five frequencies method of calculation correlated much more highly with a language measure than the average of three. This was speech intelligibility (a teacher rating, in fact), the same as that used by Kyle (1977) which persuaded Conrad that five frequencies provided significantly more information than three.

In conclusion, although the difference between the three methods was not statistically significant, we felt justified in choosing the method that provided the highest correlations, namely the average of three. Henceforth, when an average hearing loss is mentioned, it will have been calculated by this method.

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CHAPTER FOUR

THE READING ABILITY OF DEAF CHILDREN

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CHAPTER FOUR

THE READING ABILITY OF DEAF CHILDREN

INTRODUCTION

It is often not obvious to the layman that deaf individuals should have any problem at all with reading. However, large scale surveys have shown how devastating an effect deafness has on a child's ability to learn to read. A recent survey of the reading ability of deaf school leavers (Conrad, 1977 and 1979) showed the average reading age to be around 9 years. Children leaving partially hearing units (as opposed to schools for the deaf as in the figure above) were found to have an average reading age of 11 years (Kyle, 1978). Surveys in other countries reveal similar results. In the USA the average reading age for 16 year old deaf children was between 9 years 3 months and 9 years 6 months (Difrancesca 1972, Jensema 1975). Norden (1975), Rasmussen (1973) and VandenBerg (1971) find similarly depressing results in Sweden, Denmark and New Zealand respectively. Furthermore, it is generally accepted that deaf children's reading ages tend to plateau at about this age with very minimal improvement. Wilson (1979) would argue, however, that this plateau may be partly a function of the measures used. An examination of reading tests shows a sudden increase in linguistic complexity at this age. Webster (in preparation) argues that "the very information we need about the deaf reader's performance is lost when insensitive procedures are applied". Perhaps more sensitive measures of reading would reveal an improvement in deaf children's reading after the age of 9. Indeed, Webster, using a newly devised test battery, found that children's reading scores showed increases across all age ranges tested between the ages of 8 to 12. We shall return to the question of measurement later in this chapter.

Typical problems that the deaf encounter with language development have been thoroughly investigated and documented by Quigley and his colleagues in the USA (Brasel, 1975, Brasel and Quigley, 1977, Power and Quigley, 1973, Quigley, 1969, Quigley, 1979, Quigley and Power, 1971, Quigley, Montanelli and Wilbur, 1976, Quigley, Wilbur and Montanelli, 1976, Quigley and Kretschmer, 1982, Steinkamp and Quigley, 1977, Wilbur, Montanelli and Quigley, 1976). They find that 18 year old deaf students are, as a rule, unable to cope with sentences that are well within the grasp of hearing 10 year-olds. Particularly interesting is the finding by Quigley et al (1976) that certain syntactic structures that frequently appear in the writing of deaf children are accepted as grammatical by these children when used as distractor items in the Test of Syntactic Abilities (Quigley et al, 1978) even when the correct version is available among the choices given. The most common tendency observed was that of imposing SVO (subject-verb-object) patterns on sentences; for example,"the boy was helped by the girl" was often understood as "the boy helped the girl". The two sentences "The boy kissed the girl" and "The boy ran away" presented no problem for deaf children but the second part of the sentence "the boy who kissed the girl ran away" was interpreted as meaning that it was the girl who ran away. "The acceptance and use of these structures by deaf students in reading and writing indicates that they are part of the internalized language structure of deaf individuals. This point may have major significance in explaining the reading problems of deaf students" (Quigley and Kretschmer, 1982, p.71).

Conrad's survey (1979) of various linguistic abilities of deaf children raises a number of issues. Most of these are speculative, arising from his interpretation of the data and are not strictly relevant to the present study. They are concerned not so much with the measurement and understanding of the processes involved in reading, but with the form of communication used in schools. As we shall go on to discuss later, it is possible that many of the fundamental language problems of the deaf persist regardless of the mode of communication currently favoured in the classroom. The data from Conrad's study, however, are interesting. He found that hearing loss, intelligence and inner speech (the apparent ability to think in sounds rather than about the visual appearance of words in print) were all correlated with reading age, lipreading ability and speech intelligibility. If, for example, two children of similar hearing loss and intelligence were found to have very different reading ages, it is likely that the child with the superior reading ability exhibits inner speech while the other does not. As a rule, however, the deafer children are less likely to possess inner speech than those with a less pronounced loss. Similarly, children of low intelligence are less likely to exhibit inner speech than those who are more intelligent. What is not clear is the causal mechanisms involved between intelligence, hearing loss and inner speech, on the one hand, and reading age, lipreading ability and speech intelligibility on the other.

However important inner speech may be in relation to reading age, it still leaves the majority of the difference in reading age between the deaf and the hearing unaccounted for (ie. 5 out of an average of 7 years' difference); Conrad found a group of hearing children who performed no better on the test of inner speech than the deaf children but these children were still 5 years in advance of the deaf group in their reading. Interestingly, when the deaf children were split into groups according to their hearing loss, the correlation between intelligence and reading age is highest for the least deaf children. One wonders whether this might reflect a slight verbal element in the "non-verbal" intelligence test used (Raven's Progressive Matrices). Some of the items towards the end of the Ravens Test could well be more easily solved with verbal strategies. However, for no hearing loss group did intelligence account for more than 26% of the variance in reading test scores. From Conrad's data we can conclude that although hearing loss, inner speech and intelligence account for some of the variation in reading ability, there is likely to be some variance which has not been accounted for or identified.

One can only speculate at present as to what others factors might be involved. Jensema (1975) finds that immigrant deaf children, for example, tend to do less well at school in the United States than do children from white backgrounds. Essen and Ghodsian (1979) report on the academic achievements of immigrant hearing children. As detailed in chapter 2, these children tended to have lower test scores than indigenous children. Conrad did not include such children in his study of the deaf so we have no comparable data in Britain. Other possible factors in operation include the educational experience of the child and the role of "short-term" memory. Quigley and Kretchmer (1982) report that several investigations have found a correlation between short-term memory span and reading ability. All such factors are matters for future enquiry.

So, as a rule, research shows that the majority of deaf school leavers do not achieve what is generally accepted as a level of functional literacy. However, as Quigley and Kretschmer (1982) point out, national demographic data can obscure individually encouraging pictures. They cite examples of studies in which deaf students continue to show marked improvement in reading skills even after leaving school. Before we conclude from this evidence, as does Conrad, that deaf children cannot be taught to read, two major areas merit thorough investigation. Firstly, are the _measures_ we are using to test deaf children's reading ability adequate? Secondly, are our _teaching methods_ appropriate and efficient? Since the purpose of the present study was to establish if and how deaf children's reading ability relates to other areas of language use, we needed to find a reading test in which we could place some confidence.

Reading Tests for Deaf Children

As far as we know, there is no reading test to date which has been both devised and standardised especially for deaf children. Hamp's Picture Assisted Reading Test (Hamp, 1975) is an exception but suffers from two major problems. Firstly, as we shall describe later, hearing and deaf children appear to be approaching the test in different ways, and secondly, it only taps the child's knowledge of vocabulary. As we shall go on to argue later, this lack of a reading test for deaf children is of no extreme significance providing that the <u>hearing</u> referenced tests that we are using measure the same abilities in both groups of children. In order to establish this, we need to consider the tests that are used in schools in some detail. Under pressure to chart their children's progress, teachers use what is available, namely tests devised for hearing children. Those that have complicated verbal instructions or that require verbal answers tend to be discarded leaving a limited choice of material. Such tests are often used solely to provide a figure for the records, with little or no diagnostic or direct educational value.

Suspecting that deaf children were employing different strategies from the hearing to tackle reading tests, we were concerned about the use of hearing referenced tests with deaf children. Such concern is not new (see Myklebust, 1964, for example) but little has been done to demonstrate the problem in detail or to provide any alternative. Most such tests are standardised using only the 'normal' school population; special schools are not included. The reading ability of deaf children would therefore be effectively underestimated, providing, of course, that we are measuring the same things in both populations. Also unjustified, we would argue, is the assumption that a reading age of 8 in a hearing child aged 8 means the same thing as a reading age of 8 in a 12 year old deaf child. The manual to the Edinburgh Reading Test, Stage 1 (1977), states that these children "may well not encounter the same difficulties" and that the tests are "not, therefore, recommended for older severely retarded readers" (p.3). Such warnings, however, are rare.

Evidence is accumulating that the same reading age is likely to be obtained by deaf and hearing children in quite different ways. A study by Moores (1967) reports that even when apparently matched for reading age, deaf students showed considerable deficiencies in syntax and vocabulary when compared to hearing students. Similarly, O'Neill (1973) reports that deaf students were not as able as hearing students to judge which of a pair of sentences was syntactically correct, even though both groups of students had been matched for reading age. It therefore appears possible that large-scale surveys of the reading ages of deaf children such as those reported above are actually <u>overestimating</u> these children's ability. The picture might well be even gloomier than we thought. Members of the Deafness Research Group at Nottingham University have looked in detail at the results of three reading tests that are commonly used with deaf children, namely the Brimer Wide-span Reading Test (Brimer, 1972), the Southgate Sentence Completion Test (Southgate, 1962) and the Picture Assisted Reading Test (Hamp, 1975).

<u>Brimer Wide-span Reading Test</u>

We compared the performance of 60 deaf and 60 hearing children (Webster, Wood and Griffiths, 1981) on the Brimer Wide-span Reading Test (Brimer, 1972). This test, also used by Conrad (1979) in his survey of deaf school leavers, requires the child to read a sentence on the left hand side of the page and from it choose one word that will 'fit' into the space in the (unrelated) sentence on the right hand side of the page, for example :

Pack the eggs in the box   Hens lay ....

Choice is obviously governed by the words presented in the first sentence, and allows an analysis to be made of the proportions of various errors. Two major categories of error were identified, namely linguistic and non-linguistic. Linguistic errors could be broken down into

3 types:

a) where the completed sentence was grammatically correct but the sense (although acceptable) was in fact wrong,
eg. Alongside the wardrobe stood a tall chest of wood (drawers).

b) where the word chosen fitted the syntactical constraints of the sentence but did not make sense,
eg. Slowly he lifted the glass not wishing to pick (spill) a drop.

c) where the chosen word was associated with an adjacent word in the new sentence,
eg. An foolish (only) child is one who has no brothers or sisters.

Non-linguistic errors were those where there was no obvious connection between the chosen word and the new sentence. The existence of a third category of errors was hypothesised, namely those where the word chosen occupied the same location (eg. fourth) in each sentence.

Deaf children were found to make more errors than hearing children overall and a significantly lower proportion of these errors was linguistic. Since the deaf children continued to answer items well beyond their reading ability (the deaf group attempted an average of 47 questions compared to the hearing's 22), it could be argued that this resulted in the lower proportion of linguistic errors in this group. However, if a cut-off point is made at the point in the test where the reading age is attained and attention is only paid to items before this point, a similar pattern of errors emerges. It has been reported that deaf children have problems in recognising and correcting their own errors (Clay, 1977). This may be one of the reasons why a deaf child goes on to the end of a test when he obviously no longer understands the items. Another possible reason for this phenomenon (also found in the Southgate study described below) is suggested by Furth (1973) who refers to occasions where the teacher encourages the deaf child to participate even though the limited amount of information he is receiving means he is unlikely to fully understand a situation. We all know that deaf children will frequently shake or nod their heads to any question posed. It is relatively easy, for example, for them to grasp that the force of a teacher's utterance is questioning, but sometimes not so easy to understand important details that would enable the desired response to be made. A "yes" or "no" response often gives a 50/50 chance of being right. Furth claims that teachers encourage this "senseless perseverative behaviour" (p.90). Webster et al conclude, "Thus, the child's test score serves as a poor guide for any attempt, say, to estimate the types of material he or she is able to read in books, television subtitles and so forth. Had the deaf child's error patterns _prior_ to the reading ceiling been substantially different in kind from those made beyond the ceiling we might have been able to conclude that the additional, non-linguistic errors were merely the result of perseverance beyond his or her functional reading level. The fact that they were not different indicates that the deaf child's performance throughout the test is different in kind from that of a matched hearing counterpart. This clearly raises questions about the value of reading estimates of the deaf child, using norms based on studies of the hearing. They are likely not to indicate a similar delayed process but the outcome of quite different reading abilities" (p.146). It is interesting to note however, that this 'perseverance' has not been found in a large scale survey of the maths abilities of deaf school leavers (Wood, Wood and Howarth, in preparation). When tackling a maths test the children seem to know when they have reached their 'ceiling' and, like hearing children, stop.

Southgate Sentence Completion Test

Wood, Griffiths and Webster (1981) compared 60 deaf and 60 hearing children's performances on this widely used test (Southgate, 1962). The child is required to complete a sentence with one word out of a possible five that are given (for example, Ducks can pond swim water farm sing.) It was found that the deaf children attempted more questions than the hearing (92% as opposed to 85%) and made more errors (47% as opposed to the hearing's 18%). As with the Brimer Wide-span study we needed to ascertain whether or not this meant that the deaf children were simply answering questions at random above their reading 'ceilings'. By doing a linear regression between attempt-frequency and probability of success for each item, it was found that both deaf and hearing groups were less likely to answer questions that were often incorrectly answered by those children who did attempt them. The least successful question was attempted by 70% of hearing children who met with 40% success whereas the least successful question for the deaf children was attempted by 81% of them with only a 4% success rate. The hearing children achieved less than 50% success on only 2 questions whereas this was true for 17 questions in the deaf group.

An item analysis was undertaken to check whether or not the deaf children were simply answering these more difficult items at random. Results showed that on 39 out of a possible 42 items the deaf children showed significant agreement as to which was the right answer. (11 of these were in fact incorrect.) The hearing group agreed on all but the last 4 items of the test and all of the remaining 38 items did in fact constitute the right answer. This result (together with those described in the previous paragraph) reveal that the hearing children tend to select the right answer or do not attempt the question. Analysis of the second most popular choices revealed that deaf children showed significant agreement on 9 questions whereas this was not true for the hearing group on any question. This once again points to some sort of non-random strategy being employed by the deaf.

Detailed analysis of the individual questions revealed a possibility that one of the strategies deaf children used involved word association. The following examples (where the most popular answer is underlined) illustrate the point:

Ducks can - <u>pond</u> swim water farm sing.

Careless driving leads to - happiness <u>cars</u> tractors accidents improvements.

It was found that on the three most successfully answered questions (by the deaf) there was only <u>one</u> word among the five possible given that could be considered highly associated with the initial part of the sentence frame. These words also represented the correct answer.

Conrad (1979) says that in tests such as these "it may be hard to evade the probability that the most familiar word is also the correct word" but claims that this "does not necessarily give spurious reading ages to deaf children. If deaf children give the same responses as the average hearing child aged 8 years, then they have a reading age of 8 years. The possibility that deaf children might always have chosen the one word familiar to them, whilst hearing children carry out a sophisticated linguistic analysis of the sentence, cannot be a major criticism; it remains a pure speculation" (p.150). Our analyses of the performance of deaf and hearing children on several reading tests to date now render such a criticism valid and not just "pure speculation."

In conclusion, these analyses showed that deaf and hearing children were using very different answering strategies on this test and that the deaf children's response distributions were not of a random nature. If hearing children could not successfully complete a question, they tended to leave it, whereas the deaf persisted well beyond the point in the reading test which could normally be described as their 'ceiling'.

Picture Assisted Reading Test (Hamp)

Beggs and Breslaw (1982) examined deaf and hearing children's performance on the Picture Assisted Reading Test (Hamp 1975). This test requires the child to look at a stimulus word on a page, which when turned over reveals four pictures. One of these pictures corresponds to the stimulus word. The child must point to the picture that represents his choice. This test is really a vocabulary test, not a reading test. Analysis revealed that deaf and hearing children achieve the same score by identifying quite different subsets of words. Hamp (1971) also reports this finding. He standardised the test on a deaf population of 367 subjects. Beggs and Breslaw found that the vast majority of errors made by the deaf children were not of a random nature. Hearing children were asked, "Will you pick out the picture that you think 'stands out' from the page - by this I mean the one you think is 'interesting' or 'nice' or 'exciting'." Once again, the vast majority of items were reported as having non-random response distributions. A quarter of the most popular choices coincided with the correct answer on the 'real' test. (Thus one could actually score on the test simply by choosing the most exciting picture.) However, leaving these latter items aside (since one could not reliably attribute the deaf children's success on these items to a "reading" strategy or a "choose the most exciting" strategy) in 11 out of 15 cases deaf children showed the same pattern of choice as the hearing. It is thus likely that 'salience' is yet another non-linguistic strategy that deaf children use to cope with reading tests. It is also possible, therefore, that the child's measured reading age on this particular test is an over-estimate. A further criticism of this test is that it only measures vocabulary. It may well be a mistake to presume that since the various skills involved in reading develop at similar rates in hearing children, the same is true for the deaf. We cannot conclude that a measure of vocabulary in the deaf is a good indication of, for example, his syntactic development.

The results of these three studies cast serious doubt on both the validity of using these tests to compare the reading ability of deaf and hearing children as well as the claim that they are infact measuring reading in the deaf at all (at least in the sense that the devisers of the tests would like them to). We therefore either need to find a hearing-referenced test on which deaf children's performance is comparable to hearing children's <u>or</u> we need to devise and standardise a reading test specifically for use with deaf children. Time, however, did not allow the latter course of action to be pursued before this particular study began.

One test that we might have used was the Test of Syntactic Abilities (Quigley, Steinkamp, Power and Jones, 1978). This is not strictly speaking a reading test, as the authors point out. The acquisition of syntax is a major problem for the deaf and over recent years has received some attention as a possible source of reading difficulties. Success in reading and writing depends on more than just a knowledge of syntax but if a child has not mastered the nine syntactic structures covered in the TSA he cannot, according to Quigley et al, be expected to learn to read and write. The aim of the test is to help teachers determine exactly with which aspects of reading a child has problems. They can then compare the performance of this child with others since the test has been standardised on 450 deaf children, all of whom had an average hearing loss of at least 90 dB. The TSA fills a gap in the choice of tests available, since in the USA "tests of the reading process do not include rigorously constructed standardised tests of syntactic abilities" (Quigley et al, 1978). With the exception of the test that we finally chose, a similar situation exists in this country. The TSA itself, however would have been too lengthy to administer : it involves 20 individual tests, each containing 70 multiple choice items. A much shorter screening version exists which would be more useful for research purposes. Unfortunately, this test was developed for, and standardised on, an American population and for this reason alone would not have been suitable for our purposes. However, we also wanted a measure which would give a fairly global view of a child's reading ability, covering areas other than syntax. While actually writing up this work we were glad to hear that there are plans afoot to standardise the TSA on an English population. We were anxious to look at the children's reading ability as fairly as possible within the limits imposed upon us by the tests readily available. A test which seemed to offer more than most was the Edinburgh Reading Test (1977) even though the manual frankly admits that the test is not recommended for older severely retarded readers.

The Edinburgh Reading Test

The four stages of the Edinburgh Reading Test were commissioned by the Scottish Education Department and the Educational Institute of Scotland and constructed by the Godfrey Thomson Unit for Academic Assessment at the University of Edinburgh. These bodies considered such tests were necessary not so much as a means to obtain a score but "to assist in the teaching of reading". Each test comprises four or more subtests designed for investigating various aspects of a child's reading ability. In Stage 1 (the only test used in this particular study and therefore the only one referred to from now on) the four subtests aim to tap Vocabulary, Syntactic, Sequencing and Comprehension skills. An overall score as well as a score for each of the subtests can be obtained for each child. This information can then be transferred to a 'profile sheet' on the back of the test booklet revealing whether the subtest scores are unusually high or low in comparison with each other. Using the tables provided, the total score can be converted into a quotient (either for both sexes combined or for boys and girls separately) that relates that child's performance to that of the general population. One can also discover the strengths and weaknesses of a whole group of children (eg. a class or school). This test has been standardised using children from state schools in England, Scotland and Wales. In the case of deaf children whose range of chronological ages and scores does not usually permit use of these tables, we can use the Reading Age table, which relates a particular score to the age at which that score is typical. The test can be administered either individually or in groups and exists in parallel forms.

Reasons for choosing the Edinburgh Reading Test

There were four main reasons for choosing the

Edinburgh Reading Test (henceforth referred to as the ERT) to measure reading ability in the present study. Firstly, it is a recently developed test (published in 1977) and its contents are not, therefore, outdated or unusual as is frequently the case with other tests. Similarly, as it has been recently standardised (on over 5,000 children) it is more likely to fit contemporary reading standards (at least in the hearing population) than tests of a more antique nature. Secondly, the ERT appears to involve a far wider range of reading skills than other tests. Since reading appears to involve so many skills, it would clearly be valuable not only to be tapping as many of these skills as possible but also to be able to <u>assess</u> them separately. The structure of the ERT, with it's four subtests involving eight different sets of items, allows such separate assessment to be made. It is not possible for a child just to hit on a strategy at the beginning (as he might in the tests investigated above), blindly pursue it and yet still meet with some success on the test: if he does not grasp the nature of and understand the contents of the task it seems less likely that he will succeed using 'undesirable' strategies. Thirdly, the very existence of the subtests means that the teacher can diagnose reasonably accurately the locus of a child's problem (eg. vocabulary, syntax, sequencing or comprehension). The items within each question are chosen so as to provide deliberate distractors. One can then look at the child's errors in a more informed light. A child could fail on a particular question in the Vocabulary section because

a) he fails to read the whole word
(tend for tent, tress for tree, chase for chain)

b) he looks at the shape of the word and ignores individual letters
(boot for boat, test for tent, tram for train)

c) he accepts similar sounding words
(shake for snake, drain for train, stair for chair).

In the syntax section on page 4 the child is required to identify the whole structure of a sentence and cross out the redundant word. These words could be obviously inappropriate (eg. Phillip borrowed off my bicycle, Janet oftens reads a story chair), or only seem inappropriate if one reads several more words (eg. Do you want breakfast a cup of tea? Give your ball needs blowing up). In the Comprehension section, some items simply require the child to extract information from the picture, while others require him to draw conclusions from the information provided. The final items in this section require the child to infer what someone is feeling from what is being said and to summarise this in a new form. These are just examples of the rationale behind some of the items; there is clearly great scope here for the teacher to locate where a child might be experiencing difficulty. The final and perhaps the most important reason for choosing the ERT for this study was that we had obtained data and analyses (from Edinburgh University) on over 2500 hearing children's performance on Stage 1. The major interest here lay in a detailed breakdown of answers to each test item. This would enable us to investigate what proportion of children chose the correct answer and whether any interesting patterns emerged among the incorrect answers (in other words, to do a very similar sort of analysis to that used on the the Southgate test). We therefore had a vast amount of data from hearing children with which to compare the performance of the present deaf sample and any other samples we might gather.

To sum up, it has been shown that deaf children use many different strategies to cope with a reading test, some of which have little to do with reading. The study of the Southgate test revealed word association as an important factor. Kyle (1980) reports that word recognition tends to be more advanced than text comprehension in deaf children. Perhaps in the Southgate test "they capitalise on their memory for individual familiar words and upon associations between these (where possible) to provide systematic answers" (Wood et al, 1981, p.155). In the Brimer Wide-span reading test deaf children sometimes appeared to choose words on the basis of their location in the sentence. On the Hamp test deaf children's choices bore a marked similarity to those of hearing children instructed to choose the more 'salient' picture. So, as Wood et al conclude (p.155/156), "This leads us to argue that deaf children tend to search for cues or features of the test they are confronted with in an attempt to make sense of the problems they face. Overwhelmed by the linguistic aspects of the test, they capitalize on any feature of the test situation that enables them to develop and use a consistent strategy. We cannot yet identify all the features of questions that lead them to common, erroneous answers, but it seems clear that such features do exist...Hearing-referenced tests would seem to generate unreliable data and act as poor guides to the reading processes of hearing-impaired children."

This particular section of the present study was therefore designed not only to look at the relationship of reading to other linguistic skills, but also to begin to investigate the appropriateness of the ERT for assessing deaf children's reading ability using techniques similar to those employed on the three tests described above.

The teaching of reading

The other areas of necessary research mentioned above involve looking at the teaching of reading and examining exactly why deaf children experience so much difficulty learning to read. There have been many papers about standards of reading in the deaf but few on how deaf children are actually taught to read. A study by Howarth, Wood, Griffiths and Howarth (1981) goes some of the way towards remedying this. An examination of video-tapes of reading lessons showed that the deaf stopped reading or were stopped by their teachers significantly more often than hearing controls. Furthermore, an analysis of the reasons for stopping suggested that the teachers of the deaf have very different goals from the teachers of hearing children and stop for many different reasons; teachers of the deaf tend to use the reading lesson as an opportunity for teaching language itself. Consequently the deaf spent significantly less time actually reading (decoding print into speech) than the hearing ($p<.00003$). Indeed, given the frequency and length of stops during the reading lesson as well as the slow reading rate, it would be surprising if deaf children manage to grasp any meaning from the text at all.

As a result of their extensive studies of deaf children's reading abilities, Quigley and his colleagues in the United States (eg. Quigley and King, 1981) have prepared reading materials designed especially to suit the needs of deaf children. An alternative, or perhaps complementary, approach is that which tries to modify the reader rather than the materials. Clay (1977) shows how good hearing readers construct hypotheses for themselves about the meaning of the text. Perhaps teachers should help children develop this skill and to search for cues, anticipate meaning and to respond to dissonance in a constructive manner. However, as Webster (in preparation) observes, such an approach would be very difficult with deaf children, since their strategies are not as easy to infer as are hearing children's (eg. hearing children often correct themselves when reading aloud).

It is possible that one reason why deaf children fail to acquire certain linguistic structures is that they are not exposed to them in the classroom. Prepositions and pronouns, for example, may be very difficult to pick up from spoken language going on around the child. This may not be simply a matter of such words being too "small" to lipread, but rather that when used in context by a teacher, they are easily made redundant by the pointing or other gestures that often accompany them in order to help clear up any possible ambiguity.

Alternatively, teachers may avoid the use of such words at all, knowing that the children have problems with them and thus perpetuate a 'vicious circle'. With such limited experience of these words, deaf children would be bound to have problems recognising them in reading and using them in writing. Clearly, this is an area which merits far more study, both of a descriptive and interventional nature. We hope to be tackling some of the questions ourselves in the near future.

METHOD

Subjects

Data are available for 41 children (20 boys and 21 girls) with an average hearing loss in the better ear of and 94dB and an average age of 11 years 7 months. Those who did not at least attempt every subtest (9 children) were not included in the following analyses.

Procedure

As explained in chapter 2, I arranged to work with each class for one week. At convenient moments during this time (ie. disturbing routine as little as possible) the children were taken, either singly or in pairs, to a quiet spot in order to do the reading test. The 30 minutes officially allowed for the whole test (which includes time for instructions) was not strictly observed. Administering the test would have become far too clumsy if one had to calculate the amount of extra time spent giving instructions and add this onto the time allowed while actually testing the child. Obviously instructions take far longer with a deaf child than with a hearing child. However, in all cases testing was probably completed within this limit. Although the ERT is usually a group test, the nature of a deaf child's handicap makes it preferable to administer individually or in very small groups. Communicating the requirements of the task to only one deaf child is quite difficult enough, especially with a relative stranger as tester. It is possible, however, that this may introduce other factors. In the manual to Ravens Matrices (1978), for example, it is stated that administering tests individually is likely to involve more stress. This is why two different standardisation tables are provided for Raven's Matrices, one for children who have done the test on their own, the other for those who have done it in groups.

Since instructions for reading tests are designed for hearing children, certain adaptations have to be made for the deaf if they are to grasp the nature of the task.

This is particularly true of the ERT where there are 8 different sets of items, each of which requires a different explanation. Certain items are self-explanatory, such as those on pages 1 and 2 where the child merely has to draw a circle round one of the 4 words (nouns) that describes an adjacent picture. However, on page 8 the child not only has to rearrange the words provided (for example, "start when I'll to you tell") into a meaningful and grammatically correct sentence, but also has to draw a circle round the first word of that sentence. This is particularly difficult to explain to deaf children. A set of cards was made for practice so that the children could physically manipulate the words. This made explanation much easier. This idea could initially be introduced by writing up an extra example on the board. A child called Fred, for example, usually knows what to do with "name my Fred is".

There were several occasions where I considered it necessary to abandon a particular set of items with a child. This was either because my (admittedly limited) knowledge of a child told me that he was incapable of succeeding on those items. Of course, it is entirely possible that I was incapable of explaining the nature of the task in such a fashion that he would understand. If the child's own teacher had administered the test she would probably have been in a much better position than a researcher to judge his limitations and to find the most effective way of explaining the problem to him. The ERT, to a much greater extent than other reading tests, requires a good deal of explanation from the teacher throughout the entire procedure. However, as several teachers were involved in this study the fact that one person conducted all the reading tests did impose some sort of uniformity over the proceedings. If a child had been tested by his own teacher he may well have achieved a higher score. Informal observation of some of the children's test performances 6 months later suggested that this might well have been the case.

Being concerned about these possibly contaminating factors mentioned above, I thought it might be useful to obtain another sample of children (from a different school) and examine their performances on the ERT. A school was found which ideally suited our requirements. This school has been using the ERT for at least four years. One teacher has taken a particular interest and has kept records of the children's progress. She has discovered what she considers to be the best method for giving instructions, has devised extra examples for practice and administers the ERT as a group test (strictly timed) in a large room with several invigilators, all of whom have discussed the test and it's administration in detail. The invigilators are all teachers who are familiar with the children and are available to check that the instructions to the test have been understood.

I felt that the ERT results from this school were more likely to be representative of the children's capabilities than results from the two other schools where I had administered the test myself. If, however, the results from these two sets of data were fairly similar then I could be more content with the validity of the first results. Test booklets were collected from this school for 31 children who had completed the ERT Stage 1 this year. For the purposes of this comparison we were only interested in examining Form B of the two parallel forms because the children in the present study had only done Form B. However, several teachers had mentioned that they considered Form A to be much easier for deaf children than Form B. I have therefore begun to collect further test booklets from children who have completed <u>Form A</u> in order that we might look at results from the two forms to see if any interesting differences emerge. This is not part of the present study but something to be pursued in the future. All the results outlined below concern Form B and refer to children in the present study unless otherwise specified. Results from the second sample are mentioned where relevant but details of the analyses together with tables are available in Appendix III.

RESULTS

As noted by other researchers, the children in the study did not seem to be exercising any form of self-correction. This is best illustrated by the following examples where the children are required to indicate which word they consider to be 'unnecessary' in each sentence. In both cases the most popular choice of unnecessary word is given in brackets. Both these choices are incorrect.

I want to (my) dinner.

Give your ball (needs) blowing up.

These and other cases illustrate a tendency to operate on a 'word-by-word' strategy. The children tended not to delete a word that 'fits' with the word directly preceding it. However, I feel sure that in most cases, given the choice between "I want to dinner" and "I want my dinner", they would have chosen the latter as making the most sense. If they were in the habit of checking their work, this would have become apparent.

Edinburgh Reading Test subtest scores

Table 4:1 shows means and standard deviations for each subtest as well as the overall score. Scores on the comprehension subtest do appear to be lower but this might be due to a floor effect since some of the children only attempted a few items. A very similar pattern of results was found with the 31 children from the second sample (see Appendix III), their mean subtest scores being 15.5, 16, 14.5 and 13, with a mean total score of 59.5.

	Means	Std. Dev.
Vocabulary	14	3.6
Syntax	14	4.1
Sequencing	11.5	4.4
Comprehension	9	3.9
Total	48.5	13.2

Table 4:1 Means and standard deviations on Edinburgh Reading Test subtest and overall scores.

Edinburgh Reading Test subtest correlations

As can be clearly seen in Table 4:2 (below), all the subtest scores correlate highly with each other as well as with the total score. A very similar pattern of correlations was found with the second sample (see Appendix III).

	Vocab	Syntax	Seq	Comp
Vocab	-------			
Syntax	.51 ***	-------		
Seq	.62 ***	.65 ***	-------	
Comp	.58 ***	.46 **	.53 ***	-------
Total	.81 ***	.81 ***	.87 ***	.78 ***

Table 4:2 : Edinburgh Reading Test subtest correlations.

* $p < .05$
** $p < .01$
*** $p < .001$

Sex differences on subtest correlations

We split the data on the subtest scores into 2 groups (20 boys and 21 girls) in order to see whether there were any sex differences in the pattern of correlations. The results (see Tables 4:3 and 4:4 below) show that the overall subtest correlations were masking large sex differences. The girls' subtest scores inter-correlate much more significantly than the boys' scores.

	Vocab	Syntax	Seq	Comp
Vocab	-------			
Syntax	.43	--------		
Seq	.49 *	.36	-------	
Comp	.40	.04	.21	-------
Total	.82 ***	.65 **	.74 ***	.59 **

Table 4:3 Edinburgh Reading Test subtest correlations (boys only).

	Vocab	Syntax	Seq	Comp
Vocab	-------			
Syntax	.48 *	-------		
Seq	.67 ***	.80 ***	-------	
Comp	.71 ***	.72 ***	.72 ***	-------
Total	.80 ***	.87 ***	.92 ***	.90 ***

Table 4:4 Edinburgh Reading Test subtest correlations (girls only).

* $p < .05$
** $p < .01$
*** $p < .001$

We used the Fischer Z statistic to see whether these differences between the boys and the girls' intercorrelations were significant. The results (shown below in Table 4:5) reveal that most of these differences were significant. Although the girls obtained higher total scores than the boys on the reading test, the difference did not achieve significance (p<.09).

	Vocab	Syntax	Seq	Comp
Vocab	-------			
Syntax	.42	-------		
Seq	.21	.0136 *	-------	
Comp	.07	.0039 **	.0170 *	-------
Total	.43	.0436 *	.26	.0075 **

Table 4:5 Significance levels (Fischer Z) between Edinburgh Reading Test subtest correlations for boys and girls.

* p < .05
** p < .01
*** p < .001

It is worth looking at the results from the second sample of children (in Appendix III) to note the striking similarities between their and the present children's subtest intercorrelations. Once again the girls' subtest scores intercorrelated much more highly than the boys'.

Reading age and other child variables

The correlation between the overall score on the reading test and hearing loss did not reach significance. Neither did the correlation between age and reading performance. In former studies such as those by Hamp (1972), Jensema (1975) and Conrad (1979) a correlation between hearing loss and reading age is nearly always reported. We looked at the data from our study of the Southgate test (Wood et al, 1981) and found there was also a significant correlation there. It was possible that the range of hearing loss in the present sample was too narrow to show up any correlation. Montgomery (1968) failed to find a correlation between hearing loss and reading ability but all his sample were also very deaf. We therefore ran an analysis of variance to see whether the children in the Southgate study (which did reveal a significant correlation between reading score and hearing loss) had a different range of hearing losses than the children in the present study. The analysis revealed quite clearly that the hearing losses for the two samples were different ($p<.03$). Had the present sample included children with a wider range of hearing loss, we suspect that we would have found a significant correlation.

We failed to find a significant correlation between IQ and reading. However, the children's scores on the

ERT correlated with teacher ratings of general ability as well as oral ability, attitude and written language but not with ratings of speech intelligibility. However, once again, these overall correlations masked sex differences. When the data were split into two groups (21 girls and 20 boys), we found that the boys' total scores on the ERT were not in fact correlated with <u>any</u> of the teacher ratings. The girls' total scores, on the other hand, showed a strong correlation with all teacher ratings except speech intelligibility. Many of the girls' subtest scores also correlate with teacher ratings; we would expect to find this given the fact that the girls' subtest and total scores were highly intercorrelated (see Table 4:4).

DISCUSSION

My concern about my ability as a researcher to draw the 'best' from the children in the reading test was somewhat allayed by finding a very similar pattern of results (in terms of sex differences and subtest correlations) from a second sample of children who had been tested by teachers. Obviously one cannot compare the absolute levels of achievement but it seems reasonable to suppose that if any undesirable factors were operating during the testing then the pattern of subtest correlations would have been different for the two groups and that we would not have found the results from the children in the present study to correlate with other measures of their language. Conrad certainly voiced no concern over this issue.

The overall superiority of the girls (although not quite reaching statistical significance) supports the findings of other researchers (Myklebust, 1964 and VandenBerg, 1971). The verbal superiority of adolescent girls is well established in the 'hearing' literature (eg. Fairweather, 1974) but it now seems certain that this superiority persists in deafness. The sex differences in the pattern of subtest correlations are also of interest. Norden (1975) found that any measure of language ability in deaf girls was a better predictor of their ability on other measures than it was for the boys. The reasons for this are, as yet, a matter for speculation.

Although the relationship between hearing loss and reading ability failed to achieve significance, this does not suggest to us that the measure is insensitive. As mentioned in the results section, such a relationship is usually found. Conrad, however, notes a sharp change in performance around an 85dB hearing loss. The average loss of the present children is 94dB. We were not therefore surprised that the correlation did not achieve significance. Kyle (1980) suggests that as far as reading vocabulary is concerned, there is no such correlation if one only considers children with a hearing loss greater than 85dB. Of course, the Edinburgh reading test probably taps far more skills than a vocabulary test. Kyle suggests that "the nature or reading changes during the ages 7 years to 9 years and vocabulary knowledge *per se* becomes less of an indicator of the higher level skills of reading" (p.95). Webster (in preparation) examined the relationship between sentence comprehension and hearing loss and found hearing loss accounted for very little of the variance in scores. Another reason why we are fairly confident that the ERT is tapping the children's linguistic competence, is that we find other measures of the children's linguistic ability (in their conversations with both peers and teachers and in their writing) to correlate with their performance on the reading test (see Chapters 8and 9).

We found no significant correlation between reading and IQ, a result that we have in common with Vandenberg (1971), Webster (in preparation) and Clarke-Carter (personal communication). Conrad (1979), on the other hand, did. Our measures of IQ do correlate significantly with other measures taken, such as average length of turn in conversation with teachers (see Chapter 5). Similarly, the reading scores correlate highly with other measures (see Chapter 8). So, it seems unlikely that our failure to find such a correlation is due to insensitivity of either measure since both are significantly related to other variables. Perhaps we should bear several other factors in mind. Conrad reports a decreasing size in the correlation between reading and intelligence with an increase in hearing loss. He, however, considers that we should not attach too much importance to this since it probably reflects the inclusion in the deafer groups of children who cannot read at all. However, the children in Webster's study were all severely or profoundly deaf, those in Clarke-Carter's study were all profoundly deaf and the children in the present study are also very deaf (average hearing loss being 92 dB). In the light of these factors it seems reasonable to conclude that reading performance only correlates with IQ when studying a large heterogeneous population, such as Conrad's, with a wide range of reading abilities.

We are not claiming that the reading tests discussed in the introduction (Brimer, Southgate and Hamp) do not measure some sort of linguistic ability; they obviously do. The problem, however, is that they are not designed in such a way as to measure the same things in deaf and hearing children. We suspect that the design of the ERT may avoid some of these problems that appear to be inherent in other tests. We shall find the answer to this question in a detailed analysis of the errors made by both deaf and hearing children on this test.

Purely for interest, I administered a second reading test (the Southgate Sentence Completion) to one group of children in the study. Both this and the Edinburgh reading test took place within a week. On average, using the Southgate test, the children achieved a reading age 8 months higher than that they achieved using the Edinburgh. Interestingly, their teacher, who is experienced in teaching both deaf and hearing children, volunteered that she thought the Edinburgh test provided a much more realistic comparison of deaf and hearing children's reading abilities than did the Southgate test. The results of our future error analysis may enable us to confirm her suspicions.

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CHAPTER FIVE

DEAF CHILDREN'S LANGUAGE IN CONVERSATION WITH THEIR TEACHERS

CHAPTER FIVE : CONTENTS

CHAPTER FIVE

DEAF CHILDREN'S LANGUAGE IN CONVERSATION WITH THEIR TEACHERS

INTRODUCTION

In this part of the study we wanted to obtain a corpus of speech from the children, preferably in the form of a naturally occurring conversation with their teachers. We were anxious to look at this aspect of the children's language in as natural and non-invasive a manner as possible for two reasons; firstly, because we would thus be more likely to obtain a sample of the child's 'normal' language and secondly, because the results and information that we hoped (ultimately) to return to the teachers would have more meaning and, perhaps, value for them if related to what actually goes on in the classroom rather than to a situation that has been artificially imposed by a researcher.

A successful technique for obtaining just such a corpus of language from deaf children of this age was used by Wood, Wood, Griffiths, Howarth and Howarth (1982). This involved video-recording a conversation between the teacher and her whole class. Observation in schools for the deaf had revealed that such conversation sessions often took place, usually after a weekend or an unusual occurrence. The videotapes thus obtained are transcribed (word for word), coded and analysed. Such sessions are potentially interesting in that we can observe deaf children using language to communicate with their teachers about experiences outside the present context. They are therefore less likely to resort to large scale non-verbal and esoteric strategies than when communicating with their peers.

The 'conversation' section of this study is the only one which required the direct involvement of the teacher. The literature on such interactions between adults (usually teachers or mothers) and children is expanding. It is now becoming apparent that it is not just the factors that a child brings to such interactions (age, intelligence, confidence, social background and so on) that affect how he behaves. The adult's behaviour also appears to exert some influence. Such correlational studies, however, do need careful interpretation. As we shall go on to argue in the conclusion to this chapter, the direction of cause in such relationships is not always immediately apparent. What is interesting, however, is that it is not only the type of language that a child receives that appears to determine his own language output, but also the patterns of control and management. Karnes, Teska and Hodgins (1972) looked at several types of preschool provision and concluded that one major variable associated with these (hearing) children's achievements was the nature of the relationship between the adult and children. Those children who were often left to their own devices fared less well than those in set-ups where frequent one-to-one activities and conversations were encouraged. Hartmaan and Haarvind (1977) found that children whose mothers have a very controlling style responded more passively to a strange adult (asking fewer questions and usually waiting to be told what to do) than children with less controlling mothers.

Robinson and Rackstraw (1967) showed that mothers differed in the way they answered their children's questions. Working class mothers often gave "because they do" type responses, whereas the middle class mothers gave more factually accurate responses, often mentioning cause and effect, analogies and so forth. These differences were clearly reflected in the way their <u>children</u> answered questions some years later (Robinson, 1972). The intellectual and linguistic 'superiority' of certain children in one negro culture was attributed to the presence of grandparents in their home (cited by Creber, 1972). The reason given for this was that these children experienced more conversation than the others.

Our earlier study of the conversations between deaf children and their teachers (Wood et al, 1982) used coding systems developed from those used in a study of the interactions between adults and children in preschool playgroups (Wood, McMahon and Cranstoun, 1980). The main aim of this latter study was "to try to discover the effects of different styles of working with children on the experiences of the children and the part that they, in turn, play in interactions with the practitioners. Are there any general principles to be discovered which will help people who work with the under-fives achieve their own objectives more effectively?" (p.4). The major finding of this study was that the language performance displayed by the children appeared dependent on the way the adult 'stage managed' the conversations. The more control an adult exerts in conversation, the less language she receives back from the child. Furthermore, where the level of management from an adult was high, her children often approached her for management. In contrast, adults who made many conversational moves were often approached for conversation. The interactions characterised by a high level of management tended to concern the "here-and-now" and the child himself, whereas those with a low level of management focused more on other people and on the environment in general. It seemed that the practitioners often adopted certain strategies that appeared to defeat their own objectives.

However, "any evaluation of what occurred on a transcript and any chosen direction for change...was largely the decision of the practitioners themselves. It was <u>their</u> reaction to their own experiences, reflected back to them by our recordings and analyses- that formed the principle basis for any change" (p.191). The discrepancy between the practitioners' goals and their behaviour seemed to involve ignoring overtures from the children, asking too many (and often unnatural) questions and not giving the children enough time to express themselves.

The later study (Wood et al, 1982), involving deaf children, was pursued with similar goals in mind. Were the effects found in the preschool study also in operation in conversations between deaf children and their teachers? The answer to this question seems to be "yes". The more control a teacher exerted (in the form of questions and requests for repetition), the less language (ie. shorter response lengths) was volunteered by the children. These same effects have been further demonstrated in follow-up studies of both deaf and hearing children (Wood and Wood, in press, Wood and Wood, in press) and with university undergraduates in conversation with their tutees (Kingdon, in preparation).

Of course, there many variables other than those we are looking at here which affect the linguistic ability of a child and his readiness to participate in conversations. This area is too vast too discuss in detail, but the studies described below give some idea of the range of work that is now being done in this area. The earlier emphasis of research on syntax in an attempt to throw some light on language acquisition may have been of limited value. Dittmar (1976, p.185) is worth quoting at length on this matter:

> "Rather, a qualitative change in grammatical and semantic theory, more in keeping with anthropological and interactional linguistics, should lead to a consideration of the pragmatic conditions of speech acts, which are uttered in certain situations, at a certain time, in a certain place and under certain dynamic conditions of interaction. The grammatical categories are insufficient for a description of verbal interaction through speech acts, and for an adequate understanding of the processes by which speaker-hearers understand one another. The description of speech acts requires a comprehensive model of speech behaviour that includes the psychological and social configurations of interaction, as well as containing, amongst others, rules of interaction, interpretation and production specific to speaker-hearers. The concept of communicative competence seems the most promising for the foundation of a pragmatic model of social communication. On the basis of such a model it will also be possible to explain in greater depth depth the phonological and syntactic descriptions of speech variation."

Similar lines of thought, albeit on a more specific level, are being followed by individual researchers. Wells (1974), for example, suggests that the ideal situation for a learning a linguistic structure would be "a shared activity with an adult in which the adult gave linguistic expression to just those meanings in the situation which the child was capable of intending and to which he was at that particular moment paying attention" (p. 267). In similar vein, Cross (1977) concludes that we may have been asking the wrong questions about the nature of (in this case) mother language and its relation to child language development. "It may have been better to ask how much of the input can be described in terms of learning situations in which specific linguistic acquisitions may take place. The answer to this question may tell us how better to balance the child's and mother's contribution to the acquisition process" (p. 182).

It would also be interesting to know, for example, how social class affects the communicative competence of deaf children. One would imagine that the effects of deafness on a child's language development are so drastic that, in comparison, social class effects are minimal. Jensema (1975) reports that deaf children from "ethnic minority" backgrounds do less well at school than white children. We have discussed this in more detail in Chapter 2. It would appear, however, that this view that social class is straightforwardly associated with the child's linguistic ability may be an over-simplified one. This is discussed fully by Dittmar (1976) but more relevant to our discussion of, specifically, conversation, is the finding (also mentioned in Chapter 2) by

Tizard and her colleagues (1980) that although children of both working and middle class backgrounds have similarly extended and egalitarian conversations at home, at school the picture is different. Working class children "clam up" more at school than middle class children, asking fewer questions and engaging in fewer extended conversations. This, once again, is only correlational data, so we do not know whether working class children are bringing a different attitude to authority with them to school or whether it is some unspecified action on the part of the teachers which has this effect. This work of Tizard's has parallels with earlier studies such as those of Labov (1968) and Labov et al (1970) who observed that working class children reveal linguistic creativity in their home environment, if not at school. Whatever the reason, however, this relative lack of success of working class children is not necessarily (as has often been suggested) the result of an 'impoverished' linguistic background. Exactly what is responsible for this inequality is a matter for interesting speculation and probably beyond the scope of this thesis.

A recent study (Murphy, in preparation) has focused on yet another variable that determines the language produced by young children. She videotaped 3 year old hearing children conversing with their mothers about a pre-school television programme that the child had just watched. Children either watched the programme with their mothers or alone. Conversations were much more successful (in the terms of the measures of teacher power and child participation that are used in the present study) when the viewing was by both mother and child at the same time. Murphy argues that the shared experience enables more interesting talk to take place because mothers can use the programme as a springboard for further discussion. When mothers have not seen the programme the ensuing conversations tend to be of the "and what happened next?" variety. Of course, a lot depends on the conversational skill of the mother. If she is not very skillful, the latter type of conversation can occur even if she has seen the programme. Furthermore, if the child finds the programme exceptionally interesting, the conversation will be a success whether his mother has seen it or not. Interestingly, the provision of programme notes for some mothers who were not watching the television with their children, often rendered the following conversations even less successful than if she knew nothing about the programme at all. Whether similar situations would have comparable effects on the conversations of children with their teachers is a matter for future research. Would teachers have more successful conversations with their children about shared experiences?

The importance of 'shared knowledge' as a variable in the success of conversations has also been investigated by Wood and Cooper (1980). Informal observation of the conversations between young hearing children and adults (Wood, McMahon and Cranstoun, 1980) suggested that children were unwilling to elaborate their answers to the very large proportion of 'test-like' questions they received (eg. "What colour is your dress?"). By contrast, where the children believed that the adult did not actually know the answer to the questions posed, they appeared to be much more willing to participate in the conversations. Wood and Cooper tested this experimentally with 4 to 5 year old children and their mothers. The results confirmed the initial observations. At first sight this result may seem to contradict the results described above of Murphy (in preparation) but the nature of the 'task' may well be the crucial factor. In Wood and Cooper's study the task centred around the child's memory (aided by his mother's strategy for eliciting recall) about a play session, whereas in Murphy's study the 'task' was a discussion of a television programme. It is possible that in the former study the children considered the more 'test-like' discussion not to be legitimate when they believed that their mothers knew the answers. In the case of the television programme, however, more lengthy and interesting conversations took place when the mothers used their shared knowledge as a point from which to 'take off' into a more interesting discussion. When mothers hadn't seen the programme, the discussions tended to take on the more 'test-like' character that epitomised the discussions in Wood and Cooper's study and were therefore less successful. A second possible reason for this difference in results between the two studies is that they have touched upon another discontinuity in development, namely the understanding of another's state of knowledge. Perhaps the older children in Wood and Cooper's study were beginning to realise that it was not legitimate for their mothers to ask questions to which they knew the answers and were therefore less willing to participate. This hypothesis could be tested experimentally with children of different ages involved in the same task. Of course, with all the studies mentioned above, we cannot extrapolate their findings or hypotheses concerning hearing children directly to deaf children since the deaf child's social and linguistic experience is so vastly different from that of the hearing child. However, this type of study may well be worth doing with deaf children and with teachers.

It would therefore seem that, although there are many other variables that affect the responses of children to an adult's language, those concerning the function and level of control of teacher speech to young deaf children have immediate and clearly identifiable effects. The purpose of this part of the present study was twofold; firstly, to attempt to replicate the results of Wood et al (1982) and secondly to investigate whether the language a child produces under these circumstances relates to his performance in other areas of language use. If we succeed in these aims we can place a certain amount of confidence in both the reliability of the immediate effects of teachers' conversational style on children's responses as well as the likelihood that these measures are tapping some sort of central linguistic ability. Furthermore, the measures themselves could be of practical value.

METHOD

The majority of the method, coding systems and analyses used in this part of the study are similar to those used by Wood et al (1982). Various changes had to be made since our interests lie in the individual child's behaviour in the conversation sessions and not just in the group as a whole as before.

Subjects

42 children participated in this part of the study. This is a smaller number than in the other sections because one teacher was worried about appearing on video and declined to take part. Her children took part in all other aspects of the study, however. Another teacher arranged for a stand-in for similar reasons (session 3). The teachers had an average of 6 children in each conversation session. There is one exception to this. One teacher decided that she would prefer to split her class into two groups of 3. Sessions 7 and 8 represent this teacher with her two groups. Similarly, sessions 4 and 5 are run by the same teacher. This is because children of that age had different teachers according to which aspect of the curriculum was being covered. As my study involved language, the language teacher for these chil-

dren (12 of them) split the group into two and held both sessions. In analyses, however, we have treated each session as a separate one (since they have different children in them) rather than combine the data from the two teachers who ran two sessions each. This should be borne in mind when interpreting the results, although its effect is likely to be negligible.

The children were aged between 8.0 and 13.7, with an average age of 10.11. Hearing loss ranged between 60 dB and 118 dB, with an average of 92 dB. There were 17 girls and 25 boys. A more detailed description of the children is available in Chapter 2 and Appendix II.

Recording the session on tape

Arrangements were made with each teacher to record a conversation session with her children. Every effort was made not to make the session unusual in any way. The sessions were recorded at the same times that they would have normally occurred. Some teachers, for example, always have a conversation session on a Monday to talk about the weekend. Others take the opportunity for a chat after a school visit or an occasion such as bonfire night.

I decided that it would be less disturbing for the children and (especially) the teacher if I were not actually in the classroom peering through the camera while they were talking. I therefore set up the equipment (a small portable tape recorder and a camera on a tripod) in the corner of the room and, having established that all was functioning smoothly and that all the children were in view, set the tape-recorder going and left the room for half an hour. The video equipment is actually fairly unobtrusive and after an initial flurry of excitement and explanations the children seemed to forget about it. This method does leave one open to various problems; for example, if a child decides to stand up or move about while talking one risks losing him from the picture. However, I thought that getting as much 'natural' conversation as possible the most important consideration.

The question one must ask about this method of recording conversations is how much does the presence of a camera alter the behaviour of a teacher? There is, of course, no real way of establishing this. It is possible that a teacher, knowing that someone will be looking at the tapes later, will unconsciously expand or 'translate' her children's utterances during the conversation more frequently than she would otherwise have done. Nonetheless, as we shall go on to describe later, the word-for-word transcripts that we obtain from these tapes always yield enough data for interesting speculation about the nature of these conversations to be made. As mentioned in the introduction to this chapter, we have used this method now for over twenty teachers with impressively similar results on all occasions.

Transcription

Each videotape is subsequently analysed in detail to establish (as far as is possible) what is being said. Every word and important gesture is noted. All the children in this study were ostensibly oral so signing rarely arose in these sessions. A large space is left on the right-hand side of the page to allow for later coding. The coding systems are described below. A typical transcript would look like this:

	TEACHER	CHILD
T -What did you do on Saturday?		
C3-shopping		
T -Oh, you went shopping		
C3-and Mummy		
T -I see. What did you do, Peter?		
C2-I watch television		
T -Pardon?		
C2-I watch television		

Obviously there are occasions with deaf children when one cannot understand what they are saying. Very often, however, one can establish how many words they have said. We therefore note this in the transcript. If, for example, we are fairly certain that a 4 word utterance has been made, we note this as __ __ __ __. If we think one of the words has 2 syllables we note this by joining two of the lines together (__u__). Where it is evident from the intonation that a question has been asked we put __ __ __? No-responses or non-verbal responses are also noted. Of course, whether a failure to respond is a no-response depends on how much time the teacher leaves for an answer. In order to give a 'flavour' of the conversations sessions, several extracts from the transcripts are presented in Appendix V. When the transcript has been completed we move on to code both the teacher's and the children's utterances using the coding systems below.

CODING SYSTEMS

In the earlier study (Wood et al, 1982) three major codings systems were used to analyse the conversations of deaf children with their teacher. One (SRC) focuses on the teacher's utterance, one (MLT) on the child's, and one (Levels) is used to look at both the child's and the teacher's utterance. These three systems are described below. For convenience we call the last part of the teacher's utterance a teacher 'move' and it is this that is usually the stimulus for what the child says next. It is this part of the teacher's utterance is coded, although a teacher may well have said several things before it. In all these analyses, utterances from either child or teacher that are not strictly 'conversational' are excluded (for example, the teacher might say "fetch that chair" or "turn your microphone off").

Coding : The functions of teacher moves (SRC)

The first major analysis we carried out was to establish the function of each teacher move. A simple coding system has been developed (Wood et al, 1982) which enables the coder to describe the teacher's contributions to the conversation in a simple way which is both qualitative and quantitative. The ultimate aim was to provide the teachers themselves with a simple tool for analysing their own conversations.

SRC : Decision Rules.

Teacher moves can be allocated to one of 3 major categories. A 'substantive' (S) move is one which carries the conversation forward in the same subject or changes to a new one. These moves are usually questions or statements. A 'continuity' (C) move is one which maintains the status quo in the the conversation by letting the child know that the teacher is still listening and encouraging him to go on. Examples of continuity moves are, "mmm...", "I see", "how lovely" and so forth. Finally a 'repair' (R) move is one which takes the conversation backwards, going over old ground in order to clear up misunderstandings, to repeat questions that have not been answered or to correct mispronunciations. It is then a short step to calculate the percentage of each type of move that takes place within any conversation or with any particular child. We refer to this process as the 'SRC' analysis. Obviously we encounter teacher moves which do not fit our system. An example of this is the S/R move, which as it's label would suggest, is both a substantive and a repair move. When the teacher goes round the whole class asking each child in turn a certain question ("and what colour are <u>your</u> pyjamas?") we call this an S/R move. Similarly, a teacher could be checking that one particular child is understanding the conversation involving other individuals by asking him about it. This too would be called an S/R move. Given below are some examples of each type of move :

SUBSTANTIVE : Tell me about your dog.

What happened on Saturday?

Yes, I like cream cakes too.

CONTINUITY : How nice.

Oh, lovely!

Yes, go on.

REPAIR : Say that again.

You had what for your tea?

I can't understand.

Once again using the same example of transcript, we now have:

	TEACHER		CHILD	
	SRC	Level	Level	MLT
T -What did you do on Saturday?	S			
C3-shopping				
T -Oh, you went shopping	C			
C3-and Mummy				
T -I see. What did you do, Peter?	S			
C2-I watch television				
T -Pardon?	R			
C2-I watch television				

Coding: Levels Analysis

The second method used to analyse these conversations is called the 'Levels Analysis'. The major point of interest is how much control is being exerted by the teacher on the child's next utterance. This type of coding system enables us to establish, for example, how the teacher's level of control might affect both the type and the length of the child's next utterance. The child's moves can also be classified according to this system with the addition of a few more categories.

<u>Levels</u> : <u>Decision</u> <u>rules</u>.

Five major levels of control have been identified. These, together with some examples, are outlined below.

Level 1 : ENFORCED REPETITION.

This usually occurs when the teacher tells the child to repeat something for pronunciation failure or because she has not understood (eg. "Say that again" or "Say robin, robin").

Level 2 : TWO-CHOICE QUESTIONS.

These utterances require a yes/no response or a choice of two given responses (eg. "Did you go to the zoo?" or "Did you go with Mummy or Daddy?").

Level 3 : WH QUESTIONS.

This category includes all when/where/who/what/why questions as well as moves like "Tell me what you did".

Level 4 : STATEMENTS/PERSONAL CONTRIBUTIONS.

These utterances characterise more "genuine" (ie. hearing adult) conversations where no real force is exerted over the child's next utterance : the teacher makes a statement (eg. "They call this a zoom lens") or gives her views or experiences (eg. "I like them too" or "I went to Jersey last year").

Level 5 : PHATICS.

This category is characterised by moves like "I see", "How nice", "Lovely", "umhm, ah" and so forth, where no real force is being exerted over the next move. These moves exist to show the child that he is being understood and listened to.

There are occasions where the teacher's utterance is ambiguous (eg. "Do you know what the time is?" could be a 2 or a 3.) When this happens a decision is made on the basis of the way the child interprets it. If the child answers as if the question was a type 3 ("2 o'clock") then it is coded as a type 3. If he responds as if the teacher's move was a 2 ("yes") we code it as a 2. There are also three other types of moves which do not tend to fit easily into the five types described above. These are:

4.2 : Where a statement is "tagged" (eg. "Martin had a lot of fun at the fair, didn't you Martin?")

5.2 : Where a phatic is "tagged" (eg. "Oh, you went to the fair, did you?)

5.1 : Where a repetition of an utterance is requested (usually "What?" or "Pardon?")

Finally, the child's utterance can also be classified according to this system with the addition of several other categories. These are:

tick : where an appropriate response is given to a question or request for repetition.

tick4 : where an appropriate response plus a contribution is made.

x : where an inappropriate response is made.

NR : where no response is made.

This latter set of primarily responsive moves can also be used to categorise the teacher's moves when, for example, she is answering a question posed by one of the children. This is fairly unusual however, and in the majority of cases such answers are immediately followed by another move from the teacher, so are actually go uncoded. An example of this would be:

Child -"Did you go?"

Teacher -"Yes, I did. Did you like it?"

A final category is that of 'chairing' when the teacher (and on occasions a child) uses certain moves as a chairperson would. Some teachers frequently determine a topic of conversation and/or hand over to a child. Examples of these moves are "Now listen to Marcus, because this morning on the school bus something funny happened. What happened Marcus?" or "Right, Jerry's turn now". The former example would be coded as a mixture of chairing and questioning (ie. a Ch/3) although for the purposes of most analyses we use which ever part of the utterance the child responds to. If, for example, in response to "Tell us what you did" the child says "No" this would be used in analyses as a Ch. If, however, he does proceed to tell us what he did this would be used as a 3. There are other oddities which do not quite fit into the system but their description would render this section somewhat unwieldy. Only a basic outline is presented here but it will suffice to understand the findings presented later. Finally, the original example of transcript has been coded with this system and the now completed version is shown below. Where the child's response has been noted "tick" this means it is a straightforward answer with no elaboration, the actual sign for a tick being unavailable to the typist.

	TEACHER		CHILD	
	SRC	Level	Level	MLT
T -What did you do on Saturday?	S	3		
C3-shopping			tick	
T -Oh, you went shopping.	C	5		
C3-and Mummy			4	
T -I see. What did you do, Peter?	S	3		
C2-I watch television			tick	
T -Pardon?	R	5.1		
C2-I watch television			tick	

These levels of utterance easily show how much control is being used in any conversation. Obviously, a conversation which includes a large proportion of 1's (enforced repetition) and 2's (two-choice questions) will be of a very directed and unspontaneous nature (high control) whereas a conversation with many 4's (statements/personal contributions) and 5's (phatics) on both sides will be more like an egalitarian adult conversation with meaningful exchange of information. Using this analysis combined with the MLT (Mean Length of Turn) analysis we can find out whether, for example, low-control moves (4's and 5's) from the teacher prompt the children to say more or less than high-control moves(1's, 2's and 3's).

Mean Length of Turn

Mean Length of Utterance (MLU) is often used as a measure of language development. Brown (1973) believes the MLU "to be an excellent simple index of grammatical development because almost every new kind of knowledge increases length" (p.77). However, once the child reaches a certain stage of language development the MLU becomes less simple an index because it is more dependent on the type of interaction in which the utterance is taking place. Brown argues that children matched for MLU are much more likely to have speech of similar constructional complexity than children matched for age. This, one would think, is likely to be even more true for deaf children since one also has the very influential factor of degree of hearing loss to consider. He argues that during the early stages of language development it is the "compounding of relations" which causes MLU to rise, whereas later on (when MLU becomes larger than 4 morphemes) many others factors come into play depending on the circumstances (p. 221). Of course, Brown's work relates to hearing children and as there is no comparable work on the development of the MLU in deaf children, we cannot make any such decision about the limits of the value of the MLU for our present sample. However these children rarely produce utterances that are longer than 4 morphemes.

Several authors (eg Crystal, Fletcher and Garman, 1976 and Ivimey, 1982) have drawn attention to the problems involved in using MLU as a measure of language development. Crystal et al discuss MLU in relation to hearing children, whereas Ivimey is particularly concerned with its use in studies concerning deaf children. Ivimey discusses three major criticisms of the MLU in such cases. Firstly, since finding the MLU involves calculating the average sentence length one needs a widely accepted and rigorous definition of exactly what constitutes a sentence. Unfortunately such a definition does not exist. Secondly, the MLU does not provide answers to several important questions about the content of utterances. For example, even though a 17 year old deaf child may well achieve the same MLU as an 11 year old hearing child (Myklebust, 1964) this does not necessarily mean that the language being used is similar. Ivimey reports that the belief that these two groups of children have similar language skills (ie. that deaf children's language is simply lagging 6 years behind hearing children's) has been widely held for many years, even though examination of Myklebust's examples of speech show quite clearly that this view is unfounded. Increasingly, evidence is suggesting that deaf children's language is not just delayed but is different right from the start (eg. Gregory and Mogford, 1981, Quigley, Steinkamp, Power and Jones, 1978). It is obviously important not to generalise data that are relevant to hearing children's MLU to deaf children. In the present study we are only comparing deaf children with other deaf children. A third criticism of the MLU is that it does not answer questions about exactly what changes in language characterise an increase in MLU. "We are not told whether a deaf child, or a hearing child for that matter, merely adds new words to the ends of old sentences as he grows older, or makes intra-sentence adjustments, first adding adjectives to noun phrases then auxiliaries to his verbs? Does he abandon earlier incorrect structures or does he reconstitute them?" (Ivimey, 1982, p.139). Brown (1973) would say that this consideration is less important in the earlier stages of language development (with hearing children) than in the later stages. If the same is true of the deaf then we can assume that an increase in MLU in Stage I means "compounding relations". Of course, there is an additional problem in detecting morphemes in the speech of profoundly deaf children. If speech quality is very poor it is very difficult to determine whether a word has been said, let alone whether or not it has an 's' or 'ed' (and so forth) on the end.

While recognising the theoretical drawbacks of using MLU as a measure, we nevertheless use it in a modified form, namely the Mean Length of Turn (MLT). This avoids the problem of sentence-length criteria, for example, since we are interested in the whole utterance. There are certain exceptions to this rule; we exclude false starts and repetitions (though what constitutes a repetition is open to question). Also, we are not using it to compare deaf with hearing children. The rules for calculating the MLT are detailed below. As a measure, the MLT has proved to be remarkably robust, both in reliably showing up differences in children's responses to various teacher moves and, as we shall go on to describe in Chapter 8, in correlations with other measures of a child's language production. Furthermore, it has been used in studies of both deaf and hearing children, as well as with adults, with very similar results. For these reasons we find that MLT has practical and analytical value as a measure of linguistic performance in a broad sense, but not as an indication of linguistic structure.

<u>MLT</u> : <u>Decision</u> <u>Rules</u>.

In this particular form of MLT, words, not morphemes, form the basis of the score. Standard constrictions such as "I'll" and "shouldn't" count as one word. For this analysis it is usually necessary to work with both the transcript and the original video-recording since it requires very fine examination to discriminate between what is a word and what is not. This is especially difficult when working with recordings of deaf children. There are occasions when the child's utterance is almost or completely untranscribable. It is wiser to exclude these chunks from the analysis rather than risk biasing the MLT in one direction or another. More commonly, however, we have made an intelligent guess as to how many words we have not been able to transcribe and have made a note of these in their appropriate places in the transcript. Details of this are in the section above on transcription. A distinction is made between where there has been no response and where there has been a non-verbal response, although both of these count as zero in the MLT calculations. Obvious repetitions such as those included in "Daddy goes, Daddy goes with me" are excluded from the count. This example would receive a score of 4, not 6. We also exclude false starts, such as "I, er, I went too". Using the same example of conversation given in the section above on transcription, one would fill in the column for the child's MLT as follows:

	TEACHER		CHILD	
	SRC	Level	Level	MLT
T -What did you do on Saturday?	S	3		
C3-shopping			tick	1
T -Oh, you went shopping	C	5		
C3-and Mummy			4	2
T -I see. What did you do, Peter?	S	3		
C2-I watch television			tick	3
T -Pardon?	R	5.1		
C2-I watch television			tick	3

Formerly we have used this analysis to calculate the MLT for a group of children in order to see whether different teaches moves result in different lengths of turn (LT's) from the children. In this study, however, since we are interested in the individual children's MLT's, several MLT's were calculated for each child as well as for the group as a whole. These were:

1) an overall average MLT
2) MLT after teachers' 2's (two-choice questions)
3) MLT after teachers' 3's (open questions)
4) MLT after teachers' 4's (personal contributions)
5) MLT after teachers' 5's (phatics)
6) MLT after teachers' 4.2's and 5.2's (tags)
7) MLT after another child's contribution.

This last category is also a new one because while looking at so many tapes, it became apparent that teachers vary considerably in how much free reign they will give to children who talk to each other during these conversation sessions. This variation can considerably alter the tone and character of conversations which in itself may well change the children's behaviour and type of response. We therefore thought this might be worth including in our calculations. An overall MLT for each group of children was also calculated. We did not include MLT's after l's (enforced repetitions) in our analyses either in the earlier study or in the present one. These moves are usually 'strings' of requests for the repetition of one or more words, either for reasons of pronunciation or 'word' learning and, as such, do not represent genuine conversational moves. We have found that teachers do not appear to succeed when trying to encourage a child to produce an utterance (by means of enforced repetition) that is longer than his average MLT.

Reliability of coding systems

Two coders independently coded samples of transcripts of deaf children in conversation with their teachers using the systems described above. On the functions analysis (SRC), they showed 91.4% agreement and on the levels analysis, 90.8% agreement.

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RESULTS

So as to give some idea of how far the results of this study replicate those previously mentioned (Wood et al, 1980 and 1982) I shall begin in this first section with a description of the overall patterns emerging from all 8 conversation sessions. This section does not, therefore, consider individual children as a factor, but only to the group's behaviour as a whole. The next section (II : Results of Analyses on each Child) will deal with the pattern of correlations found between each child's MLT's, teacher moves addressed specifically to him, 'givens' such as age and hearing loss as well as teacher rankings of ability, attitude, oral ability, written ability and speech quality.

OVERALL RESULTS FOR ALL 8 CONVERSATION SESSIONS

The functions (SRC) of teacher moves (all sessions).

Table 5.1 shows the proportion of each type of function move made in each conversation session (in percentages). The average age and hearing loss of the children in each session are shown on the right-hand side of the table.

Session	S	R	C	Age	H.Loss
1	40	26	25	9.6	96
2	43	17	32	7.11	110
3	47	11	26	11.0	100
4	64	17	16	12.7	97
5	54	24	16	13.0	94
6	51	8	33	10.6	88
7	41	18	37	12.2	96
8	43	19	31	11.9	92
Average	48	18	27	10.11	92

Table 5.1 : The functions of teacher moves for all 8 conversation sessions (in percentages).

Approximately half of all teacher moves (48%) serve a "substantive" function. The function of the remaining moves is divided between repair (18%) and continuity (27%). Table 5.2 (below) shows comparable (unpublished) data from the study by Wood et al (1982).

Session	S	R	C	Age	H.Loss
1	25	39	26	10.10	100
2	37	15	34	10.11	83
3	16	68	5	9.6	93
4	60	13	17	7.5	77
Average	35	34	20	9.9	88

Table 5.2 : The functions of teacher moves for all 8 conversation sessions (in percentages) from Wood et al (1982).

The most noticeable difference between these two tables is that, on average, the teachers in the earlier study use more repair than those in the present study. This is especially noticeable in sessions 1 and 3. Taken together, the results from these 12 sessions show the extent to which the functions pursued in teacher speech vary between teachers. The proportion of substantive moves varies between 16% and 64%. Continuity moves comprise between 5% and 37%, while the proportion of repair can be as low as 8% or as high as 68%.

The levels of control of teacher moves (all sessions).

Firstly, we simply count the number of each type of move made by the teachers. Table 5.3 (below) gives some indication of the range of styles found using these simple criteria. The figures shown in the table are percentages of the total number of moves made by that teacher (an average of 230 moves in each of the 8 sessions). There are various other moves made (an average of 7% by each teacher) that are not shown in the table.

Session	Teacher move type: 1/5.1	2	3	4	5	4.2/5.2
1	15	14	23	14	19	6
2	9	24	26	5	12	18
3	2	30	26	10	13	16
4	7	13	32	25	11	7
5	8	20	31	21	4	10
6	3	22	14	16	21	14
7	4	17	21	15	25	13
8	7	21	15	17	20	11
Average	7	20	23	15	16	12

Table 5.3 : The percentage of each type of teacher move (levels of control) in all 8 conversation sessions.

It can be seen from Table 5.3 that the 'spread' of moves types among teachers, unlike that revealed by the functions analysis above, is fairly uniform. The teacher in session 1 uses an unusual number of requests for repetition (15%) while the teacher in session 3 is unusually low in personal contributions (5%). It seems, however, that questions (2's and 3's) form the largest category of teacher moves in these sessions.

Using the data above we form several 'summary' statistics. Table 5.4 shows the proportion of high control moves made by each teacher (column titled T.Ctrl). High control moves are questions (2's and 3's) or requests for repetition (5.1's and 1's). Low control moves are personal contributions (4's) and phatics (5's).

The remaining three columns show how often (ie. expressed as a percentage of all their utterances) the children gave elaborated answers to teacher questions as opposed to straightforward answers (C.Elab), how often they made controlling moves themselves (eg. questions and personal contributions) and generally show initiative (C.Ctrl) and finally, the proportion of all child moves that are made after another <u>child</u> as opposed to after the teacher (C.aft C.).

Session	T.Ctrl	C.Elab	C.Ctrl	C.aft C
1	53	16	37	16
2	58	26	41	7
3	57	17	34	9
4	52	20	45	11
5	58	20	39	17
6	40	17	47	33
7	42	20	46	8
8	43	26	50	12
Average	50	20	42	14

Table 5.4 : Proportion of high control moves for teacher and children (in all 8 conversation sessions).

The most obvious finding here is that the more control the teacher exerts, the less likely are the group of children concerned to make controlling or initiating moves themselves. How often the children feel able to converse with each other also tends to be related to how much control the teacher takes in the conversation although a correlation using group data fails to achieve significance. As we shall go on to describe in the next section of results, however, analysis using each individual child's results does yield a significant result. In session 2, although a verbally able group, the children very rarely contribute moves after each other (7%). This teacher is not much higher in control than the others but it is interesting that she had only just taken this class over from a very controlling teacher. In a previous visit to the school (a year earlier) we had recorded this same group of children in a conversation session with this very controlling teacher. Analysis of the transcript from this session showed up an atypical pattern of moves, especially when one considered that the children were actually more 'normal' (ie. verbally able) than most. In this particular session, the children never made a conversational move after another child, whereas the average proportion of such moves in the present study is 14%. The pattern of conversation always went teacher-child-teacher-child throughout. These children were either never given the opportunity to contribute after each other or, for some reason, did not feel free to do so. Similarly, in sessions 7 and 8 which are also low in control (42% and 43%) the children do not often contribute conversational moves after each other (8% and 12%).

These children, however, are a particularly slow group.

It is clearly not of much value, therefore, to read too much in these gross figures. They only serve to give some idea of the range of styles we are dealing with. We shall go on to investigate in more detail the relationship between teacher power and the children's behaviour later in this chapter by looking at each child's responses to teacher moves addressed specifically to him. The relationships between teacher style and child response will then become much clearer.

Levels of child response to teacher moves

In order to find out whether or not children respond in a systematic fashion to different teacher moves, we analysed all pairs of teacher-child moves in each conversation session. The patterns of child response were very similar for all 8 sessions. The averages from all 8 sessions are tabulated below, followed by the comparable table from the earlier study (Wood et al, 1982). Only categories which involve 5% or more of each teacher's moves have been presented. Examination of these two tables reveals remarkable similarities.

In these tables, the first two child response columns (entitled 'ans' and 'a+elab') refer to those occasions where a child simply answered and those when he both answered and elaborated.

Child responses

T.move	ans	a+elab	2/3	4	5	X	other
1	98	0	0	0	0	1	1
2	54	25	1	2	0	4	14
3	69	4	2	2	1	11	11
4	0	0	8	67	21	0	4
5	0	0	5	74	20	0	1
5.2	62	36	0	1	0	0	1

Table 5.5 : Levels of child response to teacher moves (averages of all 8 conversation sessions in percentages).

Child responses

T.move	ans	a+elab	2/3	4	5	X	other
1	96	0	0	0	0	3	1
2	61	21	0	1	0	8	9
3	74	3	0	1	0	12	10
4	0	2	2	69	22	0	5
5	0	0	1	75	19	0	5
5.2	56	32	0	1	0	7	4

Table 5.6 : Levels of child response to teacher moves (averages of all 8 conversation sessions in percentages) from Wood et al, 1982.

The vast majority of teacher questions (2's and 3's) are followed by straightforward answers from the children with no elaboration. Personal contributions and phatics (4's and 5's) however, are usually followed by 4's and 5's from the children. It is clear from these tables that these patterns of child response hold true for both studies. We are now fairly confident that these patterns are consistent across many different classes of children.

Such a conclusion is clearly of educational importance since, as we shall go on to discuss in the next section, not only is the level of response to teacher moves consistent, but also the length of response. Straightforward answers from the children, for example, are much shorter than their personal contributions. Thus, if the teacher wants to encourage lengthy personal contributions from her children, it is clear that a successful technique would be one which involved many personal contributions from herself.

Tagged personal contributions and phatics (4.2's and 5.2's) are followed by similar responses to those which follow two-choice questions (2's), namely a large proportion of straightforward answers with no elaboration. The pattern of child responses to 4.2's has not been presented in the table because in many cases they form less than 5% of all teacher moves. However, using the vary small amount of data available, the responses to 4.2's are divided almost equally between straightforward answers and answers accompanied by elaboration. The responses to 5.2's more closely resemble the responses to 2's since children are far more likely just to answer the question and stop: the proportion of straightforward as opposed to elaborated answers after 5.2's is approximately 2:1, which would imply that the children find 4.2's less controlling than 5.2's. Since teachers vary both in the way they use these tagged moves and in how often they use them, we shall not provide details of the analyses concerning them in the main body of text, but only in the appendices.

As in the previous study, children offered inappropriate responses most frequently after teacher 3's (open questions). After such a misunderstanding, teachers often break down the question from an open one to a two-choice one, reducing the ambiguity for the child. A typical (but fictitious) example would be:

T - Where did you go on Sunday?
C - Mummy
T - No, on Sunday...?
C - (nods)
T - Where did you go? To the park or to Grandma's?
C - Grandma's

Most of the entries in the 'other' column are actually 'no responses', particularly after teacher 2's and 3's. To sum up this section, it would appear that questions from the teacher are the moves most likely to result in inappropriate responses, no response at all and in short responses (see next section on MLT for details). In particular, open questions are followed by unelaborated answers. Personal contributions and phatics from the teacher, on the other hand, stimulate a very high proportion of personal contributions from the children.

In the discussion at the end of this chapter, we shall consider the role of questions in more detail. However, as far as type of response in concerned, the <u>overall</u> <u>tone</u> of the conversation can determine how children respond to moves within the conversation session itself. We have found that in cases where the teacher is very low in control, on those occasions when she does actually ask questions she is more likely to receive elaborated answers to them than is a teacher who normally asks many questions (Wood et al, 1982). In a study which will be described in more detail later on in this chapter, teachers were asked to change their conversational style in 5 different sessions (Wood and Wood, in press). The aim was for them to 'load' each session with as many of a specified move-type (1's, 2's, 3's, 4's or 5's) as was possible without grinding to a halt. The results of this study suggest that if children are frequently given the opportunity to take control of the conversation (ie. if they are engaged in one of the low control sessions with a high proportion of 4's and 5's) they are more likely to take advantage of those opportunities than they are when engaged in a high control session. In earlier studies we have also found that teachers who are normally high in control will usually receive a higher proportion of unelaborated answers to their questions than will low control teachers (Wood et al, 1980, Wood et al, 1982).

Level of teacher response to child moves

Wood et al (1982) found no systematic pattern of teacher responses to child moves. This is probably for two reasons. Firstly, teachers have far more 'choice' in what to say (ie. their command of language allows it) than do the children. Secondly, a child move (whatever its type) does not exert any force on the teacher's next move since it is the teacher who is deciding how she wants the conversation to run : the balance of power is very much on her side. Indeed, calling the move she makes following a child's move a 'response' is probably inappropriate. Examination of the data from the present study suggests that the same is true here. (A detailed analysis like the former one was not carried out, however, since it is exceptionally time consuming.) The results from the earlier study are tabulated below.

teacher response

Ch.move	1	2	3	4	5	4.2	5.2	Oth
tick	13	21	30	9	13	2	6	4
tick4	5	16	18	13	22	4	14	8
4	3	14	25	16	23	0	12	7
5	3	28	19	17	25	4	4	0
X	0	31	34	26	3	0	6	0

Table 5.7 : Relationship between moves in child speech and ensuing teacher moves (from Wood et al, 1982)

<u>Children's mean length of turn (all 8 sessions)</u>.

As in the previous study, we were interested to see whether certain teacher moves resulted in longer MLT's from the children.

Results of a two-way analysis of variance on lengths of turn from all children in all 8 sessions (see table 5.8 below) are very similar to those of the earlier study (Wood et al, 1982).

source	df	F	df 2	p
teacher	7	21.4	1322	.00000 ***
move	3	16.1	1322	.00000 ***
t x m	21	2.8	1322	.00002 ***

Table 5.8 : Relationships between teachers, move type and children's mean length of turn.

* p < .05
** p < .01
*** p < .001

This table says three things. Children in some of the sessions clearly said more than children in others. Some moves are clearly producing utterances of different lengths from the children than are other moves, although we need to go on to other analyses (see below) to firmly establish which moves these are. Finally, the association between move type and MLT varies across teachers.

The MLT's for each group of children were calculated and are presented below in Table 5.9. This table shows the mean length of turn (MLT) from all groups of children in each conversation session after teacher 2's (two-choice questions), teacher 3's (open questions), teacher 4's (personal contributions), teacher 5's (phatics) and the MLT after moves from another child. The final column shows the overall MLT for all children (42) after all those moves shown in the table as well as those after 4.2's and 5.2's.

Session	2's	3's	4's	5's	child	overall
1	1.42	1.32	2.06	1.71	1.91	1.58
2	2.12	2.51	3.39	3.66	2.96	2.65
3	1.17	2.37	2.48	2.95	2.35	1.93
4	1.93	2.20	2.25	2.23	2.62	2.14
5	1.61	2.06	2.33	2.67	2.16	2.23
6	1.93	5.96	8.78	10.20	5.31	6.40
7	0.77	1.38	2.52	4.49	3.07	2.35
8	1.44	1.67	1.69	3.17	1.93	1.88
Overall	1.55	2.28	3.06	4.11	3.29	2.73

Table 5.9 : Children's mean length of turn for all conversation sessions.

The MLT's after chairing moves from the teacher have not been included since some teachers hardly use such moves at all, while some make frequent use of them. However, chairing reliably yields a high MLT. The overall MLT after such moves was 3.59 words.

It can be seen from table 5.9 that certain teacher moves seem to produce reliably longer MLT's from the children than others. We compared the MLT's produced after every teacher 2 with those produced after every teacher 3 , every teacher 4 and so on until we had a comparison for every possible pair of move types (using analyses of variance). Table 5.10 (below) shows the results of these comparisons.

	2	3	4	5
2	-----			
3	.00019 ***	-----		
4	.00000 ***	.01758 *	------	
5	.00000 ***	.00000 ***	.03807 *	------
Ch	.00000 ****	.00020 ***	.56624 NS	.05941 NS

MEANS	
2	1.547
3	2.279
4	3.064
5	4.106
Ch	3.292

Table 5.10 : Paired comparisons of mean length of turn from children after each type of teacher move (combined data from all 8 conversation sessions).

* $p < .05$
** $p < .01$
*** $p < .001$

The children's responses after teacher 4's and 5's as well as after moves from another child (noted as 'Ch' in the table) are significantly longer than those produced after 2's and 3's. The response length after 5's is longer than that after 4's ($p < .05$) but neither of these two moves elicits MLT's significantly longer than those produced after moves from another child. Thus, as in the earlier study, when less control is exerted over the children they say more. Questions, perhaps contrary to our intuitions, are not the best way to stimulate children to talk. This finding is true of both deaf and hearing children (Wood et al, 1980, Wood et al, 1982).

Ideally, of course, children would have been treated as a factor in this analysis. However, not all children received all types of moves from the teacher and sometimes the numbers of certain moves to children was very small. We are therefore left with the possibility that these differences in MLT's are attributable to only some children. To investigate this possibility we used Kendall's coefficient of concordance (Siegel, 1956) which would tell us whether the pattern of MLT's (2's and 3's producing shorter utterances than 4's and 5's) was true for each child. Where there were no moves of a certain type to a child we allocated an average rank. The result of the analysis for all 42 children showed that they were reliably producing the same pattern of results ($p < .001$).

II : RESULTS FROM ANALYSES ON EACH CHILD

As mentioned in the introduction to the previous section, we will now deal with the correlations found between all children's MLT's after the different teacher moves addressed specifically to them, the teacher rankings of the children's overall ability, attitude, oral ability, written ability and speech quality, together with the various 'child' variables such as age and hearing loss.

It is possible, for example, that some children say more than others because they are older, brighter, less deaf or because they are given more opportunities to speak (ie. more moves are addressed to them) than to other children. We ran a series of correlations (Pearson product-moment) using data from all 42 children to investigate these possibilities. The correlations of interest are described below. There are obviously too many to discuss them all here. The correlations are discussed under various headings (eg. 'hearing loss' or 'the functions of teacher moves'). Those correlations that could appear in two sections are only dealt with in one to avoid repetition. The fact that teacher rankings of ability is negatively correlated with repair, for example, is dealt with in the 'teacher rankings' section rather than in the 'functions' section. The decision about where to deal with such correlations was an arbitrary one, but the reader is warned that each section does not, therefore, provide an exhaustive description of all correlations.

The first major observation is that the total number of moves (expressed as a proportion of all moves in that session) addressed to children did not vary significantly with their age, hearing loss or any other variable. Indeed, the correlation with hearing loss is notably low (r=-.06) when one considers that Wood et al (1982) found a significant correlation here (r=.44, p <.05). Once again this lack of a significant correlation in the present study may be a reflection of the very narrow range of hearing loss. This restricted range effectively minimises ones chances of getting a correlation. It is also possible that the teachers in the two groups are actually different in this respect. Otherwise, we have no explanation for this discrepancy.

<u>Functions of teacher moves</u>

Two major tendencies can be observed here. The deafer children tend to receive fewer substantive moves (r=-.1539) and more repairing moves (r=.2358). Neither of these correlations reaches statistical significance. Wood et al (1982), however, found both the comparable correlations to be significant (r=-.65, p <.01 and r=.49, p <.05). As mentioned above failure to find significant correlations with hearing loss in the present study _may_ be due to the fact that we have an unusually narrow range of hearing loss which effectively minimises ones chances of getting a correlation. Several (of the few) discrepancies between the results of Wood et al's study and the present one could be explained this way. Those children who receive a lot of repair are also those who are unlikely to show initiative themselves in the conversation (p <.01). The correlation between intelligence and amount of repair failed to achieve significance (r=-.2358).

Levels of teacher control

We know from the previous section that those teachers who repair frequently are also those who make a large proportion of high controlling moves (enforced repetition and questions). As one might expect, the correlations reveal that those children who receive a large proportion of controlling moves are also those who receive a large proportion of repair (p <.001). The more control a teacher exerts in a conversation, the less likely the child is to show initiative in the conversation (p <.001). One might have expected high teacher control to be negatively correlated with how frequently the child gives elaborated answers to questions. In fact, this correlation fails to achieve significance (r= -.2406). Teacher power is also negatively correlated with all MLT's except those after teacher 2's. So, children who receive more high controlling moves are also those who produce shorter MLT's. We also found that it is the less intelligent children who receive more high control moves (r=-.4195, p <.02). Discussed in the section on teacher rankings is the finding that the children whom the teachers consider to be less able and those whose writing ability is considered poor, are also those who are controlled more.

<u>Child-child moves</u>

For reasons mentioned in the description of coding systems, we looked in detail at those moves which a child made after another child. Of all child moves, on average 16% are those which follow another child's move as opposed to a move from the teacher ranging from 0% to 56%. Although data from the group results suggest that teacher control bears no relationship to how often children talk after each other, data using each child does show a relationship. If a child receives a large proportion of high controlling moves from his teacher, he is also likely to make a small proportion of moves after another child ($p < .05$).

Results from a recent study also suggest that teacher power and the frequency of these child-child moves are negatively correlated (Wood and Wood, in press). This study involved the same children in both low and high control conversation sessions with their teachers. In low control sessions the proportion of child-child moves was 15%, whereas in high control sessions this proportion dropped to 2%. What is also interesting here, is that children who often make moves after another child are also those who have relatively long MLT's after teacher 3's (open questions) and who score well on the reading test ($p < .001$ and $p < .01$ respectively). So, it is possible that we should be concentrating both on the general verbal ability of the child as well as the immediate effects of high control moves from the teacher as a determiners of how likely he is to make moves after another child. We shall return to the problem of direction of cause in correlational data later in this chapter.

<u>Hearing loss</u>

The correlation between hearing loss and 'teacher power' is .3054 ($p < .05$). Deafer children receive more high control moves (requests for repetition, questions and tags) than do children with more hearing. There is also a (non-significant) tendency for the deafer children to take the initiative (ie. ask questions, give elaborated answers to questions, make personal contributions and so forth) less frequently than the less deaf children.

Overall MLT was not significantly associated with hearing loss ($r = -.2923$). This result is slightly different from that of the earlier study since the latter found a significant correlation between hearing loss and MLT ($p < .01$). However, as mentioned above, this discrepancy may be a result of the difference between the ranges of hearing loss in the two samples. Alternatively there is no correlation between hearing loss and average MLT from the children although we suspect that this is unlikely.

A detailed analysis of hearing loss's relationships with MLT's after different teacher move types proves more interesting. As mentioned in the chapter on the use of averaged audiograms (Chapter 3), taking the average of 3 frequencies tends to give higher correlations with measures of the child's language ability than the two other methods which use five frequencies. The correlation between MLT's after teacher 3's (open questions) and hearing loss is a case where using the average of 3 frequencies method actually yields a significant correlation ($p < .05$) whereas the other two methods do not. When we draw all the language measures together in chapter 8, it will become evident that MLT after teacher 3's looks like a very sensitive measure of the child's linguistic ability. We do not know yet, of course, whether an increase in MLT for these children actually means an increase in syntactic complexity but we strongly suspect this would be the case. We are currently investigating the feasibility of using the computer to analyse large numbers of transcripts to test our hypotheses. MLT's after 3's also correlate very highly with the total score on the Edinburgh Reading Test. This will be discussed more fully in Chapter 8. It would make sense for MLT's after teacher 3's to be a good measure of language ability (even when compared to MLT after 4's) because such moves tap both receptive and expressive language; the child not only has to understand the question, but he also has to produce a response to it. Furthermore, we know that the children are not just saying anything after teacher 3's; in only 11% of responses to teacher 3's were the children judged to have misunderstood the question and answered inappropriately. With personal contributions, however, the child only needs to read the force of the teacher's utterance (rather than its content) and follow it with his own contribution.

Another interesting correlation is that between hearing loss (all three averages) and the children's MLT after moves from another child. Using the average of 3 frequencies, this correlation is significant at the p <.01 level. Using the other two methods of averaging the correlation is significant at p < .02. The children with more hearing say more to their peers than the deafer children. It is interesting that these particular child moves represent the only moves not directly elicited by the teacher.

Intelligence and Mean Length of Turn.

We have data about the IQ of 34 of the 42 children who participated in conversation sessions (see Chapter 2 for details). The overall correlation (Pearson r) between IQ and average MLT was highly significant (r=.5501, p <.001). When only MLT's after teachers' questions and personal contributions (MLT3 and MLT4) were used, the figures were similarly high (r=.6212 and .5380, p <.001).

Age and all language measures

The ages of the children range from 8.0 to 13.7.

Despite this large range, none of the child language measures or the teacher measures correlates significantly with age. This replicates the finding of the earlier study where the range was almost as large (6.6 to 10.8) and where no such relationships were found. It would therefore appear that although many child variables are associated with both teacher and child language measures, age is not among them.

<u>Teacher rankings</u>

Teacher rankings of the children's speech quality correlated with hearing loss ($p < .01$), with average MLT ($p < .01$), MLT's after teacher 3's, 4's, 5's ($p < .01$) and after another child's move ($p < .001$), but not with MLT's after 2's. This pattern of correlations between MLT's and teacher rankings of all five types (oral ability, speech quality, written ability, attitude and general ability) remains virtually identical. MLT after 2's consistently show no correlation with the teacher rankings.

Teacher rankings of general ability (intelligence) correlated negatively with the amount of repair the children received from the teachers ($p < .05$) and with the amount of high controlling moves from the teacher ($p < .01$). These two results agree with similar comparisons using data from the intelligence test, although in these cases the correlation with amount of repair did not achieve significance. So, the less able children, as a rule, seem to be controlled and repaired more than the abler ones. The less able children also receive fewer continuity moves ($p < .05$). Using a measure of mental age, Wood et al (1982) did not find a correlation with repair and control. In the present study, all the children's MLT's are significantly correlated with the teacher rankings of ability ($p < .001$), whereas in the original study MLT's were not found to be correlated with mental age. The correlations between 'ability' and other variables found in the present study could result from the 'subjectivity' of ranking : the language ability of the child (as shown by MLT) might colour how intelligent the teacher thinks he is. (As mentioned in Chapter 2, VandenBerg (1971) found that teacher rankings of ability correlated more closely with actual achievement than with an objective measure of intelligence). One might well expect the <u>language</u> ability of a child to correlate with the amount of control or repair he receives. This clearly needs further investigation before any firm conclusions can be drawn.

Similarly, teacher rankings of written ability correlate negatively with the proportion of high controlling moves the children receive, and positively with the proportion of such moves that the children themselves make. So, according to these ranks, the children who can write well are more likely to take a fairly active and controlling role in the conversation and are less likely to receive controlling moves (questions and so on) from the teacher. There is clearly some overlap or similarity here with the teacher rankings of general ability. Quigley and Kretschmer (1982), however, say that "probably the best single indicator of a deaf person's command of english is the quality of his/her spontaneously produced written language" (p.81). As mentioned above, all teacher rankings (including written ability) correlate significantly with all MLT's except those after 2's.

Teacher rankings of oral ability and attitude did not correlate significantly with any variables other than the MLT's. Unfortunately this does not enable us to draw any conclusions since either there are no such relationships or the measures and/or ranks we are using are not valid.

These teacher rankings, as mentioned in chapter 2, are open to criticism on several accounts. However, the fact that despite this, significant correlations have been found between some of these rankings and functional and 'objective' measures of child language is worthy of note.

Summary of results

The vast majority of the results from this study replicate those of Wood et al (1982). The teachers' more controlling moves are followed by shorter responses from the children than the less controlling moves. The functions of speech pursued in conversation vary between teachers whereas the levels of control are more uniform. Children's responses to different teacher moves follow a very systematic pattern. Deafer children tend to receive more repairing moves than those with a less severe hearing impairment.

The age of the children did not seem to be an important variable in determining either their own or their teacher's language output, whereas ability, speech intelligibility and written ability (as determined by teacher rankings) were predictive of the language produced by both teacher and child. In brief, the less able children and those whose writing ability was considered poor, received a higher proportion of repair and high control moves than the more able children. The children whose speech intelligibility was rated as good had less hearing impairment and longer MLT's than those with poor speech intelligibility.

The correlation between overall child MLT and hearing loss did not achieve significance as in Wood et al

(1982). The less deaf children, however, did produce longer MLT's after teacher 3's and after moves from another child than did the children with more pronounced hearing losses. Both the above-mentioned discrepancies between the results of the present study and those of Wood et al are discussed in terms of the relatively restricted range of hearing loss of children in the present study.

DISCUSSION

In this discussion we shall consider the following four points:

1. the problems involved in the interpretation of correlational data,
2. the role of questions and repair in conversation,
3. possible discontinuities in the effects of teacher style on children's language,
4. the applications of this research.

The fact that two variables are highly correlated does not necessarily imply that there is any <u>causal</u> connection between them. Even if we suspect there is a causal connection, the direction of the relationship is not always clear. Furthermore, a correlation between two variables may be 'mediated' by yet another (perhaps) unaccounted-for variable. The degree of teacher control is negatively correlated with the length of the MLT's that the child has produced during that conversation ($p < .001$). This relationship is obviously a fairly strong one. Does it mean that a large proportion of controlling moves reduces the MLT's of children? Alternatively, does it mean that children who produce short MLT's 'stimulate' their teachers to ask them more questions? If so, why? Furthermore, since we are looking at so many correlations in this section, it is possible that some will be a result of chance. These few points give some idea of the difficulty involved in interpreting correlations. Ideally, such correlational data should be used as a basis for the design and execution of intervention studies. An attempt has been made to try to establish if the teaching styles described in this study are causally related to child MLT (Lees, 1981). This is described below. Several other studies provide evidence to suggest that where such correlations exist, the causal relationship tends to be from teaching to learning (eg. Robinson and Robinson, 1981, Wright and Nuthall, 1970).

It is still a possibility that, despite all the attempts we have made to determine that it is not the child who is determining the teacher's conversation style and its ensuing responses, and there remains some child variable which is responsible. In other words, that the direction of cause is from child to teacher. In order to resolve this problem, a teacher might, for example, adopt different strategies with the same children on different occasions. If these strategies are found to have similar effects on the children's responses to those previously reported, then we could reliably conclude that it is teaching style per se that is producing these patterns of child response. Lees (1981), a teacher of the deaf, investigated this problem with her own class of 5 deaf children. She conducted several conversation sessions with these children. Firstly she recorded a 'normal' conversation session, then over a period of a few weeks recorded three other sessions with

1. a high proportion of questions.
2. a high proportion of phatics.
3. a high proportion of personal contributions.

This was followed by a return to a normal conversation style again. Analysis of the transcripts taken from these tapes suggested that it was not factors within the children that were determining teacher style, but that systematic changes in her style of conversation produced predictable changes in the responses obtained from the children. The educational significance of this finding is clear: it is not the child's linguistic abilities alone which determine how he performs in these conversation sessions, but how his teacher conducts them.

We have often found that teachers are surprised when they see themselves on videotape. The usual feeling is that they find themselves to be much more 'controlling' than they would like. Lees (1981) describes this. "Prior to the experiment, the author would have stated that her "news" sessions involved informal conversations, with the children chatting freely about events from home of interest to themselves. She believed that a genuine exchange of information was involved and that conversations were not restricted to the here-and-now or shared experiences. Results show, however, that the author was mistaken, for what she intended to happen and believed to occur, was not taking place. Even before the initial experimental tapes were made it had been realised that, with a home-school book open between the teacher and child, conversations were in danger of being limited to the here-and-now as illustrations were discussed. In addition, the initial tapes indicated that the teacher did not allow the children to chat freely about events at home but quickly forced them into a question-answering role." (p. 278-9).

This teacher felt that it was the personal contribution session that produced the most 'superior' language from her children. As is usual, these teacher moves produced long MLT's but they also seemed to prompt questions or a series of questions from the children. Although the use of many phatics (session 2) also produced long MLT's, the teacher felt that she was more able to successfully <u>direct</u> the conversations using personal contributions and that the conversations were generally more interesting. She also reported that when she tried to go back to her original style of conversation the children seemed to resist this return to a 'passive' role.

No long-term intervention programme has been carried out. This would enable one to see whether the long-term use of, for example, personal contributions does lead to more 'forthcoming' styles (Lees, 1981) from the children compared with a group of comparable children exposed to very controlled styles of teaching over a long period. Such a study would also enable us to decide how teacher style affects the development of a child's syntactic ability (a point we shall return to towards the end of this discussion). This sort of research may be undesirable from an ethical point of view, and might be construed as a somewhat oversimplified approach to what the teachers are trying to do in these sessions. We are not claiming that questions themselves are undesirable. Exactly what a teacher wants to accomplish and how she does it are determined by her. There may well be situations in which questioning would achieve the desired effect. They are often needed to set up a conversation or to pursue a point of interest and sometimes, no doubt, to <u>sound</u> interested! It does seem likely, however, that the <u>overuse</u> of questions has effects which are probably not among the goals of most teachers, such as encouraging a passive and undemanding role from the child. In time, these effects could lead to a further limitation on the child's linguistic experience, only increasing what Howarth and Wood described as the "cycle of isolation"

(1977). This point may well be worth considering in more detail in view of the fact that the single largest group of teacher moves in the conversation sessions studied so far is that of questions. In the present study, 43% of all teacher moves were questions and in the earlier study (Wood et al, 1982) the figure was 48%. Observation of conversations where the teacher is deliberately very low in control (Lees, 1981, Wood and Wood, in press) reveal that although the children became much more talkative, the conversation tended to meander and lack coherence. When this starts to happen in a normal conversation, it would seem sensible to ask a question (for example) in order to direct the childrens' attention to a common topic. Wood and Wood (in press) conclude that what constitutes "good teaching" is a level of control that continually takes into account the child's success or failure and adjusts accordingly.

As a function of teacher speech, repair tends to be divided equally among enforced repetition, two choice questions and open questions (1's, 2's and 3's). Thus, the high controlling teachers (ie. those who use a high proportion of questions) are, inevitably, also those who use a high proportion of repair. There has been much discussion of 'repair' as a tactic. There is some doubt as to its efficacy as an aid to language development. However, Robinson and Robinson (1981) report that those preschool children whose mothers used a strategy such as saying "I don't know what you mean" when attempting to clear up misunderstandings, had a more advanced understanding of communication failure at the age of 6 than those children whose mothers simply asked questions in such situations. We are not aware of any compelling evidence to suggest that repair (in the form of enforced repetition or imitation) is a useful technique for promoting <u>speech</u> (as opposed to language) development. Yet it can be seen in table 5.1 that, on average, 18% of all teacher moves are repairing. The type of repair moves used varies between teachers. Only 3 teachers use "I don't know what you mean" type moves. The same three teachers were also those who never used enforced repetition. Some of all the teachers repairing moves were questions. The proportion of repair moves also varies considerably between teachers, with a range extending from only 8% to as much as 26%. Combining the present results with data from the earlier study (Wood et al, 1982) reveals a range of repair extending from 8% to 68% of all teacher moves. There is clearly much scope here for teachers to vary in the amount of repair they use in their conversations with deaf children. If the finding (Wood et al, 1982) that the deafer children receive the most repair is true, then they are doubly handicapped. Not only do they have more difficulty hearing what is being said, but they also receive a larger proportion of high control teacher moves which are known to stimulate short responses. They also tend to show less initiative, but we are unable to say whether this means that the teachers' repair moves depress the child's initiative, or whether these children participate minimally anyway, perhaps because they are not so verbally able.

The classical view that children learn language through imitation (and therefore that repair has a useful function) is no longer widely held. It is now thought that that children actively work out the rules of language from their experience of it and then apply the rules which they think are appropriate to new situations. "Language acquisition is more a matter of maturation of the child's own internal grammar than one of imitation" (Crystal, 1976, p.35). The observation that children often use "I goed" instead of "I went" and "mouses" instead of "mice" suggests that they are over-generalising the "rules" they have formulated. "Far from being an error, to be criticised, the production of such forms is one of the most important stages in normal language development: it shows that the child is adopting an intelligent, deductive, creative role towards his language. And it suggests, along with the other evidence, that an explanation for the facts of language development must lie elsewhere than under the heading of imitation" (Crystal, 1976, p.35).

It is likely that deaf children too, have a 'grammar' of their own, albeit one that is not the same as that of hearing children. Analysis of the mistakes that deaf children characteristically make shows that they too may be using rule systems (Wood, in preparation). We shall discuss these hypothesised rules in more detail in Chapter 9. Such rules, however, only account for <u>most</u> of the language the deaf child encounters. It is on those occasions when the rules fail that we observe the typical errors of the deaf child ('deafisms'). Perhaps the only way to ensure that the exceptions to these rules are incorporated into the child's language system is to expose him to plenty of normal language. For these purposes, the conversation session could be a useful vehicle, although we really need to know more about the type of situation in which language learning most readily takes place. We shall return to discuss these 'rules' in Chapter 9.

The inevitable question that arises in studies such as these is what are teachers trying to achieve in their conversation sessions? Are they trying to foster communication and social skills or are they concentrating on improving language and speech? These two goals may well be difficult to disentangle. The teacher's stated aim in a reading lesson, for example, might be to teach the child to read. However, the study of reading lessons described in the previous chapter (Howarth et al, 1981) strongly suggests that teachers of deaf children have many aims other that this when ostensibly engaged in a reading lesson. Language and speech development are two such examples. Teachers of hearing children seem to be more concerned that their children spend time actually decoding the printed word. If in fact, teachers of the deaf also consider their conversation sessions as a vehicle for the teaching of language then we cannot really expect the pattern of moves to resemble a normal conversation. A point that may be relevant here, is that a teacher usually holds these conversations with about 6 children. This will deposit 'control' very much in her hands. When talking on a one-to-one basis with a child, discipline is rarely a problem. However, the presence of several children will change the tone of the conversation away from the 'normal' towards the more controlling one, bringing about the 'clamming up' that characterises children's responses in such situations. The ideal conversation would be one in which the teacher strikes a balance between her control and the participation of the children. In the hands of an unskilled conversationalist, these two goals could well be mutually exclusive.

It is possible that children of different ages (or, more precisely in the case of deaf children, of different linguistic abilities) react differently to teacher styles if conversation. In other words, just as there are normally discontinuities in children's development in other areas (Clarke and Clarke, 1976) there are also discontinuities in their reactions to language input. Two further studies of conversations have been carried out with 3-4 year old hearing children (Wood and Wood, in press) and a group of deaf children of the same age (Wood and Wood, in preparation) which may shed some light on this matter. These studies suggest that teacher control does have slightly different effects at this age, particularly with the young deaf group, for whom questions elicit responses which are as long, if not longer, than personal contributions. While the pattern for the young hearing children looks similar to that reported before (ie. personal contributions producing longer MLT's than questions) it is interesting that the pattern of responses of the two children who come from non-english speaking homes showed similarities to the that of the young deaf group. Perhaps one might tentatively suggest that children need to reach a certain level of linguistic competence before they are able to take advantage of the initiative offered to them by the teacher's less controlling moves.

Until then, they might need the guidance that questioning provides if they are to make the most of their abilities. Another possible discontinuity in the behaviour of children in their reactions to teacher style may have been touched upon, as mentioned in the introduction to this chapter, by the studies on shared knowledge (Wood and Cooper, 1980, Murphy, in preparation). Children may begin to realise (at a certain age) that if an adult asks a question to which she obviously knows the answer, this is not a legitimate conversational move and children are therefore less willing to converse on that subject.

In conclusion, it seems that we can place a fair amount of confidence in the reliability of the effects that teacher conversation style have on how the children respond. Having established this, we can go on to say that the method of studying the language of deaf children used in the present study is a useful one for two main reasons.

Firstly, some of the measures produced by this method appear to give a reliable indication of the child's linguistic ability. We will not know this for certain until we have completed the analysis of how the MLT's produced under these circumstances relate to syntactic complexity. It would seem likely that MLT's after teacher 3's and 4's will be the most useful measures. As we shall go on to discuss in Chapter 8, these two measures of conversation 'behaviour' correlate fairly impressively with the other measures of linguistic ability that we obtained. This in itself is a good indication that not only do children have some sort of overall linguistic ability (a point we shall return to in Chapters 8 and 9) but also that the measures themselves are reliable and valid. One might expect that responses to teacher 3's will be syntactically different to those following teacher 4's because when answering a question it is quite valid to omit words which would otherwise obscure the meaning. After a teacher 4, the child has to set up his own utterance without the structure that a question from the teacher would give him. However, (as we shall go on to discuss in Chapters 8 and 9) since MLT's after teacher 3's correlate significantly with performance on the reading test in particular, it is possible that of all the conversation measures, MLT's after teacher 3's may be the most useful for assessment purposes. Whatever the case, it looks as though this technique could be useful to provide a set of measures of the language ability of a child. Such measures might be used when evaluating, for example, the linguistic development of children in a change of educational environment or during an intervention study.

Secondly, this method of studying deaf children's language is clearly of potential use to the teacher who would like to know how what she actually does corresponds to what she would like to be doing. She can then change her conversation style according to her own ideas of how she wants her sessions to run and what she hopes to achieve in them. If certain teacher moves are reliably followed by utterances from the children that are both longer (as confirmed in this study) and syntactically more complex (as future studies may reveal) this will be useful for the teachers to know. It might also be interesting for her, occasionally, to monitor her conversation style over the years to see how and if it changes and whether certain styles are more productive with certain types of children. This technique is being used at Lady Spencer Churchill College in Oxford for teacher training. Student teachers of the deaf make a videotape of themselves early on in their first teaching practice. They are then taught the coding systems and use the results in discussion and tape themselves later on in their course. It appears that the technique is a very useful one as a 'focus' on conversation.

We are assuming in all these discussions that teachers, mothers, preschool playgroup helpers or any other adult all play the same (or a similar) role in the development of a child's language. The same assumption applies in our interpretation of Brown's answer to the hypothetical question "how can a concerned mother facilitate her child's learning of language?" He says (1977, p.26), "Believe that your child can understand more than he or she can say, and seek, above all, to communicate. To understand and be understood. To keep your minds fixed on the same target. In doing that, you will, without thinking about it make 100 or maybe 1000 alterations in your speech and action. Do not try to practice them as such. There is no set of rules of how to talk to a child that can even approach what you subconsciously know. If you concentrate on communicating, everything else will follow." For teachers (and mothers) of the deaf, the case might not be quite so simple. Our studies have shown that adults appear to be introducing fine adjustments to the normal structure of discourse that, in large proportions, are not necessarily encouraging the full participation of deaf children. Of course, we are also assuming in these discussions that full participation of the children is a key factor in the development of their language. This assumption is not based on educational research, but on the wishes of teachers. The teachers who appear to facilitate their children's participation are also those who will sometimes pass over a misunderstanding, thus avoiding repair, high control and the inevitable breakdown of the flow of conversation. Perhaps it is not necessarily true that with deaf children "if you concentrate on communicating, everything else will follow".

Finally, this type of study of language use shows up what enormous skill and sensitivity is needed to hold a successful conversation with deaf children. To deal with a completely incomprehensible utterance from a child and yet to maintain a non-repairing and egalitarian framework for a conversation is no mean feat. The impression one receives is that some teachers do achieve this balance between guiding the conversation and ensuring that the children participate to the maximum. There are bound to be such teachers who are 'natural' conversationalists. This type of study would be reassuring for them and potentially useful for those of us who do not bring such skill effortlessly to our conversations with children.

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CHAPTER SIX

CHILD-CHILD COMMUNICATION

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CHAPTER SIX

CHILD-CHILD COMMUNICATION

INTRODUCTION

The 'pragmatics' of language, such as the context in which it takes place, have not generally received as much attention as the structure of language itself. In the last decade, however, the literature on the language of hearing children shows that far more attention is now being paid to these functional aspects (eg. Cazden, 1970). The same cannot be said of studies of the deaf; there are very few that consider the functional effectiveness of the language of deaf people. Rather, research has concentrated on structural abnormalities. Two exceptions to this are studies by Hoemann (1972) and Schlesinger (1971) but in both, the mode of communication was sign.

There is now evidence to show that the language that hearing children use varies considerably as a function of such factors as interlocutor, task and content. If the same holds true for deaf children, then a study such as this should incorporate a situation other than the teacher-child conversation described in the previous chapter in order to investigate how their language varies and how it relates to other areas of language use. So we needed to obtain a corpus of language from each child, not only in conversation with his teacher, but also in conversation with, for example, his peers. Casual observation suggests that the conversations that take place between deaf children in the playground or in other informal situations are very lively and extended. The problem arises when we, as hearing adults, try to understand their communications. This presents particular difficulties for researchers in their desire to establish both the nature and efficacy of these communications as well exactly how they differ from the somewhat more 'faltering' conversations sometimes held with their teachers. If it were to be established, for example, that these communications with their peers were more linguistically sophisticated than communications with teachers, then more use could be made of these peer interactions as an educational technique. At present, most of the formal education taking place in the classroom is in the teacher-to-child direction. On the other hand, if such communications only encourage the development of esoteric (restricted to that particular class or school), linguistically limited or context-dependent forms of communication then they may be of less value to the deaf child in his attempts to integrate into a hearing world. This is, of course, presuming that the aim of an "oral" school for the deaf is that these children should integrate into a hearing world.

It has been supposed by many that communications between deaf individuals tend to be context-dependent. As mentioned above, it is difficult to establish this objectively because the researcher faces the problem of 'translation'. One technique which has been used in an attempt to overcome this problem is the referential communication task. Such a task usually requires one individual to describe an object or event from a given set of alternatives in such a way that a second individual can identify it from his own identical set of alternatives. The advantage of this technique is that the researcher is aware of the referents. This simplifies the procedure of understanding the communications a great deal. However, care must be taken in the interpretation of data obtained from this type of study because the communications may be task-specific and have little relevance in other situations. Using such a technique alone to assess an individual's linguistic competence, for example, would be a hazardous business. Used in an investigative or comparative manner, however, the referential communication task can be useful.

Using this technique, both Schlesinger (1971) and Hoemann (1972) found that deaf adults and deaf children were not as successful as hearing controls. Schlesinger attributed this failure to the limitations of sign language. Hoemann, on the other hand, concluded that his 8 year-old signing children were linguistically capable of dealing with the task but that they did not know how to communicate effectively.

This problem, however, is not exclusive to the deaf. Recent work by the Robinsons has shed light on similar difficulties experienced by young hearing children. They have found, using referential communication tasks, that as a rule, 5 year-olds are not very successful at giving informative communications. Furthermore, they do not take into account all possible 'objects' in the set when trying to describe only one of them. In other words, that these children do not effectively eliminate all the 'wrong' objects in their description and therefore tend to give ambiguous messages. It seems that children fall into two groups according to whom they blame when a message is unsuccessful (Robinson and Robinson, 1982). Some think the listener is at fault and that perhaps if he tries harder he would succeed (listener-blamers) whereas others realise that the message itself is ambiguous (speaker-blamers). Interestingly, those children who realise that messages may be ambiguous are also those who give more informative communications. This ties in well with Hoemann's suspicion that his children's failure to succeed in a referential communication task was not due to limitations in their language but rather to their failure to understand the demands of communication, and, as the Robinsons' study would suggest, their failure to realise that messages can be ambiguous. Special caution is therefore necessary to interpret the efficacy of the deaf in such tasks. It seems that the difficulty that children have in realising that messages can be ambiguous is not specific to verbal communication. From the results of a study using ambiguous visual messages, Robinson and Robinson (in press) conclude that "children's failure to realise that verbal messages are ambiguous is but one aspect of a more general failure to realise when one has insufficient information at one's disposal to guarantee a correct interpretation of what the world is like".

Since deaf children have such a limited experience of linguistic and social interactions in comparison with their hearing peers, one might well expect them to show a delay in mastering those skills which require an awareness of and adaptation to the linguistic abilities of others. Schatz and Gelman (1973) have shown that 4 year-old hearing children are able to simplify their speech when talking to 2 year-olds but we are unaware of a comparable study with deaf children. There is some evidence (eg. Furth, 1966) that deaf children are delayed in the acquisition of de-centred thinking and one might therefore expect them to perform less successfully than hearing children of the same age in referential communication tasks.

In their investigation of the communication skills of deaf and hearing children Breslaw, Griffiths, Wood and Howarth (1981) used two referential communication tasks: one made very limited linguistic demands while the second was potentially more complex. In the first part of the study, with children of an average age of 9, a set of blocks with three dimensions (shape, size and colour) was used. One child, out of sight of his partner, chose a block and placed it on a board upon which were drawn representations of the same set of blocks. He then instructed his partner to do the same. Predictably, the language that emerged during this task was very limited but the performance measures were interesting. Deaf and hearing children performed equally well in terms of how often the correct block was chosen at the first attempt. However, if one looked at the amount of information contained in the messages, an unexpected finding emerged. Hearing children gave sufficient information for their partners to identify the correct solution in 39% of their initial utterances, whereas for the deaf this figure was

62%. So, the deaf children gave all the necessary information at once much more frequently than their hearing peers ($p<.05$). It could be argued that this is a sophisticated technique developed by deaf children to avoid the problems that would be caused by an 'attention split' between communicating and carrying out a task. Hearing children could, of course, begin an activity while still listening to instructions or advice. This is an option not normally available to deaf children. There is other evidence that the (adult) deaf may be sensitive to the particular communication needs of another deaf individual. Deaf mothers pace their actions and communications to fit their deaf child's patterns of attention much more effectively than do hearing mothers of deaf children (Mogford, Gregory, Hartley and Bishop, 1980).

Given all the information in the initial utterance, deaf and hearing children were equally likely to go on to choose the correct solution on their first attempt. Furthermore, it did not seem that the deaf children's use of language was more egocentric or context-dependent than that of the hearing children. The results from this study therefore suggest that "where deaf children possess an adequate and familiar vocabulary to fulfil a task, there is no evidence of a communicative handicap not also shared by hearing children of similar age" (Breslaw et al, 1981, p.274). Whilst this study using blocks elicited behaviour that was easily measured, it by no means encouraged natural and spontaneous language from the children. Indeed, one teacher commented, "You're deafening my children!" By this she meant that we were forcing them to communicate in artificial situations about a subject that they were not interested in and that the resulting language reflected this.

The second part of the study aimed to elicit more natural language from children (of an average age of 10), by asking one child to describe a picture from a book such that his partner might find it in his (identical) book. The videotapes of the 82 deaf and hearing children who participated were then transcribed and analysed. There are many questions that one could ask about such data. Is the information given semantically appropriate? How easily does the information allow the listener to find the correct picture? What does the speaker do if his partner offers an incorrect picture? Does he do nothing, does he repeat his original utterance, does he offer a modified utterance or does he offer new information? Are some pictures more 'difficult' to describe or locate than others? What are the syntactic characteristics of the children's speech? Do some children describe pictures differently (eg. egocentrically, analytically and so forth) from others? If so, do these differences bear any relationship with IQ, hearing loss, age or school background? Breslaw et al only looked at some of these questions.

As far as the content of the descriptions is concerned, there were differences between the deaf and the hearing. The deaf children were more likely to include 'actions' in their descriptions than were the hearing. However, on other measures the children from one of the 3 schools for the deaf were found to be performing at a very similar level to the hearing children, and significantly better than the children from the other two schools for the deaf. The measures used here were firstly, how many (wrong) pictures were shown before the correct one and secondly, how many major features were included in the descriptions. So, in whatever skill it was that the task (and these two measures) were tapping, children from one school for the deaf were relatively advanced. All four groups of children had similar average ages and IQ's and all deaf groups had a similar average hearing loss. Conrad (1979) argues that most differences in the linguistic skills of deaf children can be accounted for by hearing loss and intelligence. He argues that school background is not a significant factor. One might interpret Conrad's position as meaning that whatever goes on in the classroom is irrelevant to the child's linguistic development. This is a theory that most teachers would find hard to accept. We now know of several aspects of conversational technique that reliably affect the type and length of responses from children. It is not an unreasonable step to hypothesise the existence of a relationship between large-scale exposure to 'successful' (in terms of what the teachers are trying to achieve) teaching techniques and language development. However, establishing exactly which teaching skills contribute to the development of which linguistic skills is a very difficult business.

Since the second referential communication task used by Breslaw et al (1981) was found to be sensitive to school differences, we decided to incorporate it into the present study (with one or two modifications to the design and several to the analysis) in the hope that it would also be sensitive to individual differences in children and would perhaps correlate with other measures of language use.

METHOD

Subjects

All 50 children took part in this section of the study. However, 4 were eliminated from the final analysis because they did not understand the rules of the game. These children included two who were evidently of very low intelligence and one with an additional handicap. The other child was one the youngest children in the group. By definition, if a child did not understand the rules of the game, he was not able to perform in such a way that yielded data comparable to those children who did understand the rules. Unfortunately this meant that these children's partners also had to be excluded. This left 21 pairs of children (42) who successfully understood and completed the game.

Procedure

The children were taken to a quiet room or area where they could play the game relatively undisturbed. A portable video-recorder and a camera with a wide angle lens were set up so as to get both children clearly in view from the side. Children were paired off by the teacher in a way that she thought would best suit the demands of the task. Children sat opposite each other, at either side of a small table with a low barrier across the middle that prevented them from seeing each other's book. Each child had a copy of the identical book (a common English reading primer) that had a few lines of text and a large coloured picture on each page. The game required one child (the sender) to describe a given picture in his book such that his partner (the receiver) could find it in his copy. Once the receiver thought he had found the correct picture, he had to show it to the sender for confirmation and carry on until he succeeded. The children then alternated roles until the game was completed. In this study, we decided to use the same set of pictures presented in the same order, for each pair. The former study (Breslaw et al, 1981) presented the pictures as drawn randomly from the book by the experimenter. However, this strategy might have allowed some children to come across more 'difficult' pictures than others. It was evident from the earlier study that some pictures, particularly those where an easily defined action was taking place, guaranteed a 'first time correct' far more frequently than other pictures. In the present study pictures were chosen such that each member of a pair would have to describe pictures of similar difficulty. In 8 out of the possible 10 pictures, there was no other picture in the book with which they would be easily confused. Each member of a pair, however, was certain to have to describe one picture that was chosen as easily confused with another in the book; for certain success, these two pictures need very careful description. The accompanying text was covered up while the children described the pictures. It was thought that it might be interesting to see if and how the children would offer information to help correct a choice of picture which was 'nearly' right. Once the rules of the game had been established (using practice examples) the children went on to describe 5 pictures each. This was recorded. Other than the 4 children described above, most children caught on immediately and proceeded to enjoy themselves. Indeed, on many occasions, once the statutory 10 pictures (5 each) had been described, more were demanded.

It was sometimes difficult for the experimenter to decide when to help (or interfere) in the event of misunderstandings. Sometimes, if an attempt to find a picture had gone on for a long time and if the child was showing signs of frustration, it was deemed necessary to offer help or encouragement. This usually took the form of asking the sender of the message to repeat it or to offer more information. Alternatively, the receiver was helped to remember crucial clues about the picture he was looking for or it was pointed out to him why the pictures he had been offering were wrong. Such interference, however, was rare.

Transcription

The videotapes were subsequently transcribed, noting every word, gesture and recognizable sign. On the occasions where it was impossible to establish exactly what was being said, a similar procedure to that used in the teacher- child conversation tapes was used. If, for example, we thought that the child had said 4 words, this was noted by 4 blank lines (-- -- -- --). If we thought that a word had two syllables, this was noted by joining two lines together (--u--). As mentioned in the chapter about conversations between teachers and their children, transcribing the utterances of deaf children is not easy. Particular difficulties include deciding whether some of the less obvious inflections are present or not (go/goes, tree/trees, look/looked and so forth). If uncertain, we did not give the children the benefit of the doubt. This procedure, of course, is open to the criticism of bias against the child whose speech intelligibility is poor. However, knowing what the children were talking about made transcription in this section of the study easier than that in the teacher-child conversation section. So as to facilitate later analysis, spoken communications were noted in a different colour from nonverbal communications. For the present purposes (changes in colour being unavailable to the typist) examples of signed or gestured communications will be denoted in [square brackets]. If a spoken word is <u>supported</u> or accompanied by a sign or gesture as opposed to being <u>replaced</u> by such nonverbal communication (as above) this is noted by a [G] in square brackets after the relevant word.

RESULTS

Examples of children's descriptions

The following 9 examples are all attempts by different children to describe the same picture. As mentioned above, words in square brackets are signed or gestured. The picture shows a pirate with long fair hair climbing up a rope step ladder on the side of a sailing ship. He is wearing dark blue trousers, a pale blue shirt and black boots and is carrying a bag over his right shoulder.

1. The boy were climbing boat [up and over], climbing.

2. The man, [bag] on shoulder [walk] look [G] the boat [G] climb [G]. The boat [G] man [holding something over shoulder].

3. The man, the man carry the bag [over shoulder] and climb the ship.

4. The woman [G] climb [G] boat.

5. Walk [carrying over shoulder] up ---- walk [carrying over shoulder] up ---- [climbing up]. Boat [G] boat [climbing up and carrying over shoulder] boat.

6. Man climb onto the boat bag [over shoulder] gold bag, gold bag and climb the ladder rope, ladder rope, going into the ship.

7. So, the man was climbing a ladder. Man climbing [G] in the boat [G] was climbing [G]. The man was climbing the ship ---- over. Alright?

8. Right. The blue [man], [not] colour, [jacket] only blue. And the boat, a boat [G] grey man climbing [G] bag [over shoulder]. Bag [over shoulder]. Let me tell you. You see a boat [G], a boat and you see a man, rope, climbing [G] with a bag [shoulder] holding, with a flag [climbing].

9. A ship...in..in...on the sea where it's very calm and the boy, the man, he has swam [G] in the water then climbed [G] into the ship. And has blue trousers [G] and black boots and light blue tee-shirt [G].

These examples show how varied the descriptions were. Some stuck very rigorously to the observable facts, while others made references to other parts of the story (eg. that the bag had gold in it) or to other pictures (eg. that the picture in question did not have much colour in it in comparison with others). Some children almost made up a story around the picture; for example, the child in example 9 says that the sea is calm and that the man has been swimming. In fact, neither of these statements is supported by the picture, nor are we told such things in the accompanying text. The child in example 4 (obviously unfamiliar with pirates or hippies) presumes that the man with long hair is a woman.

Looking at the occasions when wrong pictures were offered, it was not evident that the children made any attempt to provide any additional information. It would appear that these children were still at the 'listener-blamer' stage, although we have no objective measure of this. It was unusual for the children even to volunteer a repeat of their original utterance, let alone new information.

It was apparent from the number of failures to correctly identify the correct picture on the first attempt, that some pictures were more 'difficult' to describe or to locate than others. These were usually those pictures where the 'action' was limited. A picture of a very small ship, barely identifiable in front of a sunset was found much more difficult than a picture of a very hot pirate wiping his forehead with a handkerchief. In the former case, only 8 from a possible 21 children offered the correct choice on their first attempt, whereas in the latter, 19 children achieved a 'first time correct'.

One of the first striking characteristics of the children's attempts at communication was the ingenuity used where standard words were unknown. The best example of this comes from the original study; a child described a map as a "where-you-live". However, not all such attempts were verbal. Many children used nonverbal communication where words failed them. One also suspected that some children used nonverbal strategies, not because words failed them, but because they simply preferred to. Far more signing and gesturing was evident in the communications of the children during the game than was evident in their conversations with their teachers. It seemed (although we have no objective measure of this) that for most of the children 'receiving' the descriptions, the senders' signing and gesturing was more helpful than speaking. In one case, imitating the position of the man in the picture provided sufficient information to enable the receiver to find the picture immediately. It has become apparent that we need to develop methods of coding and analysing not only the nonverbal elements of such communications, but also the way they are used in conjunction with speech. However, for the present we are confining ourselves to the study of oral communication. Interestingly, these signed messages also seemed less 'egocentric' than the spoken utterances. Some children produced very short, syntactically correct utterances to describe a picture, but this seemed to be at the expense of the amount of information given. "There is a man on a boat" is an example of such an utterance that would, in fact, describe many of the 31 pictures in the book. It is possible that some children were still constrained enough by the presence of a hearing adult (the experimenter) to try and produce what they might feel is 'acceptable language'. It is unlikely, although possible, that these children would produce such utterances in the playground. It also seemed that the younger children gave more egocentric (ie. short and relatively uninformative) descriptions than the older children.

Pictures to Solution

This analysis simply looked at the number of pictures each child showed to his partner (the sender) in his attempts to find the correct one. On average, a total of 7 wrong pictures was offered by each child over the five trials. By calculating a correlation (Pearson Product Moment) between the total number of wrong pictures to solution offered by both members of a pair, we were able to establish that there was no significant relationship between how well one member of a pair did with how well his partner performed (r=.32). This enabled us, for the moment, to treat each child's performance separately rather than as a member of a pair.

A similar sort of analysis to that above involved calculating the number of occasions that a child offered the correct picture first. The average number of times that each child achieved a first time correct (out of a possible 5) was 2.6. Once again, there was no significant correlation between how often one member of a pair achieved this with how often his partner did (r=.4).

There are still problems in 'separating' the sender and receiver. Although we have established that there is no statistically significant correlation between the performance of members of a pair (as measured by the number of wrong pictures to solution and the number of first time corrects) it is still possible that there is some variable operating between the two that might affect the language produced. The case described in the discussion below where one child was clearly lowering the complexity of her communications to suit the linguistic ability of her partner, is an example. We therefore needed a more objective measure of the language produced. If this did not correlate with any of the other language measures obtained (reading, writing and teacher-child conversation) then we could conclude either that the measure and coding system were unreliable or that there was no relationship between the language produced under these conditions and the other measures of language obtained. The measure developed was a score of syntactic accuracy.

<u>Syntactic accuracy</u>

The method we used to establish how syntactically correct these utterances were, involved 'idealisation'. We confined ourselves to idealising only those descriptions which gave rise to a correct solution at the first attempt on the grounds that the quantity of information given was adequate. This analysis was developed by D.J. Wood in order to look in more detail at the data from the earlier study (Breslaw et al, 1981), but has not so far been published. A similar strategy has also been used by Quigley to analyse deaf children's writing (personal communication). Detailed guidelines for this analysis are available in Appendix IV, but a brief description is provided below.

The children's utterances had to meet certain requirements before we proceeded with the analysis. Firstly, we only looked at those descriptions which enabled the correct choice of picture to be made on the first attempt. In these cases, whatever the nature of the communication, the semantic content was likely to be have been adequate. There were five children who gave descriptions that never enabled their partner to make the correct choice on first attempt, so we omitted them from this part of the analysis. Secondly, if idealising these utterances required more morphemes to be added, changed, deleted or relocated than were already spoken by the child, then such utterances were discarded from the analysis. False starts, repetitions and utterances which were later corrected by the child himself were also not included. There was much repetition in these utterances. It was not always an easy decision as to whether a repeated word was simply a repetition or whether it was there for a different purpose; the latter is quite common in the language of deaf children, possibly where they are trying to disambiguate their utterances. We shall return to discuss this possible function of repetition in a more detailed consideration of deaf children's grammar in Chapter 9. If two or more versions of what was essentially the same utterance were given, we chose the more 'advanced' or meaningful version to be included in the analysis. Furthermore, we had to exclude chunks of utterances that we had been unable to transcribe. This meant, once again, that the ensuing scores may well be penalising the less intelligible children. However, this had to be done since we could not begin to idealise utterances which we had not understood.

This procedure left us with (usually) several utterances for each of the 37 children that we could then analyse. Firstly, we presumed that each utterance was tacitly begun with a phrase like "the picture shows" or "there is". So, even if such introductions were not present, we did not penalise those children who began their descriptions with "a man, a boat and a dragon" since, under the circumstances, these were considered as syntactically correct. If the form of communication used was written, however, such an utterance would not be considered correct. We tried to maintain the word order of the original utterance wherever possible in our attempts at idealisation. Wherever any 'correction' was used, (such as adding an inflection, pronoun or auxiliary verb), it did as much justice as possible to the child's original utterance. In other words, we did not try to 'put words into their mouths' any more than was absolutely necessary. On balance, we would say that our idealisations lost rather than gained meaning in comparison with the original utterance. Of course it is entirely possible that we completely missed the meaning of certain utterances; being 'outsiders' there were bound to be some rather esoteric communications going on between these children that we could not grasp.

We tried to keep tense consistent; if the majority of the child's utterance was expressed in the past tense, for example, we kept to this in our idealisations. Often, both past and present tense were used in the same utterance; in these cases we changed tense where appropriate. Where there were several alternative ways of idealising an utterance, we used the one which required the least modification. If a child's utterance included signs or gestures such as "red [boat] blue [trousers] yellow and black [tee-shirt]", as was often the case, then we did include these in our score. As mentioned above, further details about this analysis are available in Appendix IV.

89% of all the corrections that we had to make in order to idealise the 37 utterances were those of addition rather than change, deletion or relocation. The most common omissions were determiners, inflections and prepositions. The table below (Table 6.1) gives a summary of all these changes.

	add	change	delete	relocate
inflexion	23	1	1	
prepostion	18	3		1
determiner	28		1	
noun	10			2
aux. verb	9		1	
conjunction	3	1		
adjective	1			
pronoun	11		1	
verb	14	2		
	117		14	

Table 6.1 : A summary of all corrections made in order to idealise the 37 spoken utterances.

This pattern of results agrees with the unpublished analysis using data from Breslaw et al (1981) where 87%

of all changes were those of addition and the most common change involved determiners.

Having established a perfected utterance, it was then a relatively easy task to obtain a score. One simply adds the number of morphemes that have had to be added, changed, deleted, or relocated to the number of morphemes in the original utterance to calculate a denominator. The number of morphemes in the original utterance is then expressed as a percentage of this. If no changes had to be made, then an utterance would receive a score of 100%. Since we had already decided that those utterances which would have scored less than 50% were not to be included, the final scores varied between 50% and 100%. A morpheme count does show, as a rule, how much the children are saying. One possible disadvantage, however, is that children who often used 'baked' phrases (such as "have a look" and "a little bit") almost as if they were one word, will appear to get a higher score. This, in the event, rarely happened. The average number of morphemes present in the original 37 utterances used in this analysis was 12.5. Where there were several analysable utterances for one child, we used the most syntactically correct one in our subsequent analyses. The average syntactic accuracy score was 76%.

Looking only at those children who scored over 50%

accuracy, we found no significant sex differences in accuracy but there was a difference in the length of the original messages. Girls gave longer utterances than boys ($p<.005$).

It might well be useful to give some examples of idealised utterances. The morphemes or words in brackets show those that have been added, changed, deleted or relocated.

1. The man drop(s) the paper into the sea.

2. (The) sea, rocks, (a) boat (and the) sky.

3. (The) man watch(ed). (He) saw a dragon on the rock.

4. (A) dragon (with) fire (and a) rock. (The) blue pirate (is) near (the dragon). A man (with a) blue (jacket), black boots, blue trousers, (a) red belt, (holding a) blue bag, looking at (the) dragon.

Obviously, these idealised utterances are not examples of highly polished, concise and stylish prose, but are nonetheless syntactically correct.

Reliability of Syntactic Accuracy analysis

In all, 91 utterances from the original study (Breslaw et al, 1981) were independently analysed by two coders using the same system as the present study. The overall measure of agreement was 92%. This figure represents agreement on category of error. If, for example, one coder inserted "boot" and the other "shoe", these are still considered members of the same category (ie. nouns) even though the actual word is different.

School differences

In the original study (Breslaw et al, 1982) we discovered there was a significant difference in the performance on measures of numbers of pictures to solution and numbers of 'first time corrects' between some schools. Children from one school for the the deaf, in particular, showed a similar performance to hearing children but a very different performance from children in two other schools for the deaf. Since the children in the present study came from two schools we investigated the possibility that their performance was different, but found that this was not the case. Using an Analysis of Variance, the difference between children from the two schools on the pictures to solution measure was not significant ($p=.10$). Neither was it on the first time correct measure (p=.14) Similarly the length and accuracy of utterance were not different across the schools.

Correlations with other child variables

We did several correlations to establish whether or not a child's performance on the game (as defined by how many wrong pictures were offered in all and how many times they achieved a first time correct) was related to any other variable such as hearing loss, age or teacher rankings of ability and so on. None of these correlations were significant.

The correlation between the length of the descriptions (as defined by the number of morphemes) and hearing loss was significant ($r=-.47$, $p<.01$). The deafer children said less about the pictures than the children with a less severe impairment. Also correlated with length of utterance were teacher ratings of oral ability ($p<.05$) and speech quality ($p<.01$). The correlation between hearing loss and syntactic accuracy, however, was not significant. The measure of syntactic accuracy correlated negatively with age ($r=-.37$, $p<.05$) and positively with teachers rankings of oral ability ($p<.01$). Syntactic accuracy and IQ were not significantly correlated.

DISCUSSION

There was a clear relationship between the children's hearing loss and the length of their utterances while syntactic accuracy was found to be negatively correlated with age. Relationships with age or hearing loss were not found elsewhere in the present study, even in the reading section. Since a correlation between hearing loss and reading ability is normally found, we argued that it's absence in this study was due to the unusually narrow range of hearing loss. So, to find such a strong correlation in this section between hearing loss and a language measure ($p<.01$) leads us to wonder whether this particular measure is in fact a more sensitive one than any other that we have so far investigated. It is especially interesting that the children's length of utterance in conversation with their peers is correlated with hearing loss whereas no such correlation is found from their conversations with their teachers. One might therefore speculate that the comparatively spontaneous conversations held with their peers provide a more realistic indication of the linguistic performance of deaf children than are their conversations with teachers. Perhaps teachers have an "levelling out" effect on their children's language, even though there are demonstrable differences for each child in the length of response they produce after different teacher moves types. Once again, one could also speculate that hearing loss is not the prime determiner of how well the children do in conversations with their teachers. However, Wood et al (1982) found that hearing loss and MLT were correlated ($p<.01$) so this latter explanation may be unsatisfactory. We should however remember that in the present section, hearing loss was only associated with how much the children said, and not with its accuracy.

The finding that syntactic accuracy is negatively correlated with age is an interesting one. Vandenberg (1971), in her survey of the <u>written</u> language of deaf children, reports exactly the same finding. It appears that "after children had reached the stage of language development at which they were able to attempt to construct sentences the errors of syntax they made increased according to their age" (p.53).

In their analysis of the errors deaf children make in the Test of Syntactic Abilities (TSA), Quigley et al (1978) found that deaf children have problems with similar constructions to those found in the present study. Only three of the 131 changes we made involved changing word order. Quigley et al also found that there were very few SVO (subject-verb-object) violations in the errors that children made on the TSA. Of course, deaf children only use simple sentence constructions, very rarely tackling, for example, the passive. Hearing children master the passive voice by the age of 8 or 9, whereas only 40% of 17 and 18 year-old deaf children were found to have done so (Power and Quigley, 1973). The similarities between Quigley's results and ours give us confidence that our coding systems are valid.

Another reason for concluding that our measures and coding systems are valid is that we find syntactic accuracy to correlate with other measures of the children's linguistic ability taken in this study. As mentioned before, we shall draw all these correlations together in Chapters 8 and 9. There are many possible reasons why we might not have found such correlations with our measure of syntactic accuracy. Firstly, the corpus of language was obtained in an experimental situation. This might have produced results that were task-specific. Secondly, it is an 'interactive' measure (ie. two children are involved) which may have introduced some contamination that we had not accounted for. Thirdly, we only looked at 'first-time-corrects' which is imposing our own validation on the data and fourthly, the coding system itself is fairly complicated and ,one might have argued, arbitrary. So, the fact that we find correlations despite these possible criticisms gives extra weight to our faith in the measure.

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CHAPTER SEVEN

THE WRITTEN LANGUAGE OF DEAF CHILDREN

CHAPTER SEVEN : CONTENTS

CHAPTER SEVEN

THE WRITTEN LANGUAGE OF DEAF CHILDREN

INTRODUCTION

Quigley and Kretchmer (1982) consider that "probably the best single indicator of a deaf person's command of English is the quality of his/her spontaneously produced written language" (p.81). They take the view that once "standard English is soundly established as the basic or secondary internal language of a deaf child and if competent reading is established on this internal language, then the development of written language should be a relatively simple matter" (p.82). The written ability of deaf children has been by far the most studied aspect of their language. Before the recent arrival of video equipment as a tool for research, other areas of language use (such as speech) were much more inaccessible.

Previous research into the nature of deaf children's language has revealed characteristic patterns and errors. In general, when compared to the written language of hearing children, deaf children's written language "was found to contain shorter and simpler sentences, to display a somewhat different distribution of the parts of speech, to appear more rigid and more stereotyped and to exhibit numerous errors or departures form Standard English use" (Cooper and Rosenstein, 1966, p.66). Both Myklebust (1964) and VandenBerg (1971), studying separate populations in America and New Zealand, found that the most commonly used words were nouns and verbs whereas 'function' words such as prepositions were rarer. Quigley and Kretchmer conclude from available evidence that even at the age of 16 most deaf children are still unable to use relative clauses, nominals, complements and other more complex structures.

Recently, studies of deaf children's written language have hypothesised the existence of a 'grammar of rules' that generates these characteristic writing patterns, rather than viewing them as a mass of 'silly mistakes'. These errors are remarkably similar for most deaf children and can be seen in quite independently developing populations in different countries. Quigley and Kretchmer point out that many of these characteristic errors are made in reading as well as writing. Analysis of the errors made on the multiple-choice Test of Syntactic Abilities (Quigley et al, 1978) shows this to be true even when the correct version is available among the choice of items. Probably the best way to illustrate the unusual nature of deaf children's writing is to give an example. The following extract is from a story about bonfire night.

> Father say I have box fireworks box and the
> Bonfire is very big wood, Father say "wait
> First night now allright, Mother cooked
> marking a toffee apples and toffee with
> jacket potatoes, Sarah say, Please now
> fireworks was and Rock three please, Father,
> say, "wait a minute allright, Paul, say where
> bonfire a small or big, say lovely hurry
> firework beautiful yes like Bonfire and
> something food, Father, say Sarah, you
> like firework was very good girl,...

This extract was written by one of the children in the present study (subject number 22, see Appendix II) but such stories were only available for 11 subjects and were therefore not included in analyses.

The studies of Myklebust (1964) and VandenBerg (1971) included children from the ages of approximately 7 to 15, providing data on how the character of deaf children's written language varies with age. Broadly speaking, the picture looks fairly gloomy. Myklebust reports that "in some aspects of language the deaf child shows virtually no progress beyond 11 years of age" (1964, p.333). VandenBerg (1971) found "that the deaf children made no significant progress in either the variety or the frequency of their word usage after the age of eight" (p.41) and that they lacked "any real ability to abstract and express ideas" (p.48). She concluded that current methods of teaching the deaf in New

Zealand were badly in need of reconsideration since they appeared to become less effective as the children became older.

One of Myklebust's suggestions for overcoming these problems is a system "which provides for self-correction by alerting and reminding the child of his errors....While it can be assumed that pre-programmed, automated approaches using electronic instrumentation will be available and beneficial in such training, the teacher can now inaugurate systems of this type" (p.334). He envisages a system of codes for immediate feedback about the child's errors (O= omission error, S= substitution error and so on). We have detailed the problems involved in such 'repairing' frameworks in chapter 5 and shall return to the subject of 'metalinguistic awareness' in the final chapter but suffice it to say at this point that it is not necessarily a valid assumption that such an awareness of the structure of language will actually help, although in some cases this may well be true. It cannot just 'be assumed' that computer teaching will be useful and beneficial to the development of deaf children's written language without verification. No doubt the current explosion of research in this area will soon enable us to make a more scholarly decision. VandenBerg, on a slightly more realistic note, concludes that "no current method of teaching grammar has helped deaf children to express themselves in correct syntactic patterns. In the light of these findings it would clearly seem superficial to suggest that merely correcting the forms of a deaf child's expression will enable him to formulate and express his thoughts in the conventional structures" (p.52). Indeed, it seems that irrespective of degree of deafness, the children in her study tended to be more orally proficient if they had been late starting at a special school for the deaf. Quigley and his colleagues, who have documented very thoroughly the errors that deaf children make in both reading and writing, have produced materials designed specially to give children practice in these very areas and we await their evaluation. For now, however, we shall return to a consideration of the measures one can use to assess written language.

Although written language is often considered to be a useful indication of a deaf child's linguistic development, "unfortunately, instruments and methods for eliciting and measuring samples of written language are not well developed" (Quigley and Kretchmer, 1982, p.82). The usual procedure involves presenting pictures or films to elicit writing. Both Myklebust and VandenBerg used the Picture Story Language Test (Myklebust, 1965) which requires children to write a story about a picture presented to them. Their efforts are subsequently analysed along various dimensions (word productivity, sentence productivity, sentence length, syntax and degree of abstraction). Although all these 5 aspects of written language intercorrelated for the deaf group, the same was not found to be true for hearing children over seven years old. This may well indicate a 'ceiling effect' on the test.

As far as we know, the written language of deaf children has not been extensively studied in relation to other aspects of their language. This is something the present study sought to remedy. Both Myklebust and Van-denBerg included teacher ratings of oral proficiency and articulation in their surveys, but did not include any objective measure. These studies also included a vocabulary test, but, for reasons detailed in chapter 4, we are concerned about the validity of using such tests with deaf children. Furthermore, the test used was developed in the 1930's (Columbia Vocabulary Test, Gansl and Garret, 1939). Myklebust, for example, did not find a relationship between reading ability (score on the vocabulary test) and oral language (teacher ratings). We wonder whether such a relationship might in fact exist but can only be revealed by more sensitive measures. Both Myklebust and VandenBerg, on the other hand, did find a relationship between some aspects of oral language (teacher ratings of lipreading and articulation but not of oral proficiency) and written language. It might well be of value here to clarify both the nature of these relationships as well as the sensitivity of the measures.

We therefore sought to include a measure of written language in the present study in order to see how it related to our measures of the children's speech and reading ability. The procedure we decided upon was an adaptation of the referential communication task as described in the previous chapter. This would yield two basic measures of written language, namely productivity and syntactic accuracy.

METHOD

Subjects

As in the previous section, all 50 children attempted to take part in this section of the study, 4 of whom did not understand the rules of the game. These 4 children, together with their partners, were therefore eliminated from the final analysis. This left 21 pairs of children (42) who successfully understood and completed the game.

Procedure

This part of the study took place immediately the children had finished the referential communication task as described in the previous chapter. The video equipment was turned off and the children, still in their places, were given pencils and pieces of paper. It was explained to them that instead of talking about the picture, they were to write about it. They were told that when they had finished writing they would exchange pieces of paper in order that their partners might find the picture described. Once it was established, as far as was possible, that the procedure had been understood they were each given a different picture to write about. As in the previous section, these pictures were chosen on the basis that it was thought they were of equal difficulty. It subsequently emerged that a few of the children had not in fact correctly understood the procedure since they began to draw a copy of the picture rather than write about it. However, these misunderstandings were soon cleared up, often with help volunteered by the child's partner.

RESULTS

As with the spoken data, the children's descriptions varied greatly both in quality and quantity. Detailed below are 9 descriptions given about the same picture, each with original spelling and other mistakes. This picture shows a man hiding behind some trees and looking at a dragon on a rock. In between the man and the dragon is a stream. The man has long fair hair (tied back) and is wearing a light blue shirt, dark blue trousers and some wellington boots.

1. The is saw Daddy dragon

   The is water dragon

2. the Pirate is a water look

3. The blue man hiding dragon

4. Men look is dragon.

   The dragon on look the cold.

   The men tree hide and look.

5. The man is looked the rock

   the man hides the tree

   the rock was sleep on the srore.

6. The Blue Pirate was is hide.

   The tree in the hide is looked in the dragon.

   The dragon on the rock.

   The dragon is looked everybody for ship.

7. The man Island. trees looked and looked

   dragon to see in kill man No! oh no ship

   dragon to cover then him to we said not

   man went from.

8. The boy is looking at the dragon.
   The dragon is a sleep. There is lots of
   trees. There is a few grass. There is
   some hard black rock. he has black boots.
   And blue trouser and yellow hair.

9. The man was hidden by the tree and saw
   the dragon on the big rock But dragon
   did't see him.

Once again some children (see the description in number 7) seemed to be making up stories about the picture, while others stuck more rigorously to what was in actually visible. The last example provides the only instance where a child made use of the passive voice.

We submitted the written descriptions to exactly the same analysis of Syntactic Accuracy as described in the previous chapter. Unlike that analysis however, we looked at <u>all</u> the descriptions, not just those which allowed a 'first-time-correct' choice to be made. This was because our real purpose was to obtain a written description of the picture, rather akin to the procedure used by Myklebust (1964). It was hoped that by adding the (hopefully) motivating factor of communication we would obtain descriptions that would be more comparable with the spoken data. From then on, the procedure employed was the same. We idealised each description and calculated it's length and accuracy. Those descriptions to which we had to add or change more morphemes than were already present were not included in subsequent analyses. This left us, as in the previous section, with 37 perfected descriptions. However, these were not all from the same 37 children as in the spoken descriptions. 6 children who scored more than 50% accuracy in their writing failed do to so when speaking to their partners. The 6 children who failed to obtain more than 50% in this section all succeeded when speaking.

74% of all changes made in order to idealise these utterances involved addition. This is a lower figure than that from the spoken data (89%). Table 7.1 (below) gives a summary of all the corrections.

	add	change	delete	relocate
inflexion	32	2	2	
prepostion	16	2	2	2
determiner	20		8	
noun	3	1	2	
aux. verb	6	2	2	
conjunction	7			
adjective				
pronoun	1			
verb	6	3	2	1
	91	31		

Table 7.1 : A summary of all corrections made in order to idealise the 37 written messages.

These written messages tended to be longer than the spoken messages (15 morphemes in comparison with 12) but despite this increase in length, the former were slightly more accurate than the latter (80% compared with 76%).

There were clear sex differences revealed by these measures. Of those children who scored more than 50% accuracy (37 from a possible 42), the girls produced significantly longer messages than the boys ($p<.005$). Similarly, the girls' efforts were more syntactically accurate than the boys ($p<.04$).

Correlations with other child variables.

As with the spoken data, we did several analyses to establish whether the length or accuracy of the children's written messages correlated with variables such as hearing loss, age or teacher ratings. Unlike the results from the spoken data, neither hearing loss nor age correlated with these measures. Teacher ratings of writing ability were correlated with both the length of the original, uncorrected written messages ($p<.02$) and with their accuracy ($p<.01$). Teacher ratings of attitude also correlated with both these measures ($p<.001$ and $p<.01$ respectively). These are two of the very rare occasions where this particular rating shows a correlation with any of our measures. Ratings of oral ability were correlated with the length of message ($p<.02$) and judgements of general ability (intelligence) were correlated with accuracy ($p<.02$). IQ was not significantly correlated with accuracy.

DISCUSSION

The sex differences revealed in the written language of the children support the findings of earlier researchers. Myklebust (1964) reports an advantage for girls in verbal fluency and an advantage in syntactic accuracy up until the age of 13 when the boys began to catch up. VandenBerg (1971) found that girls of all ages scored better on measures of syntactic accuracy than did the boys. Most of the present sample are younger than 13 so we are unable to shed any light on the minor age discrepancy between Myklebust's and VandenBerg's results.

As far as the categories of error are concerned, we found, as did both Myklebust and VandenBerg, that by far the most common error in deaf children's written language was that of omission. However, we do not present a count of which categories of words were actually used since such analyses are commonplace in the literature.

It is notable that we failed to find a correlation between between age or hearing loss and our measures of the children's writing. As explained in the previous chapter, such a failure could be due to several factors such as the unsuitability of the measure, inadequacy of the coding system, the unusually restricted range of hearing loss, contamination due to the 'interaction' of 2 children, task specificity of the experimental situation and so on. Of course, such a failure could also mean that there is no such relationship. Another point worth mentioning in connection with failure to find correlations with this particular measure, is that children who scored less than 50% accuracy are not even included in the calculations. This may also probably bias one's chances towards not getting a correlation.

However, we have no explanation as to why we failed to find a negative correlation between age and syntactic accuracy as we did in the previous section. Anticipating Chapters 8 and 9 a little, we found that the accuracy scores in the written and spoken sections were _not_ correlated whereas the length of the messages were correlated. However, using a parametric test that enabled us to to include those children who scored less than 50% in these two sections, we did find a significant correlation between accuracy in the written and spoken messages.

As we shall go on to discuss in Chapters 8 and 9, the measures of the length and accuracy of the written messages do correlate with other objective measures of the child's language use such as reading and the length of utterances after questions and personal contributions from his teacher. So, even though we have failed in this case to find correlations with hearing loss and age, we nevertheless have some faith in the measure's ability to tap the child's linguistic ability.

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CHAPTER EIGHT

COMBINING ALL FOUR LANGUAGE MEASURES

CHAPTER EIGHT

COMBINING ALL FOUR LANGUAGE MEASURES

When we combine all four language measures (Reading, average MLT, Written and Spoken Accuracy), we can see that they intercorrelate at various levels of significance with the exception of Spoken Accuracy, which only correlates significantly with Written Accuracy. In Table 8:1, we present a summary of these correlations together with their levels of significance. For reasons explained below and elsewhere in this thesis, the correlations in this chapter are based on scores from 38 children. Hearing Loss was not significantly correlated with any of these 4 measures.

	ERT	MLT	WRITTEN	SPOKEN
ERT	------			
MLT	.6345 ***	------		
WRIT	.7399 ***	.4483 **	------	
SPOK	.2528	.2603	.4195 *	------

Table 8:1 Correlations between 4 main measures (Edinburgh Reading Test, average Mean Length of Turn, Written Accuracy and Spoken Accuracy), n=38.

From the results so far, we can conclude that these main measures intercorrelate. However, there are several possible interpretations that would explain these relationships. Taking Reading as our correlator (or dependent) variable, one explanation could be that all other measures account for the same variance. In other words that there is a single factor determining reading ability and, by implication, a unitary linguistic competence. Alternatively, some variables may account for different aspects of the variance in reading scores. This would suggest the existence of more than one influence on reading.

To explore these possibilities, we made use of multiple regression analysis. Such a procedure enables us to examine the contribution that each of our main 'predictor' variables (MLT, Written Accuracy and Spoken Accuracy) makes to variations in reading score. We have chosen Reading as our main (correlator) variable here so as to facilitate comparisons with other research involving investigations of the reading ability of deaf children (eg. Conrad, 1979 and Myklebust, 1964). However, we also performed the same analyses described below using the other variables as correlators; the results of these analyses are given at the end of Appendix VI.

We present three analyses. The first involves only the main measures of average MLT, written syntactic accuracy and spoken syntactic accuracy as predictor variables. The second analysis is basically the same but does not use average MLT; MLT after teachers' questions (MLT3) and MLT after teachers' personal contributions (MLT4) were used instead. This second analysis suggested itself from casual inspection of the data which suggested that these two variables correlated pretty well with other variables. The third analysis introduces IQ as an additional variable. Although we have said (in Chapters 1 and 2) that an 'explanation' of linguistic competence lies outside the scope of this study, there already exists work (eg. Conrad, 1979) which suggests IQ to be an important determiner of reading ability. Since we have information about the IQ of a large subset of the children, it seemed worthwhile to explore this relationship further.

All 3 analyses below were carried out using data from a subset of the children, since, for reasons explained in the relevant chapters, data were not available for every child on every measure. By definition, we were only able to perform multiple regression analyses using data from children who successfully completed every part of the study. This leaves us with a set of 38 children who meet this criterion. In the case of Analysis 3, however, the subset is smaller (34 children). Full details of these children and the raw data are available in Appendix VI.

Analysis 1

We chose Reading as the correlator variable (number 2). The table below (Table 8:2) shows the significance of variables 3, 4 and 5 (average MLT, Written Accuracy and Spoken Accuracy) in accounting for the variance in reading scores. Although initially we did calculations with hearing loss (variable 1) as one of the variables, we found it to have no predictive power. So, for ease of presentation, we have only shown below those comparisons that do not involve hearing loss. However, all raw data are presented in Appendix VI, should anyone wish to repeat the exercise for their own purposes.

Interpretation of Multiple Regression Tables.

Each of the three multiple regression tables begins by listing the variables included in each of the models. Model 1 (the complete model) in table 8:2 overleaf includes variables 1, 3, 4 and 5 (hearing loss, average length of turn, written accuracy and spoken accuracy). Model 2 includes only variables 3, 4 and 5, whereas model 3 includes only variables 4 and 5 (and so on). The significance levels on the far right hand side of the table show whether or not the variables included in that model account for a significant amount of the variance in reading scores. We can see from this table (8:2) that the only variable that accounts for a non-significant amount of this variance is variable 5 (spoken accuracy). All other variables and combinations of variables are significant. Reference to the column entitled 'R square' tells us that the amount of variance in reading scores accounted for by variable 5 is only 6% (ie. .05984).

The second section of the tables (entitled 'Comparing Models') shows what happens when we drop certain variables from certain models. 28 such comparisons are possible although not all would be informative. In table 8:2 we list those that differentiate crucial from non-crucial variables only. When we compare models 2 and 3 (in other words, dropping variable 3 from a model containing variables 3, 4 and 5) this leads to a significant drop in the predictive power of model 2. We can also see that the difference in variance accounted for between these two models is approximately 12% which is significant at the .0022 level. The third comparison (involving models 3 and 5) shows that dropping variable 5 from a model containing 3, 4 and 5 makes no significant difference to the amount of variance in reading scores accounted for. Once again, reference to the column entitled 'R square' tells us that the exact figure is 0.342% of the variance.

ANALYSIS 1

Mod	HL	MLT	WR	SP	multiple R	R square	F ratio	p	
1	1	3	4	5	.78822	.62130	13.535	.0000	
2		3	4	5	.78821	.62127	18.591	.0000	
3			4	5	.70640	.49901	17.431	.0000	
4		3		5	.59076	.34900	9.382	.0005	
5		3	4		.78604	.61786	28.294	.0000	
6		3			.58314	.34005	18.550	.0001	
7			4		.70638	.49897	35.852	.0000	
8				5	.24463	.05984	2.291	.1388	NS

COMPARING MODELS

Mods	HL	ERT	WR	SP	R squares	difference	F ratio	p	
2		3	4	5	.62127				
3			4	5	.49901	.12227	10.9765	.0022	
2		3	4	5	.62127				
4		3		5	.27227	.34900	24.4430	.0000	
2		3	4	5	.62127				
5		3	4		.61786	.00342	0.3066	.5834	NS
2		3	4	5	.62127				
6		3			.34005	.28122	12.6233	.0001	
2		3	4	5	.62127				
7			4		.49897	.12230	5.4897	.0086	
2		3	4	5	.62127				
8				5	.05984	.56143	25.2011	.0000	
5		3	4		.61786				
6		3			.34005	.27781	25.4441	.0000	
5		3	4		.61786				
7			4		.49897	.11888	10.8884	.0022	

Table 8:2 A comparison of models from the multiple regression analysis no.1.

From this preliminary comparison of models (in particular, from comparison 3) we can see that the only variable that seems to exert no effect when dropped, is Spoken Syntactic Accuracy (variable 5). Both the others (MLT and Written Accuracy), when dropped, exert a significant effect on the amount of variance accounted for (see comparisons 1 and 2). From comparison 7, we can see that dropping Written Accuracy from a model containing only itself and MLT, produces a significant result. Similarly (from comparison 8), it appears that dropping MLT from a model containing only itself and Written Accuracy, exerts a significant effect. From the results of these two comparisons, we can conclude that MLT and Written Accuracy are accounting for different proportions of the variance. Since, when dropped, MLT exerts a more significant effect that Written Accuracy, it is possible that MLT is the more powerful predictor of reading. So, we can tentatively conclude that variable 3 (average MLT) appears to be the most powerful predictor of reading, followed by variable 4 (Written Accuracy), with variable 5 (Spoken Accuracy) only accounting for variance already covered by Written Accuracy.

Analysis 2

This analysis is basically the same as Analysis 1 except that instead of using average MLT, we used two subscores: MLT3 (MLT after the teacher's open questions) and MLT4 (MLT after the teacher's personal contributions). The same pattern emerges in the initial comparisons of models as in the analysis above, namely that Written Accuracy remains an important predictor of reading, while Spoken Accuracy (variable 6 in this case) can be dropped with little effect on predictive power. However, when we come to look in detail at comparisons involving only the 3 apparently important variables (in this table, numbers 3, 4 and 5) an interesting pattern emerges. This is shown below in the comparisons presented in Table 8:3.

ANALYSIS 2

Mod	HL	MLT3	MLT4	WR	SP	multiple R	R square	F ratio	p	
1	1	3	4	5	6	.78881	.57643	10.541	.0000	
2		3	4	5	6	.78869	.62204	13.578	.0000	
3			4	5	6	.75331	.56748	14.870	.0000	
4		3		5	6	.78621	.61812	18.345	.0000	
5		3	4		6	.61406	.37707	6.860	.0010	
6		3	4	5		.78463	.61564	18.153	.0000	
7				5	6	.70640	.49901	17.431	.0000	
8			4		6	.49124	.24132	5.566	.0080	
9			4	5		.75245	.56618	22.839	.0000	
10		3			6	.60805	.36972	10.266	.0003	
11		3		5		.78195	.61144	27.539	.0000	
12		3	4			.61255	.37521	10.510	.0003	
13		3				.60662	.36799	20.961	.0001	
14			4			.46859	.21958	10.129	.0030	
15				5		.70638	.49897	35.852	.0000	
16					6	.24463	.05984	2.291	.1388	NS

COMPARING MODELS

Mods	HL	MLT3	MLT4	WR	SP	R squares	difference	F ratio	p	
6		3	4	5		.61564				
9			4	5		.56618	.04946	4.3753	.0440	
6		3	4	5		.61564				
11		3		5		.61144	.00420	0.3711	.5464	NS
6		3	4	5		.61564				
12		3	4			.37521	.24043	21.2679	.0001	
6		3	4	5		.61564				
13		3				.36799	.24765	10.9536	.0002	
6		3	4	5		.61564				
14			4			.21958	.39606	17.518	.0000	
6		3	4	5		.61564				
15				5		.49897	.11667	5.1601	.0110	
12		3	4			.37521				
13		3				.36799	.00723	0.4048	.5288	NS
12		3	4			.37521				
14		4				.21958	.15564	8.7187	.0056	

Table 8:3 A comparison of models from the multiple regression analysis no.2.

Where MLT3 and MLT4 are both dropped from a model containing MLT3, MLT4 and Written Accuracy (comparison 6) there is a significant effect (p=.0110). When dropped individually from such a model, however, the picture is different; dropping MLT3 (comparison 1) produces a result that is only just significant (p=.0440) while dropping MLT4 (comparison 2) produces a nonsignificant result (p=.5464). These results would suggest that MLT3 and MLT4 co-vary in the prediction of reading. From the last two comparisons (7 and 8) we can see that MLT3 is, in fact, the more powerful predictor of reading than MLT4. When MLT3 is dropped from a model containing only itself and MLT4, it occasions a significant drop in the amount of variance accounted for (p=.0056), whereas the converse is not true: dropping MLT4 from this model exerts no significant effect (p=.5288). So, from the results of this and the former analysis, we suggest that the highest correlates of reading are MLT after a teacher's questions and written syntax. We shall go on to discuss this later.

Analysis 3.

This analysis contains the same variables as Analysis 1 with the addition if IQ (variable number 6). Once again, reading (variable number 2) is the correlator. In the comparisons of models we find, as in the previous two analyses, that the only variable that exerts no significant effect, when dropped from a model containing average MLT, Written Accuracy, Spoken Accuracy and IQ, is Spoken Syntax (p=.1832). We do not show all these comparisons again in the table below (Table 8:4) but only present those that add new information to the picture.

ANALYSIS 3

Mod	HL	MLT	WR	SP	IQ	multiple R	R square	F ratio	p	
1	1	3	4	5	6	.83936	.70452	13.352	.0000	
2		3	4	5	6	.83840	.70291	17.153	.0000	
3			4	5	6	.70596	.49839	9.936	.0001	
4		3		5	6	.69082	.47724	9.129	.0002	
5		3	4		6	.82696	.68386	21.632	.0000	
6		3	4	5		.80168	.64268	17.986	.0000	
7				5	6	.28234	.07971	1.343	.2759	NS
8			4		6	.70306	.49430	15.150	.0000	
9			4	5		.70595	.49836	15.399	.0000	
10		3			6	.68963	.47558	14.057	.0000	
11		3		5		.64096	.41083	10.808	.0003	
12		3	4			.79557	.63293	26.726	.0000	
13		3				.63450	.40258	21.564	.0001	
14			4			.70298	.49418	31.264	.0000	
15				5		.25283	.06392	2.185	.1491	NS
16					6	.12345	.01524	0.495	.4867	NS

COMPARING MODELS

Mods	HL	MLT	WR	SP	IQ	R squares	difference	F ratio	p	
2		3	4	5	6	.70291				
6		3	4	5		.64268	.06023	5.8789	.0218	
10		3			6	.47558				
13		3				.40258	.07300	4.3152	.0461	
10		3			6	.47558				
16					6	.01524	.46034	27.2124	.0000	
8			4		6	.49430				
14			4			.49418	.00012	0.0071	.9335	NS
8			4		6	.49430				
16					6	.01524	.47906	29.3667	.0000	

Table 8:4 A comparison of models from the multiple regression analysis no.3.

Intelligence does not correlate significantly with reading (r=.1234) but does correlate highly with average MLT (r=.5501, p <.001). It does not correlate with either of the other measures (Written and Spoken Accuracy). When we drop IQ from a model also containing MLTAV, Written Accuracy and Spoken Accuracy (comparison 1) the result is significant (p=.0083). When dropped from a model just containing itself and MLT (comparison 2), the resulting drop in variance is also just significant (p=.0461). When MLT is dropped from a model containing just itself and IQ, the result is, once again, significant (comparison 3). So, we can conclude that IQ is predicting a proportion (probably small) of the variance in reading that is unaccounted for by MLT. In the model involving only IQ and Written Accuracy, dropping IQ has no significant effect (comparison 4) whereas dropping Written Accuracy has a dramatic effect (comparison 5). IQ does not, therefore, appear to be contributing to any variance in reading that is not already accounted for by Written Accuracy. Written Accuracy would seem to be a far better predictor of reading within the present sample of children than nonverbal IQ.

To conclude, it seems that Reading is best predicted by average MLT, followed by Written Accuracy. Spoken Accuracy does not provide any real predictive power. When we add IQ to the picture, it appears to provide no additional predictive power that is not already accounted for by Written Accuracy, but does provide some that is not provided by average MLT. For reasons given in Chapter 2, it seems likely that for a small and relatively homogeneous group of deaf children, IQ has only a small amount of predictive power in accounting for variance in reading performance.

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CHAPTER NINE

CONCLUSION

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Casual observation of deaf children's performance in conversation with their teachers might suggest that their language is somewhat stilted when compared with their communications with their peers. This, together with the results of our investigations into their often non-linguistic strategies in coping with reading tests, might have led one to conclude that their linguistic competence was a selection of special tricks' learnt to enable them to cope with the specific demands placed upon them at school. The central question posed at the beginning of this research was 'Is there an overall linguistic competence?' The answer, as shown in Chapter 8, would appear to be 'yes', despite possibilities to the contrary. Reading, average MLT and Written Accuracy seem to be good predictors of each other. In other words, a child who does well on the reading test is also likely to make long utterances in conversation with his teacher (particularly after open questions) and to produce syntactically accurate writing.

Before we go on to discuss the implications of these results, both for the classroom and for future research, we should discuss one aspect of the child's linguistic competence that we have not so far touched upon. It appears that not only does the teacher's conversational strategy affect the way the child responds, in the short term at least, but also the child's linguistic competence seems to relate to the way the teacher behaves towards him in the first place. This is an issue of current debate among those studying child language. Snow and Ferguson (1977), for example, are among those who argue that it is changes in mother language that affect the child's language, whereas Cross (1977) places more emphasis on the child as initiator of changes in the way the mother uses language. In the present study we have found that the proportion of high control moves a child receives from his teacher is significantly correlated with his MLT's following most types of teacher move, be they controlling or not. In other words, a child who habitually receives few opportunities from his teacher to elaborate and contribute will make short utterances in conversation even on those relatively rare occasions when he is given such an opportunity. Children who were considered less able by their teachers and those whose writing quality was poor also received more high control moves, as did those children who were less intelligent. Although we found no significant correlation between hearing loss and the total number of moves addressed to a child (expressed as a proportion of all moves in that session), Wood et al (1982) did find such a relationship. In the latter study, the deafer children received fewer moves from their teacher than those with a less marked hearing loss. Since the present study replicates the majority of Wood et al's findings so clearly, it is possible that our failure to find such a relationship in the present study could well be attributed to the unusually restricted range of hearing loss (discussed in detail in Chapters 4 and 5). We also found, in common with Wood et al (1982), that the deafer children received fewer substantive moves and more repair moves. There are further examples that serve to illustrate this trend in Chapter 5. Since we now know (from the results of Chapter 8) that the child's linguistic competence in the conversation session is related to other linguistic performance in which the teacher was <u>not</u> directly involved (ie. Reading and Written Accuracy), we need to consider carefully the effect that such differences in teacher behaviour may be having. Certainly, it seems that teachers tend to pursue conversational strategies with their deafer children that are counterproductive to their own aims (getting children talking). Of course, firmly establishing the direction of cause in such relationships is a pervasive problem. What is also needed is a thorough investigation of the interaction between linguistic competence and response to change in teaching strategy. We shall come on to this later in a discussion of possible future research.

The Warnock Report on the education of handicapped children (D.E.S., 1978) and the resulting legislation (1981 Education Act, D.E.S.) recommend that these children be educated within ordinary schools as far as is possible. It will therefore become increasingly important for educational psychologists and the peripatetic teachers involved in specialist back-up services for such deaf children to have access to reliable and valid tests of achievement. These tests will be necessary not only to establish which children are likely to succeed in ordinary schools, but also to monitor their progress once there. It would be an extremely difficult task otherwise to determine the success of a deaf child, especially when surrounded by hearing children and isolated from his peers. Our work on the use of hearing-referenced reading tests with deaf children has pointed to the pitfalls involved. We hope to find a reading test which will give a more useful and valid indication of a deaf child's progress in reading than those that are commonly in use, and are going on to examine the performance of deaf and hearing children on the Edinburgh Reading Test with this is mind. The results of this study will enable us to see whether or not the use of this test enables us to compare the performance of deaf and hearing children's reading realistically.

We have identified three measures of linguistic competence which seem to intercorrelate highly. Since there is an overall linguistic competence, it may well be a useful exercise not only to use these measures for the two purposes outlined above, but also to identify exceptions to the rule and look more closely at children who do not follow the pattern. It is possible, for example, that a child who has relatively long MLT's but who performs poorly on the reading test may be dyslexic. There is no reason to suppose, if dyslexia is an identifiable syndrome, that it does not exist in similar proportions in any population of children, regardless of other handicaps. At present such children go undetected because poor reading ability is simply attributed to deafness. For these three reasons, the development of a diagnostic battery of tests (based on such measures as used in the present study) which are simple to administer and interpret would clearly be of value.

As far as the pedagogical implications of this research are concerned, it would be simple-minded to presume that paying more attention to one of the variables we have shown to be important (eg. encouraging the production of longer utterances in conversation) will automatically result in an improvement in another (eg. reading) or vice versa. Firstly, we need to establish beyond doubt whether or not avoiding apparently unprofitable strategies in conversation will lead to long-term changes in both the quantity and quality of the child's conversational ability. Then it would be worth investigating whether such improvements bore any relationship to progress in reading and writing. Alternatively, one could research the possibility that an intensive course of reading lessons might have some spin-off in the development of a child's conversational ability. What would be especially interesting here, in the light of Howarth et al's finding (1981) that during a reading lesson deaf children spend relatively little time actually reading, would be a study in which the teachers attempted to avoid using the reading lesson as a general language lesson. Another interesting tack to pursue would be to investigate just how far inner speech (as used by Conrad, 1979) monitors the linguistic competence shown in this study. Since Conrad has shown inner speech to be a very good predictor of reading in a large heterogeneous sample, it is possible that it is also a good predictor of Written Accuracy and average Mean Length of Turn.

On a final note, all the research in this study has been conducted with children from ostensibly oral schools. It is possible, however, that the problems, strategies, teaching techniques and educational goals that it highlights may be relevant to all deaf children regardless of the actual form of communication (oral method, sign language, cued speech and so forth) that is used. The next stage in our research involves concentrating on these very areas that we have so far neglected. It would be very interesting, other than conducting studies similar to this one with signing children, to see how children in signing schools are taught to read. It may be that the actual form of communication used is only an initial and in some ways superficial step towards enabling deaf children to learn language. The problems that these children face require far more 'in depth' investigations, analysis and (ultimately) intervention studies if we are to make any headway in facilitating the task that the deaf child faces in learning to communicate with his fellow human beings.

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APPENDICES

LIST OF APPENDICES

APPENDIX I

INFORMATION PROVIDED FOR TEACHERS

APPENDIX I

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This appendix is an exact copy of the information sheet sent on ahead to the participating schools to be distributed among those teachers with children in the 7-12 age range. As described in the introduction, I was anxious to inform teachers fully about the details of our research so that we did not appear to represent any mysterious threat. I also felt their cooperation was more likely to be gained if they were aware that the ultimate purpose of our research was of an applied nature.

NOTES FOR TEACHERS

The Deafness Research Group at Nottingham University is funded by the Medical Research Council to study and report on what has been broadly entitled "The Intellectual Development of the Deaf". Part of our previous research has been directed towards gaining some insight into deaf children's language learning, the structure of their conversations with their teachers and with other children, and into their problems in learning to read.

However, most of this research has been undertaken by several researchers working in different schools with, of course, different children. We feel it would now be useful to obtain measures of all these language skills for a single group of children, thus providing a "linguistic profile" for every child involved.

This profile may be of use in the short term to the school since it might serve to pinpoint specific problems or fortes and help confirm the teacher's knowledge of a child's ability. We hope to explore the relationship between these language skills and use them to piece together a more elaborate picture of language development in deaf children, with a view to looking at their relationships to teaching style. Examples of possible questions to ask are : when is a deaf child most receptive to the teaching of reading? Should a deaf child be taught the structure of language deliberately and systematically or is it possible for him to develop it more "naturally"?

We have tried to keep the teachers' active involvement in this research to a minimum so as not to impose too many demands on their time and patience. However, the News (or Conversation) Session is the one part of the study which it is impossible to do without them. None of this work can be productive or useful without the help of the teachers ; we do not have the practical skills, nor do we know the children well enough. We should emphasise that our overall aim is not to produce a general critical evaluation of oral education, but to help identify some of the specific learning problems that deaf children face and to the describe the techniques that teachers use to try and overcome them.

We therefore hope that teachers will be interested in joining in our research and that with their help, we will be able to offer some useful information for them to consider.

Amanda Griffiths

LINGUISTIC PROFILE STUDY : OUTLINE

Detailed below are brief outlines of the four sections of the study. Apart from the conversation sessions with their teachers on (if convenient) a Monday, I propose to take the children two at a time into an area or room preferably away from their classmates where they can do the game or task involved. I would hope to arrange with each involved to begin work with them on a specified Monday, and complete the remaining games/tasks with their children on the following few days, in other words, to devote one week to each class. Obviously, all these arrangements will have to be fitted in without disturbing the normal school routine, and causing as little disruption as possible to the activities that teacher has prepared for that week.

1. News/Conversation Session

We have found the "News Session" useful as a starting point for investigating the language used by 7-11 year old deaf children. Here, the teacher typically has a small group of children with which she conducts a conversation about their activities over the weekend and other matters. It is therefore useful to record these sessions on a Monday, when the weekend is still fresh in the children's minds. However, not all teachers use this method, and we are anxious to look at conversation sessions as they occur naturally, since we feel that teachers will gain most from information which relates to real classroom situations. In practical terms, this involves putting a small video-recorder in the corner of the classroom to record what happens. If at the end of a session the teacher is unhappy with it, or feels that it is not typical then she/he should not hesitate to say so and the tape can be erased. Needless to say, all tapes remain strictly confidential and are not shown to outside parties unless the teacher involved has given express permission.

2. Child-Child Communication

We have found the communication game outlined below a useful tool for studying the language used by deaf children with each other. Since the ensuing conversation revolves around a known subject (a picture) we have some clues to aid later transcription. Two children sit facing each other each with a copy of the same book. A small screen on the table between them makes it impossible for one to see the other's book. One child then describes a picture in the book so that his partner can find it in his book. Each child does this several times.

We have used this game with both deaf and hearing children and have found that the deaf are surprisingly successful, in some ways more so than hearing children. Furthermore, they usually enjoy it. Several teachers have expressed interest in using these games themselves in the classroom.

3. Writing

We are also interested in obtaining samples of the children's writing. After the pairs of children have completed the child-child communication game, they will be asked to describe one other picture to their partner in writing. We will then see how effective these messages are when handed over to partners.

4. Reading Test

We propose to give the Edinburgh Reading Test (Stage 1) to each child, either singly or in pairs, preferably in a quiet room where they can concentrate. The Edinburgh Reading Test has been chosen because as well as giving a reading age, it provides more information about the nature of a child's reading ability than more common reading tests. We hope to gain more insight into the deaf child's reading problems by looking at the profile of his score on the subtests (vocabulary, syntax, sequencing and comprehension). The test manual recommends a break in the middle of a test ; if possible the first half will be given in the morning and the second in the afternoon.

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APPENDIX II

FURTHER INFORMATION ABOUT CHILDREN IN THE STUDY

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FURTHER INFORMATION ABOUT THE CHILDREN IN THE STUDY

Information about the children is divided into 9 groups. The first 8 such groups represent the children in each of the conversation sessions, while the final group concerns those children who took part in all parts of the study except the conversation session. The total number of children is 50.

Hearing loss is measured as described in chapter 3. The pure tone audiogram averages in the following tables are calculated using the average of three frequencies (500, 1000 and 200 Hz). Age is noted in years and nearest month. An asterisk to the right of the child's number indicates that his family is of Asian origin. Two asterisks indicate West Indian origin. The teacher rankings represent oral ability, general ability, attitude, writing ability and speech quality (noted in the tables as Or, Ab, At, Wr and Sp respectively). The column entitled "Cause" indicates cause of deafness where known. Frequently the cause in not known and this is indicated by "NK". All these variables and their effects are discussed in detail in chapter 2.

Group 1 — Teacher rankings

Child	H.Loss	Age	Sex	Cause	Or	Ab	At	Wr	Sp
1	118	9.0	M	NK	D	C	D	D	D
2	95	9.0	M	rubella	C	D	C	D	C
3	93	9.4	M	NK	D	C	C	D	D
4 **	68	9.8	M	NK	C	C	C	C	C
5	103	10.2	F	meningi	C	D	C	D	D
6	98	9.0	M	NK	D	C	C	D	D
Average	96	9.6	-	-	D	C	C	D	D

Group 2 — Teacher rankings

Child	H.Loss	Age	Sex	Cause	Or	Ab	At	Wr	Sp
7	112	6.10	M	rubella	A	C	A	B	B
8	102	7.0	F	hered.	B	A	A	B	B
9	90	8.9	M	hered.	C	B	C	C	C
10	113	8.6	M	NK	B	B	B	C	C
11	87	8.4	F	NK	C	D	C	D	B
12	47	8.0	M	rubella	C	C	D	D	C
Average	110	7.11	-	-	B	C	B	C	C

Group 3 — Teacher rankings

Child	H.Loss	Age	Sex	Cause	Or	Ab	At	Wr	Sp
13	80	11.0	M	rubella	B	B	B	C	B
14	118	10.5	F	NK	D	D	C	D	D
15	107	11.2	F	NK	C	C	C	C	C
16 **	95	11.4	M	NK	D	D	B	E	D
17	98	11.3	M	NK	B	B	B	B	C
Average	100	11.0	-	-	C	C	B	C	C

Group 4 — Teacher rankings

Child	H.Loss	Age	Sex	Cause	Or	Ab	At	Wr	Sp
18 **	88	12.3	M	NK	C	C	C	B	C
19 *	95	12.2	M	NK	C	C	C	C	B
20	88	12.7	F	NK	C	C	C	D	B
21	93	12.11	F	rubella	B	C	C	C	B
22	113	12.11	F	rubella	D	C	C	D	C
23 *	107	12.8	M	NK	C	C	C	C	E
Average	97	12.7	-	-	C	C	C	C	C

Group 5 — Teacher rankings

Child	H.Loss	Age	Sex	Cause	Or	Ab	At	Wr	Sp
24 **	97	13.7	F	rubella	D	C	C	C	E
25	88	13.1	M	NK	C	C	B	C	C
26	112	12.10	F	NK	C	C	C	C	D
27	100	12.8	M	jaundic	C	C	C	C	D
28 *	103	12.10	M	NK	A	C	A	B	B
29	65	13.0	M	NK	C	D	C	D	B
Average	94	13.0	-	-	C	C	C	C	C

Group 6 — Teacher rankings

Child	H.Loss	Age	Sex	Cause	Or	Ab	At	Wr	Sp
30	90	9.6	F	NK	A	A	A	A	A
31	97	11.6	F	NK	C	C	C	D	C
32	85	10.10	F	rubella	B	C	A	B	B
33	88	10.10	F	NK	A	A	B	B	B
34	93	9.2	F	NK	D	C	B	D	D
35	103	10.11	F	NK	C	A	A	B	D
36	60	10.9	F	NK	A	C	A	B	A
Average	88	10.6	-	-	B	B	B	B	B

Group 7 — Teacher rankings

Child	H.Loss	Age	Sex	Cause	Or	Ab	At	Wr	Sp
37	98	12.1	M	NK	C	B	C	B	C
38	98	12.6	M	NK	D	C	B	B	C
39	93	11.10	M	NK	B	C	B	B	B
Average	96	12.2	-	-	C	C	B	B	C

Group 8 — Teacher rankings

Child	H.Loss	Age	Sex	Cause	Or	Ab	At	Wr	Sp
40 *	75	12.4	M	NK	B	D	A	D	B
41	103	11.6	M	rhesus	D	D	D	E	E
42 *	98	11.7	M	NK	C	C	C	C	C
Average	92	11.9	-	-	C	D	C	D	C

Group 9 — Teacher rankings

Child	H.Loss	Age	Sex	Cause	Or	Ab	At	Wr	Sp
43	98	9.7	M	NK	C	C	C	C	C
44	78	9.5	F	rubella	A	C	A	B	A
45 **	87	9.6	M	NK	A	A	A	B	B
46	65	10.0	M	NK	A	D	E	D	A
47	77	8.1	F	hered	A	C	A	A	A
48	115	10.7	M	rubella	B	B	B	C	C
49	97	8.6	F	jaundic	D	C	D	D	D
50 **	93	8.9	M	NK	D	C	D	D	C
Average	89	9.4	-	-	B	C	C	C	B

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APPENDIX III

EDINBURGH READING TEST : A FURTHER SAMPLE

APPENDIX III : CONTENTS

APPENDIX III

EDINBURGH READING TEST : A FURTHER SAMPLE

INTRODUCTION

As explained in the chapter on reading (no.4) there were several reasons why I was concerned about placing too much emphasis on the results of the reading tests I had administered. To recap, the main problem was that I did not know the children very well and therefore was open to misinterpreting their difficulties. On several occasions I abandoned a particular set of items with a child because I judged him unable to continue: obviously I was open to error here. Furthermore, it is possible that my explanation of the task was inadequate. If the child's own teacher had administered the test she would probably have been in a much better position than me to judge his limitations and to find the most effective way of explaining the problem to him. The Edinburgh Reading Test (henceforth referred to as the ERT), far more than most reading tests, requires a lot of explanation from the teacher: there are 8 different sets of items in the test, each of which requires a different explanation. I suspected that the children would probably have achieved higher scores if their own teachers had administered the test. Informal observation of some of the children's test performances 6 months later suggested that this might well have been the case even allowing for 'normal' improvement. Since there was a possibility that I might have been a factor in determining how well some of these children would do on certain items, it was also possible that I would bias the pattern of subtest scores and their intercorrelations.

One way of checking these possibilities and easing my own mind about the validity of the ERT data was to gather another sample of ERT's from deaf children whose own teachers had administered the tests. If the two sets of data yielded fairly similar patterns of results, then I could be reasonably confident that the first set of data was not unduly abnormal.

As described in chapter 4, a school was found from which we could gather data that was free from some of these problems. One teacher has taken a particular interest in the ERT over the four or five years that the school has been using it and keeps records of each child's progress over the years. She has discovered what she considers to be the best method for giving instructions, has devised extra examples for practice and administers the ERT as a group test (strictly timed) in a large room with several invigilators, all of whom have discussed the test and its administration in detail. The invigilators are teachers who are familiar with the children and are there to check that the test instructions have been understood.

METHOD

Data were gathered from this school for 31 subjects. These constituted all children in this school who had done the ERT Stage 1, Form B (since all my original sample did only Stage 1, Form B) in that year. Using the latest audiograms available from the school, it was calculated that these children had an average hearing loss in the better ear of 104 dB and had an average age of 13 years. There is no reason to believe that these children are in any way significantly different from those in the original sample, apart from the fact that they attend a boarding school.

RESULTS AND DISCUSSION

The data from this second sample were analysed in much the same way as those from the original sample. For ease of comparison they will be presented in the same way.

Edinburgh Reading Test subtest scores

Table A:1 shows the means and standard deviations for each subtest and the overall score. It can be by comparing these with the original means that a very similar pattern of results has emerged, with this later group doing slightly better overall. This sample is slightly older (13 years as compared with 11 years 7 months) than the sample in the present study. They are also slightly deafer (103dB as compared with 94dB).

	Means	Std.Dev.
Vocabulary	15.5	3.5
Syntax	16	4.5
Sequencing	14.5	3.5
Comprehension	13	3.5
Total	59.5	12.5

Table A:1 : Means and standard deviations on Edinburgh Reading Test subtest and overall scores for further sample.

Edinburgh Reading Test subtest correlations

As can be seen in Table A:2 (below) all the subtest scores correlate highly with each other as well as with the total score. If anything, these results intercorrelate more highly with each other than in the original sample, but the differences would not be significant using the Fischer Z statistic.

	Vocab	Syntax	Seq	Comp
Vocab	-------			
Syntax	.69 ***	-------		
Seq	.60 ***	.71 ***	-------	
Comp	.55 **	.79 ***	.66 ***	-------
Total	.82 ***	.93 ***	.81 ***	.86 ***

Table A:2 : Edinburgh Reading Test subtest correlations for further sample.

* $p < .05$
** $p < .01$
*** $p < .001$

Edinburgh Reading Test subtest scores : sex differences

As with the original sample we split the data into two groups to look at sex differences. The results overleaf (Figs. A:3 and A:4) show a very similar pattern to that found in the original sample, namely that the overall ERT subtest correlations mask large sex differences; the girls' (n=16) subtest scores intercorrelate much more significantly than the boys' (n=15) scores. We used the Fischer Z statistic to see whether the difference between the boys' and girls' intercorrelations achieved significance. This revealed that as a rule, these differences were more significant than those in the original sample (see Table A:5). Once again this confirms the findings of Norden (1975) that one particular measure of linguistic ability for girls is a much better predictor of performance on other linguistic measures than it is for boys. Unfortunately the data that we currently have available from the test devisors in Edinburgh do not allow us to make such a comparison with the performance of hearing children.

	Vocab	Syntax	Seq	Comp
Vocab	-------			
Syntax	.56 *	-------		
Seq	.24	.54 *	-------	
Comp	.24	.74 **	.57 *	-------
Total	.67 **	.92 ***	.72 **	.79 ***

Table A:3 : Edinburgh Reading Test subtest correlations (boys only) for further sample.

	Vocab	Syntax	Seq	Comp
Vocab	-------			
Syntax	.80 ***	-------		
Seq	.85 ***	.83 ***	-------	
Comp	.76 ***	.82 ***	.71 ***	-------
Total	.93 ***	.94 ***	.87 ***	.90 ***

Table A:4 : Edinburgh Reading Test subtest correlations (girls only) for further sample.

* $p < .05$
** $p < .01$
*** $p < .001$

	Vocab	Syntax	Seq	Comp
Vocab	-------			
Syntax	.0014 **	-------		
Seq	.00003 ***	.0003 ***	-------	
Comp	.00003 ***	.098	.0689	
Total	.00003 ***	.3336	.004 **	.0102

Table A:5 : Significance levels (Fischer Z) between Edinburgh Reading Test subtest correlations for boys and girls for further sample.

* $p < .05$
** $p < .01$
*** $p < .001$

Correlations with other child variables.

As with the original sample of children, we did not find a significant correlation between hearing loss and reading ability. However, as explained in chapter 4, the reason for this is probably due to the fact that the children were all very deaf. Indeed, the children in this further sample were even deafer than those in the original sample (103 dB as compared with 94dB).

One unexpected correlation that emerged was that between age and hearing loss ($p<.01$). However, this is the result of a slightly odd sampling procedure. As the original sample consisted of children who all did Stage I on the ERT, I was only interested to obtain test booklets from another school from children who had done this same stage. I therefore took results from this school for <u>all</u> children who had completed Stage I that year. This resulted in a different cut-off point for age, since in the original sample I had aimed to get children between the ages of 9 and 12. This further sample included children who were much older, less able (ie. they were doing Stage I when their peers had probably moved on to Stage II) and, as one would expect, more deaf. It is these children who contribute to this correlation. This was checked by dividing the sample in half;: those who were older than the mean age (13 years) and those who were younger. The two groups' hearing losses were then compared and found to be significantly different ($p<.03$). The older children were indeed much deafer.

In conclusion, the results from the two samples of children showed clear similarities. This enabled us to be reasonably confident that the fact that a stranger administered the tests did not have too profound an effect on their performance.

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APPENDIX IV

CODING SYSTEM : THE SYNTACTIC ANALYSIS OF REFERENTIAL COMMUNICATIONS

APPENDIX IV

CODING SYSTEM : THE SYNTACTIC ANALYSIS OF REFERENTIAL COMMUNICATIONS

Below is reproduced D.J. Wood's detailed guidelines for the syntactic accuracy coding system that was briefly described in Chapter 6. We used this system to analyse both the speech used during the referential communication task (Chapter 6) as well as the written messages (Chapter 7).

What do we analyse?

On meeting a particular transcript, the first decision to make involves the isolation of words or groups of words which will not be subject to further analysis for the syntactic component. There are a number of these:-

i. If it is clear that you must use more morphemes than are spoken by the child in order to construct the simplest, appropriate sentence(s) you can think of, the transcript or section of transcript is rejected as 'unanalysable'.

ii. Occasionally, a child will correct himself, eg. "the pirate had a paper ... map ... and the map was ... the wind ... the map was blown by the wind " In these cases, the individual word or phrase which is repeated is only scored once, choosing the most "advanced" or meaningful version (e.g. in the above "the pirate had a map: the map was blown by the wind". The arrows indicate the unit of utterance in the self-correction).

vii. All comments which are to do with the regulation of the game (whether from the receiver, sender or the experimenter) are not considered in this this part of the analysis, though they will be of considerable interest in a separate analysis of control of the dialogue. So, for example, where the sender says "Ok?" or "Look for it" or (to E) "What's this called?", these are cut out.

iv. Very rarely, a child moves beyond the picture to describe earlier subsequent made-up events. Since there is no independent semantic support for analysing these utterances, they too are ignored.

Allowing for the inter-subjective component.

Many of the transcripts (particularly of the deaf children) begin with a definite article and noun, eg. "The pirate has a blue coat...". In written syntax this might appear inaccurate since "The" serves as an anaphoric reference to an entity already specified. However, since the child knows the rules of the game (ie. that they are describing pictures to each other, which have a pirate, dragon, ship etc.) it could be argued that a measure of inter-subjective understanding obviates the need for definition of the entity (although we shall also examine starting phrases as a way of looking into egocentrism, context dependency). In view of this possibility, each opening utterance is assumed to be prefaced by a tacit utterance along the lines of "The picture shows ..." or "In the picture there is ...". Thus, any opening with a determiner is accepted at this level of analysis, though an opening, say, with a verb would not since entity in this case (noun, pronoun etc. ..) has been deleted.

The Analysis Proper.

There are a number of constraints to bear in mind when trying to idealise an utterance in relation to its referent picture. These are:-

i. Wherever possible keep all words used by the child (subject to exclusions in (ii) above). Only as a last resort should a word be changed or dropped.

ii. Similarly, try to maintain word order as far as possible. Only when other, counter indications in the child's own syntax clearly mark a word order error or when it is impossible to make sense of the existing one without inserting many words should word order be changed.

iii. Any 'correction' which is applied (such as adding an inflexion, pronoun, auxiliary verb and so forth should do justice to as many of the selectional constraints imposed by the child's own syntax as possible.

iv. Where more than one option suggests itself then always take the one which demands least addition/modification. Fortunately, the semantic constraints imposed by the pictures themselves keeps the range of options small except in (1.i) which we ignore anyway.

The following list are all examples found in the transcripts together with the sorts of changes/additions made to them. These will be presented in turn (in no particular order) and an attempt made to specify the general decision rules to which they yield. No attempt is made, as yet, to specify how representative/frequent each of these changes is and it is highly likely that new data will yield its own crop of new change rules. As a rule, the transcripts are modified using actual words, although it is now proving possible to categorise the changes using quite standard grammatical terms (eg. change determiner, add inflexion, add auxiliary verb and so forth). This is the way in which we will eventually catalogue errors - the great advantage of this is that it enables us to make direct comparisons with Quigley's data on reading/writing and it ties us into mainstream linguistics. The weakness at the moment is that we are not too sure of some of the linguistic classes needed at the moment. These are simply marked with (?) after them.

Example and 'change rules'.

In the following examples, those words in brackets are those that have been changed. Those not in brackets form the original, uncorrected versions.

EXAMPLE 1

The man throw(s) the map

(add inflexion)

EXAMPLE 2

The man throw(s) the map (into the) sea.

We add an inflexion, a preposition and a determiner.

EXAMPLE 3

(A man with a) hat, long hair, boots,
reading (a) paper.

We add a determiner, noun, and 2 prepositions. The second determiner (a hat) may seem a bit pedantic, but seems on balance to warrant inclusion.

EXAMPLE 4

He (is) wear (ing) (a) black hat and he wear
(has) black hair and he (is) hold (ing)
(his) hand out because the wind goes
("whoosh") (and) the map blow(s) away.

Here we have an example of adding an auxiliary verb, an inflexion, and a determiner. "Wear" has been changed to "has" and has been treated as a violation of a semantic selection rule. Then we add another auxiliary verb, an inflexion and a (possessive) pronoun. This is followed by inserting the verb "Whoosh" but it is not critical exactly which verb is used. This particular verb is called for both by the gestures accompanying the utterance and by the syntactic frame around the 'gap' in the speech. Finally we add a conjunction and an inflexion.

EXAMPLE 5

> pirate got (was) read (ing) the map ...
> um, was sitting on his deck, but the...
> (map) ... went down and the wind came
> and the map blew out of his hands.

This is given to illustrate again an example of a change of morpheme, since example of adding "map" since map is so clearly called for given both speech and gestural context.

EXAMPLE 6

> Man he try (ies) to catch it.

This shows an example where we delete the word "Man" since the pronoun renders it inappropriate. Had a long gap been indicated between "Man" and "he", we might have added a determiner (The man........he tries...). Another alternative is "The man try(ies) to catch it" but this is rejected because it ignores the "he" (and thus also involves deletion) plus other change rules.

EXAMPLE 7

> The hat the wind blew.

This became "the wind blew the hat". This is a bit hazardous since the child might have meant the hat (which) the wind blew (adding a pronoun) but this seemed an unlikely semantic and syntactic possibility for a young deaf child. It might also have been simply marked by a pause The hat ... the wind blew ("the hat" being then tacit) - but it is doubtful.

EXAMPLE 8

> (a man with) black hair, touching his
> head. (He has a) red cat and black (X).

This transcript only just gets accepted as codable - and the result probably flatters the child involved. "Black hair", the first words of his utterance, demands the addition of a determiner, a noun and a preposition. The "touching his head" just scrapes by without needing another phrase ("he is touching"..) but the "red coat and black" after must surely demand another pronoun, verb, determiner and a noun (X).

EXAMPLE 9

> The pirate with a black hat with a red
> coat and trousers, with black boots
> (and a boat) with a red sail.

The first set of propositions is a bit ungainly ("with a red coat") and "trousers with black boots" almost suggests that "boots" are an attribute of "coat and trousers". However, it is probably just acceptable (though probably flatters the child). However "with a red sail" tagged on (without specifying the entity which possesses it) clearly cannot be allowed. So we have added a conjunction, a determiner and a noun.

Scoring system

All corrections for each utterance or message can be summarised on a table such as the one below. Similarly, one can used such a table to summarise all corrections for certain groups of children if looking for differences between groups. The actual figures in Table A:6 represent a summary of the corrections made to 37 written messages by deaf children.

	add	change	delete	relocate
inflexion	32	2	2	
prepostion	16	2	2	2
determiner	20		8	
noun	3	1	2	
aux. verb	6	2	2	
conjunction	7			
adjective				
pronoun	1			
verb	6	3	2	1
	91	31		

Table A.6 : Example of a scoring table for syntactic analysis of referential communications.

An accuracy score can be calculated for each message. We add the number of morphemes that have had to be changed (deleted, relocated, etc) to the number of morphemes in the original utterance; this forms the denominator. The number of morphemes in the original (uncorrected) version is then expressed as a percentage of this. An example is:

(The) sea, rocks, (a) boat (and the) sky.

Here 4 morphemes have had to be added to the original 4. This gives a score of 4/8 or 50% accuracy.

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APPENDIX V

EXAMPLES OF TRANSCRIPTS

APPENDIX V

EXAMPLES OF TRANSCRIPTS

Below are reproduced extracts from the conversations held between the teacher and her children as described in chapter 5. The teachers' turns are noted by a 'T' and the children's by a 'C'. Each child is given a number to facilitate transcription. Details about all the children are given in Appendix II. Thus, in the first extract below (taken from conversation session number 5), the details about C2 are given in the second row of the table in the Appendix entitled 'Session Five'. A description of how we transcribe tapes is given in Chapter 5. A series of blank lines (----) represents a word that we cannot understand. Words in brackets are not not spoken but are usually explanations of signs or actions. Even with a fairly complete idea of what is being said (as is the case with the examples below) it is still not possible to code the conversation without the presence of the original tape since the the meaning is not always clear without clues provided by intonation, expressions and gestures. However, these extracts do provide a 'feel' of the raw material for the analysis of conversations as described in Chapter 5.

EXTRACT No.1 (from session 5)

T - I saw someone collecting wood for a bonfire and he had a pram, an old pram. And every time they found some wood they put it in the old pram and pushed it.
C4- Who did that?
T - I saw someone the other week doing that.
C4- Oh.
T - Have you ever seen anyone doing that?
C4- No! Pram ---- ---- carrying.
T - Using a pram. (to C2) Did you ever see anyone using an old pram?
C2- No.
T - To put the wood in so you don't have to carry it?
C2- All people carry it.
T - Pardon?
C2- People carry it.
T - People carried it. Did you have to carry a lot?
C2- No. ---- ---- dirty!

EXTRACT No.2 (from session 5)

T - Does anyone know, can anyone remember why we put a Guy Fawkes on the bonfire?
C4- ----
T - Can anyone remember?
C2- (puts up hand)
T - (to C2) Hamid
C2- Fire
T - Why do we put a Guy Fawkes on the fire, why? Can you remember?
C2- Put man on because people want.
T - Pardon?
C2- Because all people like.
T - No! Not because all people like it. Why do we put it on the fire?

C4- Why put guy? (said for C3's benefit)
T - There's a story, there's story-
C1- Yes! Good, very good, very good fire!
T - It does mke a good fire, yes, but that's not it.
C2- Story!
T - Stella, can you remember why do we put the Guy Fawkes on it?
C5- Oh! Guy Fawkes (gestures a bonfire with something on top).
T - Yes, but why?
C1- Hamid, look ---- ----.
T - A long time ago, there was a man called Guy Fawkes and he wanted to kill the king.
C6- Kill?
T - He wanted to kill the king. He thought the king was evil and bad so he wanted to kill the king. So he waited and waited until the king came to Parliament, and underneath he'd got big boxes of gunpowder. What's gunpowder?
C4- Gunpowder, ah! Mrs. Jenkins! (mimes elaborately the action of looking down the barrel of a gun and then pushing something down it) Psshh! (shoots gun)
T - That's right! Good girl, yes! It goes in guns.
C4- Bag, a little bag.
T - And a little bag. It used to be like that. Now it's inside the bullet, the gunpowder. And something else you know that's got gunpowder in?
C4- Bullets, fire, snap!
T - What's in the gun, what else has got gunpowder in?....Fireworks! Fireworks have got gunpowder in. Anyway, it makes a big bang and blows up. And Guy Fawkes put lots and lots of gunpowder in the cellar, in the cellar, and he was going to light it when the king came....

EXTRACT No.3 (from session 6)

T - Now then! Good morning, Jenny.
C5- Good morning, Mrs. Robinson.
T - I think Judith is a little bit sad this morning. You tell them what's happened.
C5- Auntie Bella died.
T - Yes, Auntie Bella died.
C1- Oh!
T - You remember, Judith's Auntie Bella? She's been poorly for a long time, hasn't she?
C3- (to C1) You remember, ---- ----, ---- ----,(signs-poorly)
C1- Ahh!
T - So, on Wednesday Judith will go on a long journey, won't you, Judith?
C5- (nods)
T - You go with Mummy and Daddy?
C5- Mummy, Daddy, Donald and me.
T - In the car?
C5- (nods)
T - Who will drive?
C5- Daddy.
T - Daddy will drive. Will you drive a little bit?
C5- No!
T - Why?
C5- Not me, driver.

EXTRACT No.4 (from session 7)

T - What's this?
C1- People pull!
T - What's this?
C1- Root.
T - Good boy!
C3- Red!
T - It is red, it is red, but what's
it called?
C1- Root.
T - It's a root, yes, it's root.
C3- ----,----.
T - I think you've forgotten. Radish!
C1- Radish.
C3- Radish.
T - Radish, a radish.
C1- In my house, ugh! (mimes pulling something
out of his mouth and not liking it).
T - (laughs)
C3- Where?
T - (to C3) Yes, I got these from my garden.
C2- Garden.
T - (picking something else up) Where's this
one come from? Where did I get this one?
C2- Your!
C3- Your, the garden (points to outside).
T - Yes. Our, the garden outside, the garden
outside.
C2- Dead, dead!
T - Ah, well...no, it's still alive, but....
C2- Baby, grow.

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APPENDIX VI

DATA FOR MULTIPLE REGRESSION ANALYSES

APPENDIX VI

DATA FOR MULTIPLE REGRESSION ANALYSES

Given below (in Table A:7) are the raw data used in the multiple regression analyses described in Chapter 8. Each child is noted by a number in the first column which is the same as that given in Appendix II (entitled 'Further Information about the Children'). So, further information about the children, should it be required, is readily obtained by reference to that Appendix. The blank spaces in the table represent data unavailable for that particular child. The reasons for lack of data are presented in the relevant chapters. It can be seen from the table that data concerning IQ, for example, are only available for 34 of those children who have scores on every measure. Therefore, in the multiple regression analysis involving IQ (ie. Analysis 3 in Chapter 8) only 34 children were involved. Each of the other two analyses involves 38 children. Each column gives information about performance on the main linguistic measures. Further details about these measures are available in the chapters referred to in brackets below.

The main measures we used, in three separate combinations, for the multiple regression analyses are:

1. HL — Hearing Loss (Chapter 2)
2. ERT — Edinburgh Reading Test score (Chapter 4)
3. MLTAV — Mean Length of Turn (Chapter 5)
4. MLT3 — Mean Length of Turn after teacher open questions (Chapter 5)
5. MLT4 — Mean Length of Turn after teacher personal contributions (Chapter 5)
6. WRIT — % Written accuracy score (Chapter 7)
7. SPOKE — % Spoken accuracy score (Chapter 6)
8. IQ — Percentile point for Ravens Progressive Matrices (Chapter 2).

Overleaf:

Table A:7 Raw data for multiple regression analyses reported in Chapter 8.

Child	HL	ERT	MLTAV	MLT3	MLT4	WRIT	SPOKE	IQ%
1	118	4	1.39	0.57	3.50	1/49	50.0	50
2	95	9	1.26	1.00	2.00	1/49	1/49	63
3	93	24	1.72	1.50	1.33	1/49	1/49	38
4	68	12	2.00	1.72	2.44	56.3	1/49	86
5	103	6	1.28	1.67	1.29	-	-	10
6	98	5	1.55	1.00	1.87	1/49	62.5	44
7	112	26	3.62	1.83	3.62	1/49	87.5	-
8	102	27	1.89	3.14	1.00	73.9	75.0	50
9	90	28	2.72	1.82	2.80	76.9	62.5	-
10	113	28	2.12	1.72	3.00	72.7	100.	5
11	87	28	3.00	3.29	4.75	70.6	93.5	-
12	47	44	3.47	2.89	4.00	90.9	82.9	90
13	80	53	2.70	2.83	3.22	100.	64.7	50
14	118	32	0.65	0.57	2.50	91.7	100.	38
15	107	45	2.01	2.94	2.64	82.0	70.0	41
16	95	18	1.58	1.77	2.00	1/49	75.0	21
17	98	66	2.80	2.87	1.37	100.	100.	-
18	88	60	2.07	1.89	2.90	76.9	1/49	46
19	95	60	2.17	2.39	1.92	72.7	83.3	24
20	88	33	2.71	3.00	2.50	76.9	60.0	31
21	93	66	1.97	1.77	1.75	95.2	83.3	21
22	113	53	2.22	3.00	1.80	67.8	50.0	22
23	107	49	2.54	1.67	3.12	100.	80.0	24
24	97	46	2.23	2.00	0.50	92.0	62.5	50
25	88	39	2.13	2.00	2.13	54.2	50.0	10
26	112	51	1.81	1.75	2.40	75.0	1/49	21
27	100	46	2.33	1.60	2.20	83.3	1/49	16
28	103	32	1.61	1.80	1.50	1/49	62.5	50
29	65	49	2.87	2.91	2.91	60.0	66.7	-
30	90	78	8.95	5.00	15.86	100.	64.3	96
31	97	33	2.44	1.00	1.00	72.2	68.8	50
32	85	61	4.41	4.46	6.00	93.2	78.7	50
33	88	54	7.06	8.17	7.75	95.6	93.3	75
34	93	52	3.15	3.44	4.50	-	-	8
35	103	63	8.15	8.00	8.00	94.4	80.0	96
36	60	69	6.16	7.75	6.33	90.0	92.5	45
37	98	21	2.42	1.45	2.75	75.0	73.3	69
38	98	22	1.64	1.00	2.33	84.6	62.5	22
39	93	26	3.28	1.80	2.12	1/49	1/49	22
40	75	24	2.02	1.55	2.22	1/49	75.0	5
41	103	5	0.62	0.17	0.80	-	-	-
42	98	34	2.37	3.00	1.94	1/49	1/49	69
43	98	38	-	-	-	55.2	63.6	75
44	78	56	-	-	-	88.2	79.0	45
45	87	52	-	-	-	88.5	88.8	75
46	65	4	-	-	-	50.0	100.	22
47	77	28	-	-	-	100.	90.0	75
48	115	48	-	-	-	76.9	78.3	75
49	97	14	-	-	-	77.8	-	87
50	93	21	-	-	-	66.7	-	87

It can be seen from the table on the previous page that some children are noted as having a score of '1/49' in the columns representing written and spoken syntactic accuracy. As explained in Chapter 6, our analysis and scoring system for these communications only allowed us to proceed when had to change fewer morphemes than were already present in the original message. In other words, those messages or utterances that required more morphemes to be changed or added than were present in the original were considered unanalysable. So, the lowest score a child could achieve was 50%. If we had excluded those children who scored less than 50% accuracy from our multiple regression analyses we would have reduced the sample size (38) by 13. We therefore calculated three separate correlation matrices in order to see how the size of the correlations varied. These were:

1) Inserting '1' as a score in those cases where children failed to score at least 50% on the written and spoken accuracy measures.

2) Inserting '49' as a score in those cases where children failed to score at least 50% on the written and spoken accuracy measures.

3) Leaving out those children who failed to score at least 50% on the written and spoken accuracy measures. This reduced the sample size to 25.

In the three tables below (A:8, A:9 and A:10), that show the results of these three methods, the variables are as follows: 1) hearing loss (HL), 2) Edinburgh Reading Test total score (ERT), 3) mean length of turn after teacher open questions (MLT3), 4) mean length of turn after teacher personal contributions (MLT4), 5) written accuracy (WRIT) and 6) spoken accuracy.

	1 (HL)	2(ERT)	3(MLT3)	4(MLT4)	5(WRIT)
1	-----				
2	-.1842	-----			
3	-.3178	.6066 ***	-----		
4	-.1801	.4686 **	.6682 ***	-----	
5	-.1318	.7064 ***	.4302 **	.3151	-----
6	.0016	.2446	.3386 *	.2147	.3583 *

Table A:8 Correlations between main measures inserting '1'as a score in cases where children failed to score at least 50% accuracy on the written and/or spoken measures (n=38).

	1(HL)	2(ERT)	3(MLT3)	4(MLT4)	5(WRIT)
1	-----				
2	-.1842	-----			
3	-.3178	.6066 ***	-----		
4	-.1801	.4686 **	.6682 ***	------	
5	-.0841	.7346 ***	.4728 **	.4022 *	------
6	-.0282	.2821	.3676 *	.2057	.4471 **

Table A:9 Correlations between main measures inserting '49' as a score in cases where children failed to score at least 50% accuracy on the written and/or spoken measures (n=38).

*** p <.001
** p <.01
* p <.05

	1(HL)	2(ERT)	3(MLT3)	4(MLT4)	5(WRIT)
1	-----				
2	-.2420	-----			
3	-.3252	.5754 **	-----		
4	-.2165	.5206 **	.6586 ***	-----	
5	-.0201	.5234 **	.3184	.3967 *	-----
6	-.0254	.1278	.2201	.0958	.3783

Table A:10 Correlations between main measures using only those subjects who scored at least 50% on the written and spoken accuracy measures (n=25).

It can be seen from these correlation matrices that a similar pattern of correlations emerge which ever method one uses. 'Erring' on the side of caution, therefore, we chose to use the first method (inserting '1' as a score) for our multiple regression analyses because it gave the lower correlations. To use method three would have meant losing 13 subjects. The similar patterns of correlations obtained from methods 1 and 2, on the one hand, and method 3, on the other, also somewhat allayed our fears about the legitimacy of using parametric statistics on a distribution of data that was not 'normal'. Evidently the unusual distribution at the lower end is not unduly influencing the pattern of correlations.

As a further check on the legitimacy of using data with a slightly skewed distribution in our analyses, we calculated the correlation between the written and spoken syntactic accuracy scores in 3 ways:

1. With the parametric test (Pearson Product Moment) the correlation was significant ($r=.35$, $p<.05$).

2. With the nonparametric test (Spearman rank) the correlation was also significant ($t=2.86$, $p<.01$).

3. Using Pearson again, but without the children who scored less than 50% accuracy the correlation was still significant ($r=.38$, $p<.05$).

We thought it may be of interest to perform multiple regression analyses using a variable other than reading as the correlator. Spoken Accuracy does not appear to be important, so we only present below the results from taking the remaining main measures as correlators.

1. WRITTEN ACCURACY is best predicted by Reading.

2. AVERAGE MLT (Mean Length of Turn) is best predicted by Reading and, to a lesser extent, by IQ.

3. MLT3 is best predicted by Reading and, to a lesser extent, by MLT4.

4. MLT4 is best predicted by MLT3.

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