

# GESTURE TO SIGN AND SPEECH

## FINAL REPORT TO ESRC

Project No: C 00 23 2327

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April 1989

Revised March 2001

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### **Preface**

The study of the acquisition of British Sign Language (BSL) in deaf families is largely uncharted water. Not only do we have very little prior research to use as a base, there are major problems of applying categories derived from spoken language work to the analysis of sign acquisition. It became clear early in the project that deaf mothers interacted very differently with their children than did hearing mothers and the project team have, as a result, spent a great deal of time examining the first two years of life. This makes the study, after only two years of research, a preliminary attempt to describe the acquisition of sign through the period from pre-lexical, pre-gestural actions to use of sign combinations.

In addition, problems with funding in 1986 between the first stage of work and the second two-year period have meant the loss of critical data towards the end of the second year and into the third year for many of the children. This situation arose when the project, having been agreed, could not be funded for a further 12 months. Despite some success in obtaining partial funding for data collection, there was still a loss to the recordings, which can never be recovered.

Therefore, this project report concentrates on early development up to the end of the second year. The research team considers this is something of an interim report with a great deal more analysis required to fully utilise all of the data collected from birth to three years. The extent of this data is indicated in chapter 4. It will be subjected to considerably more analysis and will be a fruitful source for further research.

March, 1989

**Acknowledgements:**

We are extremely grateful to the deaf mothers and fathers who gave of their time to make the project viable. Both deaf and hearing families took part and travelled long distances in some cases to complete lab sessions. The research team of Jennifer Ackerman and Bencie Woll were the mainstay and Jaimie Cohen and Mark Ezra made significant contributions during their one-year secondments. Brian Cerney, Lynn Paul and a range of other visitors helped our thinking.

Gillian Hiles and Anne Stygall typed and produced parts of the manuscript. Finally, Margaret Binnie co-ordinated, typed, edited, arranged appointments, baby sat for the extra children in families, ferried parents around and even did some filming of hearing families. Without her, the project would have been impossible.

To everyone, great thanks.

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## Chapter 1: Language: setting the scene

Mother and Nancy are playing "pairs", choosing cards with animal pictures. Nancy's attention is suddenly caught by the "Happy birthday" chain hanging over the fireplace. She wants it removed because her birthday was last week.

Mother: Turkey!

Nancy: ?

All those ... where? (pointing to cards)

Not me (not my turn) wait, wait.

Take that; Take it off now (pointing at chain)

Take it off, I want it (off) now

Mother: Take what off?

Nancy: I want those (points to wall) now.

Mother: You want those taken off?

Nancy: Yes

Mother: Wait until we finish the game then I will take it off all right?

Nancy: I can't reach it. I can't. You reach it and take it off.

Mother: I'll ask Daddy to take it off. Wait for Daddy to come home and he'll take it off.

Nancy: Can't, can't. I can't reach it, I can't.

Mother: No, you can't reach it. Wait until Daddy comes home and takes it off.

Nancy: Leave it, leave it; leave it until later.

Nancy, aged 3 years, persists in trying to get the chain removed. There is nothing unusual about her insistence, nor her interaction, nor indeed in the content of her communication, except that the whole conversation was conducted in British Sign Language (BSL).

When Wells (1986) describes children's spoken language development he presents many similar interactions.

Mark: Helen play, please? (He wants his sister to play)

Helen still in bed, Mummy?

Mother: (from next room) Mm?

Mark: Helen still - Helen still gone sleep, Mummy?

Mother: No, she's up there talking, isn't she?

Mark: Yes, Helen come down? (request)

Mother: No, let her rest

Mark: All right, all right, Mummy.

Wells provides this as an example of his third developmental stage where the child drives the interaction using questions signalled mainly by rising intonation.

There are many similarities in the two extracts. In both cases the child leads and pursues the topic following requests for clarification. Both children show repetitions and both finally accept the mother's statements. Deaf children using BSL appear to function similarly in communication terms. Yet we know little about this language development since there are relatively few deaf children acquiring BSL from their deaf parents (perhaps around 1 in 40,000 children). This project has begun to investigate these children and the hearing children in families where BSL is used by the parents.

### **Language: a framework**

It would be foolish to imagine that a full review of the language literature could be encapsulated in this introduction. Nevertheless, it is worth considering briefly some of the influences as a base for developing some framework for our own study.

Generally speaking, texts on language choose to describe language approaches in terms of developmental stages or in terms of the global theories offered. The models of a child's acquisition of language commonly include four types:

- a) a developmental, maturational view - perhaps the earliest one where there was an attempt to describe children according to the milestones of development of language. Developmental psychologists have usually worked along these lines. One would place the theories of Piaget, Vygotsky and Bruner within this stream.
- b) a child-determined, innate capacity view - in its simplest form the child has a capacity for learning languages. This is most powerfully expressed in the work of Chomsky.
- c) an environmental, learned skill view - most commonly associated with behaviourists and most clearly expressed by Skinner. Children learn to use language according to the conditioning which they receive.
- d) an interactionist view - where language is a result of a flexible, responsive interaction between child, environment and a skilled user of the language. What occurs is largely function-driven, child-led and ensures that the learning experiences are directly relevant to child needs. Children learn language as they learn to manipulate meaning in the world around. Halliday and a host of workers in the child language field would be identified with this approach.

Such classifications are necessary to understand the changes in approach to children's language. To some extent these are subject to change in other areas of research in psychology and linguistics and no simple approach has yet been found to be completely satisfactory in offering a full view of the child's development.

Wells (1981) suggests a classification according to the way in which different aspects of language have been examined: syntax (Chomsky), semantics (Clark, Nelson), pragmatics (Halliday) and discourse (Bruner, Shaffer). Wells himself offers a further approach which cuts across his classification, drawing most on the last two; this is the view that language exists and develops in conversation. This conversation is significant because it allows the child to take the initiative with the caregiver supporting and extending the topic. Only when this occurs, Wells points out, does the child appear to respond to the caregiver's attempts to extend the topic or introduce new material.

In all of these approaches what used to be a study of how children acquire adult language has become the study of the child's language. In this, the way the child constructs the utterance and utilises the interaction becomes more important than the grammaticality or lexical accuracy. It has also become clear that caregiver's language changes according to the level of the child. Motherese, or baby talk, extends well beyond the first year as the mother adopts a wide range of strategies for maintaining the flow of conversation.

Wells (1981) presents this complete picture of development from pre-speech 'conversations' to linguistic interaction as a continuous growth with shared features:

"Firstly, there is the need for the adult to interpret the child's contribution in the light of the immediate context and the focus of joint attention; secondly, to maximise uptake, the adult's own contributions need to be closely related to the child's preceding communication and current interest; thirdly, whilst being modified in timing, form and content to the child's receptive capacities, these adult contributions must also provide the means whereby the child can enlarge his linguistic resources and, through them, his understanding of the content of communication." p.108

These features and this proposed pattern of development have informed the research study, which we will describe. We have been concerned particularly with the way in which deaf infants move from a 'pre-linguistic' proto-conversation to the extended interaction comparable to hearing speakers (as in the examples at the beginning of this chapter). The mother's use of language alters as the child progresses and the child's production becomes both gesture and sign. To describe this process adequately we need some further consideration of spoken language interaction at these stages.

### **Pre-verbal Interaction**

Tartter (1986) lists crying, cooing, babbling and real speech as the linked series in this period. In terms of perception, the infant by six months "has skills at speaker



identification, suprasegmental recognition, imitation of facial expressions and speech and at recognition of the correspondence between lip movements and speech". (p.341)

In effect, we are already dealing with a sophisticated participant by the time most child language studies are planning to record the interactions. Trevarthen and Marwick (1986) see this early development as largely innate in terms of leading to motivation for language:

"Infants are evidently born with perceptions and ways of moving that are specifically pre-adapted to be part of language behaviour. It is these co-ordinated perceptions and movements that we take to be the principal direct evidence for communicative motives in infants." (p.279)

These communicative motives are fundamental to the development towards language. Trevarthen and Marwick (1986) show the range of capabilities of even the neonate in dealing with others. The infant may have capacities for speech and visual perception which is innate and certainly demonstrate facial expression which will later come to be meaningful in adult communication. In manual activity the infant is already exhibiting primitive reaching co-ordinated to perception within this period of the first five weeks.

Beyond this, the child enters a period of primary intersubjectivity where objects and events can be shared, where games and risk are enjoyed. There is already an extensive literature on this period in psychological and linguistic terms. Bullowa (1979) and Lock (1978) provide focussed discussion of the pre-linguistic development of this early development. Bates et al (1982) link this to social development. However, Trevarthen's work is probably the most extensive for our particular aims.

Trevarthen (1985) presents evidence to support his view of the importance of even the earliest interaction.

"Face movements of infants 2 months of age when they are interacting with their mothers give evidence both for innate representation of the mother as partner in communication and for an emotional system that evaluates her expressions and regulates their interpersonal contact.

...Mothers present to infants a form of expressive activity (baby talk) that has clearly marked synchronous visible and audible features. The precocious expressive capacities and sensitivities of infants and maternal fostering of them would appear to be a human adaptation to facilitate development of observational learning and language." (p.21)

Even if we do not go as far as Chomsky's language acquisition device in terms of innateness, Trevarthen puts forward a very strong case for the existence of an interaction motive which is already present in the neonate.

From this sensitivity to facial expression and emotion, the child produces a "quality of human contact" in primary intersubjectivity (Trevarthen. 1974). This is essentially a social mechanism existing prior to any linguistic or cognitive development. Its discovery

focussed attention on conversations without speech and this form of turn-taking. Batson (1979) discussed this as protoconversation. Bruner (1978) also suggested the importance of this development in the child. However, Collis (1985) warned of over-interpreting all alternation in mother-child behaviour, as turn-taking and Kaye (1982) maintained that the 'interaction' is carried by the mother's rich interpretation of the child's performance.

Bates et al (1979) argue that intentionality in infant communication is not present until after four months. Zinobor and Martlew (1985) identified the child behaviours which produced the characteristic interpretation by the mothers.

Nevertheless, there is general agreement that the base for language is laid in these interactions and it is clear that a major part of it is in the mother's use of baby talk. Our question is what happens when this baby talk is not perceived by the child because of deafness or (in the case of deaf mothers) because it is not used.

When Trevarthen and Hubley (1978) go on to describe secondary intersubjectivity as the emergence from the subjectivity of explanation of objects during the middle part of the first year to this manipulation of objects and environment to create a framework for renewed interaction. The key part of this secondary intersubjectivity is:

"its systematically combining of interests of the infant in the physical, privately-known reality near him and his acts of communication addressed to persons." (p.184)

This capability is important since it opens the way to language through devices such as systematic pointing and reception of mother's comments and information. The critical feature is the fact that the mother does respond in speech and the child can in turn produce appropriate behaviour. All this taking place at around 9 months indicates its significance as a precursor to language growth. Our problem is that all the behaviour described by Trevarthen and Hubley (1978) at this stage seems to rely on speech. The use of joint referencing and commenting on objects when the child is deaf is inherently problematic. We might wish to ask whether secondary intersubjectivity develops at all in deaf children.

### **Beyond Communicative Motives**

Determining trends in child language work in the last two decades is difficult enough but identifying the overlapping strands of different theoretical perspectives is clearly a major problem. The milestones of behavioural and generative grammar approaches are readily seen but the mixture of cognitive and social approaches which have been apparent more recently are more difficult to describe coherently. One approach is to take a "top-down" view dealing with the substantive issues in language itself and then squeezing the research into those areas and another is to tackle it from a "bottom-up" perspective looking at the stages and the methodology used and attempting to discern trends.

Golinkoff and Gordon (1983) in setting the scene for a collection of work on the transition period into language chose the former approach. Beyond the early period of language studies which has to include what was the almost unchallenged behaviourist view they consider Chomsky's contribution as vital in setting the opposite possibility that the child is somehow biologically programmed to develop language skills. In this view the child acts on the world with the support of an acquisition device which allows the child to make sense of "inadequate" language data to form the basis of a language system. When Lenneberg(1967) added the concepts of critical period then the fixing of an ordered sequence of language achievement seemed only an empirical step away.

The fact that the child's early productions could not not be adequately accounted for by the transformations in the sentence structure and the finding of relatedness of early sentence meaning to context brought both the semantic and cognitive views to the fore. In this framework the child's cognitive development was more predictive of the communicative level reached and in fact the cognitive competence directly led to the language output. While this remains a major theoretical force it has been overtaken to some extent by the focus on the shared meaning of the mother-child interaction. The exploitation of pragmatics as a way of understanding acquisition has led to the awareness of the inextricable link between the transmission of cultural and social knowledge and the negotiation of meaning between caregiver and child. In this system the illocutionary force of an utterance is more relevant to our understanding of how interaction is exploited by the participants to create meaningful learning situations, than is the length of utterance or the actual utterance itself. From this perspective the change in the mother's mode of interaction becomes important and has led to the research interest in the ways in which the mother addresses the child. The existence of Baby Talk as the caregiver alters language production towards some type suited to the child's level, confirms both the environmental and the interactional elements in the process of development.

It should be clear that none of the top-down theoretical views so far can account for the full extent of development from earliest communication to the spoken language competence manifested by most children. Obviously there are a number of parallel tracks of development but one overlap is the one which occurs in the distinction between early communication and the language system itself. Golinkoff and Gordon (1983) accuse Trevarthen's (1979) frequently quoted work of confusion of these two tracks. Sugarman (1983) also highlights this distinction as a way of resolving some of the problems of the supposed discontinuity in language acquisition. The confusion arises in the research methodology which attempts to study children according to age and to equate language-like behaviour with linguistic interaction. How one does this leads to different questions about the transition stage. Confining oneself to antecedents of language by focussing on a particular pre- linguistic age group of children probably forces one to consider communication as the central human function. Not surprisingly one sees the rudiments of human interaction present from the earliest days and one can see the increasing sophistication of the child's capabilities in creating shared meaning.

Additionally this common data-driven strategy in infancy research may require a choice to be made as to whether to study the mother, the infant or the interaction itself. Since

each one can be described to be extremely complex these become almost exclusive choices whether we take a cross-sectional or longitudinal view. The reliance of Tronick et al(1980) on monadic phase analysis illustrates this point even when summative evaluations can be made on both participants. Recently there has been further concentration on the mother. Penman et al(1983) offer a pragmatic analysis of mother's interactional style in speech and find at 6 months, mothers question most and interpret least. Schaffer et al(1983) with slightly older children were able to highlight non-verbal aspects of the interaction.

From the "bottom-up" perspective then one can discern trends which relate to the age or stage of development and which relate to the part of the interaction studied. Although these distinctions in theory and research sit rather uneasily in our review they do turn out to be useful. While general theories of child language development offer most illumination most research has been driven by age-related concerns. This in turn leads to areas of data collection which may appear almost arbitrary when seen from the outside. One of these areas has become the age period when pre-language gives way to language.

### **The transition from pre-language to language**

Golinkoff and Gordon (1983) in opening the debate on this transition maintain:

"The puzzle of the transition period is two-fold: first what is the nature of the communicative development during this period and second, how do changes in communicative skill which occur at this time relate to the onset and rapidity of language development" p. 20

This encapsulates the difficulties, confusions and potential of this area all in one statement by talking of communication, changes, onset and language development together. The first problem of course is in deciding what the transition period might be. On the one hand it is obvious that the child can communicate without producing spoken language and then at a later stage can communicate by producing spoken language; on the other hand if one studies the mother's spoken language or one considers spoken words as the sole currency then the transition is from non-verbal to verbal competence in the child. In the first the question of discontinuity may not arise while in the second the discontinuity is there by definition. Both Sugarman(1983) and Shatz(1983) identify this distinction and use as support research such as Kaye(1979) which failed to find the predictive relation between measures in the first six months and language development by the age of two and a half years.

Perhaps the transition period can be defined by neglect. That is while there has been a vast amount of work on the first year of life and on the development of spoken language from about 18 months onwards, then one can consider the transition phase as the period which is left...i.e. from 12 to 18 months. It is true that by the final part of the first year of life the child will use non-verbal means to sustain interaction and that the mother's baby talk is characterised by non-verbal devices(Stern et al,1983) and that later the semantics of speech seem to drive the interaction but the fact that these are

apparently different does not adequately argue for the significance of the transition. Indeed both Shatz(1983) and Sugarman(1983) seem to reject the notion that this transition can be considered as continuity vs. discontinuity. The significance in the transition is only in the lack of empirical knowledge and in the theoretical understanding of how the change occurs for the child. In addition Sugarman(1983) outlines the different types of claims that can be considered for the relation of different behaviour. It can be antecedent in the sense that it precedes the emergence of another behaviour; it can be a precursor in that it not only precedes but also shares some features with some other; and it can be a prerequisite which makes its presence causally necessary if some other behaviour is to emerge. There has been a major problem in distinguishing some of these in relation to the transition phase.

For Snow and Gilbreath(1983) a more interesting question is why the child moves from one mode of interacting to another. The change itself is of interest but we know little about why the change is made. Nor do our theories tell us exactly how it happens. Only by believing in either the cognitive view that the child is growing in competence and therefore begins to interact with more sophistication or in the social view that socialisation is somehow more effective in verbal than in non-verbal terms and that the goal of the mother is to help the child to that awareness, does one have a way of describing the transition. However on examination the literature says neither and there is no explanation of why the non-verbal means is rejected in favour of the verbal. One might assume greater efficiency in verbal communication but it is only by considering children where the non-verbal means is not rejected that we can begin to explain the actual change which occurs. Children in deaf families offer such a situation. In theory the difference between gesture and sign seems relatively small and in terms of communicational continuity one would have difficulty in predicting the stages. Nevertheless, Petitto(1984) suggests that the communicative development may have meaningful stages which look suspiciously like discontinuity. However her report is based on a single subject and on only one distinction. What is required is a comparative study of children in both deaf and hearing environments who are moving from a period when their interaction is more characterised by non-verbal, non-linguistic means to a period when the major vehicle for interaction seems to be linguistic.

The importance of this study arises because in cognitive abilities we would expect deaf children to be developing similarly to hearing children whether in deaf or hearing families. One would then expect similar overlap of gesture and symbol as in hearing children. However the social argument would affect deaf and hearing children differently. Here the mother would simply extend the child's gestural competence into sign. If the transition is cognitive in origin then one should see strong similarities in the deaf and hearing infants in the study while if the social argument holds sway then the pattern of transition in a deaf family where the mother is using sign language ought to be much smoother since it takes place in a single modality. In the first case one might expect to see a clear discontinuity in the second the transition should appear to be continuous. However, Snow and Gilbreath(1983) complicate this simple view by suggesting that the two frameworks are not so separate as was once thought and by positing a social-cognitive perspective. In effect this suggests that one cannot have a

social view without allowing for cognitive competence. But there is another potentially more important complicating factor ..... cultural difference.

### **The Cross-Cultural Dimension**

Just as we close in on the key social or cognitive factors in child language we discover that they are not universal. Researchers have become aware of the problem of generalising across cultures and it has become clear that the pattern of actual emergence of language may be different in different locations in the world (Bowerman, 1980). We can show that middle-class westernised mothers tend to attribute communicative intent to preverbal behaviours and to encourage interaction from earliest times. But this apparently "normal" behaviour turns out not to be universal by any means. In fact, there are wide variations in child-rearing practices (Super, 1980). For Schieffelin and Ochs (1983) this means:

"Our position is that culture is not something that can be considered separately from the accounts of caregiver-child interaction; it is what organizes and gives meaning to that interaction.... How caregivers and children speak and act towards one another is linked to cultural patterns that extend and have consequences beyond the specific interactions observed." p.116

This type of statement is now intuitively appealing and consistent with the cross-cultural differences discovered. Studies such as Brazelton (1972) on the Zinacantan in Mexico, Caudill and Weinstein (1969) on the Japanese and Rebelsky (1967) on the Dutch, indicate the lower rate of maternal vocalisations in some cultures.

This sort of difference can be easily seen by comparing Snow et al's (1979) study of Dutch and English mother-child interaction with that of Schieffelin and Ochs (1983) report of the Kaluli of New Guinea. In the English and Dutch homes the mothers interacted very similarly and had similar expectations of the child's contribution to/partnership in the conversation. In effect the use of baby talk gave more prominence to the child's contributions and made the mothers more interpretative of such contributions. Among the Kaluli mothers do not consider their children as capable of understanding. They are unlikely to engage in mutual eye-contact and the mother speaks for the child in interaction not in baby talk but in well-formed adult-like utterances. Only the high pitched features of the mother's "voice" indicate that it is the child who is "talking". It is also true that the mothers tend not to attribute thoughts and feelings to the child. What we see therefore are very different types of behaviour and these can only be adequately understood by reference to the culture. What is also relevant to point out is that the Kaluli are not somehow disadvantaged by these differences in this early developmental pattern... they acquire very sophisticated adult interaction and language.

The importance of such cross-cultural work should be obvious in terms of identifying universals and also in terms of widening our concepts of what might be classed as deviance within any culture. They also indicate some of the culture-bound pitfalls possible in such research. Ervin-Tripp (1972) talks about linguistic bias (using or

expecting standard forms of one language mode when these may be inappropriate) and sociolinguistic bias(using tasks and contexts inappropriate for the expected language use in that culture).

Examples can be seen in the work of Blount(1969) where the Luo in Africa did not produce spontaneous speech for the researcher when recorded at home and Kernan(1969) where Samoan adults were unable to adequately converse with young children except in simple question-answers. The first occurred because the children were expected to be reticent in the presence of strangers and the second because the children are normally cared for by older children.

In terms of the discussion so far these results imply that baby talk in its "usual" form may not be universal and that the concept of continuity may have to be reformulated for some cultures. They also emphasise the need to collect data flexibly and in as many different settings as possible.

## **Chapter 2: British Sign Language and the Deaf Community**

Before proceeding to examine the nature of sign language acquisition, it is appropriate to take a "side-step" to consider the context in which such a study is carried out. In dealing with a language which has received so little research attention it is of some importance to consider its historical roots, the educational situation of its users and the way in which the language has been described by linguists.

### **The General Context**

Language study is traditionally associated with spoken forms of language. Linguists have tended to concentrate all their efforts on the description of the world's spoken languages and have discounted anything which was not spoken (Hockett, 1961). However, this was not always the case. For long periods of the 18th and 19th centuries philosophers and linguists were pre-occupied with the question of where language had originated, and a major theory debated was that spoken language had developed from a gestural form. In effect, it was the manual form of communication which was the precursor of human spoken communication. We can find many descriptions of sign languages in these early writings (see Knowlson, 1965, for an account of this debate, or Tylor, 1874 as a direct source). Most writers did feel that the system that deaf people used was primarily gestural and had not fully evolved. Therefore, it was not of the same status as spoken language but had a simple form which could be a base for the understanding of the transmission of meaning.

Between the work of Tylor in the 19th century and the work of Stokoe in 1960 there was very little written on the subject of sign language. The main professionals concerned with deaf people, educators, were reluctant to use signs and at times and in many countries actually tried to stamp out sign language as a lower form of communication. This was particularly attributable to the leading lights of deaf education in the UK, the Ewings in Manchester University, (see for example, Ewing and Ewing, 1932, or 1964). Their influence on the training of teachers for the educational field ensured that sign language was not only overlooked as a topic of discussion but was actively banned from schools and pupils were frequently punished and ridiculed for its use. Quite clearly this placed deaf parents, with deaf children attending those schools, in a very curious situation.

Linked to this educational neglect was the general social indifference to the language. This stemmed at least in part, from the view that the problem of deafness was the use of sign language. Sign language stigmatised deaf people and was direct evidence of their failure to master proper language. This type of view was held commonly in the medical and rehabilitative professions. Workers in the field conveniently "forgot" the descriptions of the complexity of sign language which we can find in the 19th century literature. Deaf people were handicapped and therefore had to be cared for. To care for deaf people one had to tolerate their communication which was said to be concrete and limiting. Even in the 1970s and early 1980s when we were in the midst of our first national research work



on BSL, we found social workers referring to deaf people as "low verbals" because of their reliance on sign language.

The direct outcome of this situation has been the removal of deaf people from any position of where they could possibly influence any decision concerned with their lives. Deaf people could not hold any power because by definition, they were handicapped and blighted. They could not know what was best for themselves and so had to be looked after. This "oppression" was compounded by the lack of any economic power within the deaf community. Because of the educational and social situation, deaf people occupied the lower socio-economic positions in society and as a result, were even less likely to influence people. And so was created a depressing cycle of rejection of the principal area of deaf people's success, British Sign Language, as degrading; because of this linguistic poverty there was refusal of a share in power for self-determination and from this, a subsequent lowering of deaf people's expectations of themselves and thereby the resignation of their own future to the whims of the hearing society in the shape of the misunderstanding professionals.

These seem particularly harsh words, yet they are indicative of deaf people's views of their most recent past and do indicate the sort of atmosphere in which British Sign Language has survived since it was first discovered in 1644 by Bulwer. The re-discovery of British Sign Language by linguists and other professionals in the last ten years in the UK has not yet reached the majority of deaf people for the simple reason that there are no effective channels of communication between the research community and deaf people. Written reports do not have any impact on members of the deaf community and conference papers "translated in to BSL" by interpreters are not being presented in a form of sign which deaf people can relate to. In effect there is very little interpreting into BSL in Britain at the present time. This in turn is simply a reflection of the long years of neglect and it will be some time before the training programmes are in place to provide the right sort of training for our interpreters.

Bringing up a deaf or hearing child in a deaf family is still a difficult matter because of these great pressures on language choice. Deaf people are unlikely to behave like an established minority group and demonstrate the power of their language to the full. We can see that their attitudes have been coloured by their experiences over the last 100 years.

## **The Language**

British Sign Language (BSL) is the chosen language of the deaf community in Britain today. It is a predominantly visual-spatial language which reflects the experiences and needs of the users, Britain's deaf people. Although arising in the visual modality, it is by no means an iconic, image-based language. British Sign Language structure is described in recent texts (Deuchar, 1984, Kyle and Woll, 1985 and Brennan, 1987). It is not necessary to go into a great deal of detail in this chapter, on the language itself. However, it is worth picking out a few of the key factors.

BSL signs can be analysed in ways similar to spoken English words. This means that we can identify component parts of the signed units which can be used to describe the units themselves. Initially these were taken to be the simultaneously occurring elements of handshape, location, movement and orientation, but a recent proposal by Liddell (1984) for American Sign Language allows us to begin to identify sequential components in the sign. Such sequential components (which may be likened to syllable structure in words) provides a new framework for analysis which has yet to be extensively applied to the analysis of the "phonology" of BSL. However, it does seem that we can treat BSL signs in similar ways to words.

In terms of syntax we can see major differences from English in order of sign production and in the mechanisms available for the grammatical realisation of meaning. While English seems to follow a largely subject-verb-object ordering, BSL is more likely to be seen as object-subject-verb. More usually this is described in terms of topic-comment structure.

Most strikingly BSL can be described as an inflecting language which indicates its use of changes in the internal structure of the sign to create syntactic meaning. Most interesting is the richness of BSL verbs in their expression of case and role, aspect and manner. BSL verbs are rarely unmarked for these features. English uses adverbial phrases or adjectival phrases to express the same meaning. Only in tense marking does English seem to be more complex. This particular difference in realisation led to early comments on BSL which suggested a paucity of lexical items. We now understand this as having arisen in a reliance on glosses of recognisable signs (i.e. we simply ignored the modulations in the sign and assigned single meanings to what were completely different sign constructions). The study of the acquisition of a language in which the signs are such densely packed units poses many problems for the researcher and ones which we have not yet fully overcome.

Even noun structure in BSL is radically different from the supposed concrete visual representation hypothesis. As in English (in words like post, hold, drink, etc.) the distinction between nouns and verbs is often difficult to make unless one can examine the sentence structure. Nouns in BSL are also likely to inflect, unlike English nouns (whose only inflection is for number or possession) and these changes will tell us about size, shape, location, number, possession and manner. This complexity makes deaf children's approximations to sign in their "baby signs" very difficult to describe. The link between sign and gesture and the development from gesture to sign is harder to identify, since gesture may be subject to many of the same internal structure changes.

Much greater detail on the adult forms of BSL can be gleaned from the references mentioned above. There are two more points which it is worth mentioning here. These concern the differences in sign languages and the variations within a sign language. Sign languages have developed differently in every country of the world. American Sign Language is quite different to British Sign Language despite the somewhat similar hearing culture. A British deaf person would not understand a conversation between two native American signers and vice versa. Yet it is the case that if these individual deaf people were to meet, the language barrier would be much less than for hearing speakers of two

different languages. This might be explained as major differences in lexicon but similarities in grammar. What deaf people seem to do is to negotiate on the lexical items to be used in their conversation and then proceed to utilise these items embedded in the grammar as determined by their own language. The result is much more than the impoverished communication between two hearing monolinguals from different countries, yet it cannot be taken to mean sign languages are universal.

A final comment is to try to dispel the notion that BSL has so many regional varieties as to make it difficult to consider it a single system. It is true that BSL seems to have stronger dialect differences than English, yet with a little reflection we can point to the difficulties of communication between hearing people from say, Scotland and East London. Accent and dialect are quite different in the regions of the UK with some being easier to overcome than others. What makes it easy to believe that English is a single language is its written form. BSL has no written form to testify to its unitary status and as a result, seems more prone to the differences arising in school varieties of sign. Despite these differences in certain parts of the lexicon, deaf people have no difficulty in travelling around the UK and as transportation and communications become easier, the differences in dialect will decrease.

BSL is therefore a language unique to deaf users in the UK; it is a complex rule-bound system of language which differs markedly from English.

### **The Community of Deaf Users**

The size of the British deaf community is almost impossible to specify. There are no means whereby deaf people can be counted either through the education, health or social services departments of government. There are no central statistics and deaf organisations do not have records of the sort which allow a meaningful estimate to be made. The nearest one can get is by examining the statistics of education over the last 20 or 30 years and then extrapolating from these on the basis that the core membership of the deaf community comes from the students of deaf schools. However, the discussion in the first section of this chapter advises caution on even this estimate. A very conservative figure would be around 20,000 deaf people and a more likely figure is nearer 30,000, with a total population using BSL at some time and with affiliations to the deaf community, of 50,000.

Deafness itself is the key to membership but although it is a necessary condition it is not a sufficient condition. One has to choose to be a member and choose to associate with other deaf people. The degree to which one does this varies enormously, with some deaf people being in a deaf club almost every day while others who are functioning members of the community attend a deaf club rarely. The position of men and women may be quite different here with men more likely to be frequent attenders of the club and women more likely to be at home.

We have described the deaf community elsewhere (Kyle and Woll, 1985, Kyle, 1986, Kyle and Pullen, 1985) and it will not be repeated here. However, one key aspect which must be reiterated is the marriage pattern in the community and the results in terms of

children. Deaf people are very likely to marry other deaf people. In our study of the deaf community in one area we found the figure to be over 90% of those who married (Kyle and Allsop, 1982). However, the vast majority of these marriages produce hearing children. The figure is likely to be around 90%. Deaf children in deaf families are relatively rare. When one turns the statistic around and asks how many of the deaf children in school are born into deaf families the figure is around 6% for families which have both parents deaf and rises to 10% where we consider situations where only one parent is deaf. Most deaf children are born into families where there has been no prior contact with deafness and where the most common reaction will be shock and uncertainty for the future. Only in deaf families will the birth of a deaf child be greeted with pride and congratulations. If we consider that deaf children occur about one in every 2,000 births (the figure would be higher if one includes partially hearing children but this is based conservatively on those who are profoundly deaf) and deaf children are born into deaf families only once in 20 times, then the birth of a deaf child of deaf parents is likely to occur only once in every 40,000 births.

The opportunity to study deaf children in deaf families is a rare and exciting prospect.

### **The Educational Situation**

This is perhaps the most complex of all the debates about deafness and the area in which the fiercest disputes exist. For at least 200 years in the UK there have been disagreements about the way in which deaf children should be treated in school. Trends in education philosophy as it applies to all disabled groups have tended to influence the debate (in the shift from residential to day schools and then in the current debate over integration). Medical discoveries and provision (hearing tests and hearing aids) have altered the population about whom the discussion is taking place. What is clear is that we are still unable to solve the problems of deafness whether one sees these in terms of prevention, remediation, rehabilitation or care.

"In spite of almost 200 years of effort in the US and more than 300 in Europe, only limited success has been achieved in developing language in deaf children to the extent where it serves as an adequate vehicle for educational development".  
Quigley and Paul, 1984, p.21

This is not an uncommon comment and indicates the frustration of all attempts to improve the situation of deaf people through education. Quigley and Paul go on to examine the range of methods and language approaches available to deaf children as they apply to spoken language learning and to literacy. They conclude that no single method seems to be a panacea and give more weight to factors of intellectual capability, family background and consistency of approach. A similar finding comes from a large survey in Canada by Musselman, Lindsay and Wilson (1985). Wood et al's (1986) view of this is that the problems which arise do so in the context of distorted deaf-hearing interaction. The natural problem that the deaf child has in mastering the visual modality to attend to both acts and objects of communication, means it takes longer to master the pre-verbal foundations of spoken language. Their view is that the distortion in deaf-

hearing relations is manageable by better understanding of interaction itself and a focus on the teaching method itself (rather than the communication mode).

Conrad's (1979) investigation of deaf education in the UK is the most extensive to date. It reiterated the findings of large scale surveys in other countries that deaf children were not successful and that reliance on speech as the only vehicle for the transmission of educational information was very limiting for the great majority of profoundly deaf children. Binet in 1908 had come to the same conclusion in France so these sorts of insights were not particularly new. However, the provision of such extensive data offered for the first time some hard evidence on the degree of failure of deaf children. It brought to the fore a debate on the approaches to be adopted with a changing population of deaf children. It led to the study of BSL as language even though Conrad's view had been that sign and speech could co-exist in simultaneous communication. Quigley and Paul have reviewed this area fairly thoroughly and do not find clear evidence of significant gains in academic subject areas by the simple use of signs alongside speech. Linguists and others have been giving notice of this likelihood for some time (Marmor and Petitto, 1979). As a result the theory which is now becoming a central one for discussion is that of bilingualism in BSL and English.

The debate is still in its infancy despite the requests for it from deaf people for a very long time. Rodda and Grove (1987) conclude in their review of the area that it is the most likely progressive move for deaf children. Kyle and Woll (1985) have also discussed this and the implementation of bilingual policies is seen as related to the general acceptance of deaf people as a cultural and linguistic minority rather than as a disabled group. As long as deaf people are seen in the latter context they will find difficulty in establishing the claims for the recognition of the status of the language (Kyle and Pullen, 1988). Quigley and Paul (1984) in summarising their own view on the requirements and outcomes of a bilingual programme maintain:

"... research also indicates that there must be a well-established first language before English can be developed successfully as a second language, and teachers need to establish a bilingual environment where equal attention and status are accorded to both languages in order to have a successful programme. This seems to require that teachers be bilingual and with teachers of deaf children this seems to require that they be proficient in ASL and in manually coded and oral English." (p. 234)

Opponents of such views have suggested that the solution lies in integration and that is where the language will develop naturally. However, Gregory and Bishop (1989) in a recent interaction study in schools where deaf children were individually integrated believe that that this does not improve the situation for deaf children and provokes a very unnatural form of interaction which does not offer a useful language model.

We come back, inevitably in our view, to the situation of BSL and its role in a bilingual programme. Strong (1988) describes an experimental approach to the introduction of ASL into the classroom. In this, one separates out the role of a first language in providing information directly, from situation of having to learn a second language. In his case the first language is ASL and the second language is a manually coded form of

English-sign. This sort of approach is already being practised in Leeds in England but it has not received any widespread research. However, in a major statement on the subject, linguists from Gallaudet University in the USA have set out a blueprint for education in a bilingual framework. In this statement (Johnson, Liddell and Erting, 1989) harness the practices from a range of countries and present a system which they report as functioning in some European countries. Deck (1987) and Hansen (1987) are examples in France and Denmark respectively. In the comprehensive statement Johnson et al put the case simply: deaf children do not have access to the curriculum which hearing teachers have available because they do not share the language of their teachers and because the form in which the information is presented is not comprehensible at the level required for internalisation. They demonstrate the problems of trying to use two languages simultaneously as in Sim Com and then set down the basic tenets of a programme for bilingualism. These principles span the linguistic, educational and sociological considerations for an education which will engender respect for the individual and his culture. They believe such an approach is essential to the development of deaf people both individually and as a community.

The issue relevant to this report is that education has moved on and the discovery of features of sign language acquisition is directly relevant to the debate which is now in place. If we can understand how deaf children in deaf families acquire BSL we will have a base for the expectations of all deaf children in education. At the same time such an understanding will help set down the goals of language use for those hearing people who have an educational role with such native signers. The discussion of bilingualism is the most natural setting for the work to be reported here.

### **Implications**

Although the study to be reported starts well before the child enters school, the general context experienced by the parents of that child, their linguistic expectations and the role of the pre-school service will impinge on the child's development. The nature of the child's language encounters will be framed in this way and the extent of interaction will be culturally determined. Understanding the pre-linguistic behaviour of the child and his/her parents offers the insight which will be of value to the intervention which one would wish to make in the case of hearing parents of deaf children where the diagnosis of the deafness has come as a shock. The deaf community believe this information has to be utilised actively and this chapter is an attempt to present some of these active forces in the field of deaf children's development.

## Chapter 3: British Sign Language Acquisition

Since there are a great many research questions yet to be addressed about the structure of BSL in its adult form, it is not surprising to find that there is a great lack of data on the acquisition of BSL. Kyle and Woll (1985) have reviewed the information available at that time concerning the development of children's sign and it is unnecessary to repeat that here. However, it is interesting to consider our final points in that review as an entry point to the discussion here.

- a) The development of language can only occur where children are provided with input which they can perceive and where the child and the adult are joint partners in creating communication.
- b) The development of gesture and sign language are discontinuous in the same way that gesture and spoken language are.
- c) In learning a language, whether spoken or signed, children must be regarded as active partners in generating the rules of language. This can be seen in the type of errors that they produce.
- d) The development of articulatory skill and the development of a language are separate areas."

None of these points seem to tell us about BSL acquisition per se and it is fair to say that our concern at that time was to ensure the separation of comments about BSL and English and to emphasise what we already knew about language development. In reality, there was virtually no data to work on. There had been no studies of the acquisition of sign in the UK, other than very cursory examinations of handshape development (e.g. Carter, 1981). Our goal was to emphasise the interactive nature of sign language acquisition and to try to compile a register of acquisition studies of other sign languages. There were very few of these for the reasons mentioned at the end of the last chapter. The four simple points seemed appropriate at the time. It is worth re-considering them now as a way of examining the field of language acquisition.

The first and third points are apparent from the first two chapters of this study but there had been initial evidence that deaf children were able to produce language in the absence of adult model (Goldin-Meadow, 1979). She studied 6 deaf children in hearing families aged between 1;5 and 4;6 years and followed them over a varying period of time at one, two or three month intervals. The children were claimed to be unable to rely on oral communication (having moderate to profound hearing losses) and were not exposed to sign language input. By carefully examining their gesture production she was able to detect language-like features in their communication. She concluded that the deaf children's communication system did resemble that of hearing children, allowing for differences in lexical meaning criteria. She also concluded that the deaf children were "developing a language-like system without the benefit of a conventional linguistic model.

Mohay (1982) studied 2 children from the age of 18 months and 21 months respectively, in a similar context to the study by Goldin-Meadow. She concluded:

"The evidence from the present study suggests that deaf children of hearing parents, who are not presented with a manual language model, develop a communication system based in the inconsistently used gestures of the hearing community and a few arduously learned words. The children's gestural and spoken lexicons are small, and the structure of their systems is simple; however they are able to express all of the semantic functions expressed by hearing children at a similar stage of development" (p. 86)

Her apparently optimistic view had to be tempered by the fact that the children could only be compared to hearing children at the same stage which meant much younger children, i.e. deaf children were developmentally delayed.

This type of research has been questioned on the basis that the children are likely to have had some contact at pre-school gatherings, with other deaf children who will be developing signs more naturally and as a result, some models may be available. Volterra (1983) examined the Goldin-Meadow corpus and concluded that the children were not producing combinations of symbolic gestures, only combinations of deictic gestures or deictic gesture and single symbolic gesture. Her study indicated that only deaf children of deaf parents seemed to reach a stage of combining symbolic gestures. For natural language development to take place the children needed to have access to model of the target language.

Goldin-Meadow and Mylander (1984) subsequently replicated their own findings in a study of deaf children from the age of 1;4 to 3;1. They claimed that the children developed a gesture system comparable in semantic content and structure to that of the original study and to that of hearing children. Bates and Volterra (1984) in their response suggest that there are input analysis problems since the children are still likely to meet other deaf children who will provide them with gestural input; that there are problems in the analysis of output where a very rich interpretation was used. The difficulties in this revolve around the question of what is a gesture. We have addressed this in chapter 8 and it will be discussed further below. In the end, we are in an inconclusive position in relation to the level of sign competence developed by deaf children in a hearing environment. There does seem to be a developmental delay but also evidence that deaf children can construct for themselves a basic communication system in the absence of fully developed adult models.

### **Pre-language development and interaction**

#### *(a) Some comments on pre-speech*

One of the problems of the above studies is that their children are too old for us to be able to investigate adequately the origins of gesture and to be able to consider the development of interaction at its critical stage in the first year. As we argued in the first chapter it is in the first twelve months that children will lay down the rudiments of



language as a cooperative activity. This is the area which will be of most importance to deaf children when they are unable to access the spoken form.

One point which is worth mentioning in passing in relation to this early interaction is the supposed finding which is now difficult to trace (see Locke, 1983, for a review), that deaf children babble normally in the first year and then gradually this oral output declines. Stoel-Gammon and Otomo (1986) compared 11 hearing and deaf infants from 4 months of age. They found major differences which became apparent around the 6-8 months period. Deaf children produced fewer consonant-vowel sounds and their repertoire of sounds seemed to decrease over time. There were major qualitative and quantitative differences.

Oller and Eilers (1988) in a further study of nine deaf children note marked differences in the onset of canonical babbling. Although these deaf children had intensive attention to their amplification needs they were unlikely to exhibit similar patterns to that of hearing infants and the 3 children who eventually showed this form of babbling were developmentally delayed. Despite the early diagnosis of hearing loss and the provision of hearing aids deaf children are not exhibiting the potential for spoken language hoped for by writers such as Plath (1986). For deaf children the most realistic option may be to explore the visual medium for a language system.

*(b) Basic systems available to the child*

There are a number of ways of examining the capabilities that the child brings to the situation of interaction. Two aspects which have been considered are natural "hand gestures" and the establishment of affect. Trevarthen (1986a) calls this area "kinematics" - "the largely innate dimensions of neuro-motor dynamics in all kinds of expressive action including whole body posturing, hand gestures, face expressions and vocalisations. Since we have discounted vocalisations for deaf children we can focus more on the first three. Trevarthen's view is that communication exists to create mutual motivation and that it is the expression of emotion which causes the tuning of the shared motivation. Mothers and babies manipulate eye-contact, speech sound, facial expression and gesture to create and maintain an interaction which seems to be vitally important to development. The sophistication in imitation and control mechanisms for facial expression seems to be present almost from birth. Additionally, Trevarthen identifies the onset of manual activity as in pre-reaching, as occurring shortly after birth.

Trevarthen (1986b) describes in some detail these hand movements and gestures which he sees in terms of emerging brain function and the need for emotional links to the mother. Reaching and holding are basic elements of the child's activity in the first few months and the emergence of imitative gestures occurs around 7 months. He maintains that such manual activity parallels the maturation of vocal expression. While the major part of this work is with hearing children, it provides insight into the developing capacities of all children. When Trevarthen can relate these to the development of intersubjectivity then the significance for interpersonal interaction becomes obvious. Deaf children should have all of the same motor functions available and so we would expect this period to be of considerable importance. The presence of these similar reaching and manual

behaviours may be a factor in the mother's later "diagnosis" of the child's hearing loss. Deaf children are likely to bring a whole range of capabilities in this to the basic interaction with the mother. The major question is then how well those around can monitor and utilise this channel for development of interaction.

Needless to say there has been very little research on this early stage of development. Reilly, McIntire and Bellugi (1985) in a study of older deaf children suggest that there is a development of affect in the child which leads to a separation of facial expression as a syntactic element of sign language and facial expression as expression of emotion. Meadow-Orlans and her colleagues (mentioned below) do have data on this early development but have as yet only reported on the mother's affect. What is apparent is that we need a great deal more study of this area and of the extent to which it is exploited by the deaf and hearing families. We suspect that deaf mothers exploit this early development rather differently to hearing mothers and this is an area which will be considered in our data.

### *(c) Gesture*

Beyond this early period there has been a great deal of interest in the gesture systems which seem to develop. Lock (1980) is perhaps one of the most interesting accounts of how gesture seems to lead into language and then to accompany it. Accredolo and Goodwyn (1988), in an extensive study of hearing infants gesturing, suggest a predominance of object gestures. Caselli (1983), in an important study, indicates the necessity of examining hearing infants' gestures to establish a meaningful base for understanding the development of deaf children's signs. The issue is important for the simple reason that sign language seems to share the same modality and it is likely to be more difficult to separate out the two forms, whereas it is relatively easy to do so for hearing children.

Volterra (1987) argues for a redefinition of early sign. On the basis that the reported early signs of deaf children are simply gestures comparable to those of hearing children, she sets out a method for determining gesture/sign difference. This is not widely used and this makes the reviewing of a range of research on early sign development rather difficult. Volterra's work does lead to the proposition that sign and speech are parallel systems with babbling/vocalisations comparable to early gesturing. We can then chart a parallel development in speech and sign. This would lead to the expectation of signs in their fully lexicalised form sometime around the middle of the second year.

Another major source of information on gesture development has been the work of Petitto. According to her findings on the emergence of sign language in deaf children, the gestural productions of deaf and hearing children are not different:

"With the exception of sign babbling, the deaf children produced gestures that were nearly identical in form and function to those of hearing children, and they were not more advanced despite the fact that sign languages are constructed in such a way as to lend themselves to this unique type of iconic (non-arbitrary, pictorial), gestural elaboration." (Petitto, 1988, p.210)

American Sign Language at least, can be seen to be distinct from gestures and we can expect ASL and spoken English to be developing at the same rate and with similar milestones at least in the early stages. This view which has become well established (see Volterra, 1987) contradicts an earlier set of findings (e.g. Bonvillian et al, 1983) that ASL seemed to be acquired earlier than spoken English.

#### *(d) Interaction*

On the basis of the literature on early spoken language development, on proto-conversations and intersubjectivity, we can expect deaf mothers to have problems in engaging in extended interaction with their deaf children, for the simple reason that most of the interaction relies on the fact that the mother and child can jointly engage in a task and the mother can keep up a stream of comments which will both inform and control the child's behaviour. For a deaf mother, or a mother with a deaf child, at least in theory, interaction during joint reference will be difficult.

Gregory (1985) supports this view in her examination of mothers of deaf children. Calling on data of children around 15 months in age, she found that mothers found it difficult to initiate and sustain the normal interpersonal games of that age, were less likely to respond to the vocalisations of the child and were less in tune with the child's actions and vocalisations (they tended to talk at the same time). In addition, establishment of eye-contact was difficult and was noticeably less likely than with hearing-hearing pairs. Gregory and Barlow (1986) confirm these findings in their study of joint attention. Swisher (1986) reports similar findings with attention in hearing mother-deaf child pairs where sign was being used by the mother. It seems relatively clear from the frequent comments we have from teachers and parents that the major task for the adult is to obtain and maintain the child's eye contact. Day and Gutfreund (1987) found mothers of deaf children were much more likely to be directive when the child looked away and also tended to be less responsive when the child shifted the focus of attention. Nienhuys and Tikotin (1983) confirm this in a pilot study with hearing mothers of a deaf and of a hearing child. The mother of the deaf child seemed to have been forced to adopt a strategy of monitoring and attracting the child's attention, rather than being able to talk over the child's focus of attention. All of these studies have concerned children over 15 months, which is a long way beyond the time when Trevarthen has suggested that attention and eye-contact will have become established in the majority of children.

However, there has been some work on deaf mothers with deaf children and which has also looked at the early months. Meadow-Orlans et al (1986) report a study of deaf-deaf, deaf-hearing and hearing-hearing mother-infant pairs at around 3 months of age. Using the Monadic Phase Analysis of Tronick et al (1980) they have examined in fine detail how mothers and babies interact in a lab setting. They found that deaf mothers are much more likely than hearing mothers to display positive facial affect during interaction periods. They speculate that facial affect may take the place of positive vocal intonations. Given the expectations on this period, it would seem that deaf mothers are simply exploiting the visual modality to maintain the joint "motivation" which Trevarthen talks about. A further report by Erting et al (1987) describes the equivalent of Baby Talk in sign and suggests ways in which it is used by deaf mothers. This is the first indication

that deaf mothers may be able to function effectively despite the apparent loss of the auditory modality.

Harris et al (1987) emphasise the differences in mothers' strategies in gaining and utilising attention. In a study of two deaf mothers they show how one mother seems to incorporate signing into the activity, by displacing signs, while the other mother seemed to try to bring the activities into her own signing space so that she could control it better. In all of these studies it can be seen that we are in a very early stage of investigation. Few children are diagnosed early enough for the necessary research work to be done. In our study we have been fortunate enough to be able to record children from a few months old and so there are answers to some of the questions posed.

#### *(e) Sign Language Acquisition*

There has been very little work on the acquisition of BSL despite the upsurge in interest in the language in its adult form. This is a little surprising since the national system of screening for deafness does identify the great majority of deaf children by the age of a year or so. When the mother or father is also deaf the likelihood of an early diagnosis is increased. It should be possible to track down the deaf children early in their development. Unfortunately the pre-occupation at that age has nearly always been with auditory enhancement and any research in the first four years of life has taken language samples only in speech. We have virtually no way of telling how well developed the language of deaf children is when it is acquired early and in the form of BSL. Carter (1981), in an unpublished study of a two year old deaf child in a deaf family, identifies a series of handshape which were similar to those reported by McIntire in 1977 for ASL, but there has been very little other work.

Papers by Lillo-Martin (1988) and Bellugi and Klima (1985) indicate that ASL development shows many of the exciting characteristics of development of all languages. Lillo-Martin describes the process of "new word" formation in ASL by young children. Bellugi and Klima show how deaf children acquire deictic pronouns, noun-verb distinctions and the spatial indexing which is necessary for sign language use. Each of these studies indicates the complexity of the process and yet how similar the tasks are for deaf and hearing children when the languages are accessible.

According to Hoffmeister (1982) and Petitto and Charron (1987) deaf children are passing through the same stages in acquiring sign as hearing children do in learning their spoken language. The evidence for this broad claim is of course rather weak but increasingly studies are highlighting the relation of sign language to language rather than to the visual modality per se. Typical of this is the finding that iconicity plays a relatively minor role in the acquisition process (Orlansky and Bonvillian, 1984, and Pizzuto, 1985).

There is as yet no detailed longitudinal study in the field such as have been carried out for hearing children (e.g. Wells, 1981) and as a result we are not yet able to decide on the comparability of sign and speech development. It seems likely that a major distinction will have to be made between deaf children learning BSL from their deaf parents and those learning from their school friends because their parents/teachers are

not using sign effectively. Wickham (unpublished) in a study of children's sign production in Total Communication settings found relatively late development of important sign features such as placement, person indexing and verb modulation. It is not clear what we must expect in BSL acquisition but it will be an important study both for the linguistic analysis it offers and for the educational and family implications.

Research on sign language acquisition in the UK is at a very early stage. There has been no educational or social priority for its study because the dominating force has been the preoccupation with English. As strict oral regimes decline in schools for the deaf, greater interest is manifest in sign. To a large extent this has meant replacement, not by sign language but by some form of English-based sign as teachers are unwilling to give up their link to their own language. For teachers to be using BSL in class would be for them to use a second language and there is as yet neither the understanding nor the necessary training which would lead people into the position of embracing a bilingual framework. It seems that the process towards such an approach has to be made slowly and predictably without learning from the experiences of other countries. As long as the education of deaf children rests in the hands of those who have no contact with deaf adults, their community and culture, who have no skills in the language used so easily by deaf children then there is unlikely to be sufficient base for research on the acquisition of BSL. Parents' advice comes from such professionals and they will be unaware of the potential for development of their children until a clearer understanding exists among the educators. All of this makes the study of sign language acquisition even more pressing since it will both inform and create change. It is an unusual situation for a research study to begin its work; the results should begin the process of change.

## Chapter 4: Methodology

Aim: The study was set up to collect data on the acquisition of British Sign Language by deaf and hearing children in deaf families. As a result of an initial study funded by ESRC (COO232220) the project became an analysis of the development from gesture to sign and speech of these children. This indicates the bilingual nature of the development in these families. The study had as its primary aims:

- a) the collection of video data of deaf (DCDP) and hearing children (HCDP) from deaf families and of hearing children from hearing families (HCHP) in a laboratory setting during the first 3 years of life;
- b) the collection of video data of DCDP and HCDP in the home setting during the first 3 years;
- c) the analysis of patterns of interaction throughout this period;
- d) the examination of progress from pre-lexical to lexical use of BSL signs and English speech in DCDP and HCDP;
- e) to consider the implications for the acquisition of language beyond this period and to indicate the important features of BSL acquisition.

### Method:

The children: The children were known personally to the investigators because of the direct links with the deaf community in Avon which we have built up over the last seven years. We had no difficulties in obtaining co-operation after visits to the homes by one or other of the principal investigators. Their participation was aided by the fact that the mothers also began to arrange coffee mornings with each other, at fortnightly intervals. Joining the project was linked to joining the coffee group. Details of the children and recordings are shown in Table 4.1.

Table 4.1: Children studied

Child	Parents	D.O.B.	Age at first recording	No of recordings	
				Home	Laboratory
SG deaf	deaf	31.12.82	9 months	19	8
SI deaf	deaf	30. 9.82	9 months	19	8
HR deaf	deaf	11. 2.85	1 month	10	11
DN deaf	deaf	30. 1.84	5 months	14	7
JB deaf	deaf	6. 6.86	9 months	1	16
AI deaf in one ear	deaf	17. 7.84	3 months	13	9
HLL hearing	deaf	3. 7.84	4 months	11	11
HL hearing	deaf	10. 5.84	11 months	6	5
CS hearing	deaf	21. 6.84	2 months	14	10
GJ hearing?	deaf	13.10.84	2 months	11	12
WK hearing?	F-hearingM-deaf	16. 2.85	1 month	9	9

CD		26.12.86	1 month	17	19
RW		24.12.86	1 month	11	17
PE hearing	hearing	3. 2.84	12 months		7
PC hearing	hearing	2. 8.84	7 months		9
HC hearing	hearing	12.12.84	2 months		10
BO hearing	hearing	28.11.84	2 months		10
BSK hearing	hearing	31. 1.84	2 months		9
HJ hearing	hearing	3. 2.85	2 months		9
WG hearing	hearing	21. 2.85	1 month		4
SJ hearing	hearing	5. 2.85	3 months		8

Over the period of the project there were conflicting test results on the hearing status of some of the children. Two of the children who were initially deaf turned out to be hearing, and one of the hearing children has turned out to be deaf. We have therefore 5 DCDP and 8HCDP in the study. We have been able to obtain the audiograms for 4 of these 5 children(the fifth family maintains that they have not been given the information and have been refused access to it. Since it is not a location in the county we have been unable so far to make any progress on this. The child behaves like a profoundly deaf child.) Average hearing losses in the better ear for the children are 104dB, 53dB, 91dB and 97dB.

The Parents: Among the 11 deaf families, one father was hearing, while all the others were deaf. Four mothers had themselves come from deaf families, while this was true for two of the fathers. One couple divorced during the project. Mothers ranged in age from 19 years to 32 years at the start of the project, while fathers varied between 27 and 37 years. We have collected further detail on the families during our interviews which are reported in chapter 10. These confirm socio-economic groupings in the skilled manual class as the median. It should be said that we have to be careful in relating these details, not to identify the parents or their children. Because we are dealing with a minority group, given a few misplaced facts it would be relatively easy to identify the children and their families. This we have promised not to do and therefore this section is necessarily more sketchy than it would otherwise be.

Among the hearing families, three fathers were teachers though the profile of the others was more closely matched to the deaf families.

Design: Recordings were made with all the mothers and babies by the deaf researcher (in the vast majority of cases) or by the principal investigators (in the case of emergency). Both principal investigators are fluent BSL users. Recordings were made from the first few months until 3 years of age. The recordings were structured as follows:

- a) Type of observation: Video recordings of spontaneous interaction at home and recordings of staged interaction in the University. The former includes more child-initiated sequences while the latter allows manipulation of parent-initiated behaviours.

- b) Frequency and duration: Recordings were made twice each month, once at home and once in the University. (Hearing children only come to the lab.) From 13 months, recordings occur in the laboratory and at home in alternate months.
- c) At home: Initially two cameras were used but this was discontinued in favour of a single hand-held camera as the children become more mobile. Mother-determined interaction was recorded during the first five minutes then random five-minute sections of mother-child morning/afternoon activities were recorded over a period of 2 hours. (Table 4.3) In the latter stages of the project this was reduced to four periods in a one-hour session.

More detail on the recording procedure for each type of session is provided in Tables 4.3 - 4.6.

Table 4.2: Laboratory session for mother and infant (12 months old)

<p>Infant in baby chair raised to mother's eye level. The mother sits comfortably.</p> <ol style="list-style-type: none"> <li>1. Free interaction (3 minutes) - mother merely asked to get the child's attention and to interact in language.</li> <li>2. Staged exit-entry sequence (3 times) - mother leaves to hide behind a screen and re-enters and continues interaction.</li> <li>3. Simple joint referencing controlled by mother. Mother uses 2 toys (one silent - a duck, and a rattle) to obtain child's attention and to elicit child's tracking and wanting behaviour.</li> <li>4. Simple mutual eye-gaze to objects (stars) - mother attempts to get the child to follow her pointing to stars placed 8 feet away. Four separate stars used.</li> <li>5. Repetition of activities 1, 3 and 4 with deaf researcher - this allows examination of behaviour to strangers and comparison of interaction with a single constant person.</li> <li>6. Simple object play - toys introduced on the tray of the baby chair allow child to manipulate and interact with toy and mother.</li> <li>7. Free play and interaction on the floor - mother and child in close proximity with similar toys.</li> </ol>
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Table 4.3: Toys used

1 month to 10 months	11 - 12 months	13 months
Duck and Rattle	Same	Same
On tray: green ring, dumb-bell rattle, soft rabbit	Tray: same	Tray: rabbit and post box
Floor: rattle and duck	Floor: rattle, duck	Floor: same and soft blocks

Table 4.4: Schedule for home recordings (infant < 12 months)

- |   |
|---|
| <ol style="list-style-type: none"> <li>1. Mother-child interaction - mother invited to demonstrate developments in the child since last recording.</li> </ol> |
|---|



2. Mother-child interaction with our toys - mother uses toys brought by the researcher.
3. Six randomly pre-arranged recordings over a 2-hour period. That is, working on a 24 x 5 minute grid 6 random periods are chosen and recording occurs at that time. This recording is done by the deaf researcher with a hand-held camera. Fixed camera recordings proved wasteful since mother and child move around the house. In addition, with a hand-held camera it is possible to disguise the periods when recording is taking place so that the mother is not aware of which periods are being recorded.

Table 4.5: Toys used:

Months	1-9	10-12	14	16	18	20	22	24-30	32+
Rattles	*	*							
Stacking cups		*							
Soft Picture Books			*	*	*				
Story Book			*	*	*	*	*		
Other Books eg Where's Spot?							*	*	*

Table 4.6: Lab filming:

Children 15 - 19 months	
1)	Mother and child sit at table Plays with soft blocks (warm-up activity) (3 mins)
2)	Mother and child play with jigsaw Encourage mother to talk to child (5 mins)
3)	Tea-party (5 mins)
4)	Deaf researcher joins tea-party, mother leaves and hides behind screen (3 mins)
5)	Mother returns. Put tea-set away
Children 2 years onward:	
1)	Mother and child sit at table, plays with doll (2 mins)
2)	Communication task Box with table, small car and big car
3)	Play people. Encourage mother to make up a story about the play people. (5 mins)
4)	Tea-time - make jam sandwich (2 mins) make peanut-butter roll (2 mins)
5)	Tea-party. Deaf researcher joins and mother leaves (5-6 mins)

In addition to these activities, mothers were asked questions to complete the language, social and motor development "scales". These were taken as a guide to maturation only and are a composite of a number of scales (see Appendix 1). These were completed on a rotation so that during the first year data was available on each every 6 weeks and in the second year every 3 months.

Mothers were also asked to list early signs by the children and these were compounded to provide a detailed list of signed items as they emerged. Wherever appropriate, mothers also gave details on spoken language development.

### Analysis:

As a result of this procedure a vast amount of data has been collected. This is well in excess of the numbers of children contracted in the project proposal. This can be explained very simply as the need to collect data on such a rare population as and when it occurs and when the opportunity arose we responded. It is clear that this will now take a long time to analyse fully and this project becomes only an initial entry into the database.

A detailed coding system was developed during the first stage of the study but this has never been fully applied to all the data. We discovered in the early stages that the data was much more complex than expected and given the short time available(24 months) to maintain a filming record of 19 families on a two-week and monthly basis and to encode, it was felt more appropriate to analyse in detail only segments of the data. In this, we chose an approach which might be more illuminative in the short-term and which could indicate more clearly the key direction for longer term work which would incorporate a global encoding of all data collected. The range of results reported in the next 6 chapters have, we believe, amply repaid this judgement. It still remains to probe more deeply and to encode more generally. This will be the basis of further work.

## **Chapter 5: What mothers say and how infants look**

Studying mother-child interaction is rather like watching the clouds pass. You can see the formation in the distance, watch it change and develop and finally, disappear over the horizon. There is no point one can see where it is not a cloud yet it takes so many shapes and so many factors tug at it as it moves. We know in theory what constitutes the cloud but any single cloud seems to be of its own design. The complexity is difficult to manage. There is one last thing about clouds and mother-child interaction, they are both beautiful to watch and highly addictive.

For a researcher looking for language origins there are immense problems. It is now acceptable to look for answers in the first year of life and it is now advisable to consider how the mother structures the interactional experience for the child. Yet, even within an emerging literature of pre-language, there are very few clues to the full complexity of interaction. By and large, research has concentrated on precursors to speech (Lindblom and Zetterstrom, 1986) and so has often lacked the visual-motor dimension. While this may not have been a problem for researchers in the past, when there are deaf people involved it becomes a major limitation. We have gone back to try to study this more basic question of how the visual, motor and auditory media are used to form the early interaction. Inevitably, we do not have a good framework for this since for hearing researchers it has always been the auditory channel which is most salient and spoken language which is most recognisable. Our task is to establish a way of understanding pre-language (signed/spoken) when mothers and infants interact and to determine the features of mothers chosen form of behaviour which stimulate the infant's attention. When we remember that we are studying deaf mothers and deaf infants then we need to stand back from much of the preconceptions on what is appropriate behaviour in interaction with an infant.

Before tackling this in a little more detail we need to mention studies by Nienhuys and Tikotin (1983) and by Meadow-Orlans et al (1985). Both use a form of analysis known as Monadic Phase Analysis (Tronick, Als and Brazelton, 1980) In essence this focusses on mother and infant separately and in a micro-analysis categorises their states every one-third of a second. In Nienhuys and Tikotin's study, a deaf infant and a hearing infant were examined from the age of 33 weeks until 43 weeks. Some differences in the children emerged but it is perhaps the mothers' differences which are more significant for us. The hearing mother of the deaf infant spent more time monitoring her child and less time playing as if to emphasise her need to control an attentional channel.

Meadow-Orlans et al (1985) found that deaf mothers used more positive facial affect than did hearing mothers at 3 months of age. They explain this as being a function of sign language use and certainly it accords with a notion that the language currency is visual. What it implies is that deaf mothers may adopt a different approach to early interaction to that of hearing mothers. If one accepts the cultural identity of deaf people this now seems an appropriate consideration as we discussed in chapter 1.

Our question then begins to be focussed: what do deaf mothers do when they engage in early interaction with their infants. Is there evidence of difference which is explained in cultural features or in the requirements of the visual modality.

### The Children and the Recordings

For our purposes in this section we will present some analysis of mother-child interaction in 6 families selected from those who have completed all the necessary laboratory recordings in the first year.

#### *The children*

All children in this analysis are first-born to parents aged between 19 and 29 years. In socioeconomic terms the hearing parents were slightly more favoured with two fathers being teachers, the other father was deceased. In the deaf families all were in skilled manual jobs; one father was hearing. In the analysis here we will use data from recordings at 12 weeks (3 months) 26 weeks (6 months) and 40 weeks (9 months) [Table 5.1].

Table 5.1: Age of infants at recordings

Hearing	[OB	12w 6d	27w 1d	41w 1d
mothers	[JH	12w 2d	25w 5d	29w 6d
	[CH	12w 2d	26w 0d	39w 1d
Deaf	[KW	12w 5d	26w 3d	41w 2d
	[JG	11w 5d	25w 5d	39w 5d
	[HR	13w 3d	27w 1d	40w 2d

#### *Recordings*

Each laboratory session is structured in a similar way with a number of phases of interaction. Here we have used approximately 3 minutes of interaction where mother and infant are engaged with two toys (a duck and a rattle). This occurs around 3 minutes into the session. The mother is instructed to interest the child in the toys but not to give the toys to the child.

#### *Method of Analysis*

The system of analysis used is a simple pragmatic one with a coding of mother's utterances based on that used by Penman et al., (1983). These are shown in Table 5.2.

Table 5.2: Categories for pragmatic analysis of mother's utterances

### INFORMATION SALIENT: Propositional content

	Category	Examples
Direct	Infant's actions	You play with the chair, have a look at the duck.
	Infant's feelings	You laugh now
Interpret	Infant's actions	You're a vandal
	Infant's feelings	You like that noise; you're in a temper
Question	Infant's actions	Do you want the duck?
	Infant's feelings	Why are you crying?
	Mother's behaviour	What have I got?
	Environment	Can you see the lights? What's this?
Report	Infant's state or action	You've got one at home
	Mother's behaviour	I'm not going to let you have it
	Environment	This is a nice place
	Statements characterised by rhythm	All gone; down he goes
Naming	Single word (identifying object)	Duck, rattle
	Two words	Red duck
	Listing	Red, green, yellow, blue.

### AFFECT SALIENT

Encourage	Yes, fancy doing that
Discourage	No, you can't
No sense	Quack, quack
No sense - sign	Hand wave
Greets	Vocatives, and attention; Fred!
Mimic	Where sound or sign is copied
Recite	Nursery rhyme
Laugh	-
Apology	Sorry

These categories have been adapted from Penman et al (1983). We have added a general category of naming which can be considered a subset of report. We have found this addition necessary. There are also problems about certain categories when applied to sign e.g. no-sense where the meaning is related directly to context and is not propositional in speech but does include signs e.g. 'quack' - accompanied by sign. Their analysis of mothers at 3 months and 6 months imply an increase in information salient utterances by the mother as the child gets older as a way for the mother to verbalise her thoughts and interpretations of the child. They see an increase, particularly in questions and in reports, and a decline in affect oriented utterances. However, these differences are still quite small.

## Results

We have also used a simple classification system to describe the direction of the child's gaze (again drawn from Penman et al.) This is simply coded as Communicative (C), when the infant gaze is on the mother, Praxic (P) when the child is focussed on an object, Other (O) when the child is looking at other items not between mother and infant, and Avert (A) (a category derived from Monadic Phase analysis) when it seems the child is deliberately choosing to shut out mother's stimulation by averting gaze from the offered attentional goal.

Perhaps the most striking finding when we looked at our data from all our deaf mothers is that few use BSL throughout the interaction. Whether at home or in the laboratory during the first year of life, deaf mothers use considerably more English-based sign than BSL. This is true of all those with infants who are hearing and even of those 2 who thought their children were deaf but subsequently were discovered to have mild hearing losses. The same could be said also for two of the four deaf mothers who have deaf infants. It makes it quite clear that our study should be about bilingualism. We have known most of these mothers for over 6 years and all our recordings at home and in the laboratory are done by a deaf BSL user well known to the families. The lack of BSL is not because of an attempt to please hearing researchers.

When we analysed the data at first our subjective impressions were that deaf mothers used much less language in interaction. It is true that compared to our own hearing group utterance rate is less but it is well within the figures quoted by Penman et al (1983) for a sample of 19 mothers in a similar task. They found a range of between 51-248 at 3 months and 45-318 at 6 months for a 15 minutes period of interaction. Our mean figures are in Table 5.3 and the ranges were: deaf mothers (98-307, 174-248, 212-286) and hearing mothers (169-338, 225-444, 243-359) for 3, 6 and 9 months respectively when pro-rated for 15 minutes.

Table 5.3: Mean rate of all utterance by deaf (n=3) and hearing(n=3) mothers (per minute)

	3 months	6 months	9 months
Hearing	17.69	22.80	23.92

Deaf	12.56	13.60	15.98
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The data confirms a lower utterance rate by deaf mothers but it is well within (and beyond in some cases) the rates provided by Penman et al.

Perhaps our main concern is sign use and here there is a rather interesting finding of an increase in sign use over time. Rate for utterances containing signing or consisting of sign only (a small percentage) is on average much less than for spoken utterances (3.53, 6.17 and 8.33 respectively for 3, 6, and 9 months). However when these are converted to percentages of the actual utterances, we find a clear trend towards increasing the sign content of utterances over time (Table 5.4).

Table 5.4: Content of sign in utterances as a proportion of total utterances (%) (Deaf mothers)

	3 months	6 months	9 months
HR	6.19	58.15	63.28
GJ	6.28	18.93	51.14
WK	46.14	53.04	37.83
Mean	19.63	43.37	50.75

In effect, there is a change occurring from the period of 3 months onwards with 2 of the mothers progressing from almost no sign use at 3 months to over half the utterances involving sign by nine months. The findings for KW which seem at odds with the others seem to be due to the very low overall sign utterance total produced at 9 months.

As well as the difference in utterance rate between our deaf and hearing mothers, we find also a difference in complexity as indicated by mean length of utterance measures and by measures of repetition. In taking MMLU (mother's mean length of utterance) we have ignored vocatives and no-sense utterances. Table 5.5 shows the average difference.

Table 5.5: Differences in MMLU

	3 months	6 months	9 months
Hearing	3.43	3.50	3.17
Deaf	2.86	2.54	1.91
Deaf (signed)	-	2.19	1.62

Interestingly the signed utterances are not greatly dissimilar. In considering repetitions in mother's utterances we categorised utterances which were repeated verbatim in

whole or in part within two utterances of the original e.g. "it's got no squeak, no..oo, got no squeak," would count as one repetition. The most predominant repetitions of deaf mothers at any age were of one word/sign in length (Table 5.6).

Table 5.6: Repetitions in utterance as percentage of total

	One Word			Phrase			Sentence		
Months	3	6	9	3	6	9	3	6	9
Hearing	1.3	3.0	1.0	13.3	3.3	19.7	18.3	9.0	3.7
Deaf	17.0	11.3	10.7	0	0	1.7	1.0	2.7	0

On these measures deaf mothers are using less 'complex' and shorter utterances on the whole. However, we must be very careful here since the deaf mothers engage in a whole range of movement behaviours which subjectively look markedly different to hearing mothers. We do not yet have a system for classification of such behaviours.

Using the coding system mentioned earlier we looked at the broad classification, information-salient versus affect-salient. We find a gradual decline in information-salient utterances over time (as suggested by Snow (1977) but different from Penman et al (1983)). Table 5.7 has the detail.

Table 5.7: Percentage of information-salient utterances

	3 months	6 months	9 months
Hearing	78.85	66.83	65.26
Deaf	62.06	67.43	53.74
(Signed)	-	80.40	67.89

The decline towards 9 months seems to be due to the increased play activities of the mother at this time and the prevalence of utterances related to 'far-near' games (where objects are brought from a distance right up to the child's face) - deaf mothers engage in this sort of teasing game rather less than do hearing mothers and are perhaps more likely to move across the visual plane than towards the infant.

However, the more significant aspects are when we consider the individual categories. Four specific aspects are examined in the following tables: question, report, naming and no-sense.

Table 5.8: "Question" as a percentage of utterances (%)

	3 months	6 months	9 months
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Hearing	23.5	27.1	10.9
Deaf	5.8	8.1	6.5
(Signed)	-	8.5	8.7

Penman et al (1983) suggest that questions increase over time (they used 3 months and 6 months) while Snow (1977) suggested that questions decrease from 3 to 12 months. Both results could be true in our data given the fact of increases at 6 months then a decline.

Table 5.9: "Report" as percentage of utterance

	3 months	6 months	9 months
Hearing	35.9	29.2	43.2
Deaf	12.5	23.8	11.1
(Signed)	-	42.8	16.9

In Table 5.9 we find deaf mothers "report" less yet they name considerably more often (Table 5.10).

Table 5.10: Naming as a percentage of utterance

	3 months	6 months	9 months
Hearing	2.9	3.2	4.3
Deaf	38.6	24.8	34.7
(Signed)	-	24.1	45.4

Of these namings the most common is single word or sign naming whereby objects are designated. The naming category is in one sense a subset of report being a comment on an item in the environment. However it does seem to be significant characteristic of deaf mothers' communication.

Table 5.11 shows the same figures for the category no-sense where there is greater use of words and sign which are repetitive and specific to 'play' in the situation e.g. "quack, quack....". As mentioned before, this type of utterance is problematic since it may be of a different function in speech as compared to sign. In speech it represents 'non-speech' sound of a duck but in sign it shows actual motor movement of a duck and could be classed as information about ducks.

Table 5.11: No-sense as a percentage of utterances

	3 months	6 months	9 months
Hearing	2.0	7.6	19.5
Deaf	8.1	22.2	31.4
(Signed)	-	11.0	21.7

When we examined infant gaze we found the average results as in Table 5.12.

Table 5.12: Distribution of gaze in communicative and praxic modes and praxic modes (averaged over 3 infants) (% of time spent in each mode)

	Communicative			Praxic		
	3mo	6mo	9mo	3mo	6mo	9mo
Deaf parents	13.7	5.8	19.0	78.8	87.1	61.9
Hearing parents	19.1	13.4	23.2	49.2	64.5	68.9

The corresponding results found by Penman et al. are:

3 months - 30% Communicative, 27% Praxic
6 months - 12% Communicative, 61% Praxic

Our results similarly show an increase in praxic mode from 3 months to 6 months but a likely decline from 6 months to 9 months. This seems to relate to a re-emergence of interest in communication. Also there is a marked difference between deaf mothers and hearing mothers since infants in deaf families seem to be more likely to be engaged with objects and less likely throughout to be engaged with people. Since both groups of infants are hearing and one does not expect them to be greatly different genetically, the effect seems to be arising in the variable of the mother's behaviour.

The inter-rater reliability in this analysis is not as high as one might have hoped, but the general pattern of these results is not affected by this. The "Avert" and "Other" categories are more used by hearing families and more in evidence at 3 months than later, though there is some degree of reversal of this in deaf families. Further analysis would be required on these categories to offer a useful explanation.

Even these limited results are complex and it is obvious that the numbers of mother-infant pairs make generalisation rather difficult. We know too that interaction in this first year is particularly prone to variation and is clearly affected by physical factors which may be unknown to the researchers at the time of filming, e.g. indisposition in the infant. However the findings still remain to be explained and it is to be hoped that we can make some useful attempt on this here. The major results are that deaf and

hearing mothers seem to interact in many similar ways e.g. in terms of overall information content in their utterances yet the nature of the interaction is somewhat different. We can summarise the results as:

1. Deaf mothers do not simply use their native language in interaction. In fact they are initially more likely to use spoken language in the earliest interaction to the exclusion of sign.
2. The rate and extent of deaf mothers' utterances seems to be less than that of hearing mothers and also seems to be less complex linguistically. This is true whether we take only signed utterances or all utterances. It is advisable here to say "seems" since we have as yet no effective way of coding what it is the mothers are doing when they move. Can we class the extensive movement of the deaf mother in the child's line of sight as some form of visual babbling or attention getting? This sort of movement is considerably more than that of hearing mothers at least by our brief visual inspection.
3. While the overall proportion of information-salient utterances is similar throughout the 3 recording periods in the first year, there is considerable variation in the type of utterance. Deaf mothers question less, and report less but name considerably more and use no-sense utterances more.

Infants in deaf families are less involved in communicative mode and more likely to be object-oriented (praxic) than those from hearing families. The general pattern of increase in praxic mode found by Penman et al. (1983) is confirmed but not to the same degree and with a slight decline in object-orienting by 9 months.

To understand these differences we can simply invoke a cultural rule that deaf people will be different. We would therefore not expect deaf mothers to look the same as hearing mothers and since their communication relies on a different modality we would anticipate even more extensive differences. There seems little doubt that cultural differences allied to the weakness of coding systems which are derived from hearing interaction and are therefore more reflective of the auditory modality, are a major part of the difference. In particular we could invoke the insights of mothers who tell us that they although they know their children are hearing they find it difficult to bring themselves to "talk" to them when the child is not actually in eye-contact. If this were true it would explain the shorter mothers' MLU since less could be conveyed in the relatively short period in which the child is fully engaged with the mother.

There is however another explanation for the data. Trevarthen and Marwick (1986) set out a summary of the changes in the infant in the first year of life. They suggest that developmental changes in the child's interest in the mother's face mean that the child is most actively engaged up to 3 months of age and then there is rapid decline towards 5 and 6 months and a brief levelling before a further decline towards 9 months. However, it is not quite as clear-cut as Trevarthen and Marwick's findings. The same trend can also be seen in the data of Penman et al (1983). Additionally, Trevarthen points out that

visual acuity increases throughout the first few months reaching a peak at about 6 months.

The significance of both of these factors would be that if a deaf mother requires the child to look at her then she will find difficulties from 3 months onwards as the child becomes actively engaged with objects. Initially this will be a visual involvement and then latterly it includes reaching which also increases in the early months peaking at about 8 and a half months. The deaf mother then has to contend with a child who is not "attending" and who is psychologically limiting the nature and extent of her utterances. The mother would then have to engage in more visually salient and object-related activities. In support of this we find frequent examples of signing with an object such as using a rattle in the sign "NOISE". Even more common is the parallel use of the object and the sign where for example the mother signs DUCK with her right hand while displaying the duck in her left hand.

There are therefore fewer entries in the "interpret" category since the mother cannot mirror the child's actions if the child is not watching but has to break the child's gaze overtly by moving into the line of sight. The "game" seems to become "how to get the child to look at me" rather than how to get the child engaged in long interaction. By 9 months the hearing mother seems more adept at creating mutual eye-gaze and engages in turn-taking routines through simultaneous far-near games. These are very frequent in the hearing mothers and almost completely missing in the deaf mothers at the same age. They involve taking the object and bringing it often in stages towards the child's face; what may be important is that it is always accompanied by sound, often spoken phrases, repeated rhythmically. For example, the mother brings the duck towards the child's face saying "..gonna bite your nose...gonna bite your nose ..gonna bite your nose...dddd...gotcha". As the duck approaches the child's face the gaze switches from the object to the mother's face and child grins or laughs at the mother so that at the point of contact the child is fully engaged with the mother's face. Characteristically the mother pauses and the child responds with smiles or giggles and then the mother repeats. The same games for the deaf mother seem to exploit the visual space allowing the child's eyes to track the object with less opportunity for linguistic intervention by the mother.

The most likely explanations for the difference between deaf and hearing mothers is therefore a combination of different cultural expectations, a weaker linguistic image of sign language because of the experiences of all deaf people of this age in the UK and the actual changes in the child during this developmental period. Such information does not imply that deaf mothers are disadvantaged by these circumstances though the artificial situation of the lab and the nature of the coding system could push researchers to this view. It should also be added that we do not find marked differences from this in our home recordings - there does seem to be less linguistic communication on the part of the mother.

We are left with something of a problem in relation to the infants' behaviour, since it can be construed both as an outcome of the mothers' difference and as a cause. If these 3 infants from deaf families are simply more object-oriented than the mothers' interaction

will be of a specific type. However, given that all the infants are hearing this possibility seems unlikely and we begin to believe that the mothers are engendering a different style of interaction even at this early age.

However, this information does lead us to speculate on the situation which would occur if the rich linguistic input of the hearing mother were paired with a deaf infant. Very little of the intonation which characterises this interaction would be meaningful and the developmental changes in the child would imply that the mother's attempt to "talk over" the child's engagement with objects would have very little impact. Where it may lead is to the limited joint behaviour of hearing mother and deaf child which has been described by Gregory (1987).

While we see little adult BSL in the mother's utterances we see an increasing amount of sign use as the mothers seek to exploit the child's developing visual acuity and the signs act to create and utilise attention which will be so important in the second year. We are still at a very elementary stage of our analysis and there are a great many questions unanswered. However, we feel we should not try to avoid saying that deaf mothers use different strategies in an attempt to argue the case for their competence. Deaf mothers using sign do not have to follow the rules of hearing mothers in order to establish language competence in their children. The sooner we have an understanding of these strategies the sooner we can adequately counsel hearing parents of deaf children in strategies which will maximise their children's developmental potential.

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## CHAPTER 6: ATTENTION AND EYE-GAZE

The pattern discovered in Chapter 5 where the deaf mother uses language rather differently may be indicative of a general difference in interaction. The requirements of the visual modality are quite different to the auditory and the nature of the information exchange, attention and eye contact can be predicted to be different. This chapter focusses on these possibilities and attempts to describe the pattern of interaction in a task requiring joint reference.

We had in our original proposals considered this might prove difficult for deaf mothers since for the child or mother to direct gaze at a separate object the eye contact must be broken and thereby the exchange of information stopped (if either child or mother do not hear their auditory information overlaid or the referred-to-object is not received). In practice we found this was a task which deaf mothers seemed to enjoy more than did the hearing and were able to persist at it with greater enthusiasm. The age at which the eye gaze of the child could be manipulated by the mother was broadly similar for deaf and hearing mothers. Yet our impression was of qualitative difference. This part of the study investigated this aspect.

The rationale for the study derives from the general claim (by e.g. Trevarthen and Marwick, 1986) that during the first year the child passes through a number of stages beginning with an attraction to the human face, and then an involvement with objects and finally, late in the first year, a re-awakening of interest in the face but now in an important period of secondary intersubjectivity.

### Method

The analysis reported in this chapter concerns 6 hearing children from deaf families and 5 hearing children from hearing families. We will take a subset of their lab data at 6 months, 9 months and 12 months. The section examined is a task where the mother is asked to direct the child's eye gaze at each of 4 stars in the room placed to form a square around the baby's high chair. All are out of reach and require either the mother or the baby to turn away from mutual eye contact. The families are similar in socio-economic profile according to head of household. Age and status are shown in Table 6.

Table 6.1: Age and Status (Average Weeks)

	6 months	9 months	12 months
Deaf Mother/Hearing Child (n = 4)			
Deaf Mother/Partially Hearing (n = 1)	27.3	39.8	52.3
Deaf Mother/Deaf (n = 1)			
Hearing Mother/Hearing Child (n = 5)	25.6	39.0	52.8

At the time of recording all the mothers believed their children to be hearing. Subsequent to these recordings one child was found to be partially hearing in one ear and one to be severely deaf.

In trying to understand the way in which mothers create such joint reference, we have reduced the task to a very simple lab exercise of asking the mothers to direct their infants eye gaze at the stars. These stars are at the same height as the baby who is in a high chair and about the level of the mother's pointing (she is on a lower chair in the child's line of sight). We emphasise to the mothers that there will be differences in the child's looking from session to session and there will be differences according to age, to avoid over-anxiousness. The task requires the mother to attract the child's attention, establish eye-contact and then she talks, turns and points to the star. She will monitor the child's looking and often hold her 'point' to the star.

We analysed the mother's strategies in the task with a very simple coding scheme. The mother can speak or sign (and this is transcribed). She can point or return to rest; She can look at the star or at the child. The child can look at the mother, or at the star or simply look away. An example is shown in Figure 6.1. By considering the relationship of these simple activities we can uncover some of the similarities and differences among deaf and hearing mothers. In any session mothers may make a different number of attempts; we have analysed only the first 4 attempts in each session to provide comparable data. In this paper we are not interested in how successful the mothers are, only in how they attempt the task and how the 2 groups compare over this time period.

## The Results

There are clear differences of strategy. Deaf mothers are much more likely to refer to the star before pointing, are more likely to use a fixed pattern of eye-gaze and pointing and are much less likely to use speech or sign when pointing. Figure 1 shows the usual pattern for deaf mothers and a comparable pattern for hearing mothers. The typical pattern is for the deaf mother to engage the child by waving or playing peek-a-boo, then with eye-contact she will point and shift her gaze simultaneously towards the star. She then shifts back to the child whose gaze probably passes hers on its way to searching for the object of attention. The mother shifts back and forth until she terminates the sequence by lowering her arm. The one mother who does not follow this pattern has major problems with the child's attention.

Figure 6.1. Typical patterns for attention in deaf and hearing mothers

- a) Deaf Mother: ..... Time
- Speech ..... Star! .....
- Sign ..... STAR! ..... STAR
- Point ..... P ..... R .....
- Eyegaze ..... C ..... S ..C..S..C .....



Child

Gaze ..... M ..... S ..... M

b) Hearing Mother:

Speech: What's this here? Look yes you can see it

Sign/gesture .....

Point ..... P .....R

Gaze ..... C ..... S ... C .....

(P = points, R = arm returns to rest, C = gaze on child

S = gaze on star, M = gaze on mother, A = gaze away)

Hearing mothers do a range of other things which we can best describe as a series of simple results.

Table 6.2 shows that deaf mothers almost never start without eye-contact, while hearing mothers clearly have the option (since the child can be listening but not watching). The slight variation for deaf mothers at 9 months is due primarily to the one mother with problems. Table 6.3 confirms this pattern where deaf mothers seem to insist on eye-contact before they will proceed. These 2 tables do not give an exhaustive description since there is also a possibility that the child leads in the interaction and the mother follows.

Table 6.2: Average No. of 'Starts' when baby is not looking at mother (max = 4)

Mother	6 months	9 months	12 months
Hearing (n=5)	1.6	1.4	2.0
Deaf (n=6)	0.7	1.0	0.2

Table 6.3: Average No. of 'Starts' when baby is looking at mother or her hand (max=4)

Mother	6 months	9 months	12 months
Hearing (n=5)	0.0	0.8	0.0
Deaf (n=6)	3.0	3.2	4.0

The problem at 9 months in Table 6.2 occurs because one deaf mother seemed to develop a problem of attention getting.

This one deaf mother who had major problems in obtaining and keeping the child's attention is having the problems predicted by Trevarthen and Marwick's (1986) claims. The child is no longer interested in the face and the mother attempts to "work" without this attention. Her sequence does not function effectively either .... she points first then returns to try to sign then points again. In between she may say in a very deaf voice, "over there". The child looks confused and bored. She refuses to look and seems unwilling to initiate any interaction. However, the pattern is only maintained at 6 months and 9 months. By 12 months this mother is behaving in the same way as the other deaf mothers.

When we asked deaf people about these findings and about their strategies, they nodded wisely and said, "Of course. Deaf people have to wait for eye-contact and they are patient in getting it. Hearing people talk too much and for deaf child it is impossible to follow." However, deaf mothers use the same strategy with their hearing children as they would if the child were deaf. They say that they cannot bring themselves to sign or talk when the child is not looking.

## **Discussion**

Although we are not proposing a detailed statistical analysis here, the clear difference in pattern is striking. A major feature is the consistency of the deaf mothers in interacting in this way. They always obtain eye contact and then refer it to the object before indicating it. This is rather like the "marking mothers" described by Lock (1988). The child's eye contact is treated almost as a request would be by hearing children. For the mother this is the stimulus to respond in a particular way. The child therefore determines the pace of the interaction. Only when the mother exploits the visual space in an intrusive way (by waving, or touching, or banging) does the child have to follow the mother).

One of the key problems for hearing mothers with deaf children is this very different form of interaction. The idea that requests from the child come through eye contact is rather alien. The likelihood is that many of the child's early initiations are missed by the hearing mother. The effects of this could be quite severe and may be the factor which produces the "non-attending deaf child by the age of twelve months.

The results contribute a good deal to the emerging picture of this early interaction. They also suggest the need to consider the parent counselling required to ensure this aspect of early development is identified and utilised.

## **Chapter 7: Interaction and Motherese in the Second Year**

In terms of actual research on the emergence of language in the early period, there are surprisingly few studies of early interaction. Bonvillian, Orlansky and Novack (1983) used video recordings and diaries of children from 7 months to 1 year 11 months. Maestas y Moores (1980) studied children up to the age of 16 months with the emphasis on "motherese". She reported deliberate shaping of signs by mothers, particularly the provision of kinesthetic information to the child through signing on the child's body, and by the mother placing the child on her lap while signing to other adults. More recently, Erting (1987) has described the precise modifications in the form of signs found in mother-child signing when compared with signing between adults.

As Volterra (1986) has noted, because of the history of sign language, emphasis among researchers has often been to prove that the communication used amongst deaf people was a true language. Because of this approach, much of the research paralleled spoken language research, with emphasis on such topics as handshape acquisition (McIntire, 1977), the semantic relations first expressed by the child (Schlesinger and Meadow, 1972) "baby" signs (Carter, 1981) as we pointed out in chapter 3.

A large number of studies have presented findings which claim that signs develop earlier than spoken language. Bonvillian, Orlansky and Novack (1983), McIntire (1977) and Schlesinger and Meadow (1972) all indicate significantly accelerated growth of sign language. Bonvillian, Orlansky and Novack (1983) report the appearance of the first sign at a mean age of 8.5 months, and achievement of the 10 sign milestone at a mean age of 13.2 months (compared to Nelson's (1973) mean of 15.1 months for English-speaking children). They identify two sign combinations at a mean of 17 months (range 12.5 to 22 months) in comparison to a range of 18-21 months in speaking children (Slobin, 1971). These differences are significant ( $t(27) = 2.67, p < .02$ ). Schlesinger and Meadow's findings (1977) are similar; they claim that two sign combinations occur at a mean of 14 months, and that signing children reach the 100 sign vocabulary milestone at a time when speaking children only have 50-word vocabularies.

Volterra (1985) and Caselli (1987) criticize these findings, claiming that this sort of comparison is not valid without looking at the development of gesture in hearing-speaking children as well. Volterra concludes that early deictic gestures occur in both deaf-signing and hearing-speaking children. These are then followed by the development of signs or referential gestures and words. Caselli (1987) claims that two-sign or two-word combinations occur at around the same age of 18 months in both signing and speaking children.

The major problem with claims about relatively early acquisition of sign language as compared with the acquisition of spoken language lies with the interpretation of data. Two factors affect this; the degree of interpretation of a child's behaviour as linguistic, and the surface discontinuity between gesture and spoken language development in hearing children in contrast to the surface continuity in the development of gesture and sign language.

In identifying child behaviour as linguistic, parents are likely to interpret babbling as words if there is a degree of phonetic resemblance. However, they are unlikely to assign meanings to gestures and ascribe the same status to these as early language. Deaf parents, however, seek meaning in gesture rather than in vocalization. Just as hearing parents with a hearing child give a rich interpretation of utterances which relate phonetically to real words, so too do deaf parents of a deaf child interpret gestures and other body movements which resemble signs as actual early language.

The apparent continuity in form of gesture and signs would provide two plausible explanations for earlier development of signs as compared to words: firstly, "articulation with the hand which is temporally slower than the one with the tongue could offer greater perspicuity to the infant learner of gestures than the one who learns through words" (Volterra, 1986); and as discussed above, children using signs do not need to switch modality while making the transition from pre-linguistic to linguistic interaction.

Pizzuto (1985) and Petitto (1985) have presented convincing evidence for the discontinuity hypothesis. The presence of visual identity between the pointing gesture and some pronouns in sign language does not facilitate the mastering of the pronominal system. In other words, while there is a widely reported phenomenon of pronoun reversal in children acquiring a spoken language, we would expect children acquiring a sign language to have no problems with the acquisition of "ME" and "YOU", since the gestures and the signs appear to be the same. Petitto (1985) has studied a deaf child learning American Sign Language who went through the same errors as hearing children make: using the term "YOU" when she meant "ME".

### **Motherese and sign language acquisition**

Sign language acquisition research can also shed light on topics connected with interaction in the first year of life. Schaffer (1977) and Snow and Ferguson (1977) provide examples of the large number of studies of the earliest "conversations" between mothers and their babies. By presenting continual repetition in reoccurring contexts, mothers offer ideal learning situations from which infants can extract linguistic rules for later language use. This model presents mothers and infants as participants in pre-linguistic dialogue. Snow (1977) has observed changes in the mother's part in this interaction, moving from talk about infants' feelings and states in the first six months to talking about events and actions in the external world. Sylvester-Bradley and Trevarthen (1978) and others maintain that such changes in the mother's speech are indirect responses to developmental changes in the child. As the child's focus of attention moves from the mother's face to objects in the environment in the 5 - 7 month period, a change in the mother's interaction style occurs as a response to the child's increasing interest in real world objects. As the child progressively relates with greater interest to objects than to faces, it might be predicted that deafness will cause increasing difficulty with establishing and maintaining communication.

Research on language development in deaf infants with hearing parents who communicate only in spoken language has identified problems in the development of attention and turn-taking, primarily because the complementary nature of normal early

interaction is disturbed. These children cannot hear the language of their hearing mothers and thus the "fine tuning" predicted by studies of hearing children and their mothers does not take place. The result is a failure to develop normal interaction. Gregory and Barlow (in press) and Swisher and Christie (in press) have noted the frequency of overlapping speech and the absence of turn-taking patterns in interactions between deaf children and hearing parents. As our focus in this study is on families where the mothers are deaf, we are concerned with how the use of sign language by the mothers constrains the type of fine tuning occurring in interaction. Understanding the approach of a deaf mother not only provides information about how sign language functions, but also about how deaf infants with hearing parents might be expected to behave if hearing parents used interaction strategies suitable for a deaf child.

Gregory and Barlow (in press) found that only 7% of acts by mothers were unrelated to a child's activity where both participants in the interaction were deaf, but 41% of deaf children's acts were followed by unrelated acts where the mothers were hearing. Gregory and Barlow suggest that the problem for deaf children of hearing parents is not the limited linguistic input they receive, but the difficulty in establishing pre-linguistic skills.

It is also important when comparing the behaviour of deaf and hearing mothers to include features of deaf culture as a possible cause for any differences found. Researchers have recognized that patterns of mothers' behaviour in interaction are related to culture.

"How caregivers and children speak and act towards one another is linked to cultural patterns that extend and have consequences beyond the specific interactions observed." (Schieffelin and Ochs, 1983, p.116)

Baker and Cokeley (1980) see centrality of membership of the deaf community as determined by a number of overlapping criteria. These include audiological, linguistic, social and political. Freeman, Carbin and Boese (1981), in their statements on the importance of deaf culture, as distinct from community, include knowledge, belief, art, morals and law, all mediated by language. The deaf community are a non-literate society (both in sign language and in English), without access to many features of modern western culture, such as telephones and radio. There are also distinct aspects of deaf society which differ from those of the surrounding hearing community. These include, for example, a different function for personal names, compared with their use in the hearing community. Deaf people normally receive unique personal names, often based on some physical feature or deriving from sign play with their English names ("SQUINT-EYE", or "TREES" for a person named "Woods"). Neither these names nor hearing community names have any vocative function. Other differences between the deaf and hearing communities can be found in many aspects of social structure. It should also be noted that if measurable hearing loss is a determining criterion for membership of the community, then deaf parents may not view hearing children as potential members of their community, and this may have implications, for example, for language choice.

While only a subset of the data analysis from the first year has been presented in the last two chapters, the findings from these analyses, as they are relevant to our second year work, can be summarized as follows:

1. Deaf mothers with hearing children did not simply use sign language in interaction. They initially used spoken language in their earliest interactions with the child to the exclusion of British Sign Language.
2. The rate of utterance production and utterance length was less than that of hearing mothers and also was less complex linguistically.
3. While the overall proportion of information-salient utterances was similar throughout the three recording periods, there was considerable variation in the type of utterance. Deaf mothers questioned less, but used naming and unstructured utterances more.

## **Second Year Sample**

The home recordings of five children have been included in this part of the analysis: two hearing children and three deaf children, all with deaf mothers. During the home sessions, recordings were made at random intervals over a two-hour period, preceded by a five-minute play session using a selection of toys and books brought by the researcher. A total of 30 minutes was recorded on each occasion. For this part of the analysis, only the five minute play session has been included from recordings made at ages 1:0; 1:3; 1:6 and 1:9.

## **Voiced and Voiceless Signing**

All the deaf mothers used signing with their children in this age group; the most noticeable difference between those with hearing children and those with deaf children was in the use of voice to accompany sign. Only one of the three mothers with deaf children articulated English words while signing; both mothers of hearing children articulated English words while signing. Reference will be made to this in the discussion below in relation to cultural explanations for deaf mothers' behaviour.

## **Attention-getting**

One major difference between the use of sign language and spoken language is that interaction in sign language requires visual attention to the speaker. As Harris, Clibbens, Tibbits and Chasin (1987) have pointed out:

"The problem for the deaf child learning to sign is this: both the adult language and the social context to which that language relates have to be visually attended and, therefore, the young deaf child has to divide attention between the language presented to him/her and the relevant context. (p. 229)

Harris and colleagues analyzed the proportion of signed utterances presented in the child's visual field according to the mother's attentional strategy. For the two children

studied, only 7% and 4% of mothers' utterances respectively were preceded by tapping the child to gain his or her attention at the ages of 7 and 10 months. They explain that although tapping occurred more frequently, it was not a successful strategy in that it did not result in the child turning towards the mother much of the time. The most successful strategy adopted by the mothers was to sign within the child's existing focus of attention, either by moving the sign to a different location, moving herself into the child's line of sight, or, rarely, by adjusting the child's position.

Tapping as an attention getting device occurs much less rarely with hearing mothers of hearing children; the most usual strategy for gaining a hearing child's attention is the use of vocatives, most often the child's name. If maternal behaviour is tuned to the child's potential, then we would expect deaf mothers with hearing children to call them to attract their attention; if maternal behaviour is drawn from the mother's potential, then we would expect tapping to be used.

All attention-getting devices used by the mother were coded for each five-minute period of interaction. The figures are present in Table 7.1.

Table 7.1. Frequency of attention-getting devices used by deaf mothers with deaf or hearing children in 5-minute play session.

Child age	1	1.3	1.6	1.9
Tapping				
Deaf child	7	11	14	6
Hearing child	1	9	9	7
Vocative				
Deaf	0	0	0	0
Hearing	0	1	3	0

As can be seen from the table, tapping was the most frequent attention-getting device used by the mother, whether or not the child could hear, with a very small number of vocatives used only by the mothers of the hearing children. It may be concluded, therefore, that attention-getting was not tuned to the child's ability to hear. The increase in use of tapping and vocatives between 1:0 and 1:6 and decrease from 1:6 to 1:9 may be related to developmental changes in the child. Before 1 year the mother most often moved herself or pointed into the child's line of vision; after 1 year 6 months the child mastered a strategy of automatically looking up at the mother as part of turn-taking behaviour.

Apart from tapping and waving, there was frequent use of pointing by the mother. This was coded separately from attention-getting, as unlike tapping, pointing is integrated into sign utterances. Pointing most often took the form of touching with the index finger the object to which the child was attending; the mother reached round the child and pointed; the child turned round to face the mother and she continued with her utterance. Following Swisher and Christie (1986) we counted the number of points used by the mothers in the five-minute samples and the percentage of "effective" points.

These were defined as points followed by the child's gaze to the mother's following utterance.

The number of points and percentage of "effective" points produced by our sample of deaf mothers (37 points per 100 utterances, of which 89% were effective) was comparable to Swisher and Christie's hard-of-hearing mother (41 points per 100 utterances; 93% effective). In contrast, the hearing mothers of deaf children in their study produced only 18 points per 100 utterances of which only 43% were effective.

## **Naming**

Gregory and Barlow (1986) compared looking at picture books by deaf mother and child pairs, hearing mother and child pairs, and hearing mothers with deaf children. They found that deaf pairs attended much more to the book than either of the other two pairs. This was at least partly because hearing mothers with deaf children often elaborated on the contents of the book, talking about a past event, or another object in the room, while deaf mothers never did so. They hypothesised that there were potential difficulties for deaf children in dividing their attention between the task and the other person when using visual communication, and that limiting the context to the immediate task reduced this problem.

It is not surprising, therefore, that much of the five minute play sessions, particularly before 1 year 9 months was taken up by naming games, where the mother adopted a tutorial role, teaching the child signs for objects. This was largely accomplished by the mother pointing to an object or a picture of an object, and either providing a model sign for the child or by signing "WHAT'S THAT". Unlike the sign "WHAT" in interaction between adults, which is produced by holding the hand with index finger extended and pointing upwards, palm away from the body, "WHAT'S-THAT" is articulated by holding the flat hand, palm up, in front of the body.

Model utterances, usually consisting of a single sign, varied in significant ways from the articulation of the same sign in other contexts. Models were characterised by extensive reduplication of a sign's movement, often at slow speed, and movement across a large area. Several examples will make this clear. The sign "AIRPLANE" is normally made in the following way: the thumb and little fingers are extended from the fist, palm down, and the hand moves at shoulder height in a short arc across the body. In providing a model of "AIRPLANE", the sign had the same handshape, but often moved to the extreme left of signing space, was then turned and brought back to the right side of the body with swooping movements and then returned to the left again, sometimes finishing on the child's body. Movements were reduplicated as many as 10 times, compared with a single repeated movement in other contexts.

The mothers often provided a model of a sign for the child, and then acknowledged either the child's attempt to articulate the sign or some other indication by the child that he or she had understood the utterance, such as the child pointing at the appropriate picture. The acknowledgements showed little reduplication or other alteration from the



usual form. In Table 7.2 below, a selection of signs is presented with the number of reduplicated movements indicated when occurring as models or acknowledgements.

Table 7.2. Mean number of reduplicated movements in mothers' naming models and naming acknowledgements in free play sessions

Sign	Model	Acknowledgement
Airplane	3	1
Boat	2	1
Car	7	2
Cat	6	3
House	2	1
Motorbike	6	2
Rabbit	3	2
Train	5	2
Tree	3	2
Grouped Means	4	2

Mothers thus provided models of signs for children that were visually and temporally expanded, only when they wanted the child to attend to and copy the form. This type of modelling sometimes also included actual manipulation by the mother of the child's arm and hand to articulate the sign.

### **Length of Utterance**

The subjective impression of hearing people looking at these recordings is that the amount of signing produced by the mothers is much less than the amount of speech that one would expect hearing mothers to produce. Gregory and Barlow (1986) found that the deaf mothers in their study spent less than half as much time signing to their children as hearing mothers spent speaking. We did not have a comparable control group for the children in our study but our results were similar to Gregory and Barlow. Mean length of utterance produced by deaf mothers was also shorter than for hearing mothers with children of the same age, but as explained above, this is likely to be due to the much greater amount of reduplication and extended time taken to articulate model signs.

### **Discussion**

To understand the differences between deaf and hearing mothers it is necessary to look both at cultural and situational demands. Using coding systems based on spoken language interaction causes problems in analysis. For example, British Sign Language is a language which is inflected for aspect and manner. Counting signs to determine mean length of utterance will underestimate the complexity of signed utterances. As has been noted in relation to naming models, signs can be altered in manner of articulation in ways which are unavailable to spoken languages and so cannot be directly compared.

Deaf mothers of hearing children tell us that although they know their children can hear they find it difficult to communicate if the child is not looking at them. This may explain

the lack of vocatives in the mothers' communication and account for the observation that whether or not a child can hear, a deaf mother's interactions differ from a hearing mother's. Unlike spoken language interaction, where it may be assumed that the verbal message can at least be heard without the child directing his attention to it, in sign language communication the child must attend visually to the message as it begins, or it is missed. Sign communication can only take place when both parties look at one another. As the child's interest in the world around increases, the mother's control of infant's eye gaze becomes more difficult. For a hearing mother and child, the problem is less, because she can talk during object play. The deaf mother is faced with the task of gaining attention to give information, and she needs to engage her child's attention before beginning to sign. We might predict that the deaf mother would engage in more overt attempts to break eye gaze to obtain the child's attention, and a tendency to avoid signing while attracting the child's attention. Deaf mothers in the early recordings achieve this training of attention by constantly placing themselves in a location to interrupt the child's line of gaze. Deaf mothers appear to view early interaction as a means of focussing the child's gaze and providing training in attention games. While this results in an apparently small amount of interaction, and repetitive utterances when compared with hearing mothers, the result is the successful development of language at a comparable rate and level to that of hearing children with hearing parents.

## **CHAPTER 8: Lexical Acquisition: An Introduction**

Our earlier work on this data has concentrated on the first year of life and considered the problems that in theory must exist for a deaf mother in creating joint reference for a child. We have discovered major differences in lab recordings between deaf and hearing mothers in the language they use with their children (Kyle et al, 1987). Deaf mothers mix speech and sign even when the child is deaf but there are also patterns which seem to correspond to the developmental phase of the child. As children move from a primitive proto-conversation stage of interest in the face to an object-orientated interest, deaf mothers begin to use more sign. They begin to adopt more specific attentional strategies. They talk and sign less than hearing mothers talk. They name objects more, and repeat more. They question less.

When we examine specific attentional tasks (Kyle et al, 1988) we find they adopt a different pattern to direct their child's attention. They refer to objects before pointing, and do not talk or sign while the point is happening. They work with the child's eye-gaze and will not engage in the game until the child looks at them. In comparison, hearing mothers do not refer to objects before pointing (they use other devices like ... "what's that? ... then answer the question themselves as the child's eye gaze rests on the object). In this way their language is overlaid on the joint reference. Deaf mothers' comments precede or follow the child's visual attention. When we have looked at the deaf children in hearing families in the second year of life they seem to lack the discipline of attention which is developed in the child in the deaf family in this first year. Now our question is "What happens in the second year?"

### **Data Analysis**

There are two sources of data for us to draw on: the reports of the mothers on the child's sign development and the filmed sequences of interaction. We will concentrate on the period from the emergence of the reported first sign and look at our data during the second year of life. Our questions are how early and in what way do signs develop in children in deaf families and how do these relate to the gestures reported among hearing children (e.g. Volterra 1983, Caselli 1987, and Acredolo and Goodwyn 1988).

### **Mothers' Reports**

We have found it difficult to get our mothers to use written forms but we have collected data each month of home filming on the observed "new language" that the child has developed. The interpretation of what a sign is has been left to the mothers to encourage only the reporting of sign/gestures which they believe to be communicative. One can argue that a more rigorous diary study will limit the reporting to more manageable data; however we believe that the mothers were less constrained in this way and it has been possible for us to subsequently classify the responses.

As might be expected, there is considerable variation in the children in both type and age of reported signs. Our reports are taken from 3 deaf children in deaf families (1 boy and 2 girls) and from 5 hearing children in deaf families (2 boys and 3 girls).

Excluding reports of "BYE-BYE" which frequently came early the first reported signs were at 11.0 months for deaf children and at 11.4 months for hearing children. The boys were later at an average of 12.3 months while the girls were reported at 10.6 months. Bonvillian et al (1983) point out the difficulty of dealing with the first word and suggests first 10 words/signs as a more useful measure. Table 8.1 compares his data and ours with the figures provided by Nelson (1973). Our deaf children are closer to Nelson mainly due to the effect of 1 boy who was extremely slow to reach 10 signs (i.e. 21 months).

Table 8.1: Average Age to Reach 10 Words/Signs

Nelson (1973)	Words (hearing)	15.1 months
Bonvillian et al (1983)	Signs (hearing)	13.2 months
Reported data	Signs (deaf children)	15.3 months
	Signs (hearing children)	13.0 months

It is questionable whether this is a useful way to consider deaf and hearing children and Volterra (1986) has argued strongly that one needs to consider gestural development in hearing children to make meaningful comparisons. A recent study by Acredolo and Goodwyn (1988) is very helpful in this respect. Their longitudinal diary study of the development of symbolic gesturing allows this more direct comparison.

Acredolo and Goodwyn (1988) have excluded 5 conventional gesture categories of:

- pointing to comment
- and to request
- "yes"
- and "no" as replies
- and waving for "bye-bye"

The focus on 5 categories:

- object signs
- requests
- attributes
- replies
- and events.

We have applied these to the mothers' reports in a preliminary analysis. As one might expect many of the reported signs by our deaf mothers are very similar to the gestures described by the hearing mothers. This increases the problem of discriminating between sign and gesture. Acredolo and Goodwyn (1988) report the first object gesture at 15.59 months while our deaf mothers report them rather earlier (11.33 months for deaf children and 11.4 months for hearing children - though these are often signs like "Mama" and "Dada"). Attribute gestures (such as "hot" and "all gone" seem to occur around the

same time in both reports: 15.27 months in Acredolo and Goodwyn (1988) and 15 months for deaf children and 14.2 months for hearing children.

Examining the first 25 signs reported by our deaf mothers we find that object signs are generally the most used category ranging between 64% and 88% of the signs reported. This is the result which Nelson and Lucariello (1985) claim to be common in hearing children's development of spoken language. Interestingly, Gregory and Mogford's (1981) study of older children indicates that deaf children are likely to have fewer of these object names in their spoken vocabulary than hearing children. What our reports seem to imply is that this result is confined to the spoken vocabulary as our children seem to be using a similar amount of object names in sign as those reported in hearing children. A general observation on the development of these initial signs is that they seem to arise in the context of direct tuition by deaf mothers and certainly our results on deaf mothers' different interaction style seems to support this (Kyle et al, 1987a,b). In Acredolo and Goodwyn's study only 32% of action gestures were seen to arise within interactive routines. How this might apply to deaf families can be considered in relation to the data collected in our study.

### Home Filming

The recordings collected during the visits to the deaf families now constitute a large corpus of diverse data. Only a subset will be used in this chapter for discussion purposes. The sequences chosen were where mother and child are engaged in interaction for at least 1.5 minutes. This means that the recordings involve cooperative activity between mother and child and this mostly focusses on book reading and play with blocks. As part of a general examination of speech and sign development and the situations in which it arises we have developed a coding system which takes into account not only the child's utterance but also the preceding activity by the mother. In the first instance we will consider the distribution of mothers' modelling (M), soliciting of the child's utterances (SOL) and of the spontaneous productions of the child (SP).

Both the solicit and model can occur in a number of ways: signed, spoken, gestured, with deictic gesture or with some combination. What we need to know is the extent to which the mother seems to set up the child's learning by offering a direct model for the child. When we take the definition of model to mean the immediately preceding utterance then we find that modelling is not the most common feature of interaction. Mothers typically attempt to elicit the signs from their children and then reinforce with an appropriate version of the sign (Table 8.2).

Table 8.2: Deaf Mothers' Approach to Interaction (% occurrence in samples from 5 children aged 1:0 to 1:11)

Hearing Children		Deaf Children	
SOL	SP	SOL	SP
25	52	41	44

38	31	53	38
		43	51
-----			
33	42	46	44

Dealing with all the interactions in this part of the data we find that the greater part of interactions are spontaneous on the child's part and that a minority (less than 25%) occur in the context of modelling. Acredolo and Goodwyn (1988) claim only 32% of their symbolic object gestures were acquired within an interactive routine which implies a great deal more active tuition on the part of the deaf mothers.

Deaf mothers also seem to use the solicit category slightly more in the second part of the second year with it occurring in 27% and 36% (hearing and deaf children respectively) up to 1:5 and then 36% and 52% between 1:6 and 1:11. The most typical example of this type of interaction is of the form, "What's this?" or literally "POINT ... WHAT?"

### Looking at Lexical Acquisition

However, the main point of concern for studies like this and the one which makes almost all lexical analysis problematic, is the difficulty of distinguishing between sign and symbolic gesture. The various definitions available are unsatisfactory.

For a signal to be a sign or word, Volterra and Caselli (1985) suggest: "a) the signal has been used (at least once) to refer to a referent not present in the immediate environment; and b) the signal has been used with various communicative intentions (i.e. more than one)".

Goldin-Meadow and Mylander (1985) studying deaf children in hearing families decide that a communicative gesture must meet both criteria:

- a) "the motion must be directed to another individual ... and
- b) the gesture must not be a direct motor act on the partner or on some relevant object". This allows them to deal with deictic signs and with characterizing signs. They then go on to try to provide some guidelines for glossing characterizing signs.

In fact neither definition nor comparable ones for words are particularly helpful since it is unlikely that periodic video recordings can allow us to adequately meet Volterra and Caselli's requirements that a sign be used in a range of settings for different exemplars of the same class. The weaker aspect that it be used for items not present does not help since reference to objects not visible may occur in the context of request in a routine and the same instances arise in hearing children. And that, perhaps, is the crux of the matter. Acredolo and Goodwyn (1988) in their definition of gestures in hearing children include the same elements as Volterra and Caselli (1985) ... the gesture had to appear

repeatedly in the same form and had to be generalised beyond the specific situation in which it was acquired.

The question becomes simpler: are we dealing with a proliferation of object signs or a series of symbolic object gestures? Are these simply analogous to the problems of determining words? The signs we have reported in our mothers' study share many characteristics with the gestures listed by Acredolo and Goodwyn (1988) and if we take away the early emergence of name signs such as "Mama" or "Dada", the dates of emergence of the different classes look similar. In our early data (Table 8.3) the predominant sign type is object names and attributes or characterizing gestures. Perhaps to understand this we need to take on Nelson and Lucariello's (1985) view:

"The assumption here is that during the first half of the second year the event representation remains unanalysed in terms of specific concepts of objects, actions and actors. It is only during the second half of the second year, in general, that discrete concepts are differentiated from the whole. We believe that this explains the prelexical period of word use followed by lexical (denotational) uses in the latter half of the second year." (p.80)

Such a change would allow us to incorporate both signs and meaningful, symbolic gestures (and words) into our data without being concerned about their ultimate status (assuming we kept to the minimum levels of definition suggested by the authors above). In addition, it would explain the increase in solicit behaviour in the mothers in the second half of the first year... the game of naming is becoming more interesting for the child and the mother has less need to model.

Since the main topic of this chapter is the extent of the child's development of a lexicon it is appropriate to turn to the considerations for sign development. The analysis is proving more complex than expected. All we can do is provide some direct access to the data being considered. Table 8.3 has 3 extracts of a deaf girl and her deaf mother at ages 1:3, 1:6 and 1:9. We can see the change in the interaction and the move from mother leading to child leading. The lexical development appears to be visible even in this limited data. We see only single signs up to 1:6 but in very clear-cut routines designed to elicit sign. However in the 1:6 recording the child over-generalises the sign CAR to Coach or Bus and the mother explains. By 1:9 the child is producing multi-element utterances and is leading the interaction. Such a development is as predicted by Volterra (1986) and seems to support the notion that much of the early development of sign is similar to that of spoken language.

Table 8.3: The shift in children's use of sign from pre-lexical to syntactic (1:03 - 1:09) (gloss in caps. translation in brackets)

1:03 - play routine involving naming of items on a play cube		
Mother	Daughter	Comments
POINT WHAT THAT?		
(that .. what's that?)	"tree" [only interpretable	

TREE		in context, as it is incompletely formed in the wrong location [mother repeats response offering correct sign]
POINT, WHAT POINT (a tree! what's that?)	"car"	

This early interaction is characterised by the routine and the child appears to respond in her turn rather than having any clear idea of the lexical use of the sign.

1:06 - play routine as above		
POINT? (what's that?)	TREE	[with correct handshape and speech sound, now recognisable]
TREE! (yes a tree!) {shows cube}	CAR	
CAR! (yes a car!) {shows cube}	CAR	[here the child over-generalises and the mother corrects - it seems the
BUS, BIG BUS, CAR SMALL, POINT BUS BIG (it's a bus, a big bus)		child is now attaching labels to items as in the lexical stage]

Here the child has made great progress and is an active participant in the naming routine. She is able to manipulate the labels and is actively making judgements.

1:09 - mother and child are looking at some books		
DOLL POINT WHAT? (a doll, what is it?)	DOLLY	[child sign]
		HAIR-WASH
WHO WASH-HAIR WHO? (who's washing hair?)		
	DOLLY	
GIRL DOLL		
	DOLLY	



DOLL, WHO WASH-HAIR? (a doll, who is washing hair?)	WHERE J? PLAY J (where's Julie? play with Julie)
JULIE PLAY?	HOME (she's at home)
HOME	JULIE PLAY, JULIE PLAY

Here the child is entering into conversation and is actually leading. She introduces 2 new topics generated from the book, firstly the doll with the hair wash and secondly that Julie has a doll to play with.

These extracts from the same child signing in BSL show the extent of development over this short period of 6 months in the second year and indicate the relative sophistication of a deaf child of this age.

In this chapter we have attempted only to set the scene for a more detailed lexical analysis in the next chapter. We believe that many of the patterns of interaction among deaf mothers and their children at this age are similar to those of hearing mothers with perhaps some preponderance of solicit behaviour. This in turn may lead to an earlier appearance of a range of sign/gestures. These sign/gestures are probably best dealt with as pre-lexical and fit more with the types found by Acredolo and Goodwyn (1988) for hearing children.

While suggesting that these sign/gestures seem to appear earlier we do not consider that this means that sign language develops earlier. However, the differences in mother-child interaction (in the first year of life) which we have already reported would seem to create more opportunity for certain types of symbolic gesturing to appear and for the deaf mother this would be a salient feature of interaction. It is easy to see how this might have led to the belief in earlier acquisition of sign language. However, the precise status of sign/gesture distinction in the deaf child's development remains to be completely established..

## **Chapter 9: Acquiring BSL**

As we have seen in the last chapter there are major problems in determining the difference between gesture and sign in the early corpus of the child. We can try to adopt the approach suggested by Dromi(1988) for words which is very similar in principle, to that of Volterra(1987). Gestures may be considered comparable to vocalisations which have meaning in a particular context. Signs can be detected when the child is able to use sign-like activity to designate objects which are not present or to use them for different objects or events of the same class. In addition, the signs must lead to acknowledgement by the mother or be likely to produce more extended interaction.

What we have found in chapter 8 is, that even this is difficult to enforce as a definition when the data is spontaneous and the most likely differentiation between gesture and sign occurs when the child begins to use sign-like productions in situations where the meaning is over-extended. What we see is the child beginning to lead in the dialogue and looking for situations where he/she can offer comment which leads to interaction. If this initial finding is replicated in the more detailed analysis in this chapter, it implies that deaf children pass through the same one-sign stage as hearing children do in the one-word stage. It is also likely to be consistent with the findings of Petitto that deaf children do not treat gestures in the same way as signs and that one can see the distinction in their production.

The analysis reported in this chapter comprises data from the home recordings made between the ages of 1 year 1 month and 2:0 years on all five children who were deaf of deaf parents(DCDP).

### **Whole Sample Analysis**

As reported in an earlier chapter, because of funding gaps the sequence of recordings is incomplete for some of the children whose second year occurred during that time. Some other recordings could not be included in the analysis for other reasons. Accordingly, the table below indicates the total recordings for this group in the second year.

Age (months)	13	14	15	16	17	18	19	20	21	22	23	24
Child												
GS	X	X	X	X	X	X	X	X	X	X	X	X
ES	X	X	X	X	X	X	X	X	X	X	X	
ND	X	X	X	X		X			X			
JB			X	X			X			X	X	X
RH	X					X			X			X

Because the recordings were made in a natural setting, interaction did not take place continuously over the recording period. For analysis purposes, only portions of the recordings where mother-child interaction occurred were included. This was calculated as any period during which the child was responding to the mother's communication. This ranged from one minute of the entire recording period to 28 minutes. The average time during which interaction occurred averaged for each child over the total number of recordings was as follows:

- ES 20.89 (range 1 min to 28 min 30 sec)
- ND 14.67 (range 5 min 30 sec to 24 min)
- GS 12.42 (range 3 min 30 sec to 26 min 30 sec)
- JB 7.08 (range 3 min 30 sec to 14 min)
- RH 6.5 (range 4 min to 10 min)

### Amount of Communication

As with the analysis of spontaneous spoken interaction, the units of analysis for signed interaction must be defined. We based our unit for analysis on Wells' (1975) definition of an utterance as 'one independent unit of verbal communication together with any other units that are dependent on it', but differ from him in including utterances that consisted entirely of gesture produced by either the child or mother. The number of utterances per minute produced by mothers and children was calculated at each occasion of recording.

The average number of utterances per minute is given below. The "mothers' signed" category excludes all utterances consisting only of a deictic or other gesture.

	MOTHERS TOTAL	MOTHERS SIGNED	CHILDREN TOTAL
ES	14.92	11.83	1.98
JB	14.8	6.32	3.56
RH	11.73	7.53	6.45
GS	7.71	6.67	2.56

ND                      5.8    4.74    3.38

A comparison with Wells' (1985) data for hearing mother-child pairs in the age range 15 to 24 months is quite interesting. At 15 months there were an average of 2.96 adult utterances per minute and 2.03 child utterances per minute; at 24 months his sample was averaging 4.44 adult utterances per minute and 5.54 child utterances per minute.

### The Lexicon

The total number of different signs used on each occasion of recording was calculated and the following analyses were performed: classification of signs; cumulative vocabulary at age 2 for each child; number of signs used by one or more children.

Cumulative Vocabulary: This was calculated by listing all signs used at each occasion of recording. The figures for each child are as follows:

GS	89
ND	85
ES	67
RH	28
JB	26

As can be seen from the figures above, only three of the five children have passed the 50-sign milestone by age 2(although one must point out that we do not have an exhaustive sample of the child's utterances - the mother's list would produce a rather greater number but nevertheless these give us a comparison with many of the standard corpora in terms of output); in the individual profiles section, the two children who are far behind the others will be discussed in detail.

Total Signs: the total number of different signs used by all the children in the sample was 180. These are listed in the table below, together with an indication of how many children used each sign. Of the 180, 118 were used by only one child; 28 were used by 2 children; 25 were used by 3 children; 7 were used by 4 children; and 2 were used by 5 children.

Table 9.1: List of different signs used by all the children

		<b>Sign</b>	<b>No of children using sign</b>		
AEROPLANE	2	BALL	3	BIKE	1
AGAIN	1	BALLOON	1	BIRD	5
ALL	1	BANG	4	BISCUIT	1
APPLE	2	BATH	2	BITE	1
AWARE	1	BEAR/TEDDY	3	BLOW	1
BABY	4	BED/SLEEP	4	BLUE	1
BAG	1	BIG	1	BOAT	3

BOOK	3	'G'(GRANDAD)	1	RABBIT	3
BOWL	1	GEMMA	1	RATTLE	1
BOY	3	GIRL	2	RED	1
BREAD	2	GLOVES	1	ROUND	1
BRICK	1	GO/GONE	5	SAME	1
BROKE/BREAK	3	GOAT	1	SEALION	1
BROTHER	1	HAT	1	SEE/LOOK	2
BRUSH-HAIR	3	HEAR	1	SEESAW	1
BUMP	2	HIPPO	3	SERVE	1
BUS	3	HOME	1	SHEEP	2
CAKE	1	HORSE	2	SHOE	2
CAMERA	1	HOT	1	SLIDE	2
CAR	3	HOUSE	1	SMACK	3
CAREFUL	1	HUNGRY	1	SMALL	1
CARROT	1	'J'(JULIE)	1	SNAIL	1
CAT/PUSSY	4	JUMPER	1	SNAKE	1
CHAIR	3	LADY	1	SPIDER	1
CLAPPER	1	LIGHT (BULB)	3	SQUIRREL	1
CLEAN-TEETH	1	LION	4	STAR	1
CLIMB	2	LORRY	1	STOP	2
CLOSED	1	LOW	1	STUPID	1
COFFEE	1	MAN	1	SWEET	1
COLD	1	MICKEYMOUSE	1	SWIM	1
COUGH	1	MILK	2	TAKE	1
COW	1	MONEY	1	TEA	2
CROCODILE	3	MONKEY	3	'T'(TEDDY)	1
CRY	1	MORE	2	THANK-YOU	2
"D"	1	MOUSE	1	THINK	1
DADDY	1	MOUTH	1	THROW	1
DIRTY	1	MUMMY	3	THUMB	1
DOG	2	MUSIC	2	TICK-TOCK	3
DOLL	2	NANNY	1	TORTOISE	1
DOLPHIN	1	NAUGHTY	1	TRAIN	3
DON'T-KNOW	1	NICE	1	TREE	1
DONKEY	1	NIGHT	1	TROUSERS	2
DOOR	1	NOISY	1	TWO	1
DOWN-SLOPE	1	NOSE	1	UP	3
DRAW	1	NOT	2	UPSTAIRS	1
DRINK	4	OPEN	1	WAIT	1
DUCK	1	ORANGE	1	WALK	1
EAR	1	PANDA	1	WANT	3
EAT/FOOD	4	PAPER	1	WASH	1
ELEPHANT	1	PENGUIN	2	WASH-HAIR	1
EYE	2	PHONE	3	WET	1
FALL	3	PIGGY	2	WHAT	4
FAT	1	PLAY	1	WHERE	3
FILM	2	PLEASE	1	WHO	1
FINISH	1	POP	1	WINDOW	1
FISH	3	POUR	1	WOMAN	2
FLOWER	3	PUDDING	1	WORK	1
FRUIT	1	PUSH-OVER	1	DADDY/BIRD	1

GIVE/WANT	1	TEDDY/BABY	1
HORSE/RABBIT	1	ZEBRA	1

### Mothers' Utterance Functions

Mothers' utterances were coded by a four-way functional categorisation system. Only utterances responded to by the child were included in this analysis. Utterances were coded as:

- 1) mother solicits sign (e.g. What's that?)
- 2) mother solicits deixis (e.g. Where's the lion?)
- 3) mother solicits gesture (e.g. Clap your hands)
- 4) other (e.g. mother models, acknowledges, etc.)

Percentages of mothers' utterances in each of these categories were as follows:

	SOL/S	SOL/P	SOL/G	OTHER
GS	42	8.91	4.09	45
JB	60	17	5.67	17.3
RH	51	31	5	12.75
ND	55.5	12.5	3.17	28
ES	66.2	4.54	5.09	24.18

While there are substantial individual differences within the sample, the two least advanced children (JB and RH - see individual data below) receive the highest percentage of deixis solicitation. This type of mother's utterance, of course, provides the least opportunity for the child to produce any linguistic output.

### Individual Profiles

Because of the small number of children, and the wide differences between them in such factors as degree of deafness, position in the family, etc., it was decided to prepare individual profiles of language development from 12 to 24 months for each of the five children. This is justified as well by the differences in the linguistic stage of development and rate of progress of each of these children identified during the analyses.

Five profiling features were calculated for each child: utterances per minute; signs per minute; proportion of utterances with sign; proportion of multi-sign utterances; vocabulary. These measures will be discussed briefly before discussing each child individually.

Utterances per minute: We based our unit for analysis on Wells' (1975) definition of an utterance as 'one independent unit of verbal communication together with any other units that are dependent on it', but differ from him in including utterances that consisted

entirely of gesture, where this gesture had a communicative function. The number of utterances per minute were calculated at each occasion of recording.

**Signs per minute** Each utterance was categorised as one of four possibilities: sign; point; gesture; or unanalysable. Criteria for assigning utterances to the 'sign' category have been discussed previously.

It should be mentioned that it was decided not to calculate mean length of utterance, despite the frequent use of this measure in child language acquisition studies. As Dromi (1988) and others have pointed out, languages which are heavily inflected are less amenable to analysis in terms of MLU in words, as this measure undercalculates the language development of the child.

**Proportion of Utterances with sign:** The proportion of utterances containing at least one sign was calculated for each occasion of recording. These utterances could consist of a sign alone, a sign combined with one or more gestures, or consist of two or more signs.

**Multi-Element Sign Utterances:** All utterances which consisted of at least one sign and one gesture and/or point were included in this measure.

**Vocabulary:** The total number of different signs used on each occasion of recording was calculated. A Type-Token ratio was calculated for each child but is not included in this analysis as results were so variable, probably because of the widely differing amount of data available at each recording session. As there is a strong likelihood that the same sign will be used more than once in a conversation, the fewer interactions comprising an occasion of recording, the lower the type-token ratio.

Figures 9.1 - 9.4 show the pattern of development in the measures utterance per minute, signs per minute, proportions of utterance with signs and vocabulary of signs, for each of the children. The @curves@ in the graphs are unlikely to be smooth on such a sample of interaction and they do show wide variation from child to child.

### **Child 1: Ginny(GS)**

**Utterances per minute:** The number of utterances per minute produced by GS rose from 1.58 at 1 year 1 month to 5.95 at 2 years, with an average of 2.56 over the entire period.

**Signs per minute:** The number of signs produced per minute also rose throughout this period, from .81 at one year one month to 2.13 at 2 years.

**Proportion of utterances with sign:** This figure fluctuated over the year of recordings, averaging 43% overall. Thus, the increase in production of signs was not because of a greater proportion of utterances which contained signs, but was accounted for by the increase in total production of utterances.

**Multi-element utterances:** The first utterances consisting of more than one element appeared at age 1 year 2 months, and was of the form POINT + SIGN or SIGN + POINT. A sample of multi-element utterances is given below together with age at recording.

1 year 2 months	POINT TICK-TOCK
1 year 3 months	QUACK POINT
1 year 4 months	BIRD POINT
	POINT BIRD

At 1 year 5 months, two new types of multi-element utterance appeared. The first consisted of a sign "bracketed" by two points, or a point "bracketed" by two signs. A sample of such utterances is given below together with age at recording.

1 year 5 months	POINT CAKE POINT
	DRINK POINT DRINK

The other type of multi-sign utterance consisted of combinations of two or more signs:

1 year 5 months	DRINK BATH
1 year 6 months	BABY APPLE (i.e. baby food)
	TWO CAR
1 year 7 months	WHERE BIRD
1 year 8 months	CLIMB TEDDY (i.e. teddy is climbing)

At 1 year 9 months, a new bracketed type of construction occurred with one sign bracketing another:

1 year 9 months	WHERE BOOK WHERE
	BALLOON BLOW
1 year 10 months	GONE NO
1 year 11 months	BABY POINT MONKEY (i.e. that's a baby monkey)
	GONE COLD (i.e. it's not cold any more)
2 years	ME EAT BREAD ME
	ME WANT DRINK



At the first occurrence of multi-element utterances at 1 year 5 months, 10% of all utterances fell into this group. The proportion of multi-element utterances rose to 17% by age 2.

Perhaps the most interesting feature here is the emerging two-element utterance of "true" sign which requires a period where a sign is bracketed by a point. We will explore this aspect in the other data.

### **Child 2: Nancy(ND)**

Utterances per minute: Nancy's utterance rate seems similar to that of Ginny though the rise in output occurs earlier, around 1:5 to 1:9. The average is greater at 3.38.

Signs per minute: Nancy seems to have had the greatest increase around 1:1 to 1:4. The low figure for 1:6 may be due to circumstances when she was unwell. Her final point at 1:9 of 4.89 signs per minute is over double the rate of Ginny at 2:0 years.

Proportion of utterances with sign: The data in Figure 9.3 again puts Nancy well ahead of her peers in production, reaching almost 75% by 1:6. None of the others reaches such a stable high figure.

Vocabulary: The development again is well in excess of her peers. She reaches a 50 sign output in the recordings we have for her at 1:9.

Multi-element Utterances: As we might now predict from the above figures Nancy is further advanced in the combination of sign and gesture. We see the first combination at 1:0 with WHERE T(probably a baby form for "D" or Daddy and THAT BALL. These are followed at 1:1 by both bracketed utterances and what look like sign combinations:

BABY THAT BABY

THAT CLAPPER(a particular toy she has)

but also WHAT FALL

WHERE CLAPPER

Recordings at 1:2 and 1:3 do not show significant change with further mixtures of bracketed and sign plus deixis occurring in conjunction with simple sign combinations. By 1:6 we have the tremendous increase in utterances and the first referential sign combination and longer utterances in:

MONKEY FLOWER

THAT WHAT BLUE

THAT DOWN PANDA

By 1:9 this has further increased and sign combinations seem to be well established. Among a very wide range of utterances are:

SMACK MUMMY

CAR BANG

PLAY HOME

CAR WORK

LADY BAG

LOOK GONE

BABY WALK

and also longer sign utterances:

CHAIR BROKE THAT

BIG CAR THAT

THAT DADDY, MUMMY BEAR ME

It seems clear that she has progressed from the primitive sign plus point through the period of bracketing to a full two sign stage. Subsequent recordings of Nancy show her to be a competent sign user and a "model" of BSL development. Analysis of her development beyond the second year will be completed at a later date.

### **Child 3: Rebecca(RH)**

Utterances per minute: Unfortunately there are only 4 data points in her corpus and so the figures for growth may be rather distorted. The apparent increase at 1:7 is a distortion of this nature as there was less than a minute of sustained interaction during which there was a good deal of activity. It is more realistic to use the data point of around 6.5 utterances per minute as the level reached.

Signs per minute: However, the data point at 1:7 for signs produced is more in keeping with the general increase in her output. By the age of 2:0 the number of signs produced per minute of recording is the highest of the group at 5.0.

Proportion of utterances with sign: This figure is rather stable in the the first three recordings but rises at 2:0 to 78%.

Vocabulary: The range of production is rather small and does not seem to increase greatly in the second year. As was pointed out earlier her sign production is well behind the others and has only reached 28 signs by the 2 year recording.

Multi-element utterances: These are very few in number over the whole period. We detected one "point plus sign" at 1:0 and a series of "sign plus point" at 2:0 but no real evidence of smooth acquisition of sign. Curiously at 1:7 we have some examples of multi-sign combinations in:

WHAT BUMP

BABY MONKEY THAT

ME COUGH THAT

DOWN-SLOPE BIRD

These would have been expected to lead into the two-sign stage with a consequent expansion in vocabulary. This does not occur in our recordings. If we examine her recordings in more detail we find a considerable proportion of vocalisations within utterances and it seems likely that this child is becoming bilingual. She has a partial hearing loss(53dB) and barring a significant decline in her hearing over the next few years she would be expected to acquire speech. The mother-infant interactions were always characterised by speech sign combinations on the mother's part and it looks as if this child may not use sign as the primary language.

#### **Child 4: Ellis(ES)**

Utterances per minute|: The level of output is rather low with very little increase until 1:11.

Signs per minute: The above comment applies to sign output with no marked change until nearly 2 years old.

Proportion of utterances with sign: Perhaps because of the low rate of output we find that there are considerably more utterances which involve sign. The main increase occurs around 1:5 to just over 50% and this changes only a little through the rest of the second year.

Vocabulary: As expected given the rather slow growth there is no marked change in output by the end of the second year. A rate of between 10 and 20 signs per session is rather less than we might expect of a hearing child in speech.

Multi-element utterances: There are no recorded combinations until 1:5 when we find:

WHERE THAT

WHAT HORSE/RABBIT(ambiguous)

This is the first indication that the stage of sign plus deixis is being reached. In the recordings for 1:6 we find more examples:

THAT TRAIN

THAT DRAW

THAT BABY

THAT DOG and so on

but also CAR FLOWER

BREAK BOOK

GOOD BOY

In this we have the referential sign combinations which should herald entry into the stage of expansion of sign utterances. However, it seems that such growth is not smooth and at 1:7 and 1:8 we find only sign plus point. At 1:9, 1:10, and 2:0 we have 4 more examples of referential sign combinations accompanied by a rather sparse output of sign plus points. Despite the apparent "breakthrough" at 1:6 there is no expansion of the sign acquisition. From our later recordings of this child it seems that sign development has slowed down following the growth in the first part of the second year. We have recently seen him at school and his sign production has increased greatly and it looks as if this developmental pause has not indicated any longer term problems.

### **Child 5: Jeremy(JB)**

Utterances per minute: The major developments seem to take place later for this child. In the early stage we find very little output at all and it is only in the recordings for 1:10 and 1:11 that we find significant interaction taking place.

Signs per minute: The same pattern is found in the sign output, with the major increase in the last few months of the first year.

Proportion of utterances with sign: It is only by the end of the second year that we find the proportion of utterance with sign creeping beyond the 50% mark.

Vocabulary: For most of the period his vocabulary output is less than the others in the sample.

Multi-element utterances: Considering the above results it is not too difficult to predict that this child is at a very early stage of development. We have no records of combinations until 1:9 when we see the first sign plus point in NOSE THAT. At 1:10 and 1:11 we begin to see more:

SMELL THAT

FLOWER THAT

DUCK THAT

TELEPHONE THAT

and some bracketed constructions:

GONE THAT GONE

THAT BIRD THAT

and one example of a sign combination:

BIRD RED

In this we can begin to see the developments one would expect and this boy is progressing through them rather slowly. He is the youngest of the children in our study and as a result we do not have extensive data on his third year (since we had to finish filming around that time). It seems likely that he is achieving BSL but rather more slowly than the others. It may be that style of interaction is a factor in this but we will require to carry out more detailed analysis to determine this.

## **Discussion**

In this chapter we have examined all of our second year data on interaction in the home for the five deaf children who have deaf parents. We have chosen to focus only on the situations where there was interaction of more than 30 seconds and so have excluded the very brief interchanges which can occur in the home as the mother interrupts her own housework to make a comment to the child or where the child is engaged in other activities with only very brief intervention from the mother. This means our conclusions cannot be about the absolute extent of the child's sign competence but rather about the rate of change in the situations defined. Despite these caveats on the work we can begin to make some comment on BSL acquisition.

Not surprisingly, the first clear statement has to be on the great variability in the rate of development. While three of our children have reached the 50 word stage, two have not. Of these, one may be more likely to use English as her primary language and the second appears to be passing the same stages of language use but at a greatly reduced rate.

The major finding is that children do proceed through an early sign/gesture stage which is not easy to detect either by reference to age or by the type of sign output. Rather it has to be identified by the movement into the next stage. This is where sign and point are combined. Most commonly we see "OBJECT THAT" or "THAT OBJECT". We cannot be sure yet that this is indicative of a lexical use of the sign element. It is possible that this simple combination is merely an extension of gesture.

Beyond this period we find the emergence of bracketed constructions of the form: "THAT OBJECT THAT" or even "OBJECT THAT OBJECT". In examining the data we find that the sign component as distinct from the point does not have to be an object sign but is likely to be characterising in the sense that it describes a component or characteristic of the object or event.

At this point we see the emergence of the first two sign utterances. These are consistently referential sign combinations as described by Volterra(1983) and seem to lead on to three and four sign utterances. One has to be careful in making firm statements here but it seems that the bracketed constructions are a precursor to sign combinations. We are not yet able to determine whether this is a necessary stage for subsequent BSL acquisition. Of our 5 children in this chapter we can see only one who has passed through this stage and emerged on the pathway to BSL. Two more have achieved the 50 sign stage and are combining signs. The final two do seem to be on the brink of mastering two sign utterances and have examples of the above utterances in their data. There is no doubt that we need to continue this analysis into the third year and beyond to determine the impact of these developments.

## **Chapter 10: Professionals' relations with deaf parents.**

### **Beginning in Sign: deaf families**

"At first, Emma found a lot of problem in her classroom and playground, because she still use her signings which the hearing children thinks they look funny and made a lot of fun of her. Emma was very upset and told us. Then I said I preferred her to return to the Deaf School, but my wife says don't give up too easy, then helped Emma to understand how to stand on her own two feet."  
p.266

This statement by a deaf parent is part of a long account of growing up in the deaf community, reported by Kyle and Woll (1985). It is indicative of a number of things - the written language seems to imply that the parents are unable to use English effectively or are of low intelligence, that they feel ambivalent about the integration of their daughter and that they seem to take for granted the fact that hearing children will make fun of their language, British Sign Language (BSL)

In the terms of the 1981 Education Act it could be argued that their deaf children are outside of the workings of the Act because they have learning difficulties arising from the fact that their language at home is not English. They may have special educational needs because of the type and form of education offered but they do not have learning difficulties as defined by the law. Compared to the majority of deaf children they are in a favoured position or might be if the law recognised BSL as an indigenous language of the UK.

Unfortunately, the picture is not as simple as this because education, until recently, has ignored British Sign Language and its potential and most professionals are unaware of the capabilities of deaf adults in their own language. Interpreted messages tend to be conveyed in a pidgin form because of the lack of access to deaf people's natural use of sign in the interpreter's training. Even hearing children of deaf families are likely to have mixed feelings about language:

"...my father being born deaf and my mother becoming deaf after acquiring speech and English grammar ... As a child I always regarded my mother as the highly intelligent member of the partnership. She could speak read and write, while I considered my father to be inferior because he could do none of these things.... If I was called upon to do any interpreting which had direct relevance to the family situation, it would usually be for my mother who had accepted the role of being the person who made any contact with the hearing community. This, I am sure, helped to create in me a recognition that English was superior to BSL"  
(Colville, 1981, p.179)

These long extracts first from the deaf parents and then from a hearing son of deaf parents, take us into a world where education is complex not because it is new or is influenced by new legislation, but because it is simply inaccessible through the language

of the home. For deaf parents bringing up a hearing child or even a deaf child, it is a struggle not at home, but in the outside world where all the transactions are done in speech and where it is perceived that to have deaf parents is to be a disadvantaged child.

### **Deafness and Family Life: the first generation**

In exploring the position of deaf and hearing children from deaf families in our society it is appropriate to consider the formative experiences of those parents. Born in the 1950's and 1960's these deaf people who are now the deaf parents of our study, will have experienced a changing world of care and concern, technology and innovation and will have encountered a great deal of suspicion and ignorance.

For most people deafness has no known cause. Medical records will have anything up to 55% as "unknown" cause. When the deaf person is asked about their knowledge of the cause the figure may be as high as 80% who have no knowledge of why they are deaf or mistakenly attribute their deafness to a cause which is unlikely or inappropriate ("fell down the stairs at age 4" when they were known to have been born deaf). For deaf people the extent of hearing loss and the reason for it are not particularly important. Deafness is a state of mind and an attitude, not something to be prevented or fought against or even worried about. This is in marked contrast to those who lose their hearing and indeed to those hearing people who have taken the time to consider what effects hearing loss might have. For most of these, hearing loss is to be cut off from the information in the world around, from relatives and friends and to be seriously handicapped in terms of employment.

Although hearing aids and health screening were available to the children of the 1950's they are unlikely to have had the early provision and support which is now available. Hearing aid technology has progressed and there are hopeful signs that some young children can benefit from the early fitting of appropriate aids. For most of our deaf parents, family life in the 1950's would have been difficult as the prevailing ideas were that the hearing parents must refrain from any form of gesture or signing in their communication so that the child would be forced to use their hearing (to whichever degree it was available). In so doing, they would ensure the maximum development of spoken language competence, and thereby, the maximum success in the world of hearing people.

Deaf children would normally be sent to deaf schools. There were special units available (since just after the war) but the most likely place for the child was a segregated school with other deaf and partially hearing children. The outcome of this education was disappointing to say the least (Conrad, 1979) and there has been a massive re-thinking of the approach to deaf people's education. Not only was the outcome very poor academically but it led to employment life spent in lower paid jobs with fewer responsibilities.

During the 1950's and 1960's it would have been unusual for there to be any role models for the deaf child in the school setting. Deaf children often grew up believing they would become hearing and without any concept of the "successful deaf person". A belief in



failure was almost part of the "package" offered by the system and not surprisingly deaf children with only each other as a resource were unlikely to adopt positive attitudes to themselves or to have confidence in their abilities to change the world around them. The outcomes of the deaf experience were low levels of performance skills as valued by the hearing world, a poor self-image and also a complete lack of power to alter the situation.

Deaf people were unable to read or write effectively and unable to speak; there were no trained interpreters and those who acted as such shared the same views of the failure of deaf people which was offered by an education system unable to utilise the normal intelligence of deaf people. When asked to campaign by community workers deaf people were unwilling and unable to see the potential for change. They were reluctant to risk the community life which they now enjoyed (albeit to the exclusion of all hearing people) which they felt would be threatened by any action.

This is a gloomy picture with which many educators would disagree, yet it is the picture offered to us by most influential research studies and directly by the members of the deaf community. Their view as participants in the experience is of considerable value and if they are unable to perceive the good motives of those around them and in positions of authority, then it is probably a function of the lack of communication and of the unique language situation in which deaf people find themselves. Their main concern is that the situation of their own childhood has not changed very much for today's deaf children.

### **Deafness and Family Life: the second generation**

In an attempt to establish the priorities for the families in their interaction with their deaf children we set up a two-part, in-depth interview on knowledge of child-rearing and on aspects of the interaction with professionals and others. These interviews give us some insight into the situation of deaf parents and their contact with others. The questions used are listed in Appendix 2.

#### **The Parents**

As described before, five of the deaf mothers were housewives, while 5 were in part-time work; one was unemployed. Eight of the husbands were skilled manual workers; two families were divorced and the last husband was a labourer. We contrasted this group with eight hearing families with hearing children who had participated in an earlier phase of our research and who had children of the same age. Of this group, 5 were housewives, one was a teacher, one an office assistant and one worked in a club. Three families were single-parent; three husbands were skilled manual workers, one was unemployed and one was a teacher. Their average ages were similar: Deaf wives (30 years), husbands (34 years); hearing wives (29 years), husbands (34 years).

A deaf researcher interviewed the deaf families at home using BSL and a hearing researcher talked to hearing parents at home or at nursery school. There were two parts to the interviews, one dealing with bringing up children and the other more open-ended, dealing with attitudes and experiences in relation to deafness and the hearing world. In

this chapter we are not concerned with statistical measurement since the samples are quite small, but rather with gaining an impression of deaf parenthood.

*Parents' Perspectives:*

a) Information

We hypothesised that the differences in the way deaf mothers interact was not only due to the difference in modality of the language used but also to the fact that deaf mothers were not exposed to the same amount of cultural information on child-rearing. Health visitors and doctors would find it very difficult to communicate with these deaf parents and usual sources of information such as books and television might not be accessible to deaf people. We asked about the sources of information used by parents (Table 10.1).

Table 10.1: Sources of information on children

"In developing knowledge about children people get information from different places. How helpful were these?"

	Helped a lot %	
	Deaf (n=11)	Hearing (n=8)
Reading books	27	50
Watching baby programmes on TV	0	13
Asking other people	55	38
Just watching others	27	0
What you remember of when you were a child	18	0
Just your own natural feelings about children	45	88

As expected, deaf people find books and television less helpful than do hearing people though the degree of help from these is generally much lower than one might think. Interestingly, deaf people seemed much more likely to ask others for information or to observe others. Hearing mothers were more likely to use their natural instincts. This seems surprising in one respect but may be due to the fact that deaf people expect to have to ask others for daily information. This does not necessarily reflect dependency but may be part of an insecurity in relation to the perceived sources of information.

In Table 10.2 we see the follow-up question as to whom the mothers direct their requests for information. Again some interesting differences emerge with the hearing mothers most likely to feel that they learned little from the people and professionals around. It could be argued that the wealth of information in the media and through casual contact means that for hearing people the direct help of others is seen as much less effective. The deaf mothers show a different pattern and seem to be less negative about the help received from others. Parents, friends and doctors are more likely to have given help i.e. deaf people seem to value the views of these people and are much more likely to consult them than are hearing mothers.

Table 10.2: People who were less likely to be seen as helpful

"In giving advice to you about children, who was most helpful?" [3 point scale - a lot, a little, not at all]

	Helped not at all %	
	Deaf (n=11)	Hearing (n=8)
Parents	18	50
Older relatives	36	75
Relatives with children of the same age	73	63
Friends with children	18	38
Doctors or nurses	18	63
Teachers or Social Workers	36	88

As a way of exploring the period of the first year of life we asked mothers about their "policy" for their children in terms of what they thought was appropriate (Table 10.3). In questions of "policy" there seem to be very few major differences but with the theme running through the deaf mothers responses that the child may need less "intervention". Deaf mothers seem to under-estimate the baby's ability to play games and to understand the language around it and significantly deaf mothers do not feel one should encourage a baby to talk or sign at 6 months. This latter fits with previous findings (Kyle et al, 1987a) and with the different interaction pattern of deaf mothers in the task described above. However, the size of the difference is not repeated in other parts of this questionnaire and should therefore be treated as indicative only.

Table 10.3: Policies for child-rearing

"Thinking about the first 12 weeks after birth, do you think ...?"

	Yes %	
	Deaf (n=11)	Hearing (n=8)
A baby should be picked up whenever it cries	64	38
You can play games with a baby at this age	82	100
The baby can understand its mother	73	88
The mother should talk to it as mealtimes	82	100
A baby can see small finger movements(fingerspelling)	36	88
It is better to be simple - use only one or two words (signs) at a time	73	50
"At 6 months do you think ...?"		
You should encourage a baby to talk or sign	9	75

#### b) Communication.

When asked about sign language and whether both deaf and hearing children in the family should learn to sign, it was quite clear that signing had to be a central part of development.

"Deaf children must have sign, it is part of their natural upbringing" deaf father with deaf and hearing children

"If there were no sign the child will be behind at school. It is vital from birth to four years old. That's when the brain develops and that's when it should be learned. If there is no signing how can learning take place" deaf mother with deaf and hearing children

Even for hearing children in the family sign should come early.

"If I talk my speech would be rubbish. With a hearing child if I used speech I would be wasting my time. The child would not understand my voice. It's better to sign whether deaf or hearing" deaf mother with deaf and hearing children

"The children must understand what I say. When they turn away or don't see me when I talk, I will tap them - that's my habit, the deaf way. I know they are hearing but I like the children to look at my face to show that they understand" deaf mother with hearing children

The consensus was that with hearing children in deaf families there should be both sign and speech though these children had to feel comfortable with sign. For deaf children, some parents believed the signing should be accompanied by speech but were unable to suggest a pattern of use related to the particular age and context. BSL was most likely in infancy but as the degree of deafness became apparent, only the profoundly deaf child would have BSL. In school, teachers would use sign and speech for reading and speech teaching but for content areas such as history, BSL was more appropriate. In this, of course, the parents were considering deaf children and their needs. It was felt that hearing children were able to learn to speak as soon as they came in contact with other hearing people but nevertheless it was vital for them to be able to communicate with their parents in sign.

### c) Beliefs about Deafness in the Family

One area which produced interesting comments was when we asked the deaf and hearing parents about their expectations of the family who had a deaf or hearing child. We asked about the problems which they foresaw in the various permutations of deaf and hearing children in deaf and hearing families. The numbers are small - only 11 deaf mothers responding and only 8 hearing mothers responding but they do give some indication of the differences in perception.

In the most common situation of the deaf child born into the hearing family, all the respondents agreed that the reaction of the hearing family would be of upset and disappointment. Hearing mothers thought the family might come closer together as a result but the deaf mothers were split equally on this. However in the area of specific problems the greatest differences showed up.

Deaf mothers tended to believe there would be problems in talking to the child, in understanding what the child wanted, in the child's behaviour and also in bonding with the child. Hearing respondents did not see problems to the same extent and half did not think there would be problems in talking to the child and three quarters did not think

there would be any problems in bonding. This is rather surprising in some respects as it seems that hearing people under-estimate the degree of problem faced in having a deaf child. For deaf adults the problems seem immense as they are reminded of them every time they talk to other deaf people.

When deaf parents have hearing children there are often mixed feelings. It depends to some extent on the experiences they have had in their early life but it can also be related to their own security as deaf people. For some it is disappointing since the child is likely to become a member of the hearing community and is likely to drift away from the deaf home. For others it is seen as an advantage both from the child's point of view in being able to compete in the hearing world and from the parents' point of view in having an interpreter.

When we asked the respondents what they thought about hearing children in a deaf family, there was a broad agreement. Deaf parents would be happy with only a minority thinking there would be some misgivings. The deaf respondents painted a rosier picture than did the hearing respondents, half of whom expected problems in 'talking' to the child and in getting the child to bed.

Where there is a deaf child born in a deaf family the feelings may be strong in either direction. Half of our hearing mothers thought deaf parents would be upset or sad and none would be happy. Nearly two-thirds of the deaf respondents mentioned happiness as the reaction of the deaf family. In both the groups of respondents they expected very few problems and clearly had taken the view that the child would identify more closely with the parents. This was reinforced very strongly in the accounts of the deaf families themselves when they talked about their children.

#### d) Relations Inside and Outside Families

Most deaf parents reported that they did not mind whether the child was to be deaf or hearing and were more anxious about whether it would be a boy or a girl. Some, however, did feel strongly:

"I hoped for a deaf child. It had to be deaf because I already have three. I wished for a deaf child. If it had been hearing I would have been in a panic as I wouldn't know what to do.. I prayed she would be deaf" deaf mother with deaf children

Most deaf parents accepted it no matter what though some with a deaf child had doubts.

Mother: Do you remember I was upset?

Father: You were only upset for about 10 minutes! You were worried about 'how' and 'why' but I said 'look at us, we are deaf, we are both happy, so he will be the same. He will be happy. I don't think there is a problem. He is very lucky to have deaf parents. With hearing parents he would struggle with communication.'" deaf parents with deaf child

For some the biggest issue was that they had not noticed the deafness themselves (something which deaf people pride themselves in being able to do):

Father: I never thought she was deaf when she was very small. Later on when she'd had a hearing test and they said she was definitely deaf, I couldn't believe it. It was impossible, it was if she had sharp hearing and was able to look around. I realise now it was her eyes that were sharp, catching glimpses of things.

Mother: ... I felt not to worry, she's hearing. Because sometimes when I made a sound she woke up and I thought it was my fault. After the hearing test when they told me she was deaf I felt shocked and then believed it was a mistake she was only a little deaf.

I think I accepted it right away but I felt so stupid - why hadn't I noticed it before. A mother should know better.

For most, of course, the reaction was acceptance but very quickly they began to have professional intervention whether the child was deaf or hearing:

Father: The midwife said she was worried because she (the baby) was hearing and we are deaf. I told her not to worry, we would teach her. She said, 'are you sure?' and promised to bring her tape recorder. Told us to put the television sound on and not to let her be lonely ... Deaf family, hearing child.

Here is a classic misunderstanding and the beginnings of the syndrome of treating the parents as unable to deal with their child. In extreme (but common) circumstances we find the 'grandparent' effect where the grandparents take over responsibility for the child (the one they lost) and insist on continuous contact. In doing so they de-skill the parents.

For parents with a deaf child the full machinery of the system moves into place quickly and it can often be a major problem for deaf parents in coping:

"I was not upset that he was deaf. Only when I took him to the hospital. I was there all morning. Then about 12 o'clock they told me 'he is deaf'. I asked how he was deaf. They said 'he has no response, nothing at all'. That really upset me. I said 'what do you mean 'no response'. They said there was nothing on the machine, no information. I didn't know what to do and took the baby home and burst out crying. It was the way they said it, they should have explained that they'd only tested some frequencies and 'no response' meant he cannot hear. I thought 'he's got nothing, nothing at all', which meant I didn't know where to start." Deaf mother, deaf and hearing children

When she expanded on this it was clear how deeply upset she had been.

Father: Plus the cradle test was new at that time. You put wires on the head - so when she said 'no response' I was puzzled - response in hearing but what about the brain responding - intelligent, mental, what level?.."

Mother: Also I didn't like to see him with wires on his head. I was feeling sick as well. It was only supposed to be an hour but it took all morning. By then he was getting a bit irritated and I tried to breastfeed him to comfort him. It was a horrible morning. When they said there was no response it was the last straw."

We have heard of these experiences from many sources in different types of handicap but when the parent cannot hear the information it requires a great deal of sensitivity to deal with it effectively. This sensitivity was also absent in another situation where a child who had been thought to be hearing was now thought to have a slight hearing loss.

"Mr. Gray came last Friday and said that Rosie had to see a specialist and was to be referred to the teacher of the deaf. I said 'why? You look at her as if she was deaf'. He said he was just wanting to help. I told him I didn't need help and if I did I knew a better person to go to. His attitude infuriated me - he spoke to her as if she was deaf. The way he talked to her with exaggerated mouth movements, I felt like wringing his neck." Deaf mother, partially hearing child

In her case, this mother held out for her own control of the situation.

"So I said to him, 'look, if after she has seen the specialist and happens to have a hearing problem, then I'll decide what to do.' I felt it was because we were deaf, they've got to help. I know better. I've been through it and know what to expect."

For the mother who'd been told 'no response', the situation just got worse:

"On that day I was home, upset. When Joe came home at 4.00 I was upset and tried to tell him what had happened. Just at that minute, the home teacher came to talk about hearing aids. I hadn't even explained to Joe what had happened and she was sitting there talking about problems and hearing aids. I was completely confused and not ready to accept it - he was only 4 months old."

And still it continued:

"...then she came back again with a bag of 'instruments'. It made me wonder and I thought I really had to work hard with him. ... When I think back to when Jane (the first child) was a baby, I enjoyed her, taking her out in the pram, changing her nappy, giving her a bath. Every afternoon I'd take her for a walk around the block. When I look back with Michael, I didn't have time for that. Now I wish I could turn the clock back and tell everyone to wait, that Michael and me are more important."

And in a final, almost comic episode, we see further intervention which is puzzling for this deaf parent:

"I remember when he was a baby, she said 'have you put him on the washing machine?' I said 'no'. She said that he would feel the vibration. I said that he was still a baby, I didn't need to put him on the washing machine. She said that you have to teach him to feel the vibration. I said I'd prefer to put him in the baby bouncer and let him watch the washing machine!"

For this mother each weekly visit brought "new helpful suggestions" of things to do but which simply caused panic and a feeling of inferiority.

This conscientious visiting means teachers in this area were likely to turn up on the doorstep the day after diagnosis. Often the reaction of the parents to this was shock. Another deaf parent reported having an argument over hearing aids on this first visit. The child was only 4 1/2 months old and the diagnosis had been the day before. According to current theories of pre-school support hearing aids must be worn immediately diagnosis is confirmed. For deaf parents, this view is very puzzling and when following quickly on traumatic experiences with hearing professionals in a hospital (usually without an interpreter) can be very upsetting. The basic principle of providing information to parents is seldom managed with deaf parents. At this early contact stage we (the authors) have never heard of a peripatetic teacher, or audiologist or other professional, bringing a sign language interpreter to the home or into the situation where the parents are most likely to be confused and emotionally upset. The outcome is predictable - the parents get further information (interference) which they cannot understand since it is presented in speech. For hearing parents it is possible to head for the library to read everything available but most deaf adults have problems with written English. The critical period for explanation, acceptance and adjustment is characterised by unexplained professional intervention in a language which deaf parents do not understand.

Even where the teachers have begun to use sign there are problems. In one case the same teacher who had punished the parents for signing, years before (i.e. "smacked our hands") turned up as the pre-school teacher. Now, however, the teacher wanted to sign.



"I always go into the kitchen but sometimes she'll come and ask me 'what's the sign for blue?' So I give her the sign and she goes back to Mark. Then she's back to me again asking the signs. Backwards and forwards. It's a great bother. I need her to learn to sign somewhere else not rely on me. It makes Mark confused ...

Sometimes she asks me questions like 'What's the sign for 'please'?' Her sign is different to mine and so she asks why they are different. I don't know. Then she asks me for 'thank you'. Then she asks why 'please' and 'thank you' are the same sign. I'm at a loss - a lot of signs have different meanings...." Deaf mother and deaf child

While the deaf mothers with hearing children have many fewer problems with professionals, there can still be the lingering doubt that they are not good parents because they do not talk. A common reaction is to congratulate deaf parents for having a hearing child.

"For example, when I took Frances to have a look round the school to see the headmistress, we introduced each other then I said 'I am deaf'. They asked if Frances was deaf and I said no, she was fine and normal. She said 'Oh, good!'. I could tell she was worried because I was deaf. Then she told me Frances talked beautifully. I said 'So what?' Her response was 'You're deaf, your husband is deaf and Frances isn't'." Deaf mother with deaf and hearing children

However, another mother sums up the feelings perfectly in this situation:

"I feel I'm the right mother because she will be bilingual like if his father was Arab and his mother English where the child speaks English and Arabic. She'll be better off than other hearing children. She will be bilingual. Would you say I wasn't the right mother because I was foreign - of course not." Deaf mother, deaf and hearing children

#### e) As the Child gets Older

Most of our parents had not considered the issues to be faced by the children as they got older. The children were only 3 - 4 years old at the time of interview. Nevertheless, we do predict some difficulties in dealing with the world and a most common situation is the following:

"Perhaps a good example is my hearing brother. He was unhappy, isolated and frustrated as most of the schoolchildren made fun of him. They teased him about having deaf parents who used signing. My brother was ashamed and so if my mother wanted to go shopping, he said he didn't want to go. He wouldn't tell her what was wrong until in the end he did say 'it's because of the boys, I don't want them to see me with you, mum. They'll start getting on to me'."

This becomes an increasing problem as the hearing child goes to school and gradually it would seem, is drawn towards the hearing world. Few of our deaf parents acknowledge this but in reality, few hearing children from deaf families marry deaf people. Their associations become outward from the home. For some, interpreting for deaf parents can be a problem and some parents specifically avoid using their children as interpreters because they are aware of the tensions created. Most deaf parents take their hearing children to deaf clubs but ultimately the ties are to the hearing world.

Where the child is deaf the problems are of a different nature and revolve around questions of schooling, communication and language. Here the expectation is of closer family ties and positive identification within the deaf family unit. These children will tend to become central members of the community and carriers of the culture.

### **From the Hearing World**

Much of the above will seem strange to hearing readers used to the notion that deaf people are part of a disabled minority who need to be helped and cared for. For those who lose their hearing, deafness is a disaster. For

the people we talked to in this study deafness is a way of life. For most, it is an identity and a source of support. It is the only world where communication is easy. To all intents and purposes these deaf people are part of a minority group. The more one examines the interviews, the more one accepts this as a statement of cultural identity.

Not surprisingly, therefore, tensions arise from the 'good practice' of professionals who set out to care for a 'disabled' group. They perceive deaf people as in need of aid but generally offer it in a way which requires submission to hearing norms. The lack of use of interpreters and continued attempts by professionals to communicate in speech when it is inaccessible or very difficult to comprehend is totally mystifying. Perhaps it is seen as part of an educative function. It puts deaf parents at a disadvantage and offers very little hope of the development of understanding of the problems the children may face.

Hearing parents, with children with special needs, experience the same problems at diagnosis and in counselling but at least they do not have to struggle with unfavourable language conditions. When they do not understand they can ask; when they want more information they can go to the library or watch television for details. For deaf parents, this limiting of access is compounded by the fact that we seem to be unaware of their competence in social terms, in use of their language and ultimately in their role as parents.

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## **Chapter 11: Gesture and Sign**

Research on language development in relation to deafness has focussed on both the development of spoken language in deaf children and the development of sign language. The research reported on in this chapter focusses on deaf mothers as well as deaf children, and is concerned with issues of how language develops, and which language develops, in families where the mothers are deaf. We aim to answer the following questions:

1. Are the patterns of interaction between deaf mothers and their children comparable to those for hearing mothers and their children?
2. What language or languages do deaf mothers use to communicate with their children?
3. What language or languages do the children of deaf parents learn?
4. Can children differentiate gestural and linguistic units occurring in the same modality?
5. Does the apparent close relationship between gestures and signs facilitate sign language acquisition?

These questions are of importance to child language acquisition research generally. We might expect that the use of a visual modality for interaction would create very different interaction patterns, since eye gaze is a prerequisite for receiving communication. The very different modality of sign language might result in a different pattern of development compared to spoken language. As Petitto (in press) notes, for any evaluation of the importance of pre-linguistic gestures in early language acquisition, sign language research provides a unique methodological advantage, since developmental processes using the same modality and visible articulators can be observed over time. The transition between pre-linguistic manual gestures and spoken linguistic communication may appear abrupt because of the modality shift involved, rather than because of any deep discontinuity between pre-linguistic and linguistic stages. Sign language research thus provides a unique means of examining if language involves domain-specific or general cognitive capacities.

### **Sign Language Acquisition**

In terms of actual research on the emergence of language in the early period, there are surprisingly few studies of early interaction. Bonvillian, Orlansky and Novack (1983) used video recordings and diaries of children from 7 months to 1 year 11 months. Maestas y Moores (1980) studied children up to the age of 16 months with the emphasis on "motherese". She reported deliberate shaping of signs by mothers, particularly the provision of kinesthetic information to the child through signing on the child's body, and by the mother placing the child on her lap while signing to other adults. More recently,

Erting (1987) has described the precise modifications in the form of signs found in mother-child signing when compared with signing between adults.

As Volterra (1986) has noted, because of the history of sign language, emphasis among researchers has often been to prove that the communication used amongst deaf people was a true language. Because of this approach, much of the research paralleled spoken language research, with emphasis on such topics as handshape acquisition (McIntire, 1977), the semantic relations first expressed by the child (Schlesinger and Meadow, 1972) "baby" signs (Carter, 1981), etc.

A large number of studies have presented findings which claim that signs develop earlier than spoken language. Bonvillian, Orlansky and Novack (1983), McIntire (1977) and Schlesinger and Meadow (1972) all indicate significantly accelerated growth of sign language. Bonvillian, Orlansky and Novack (1983) report the appearance of the first sign at a mean age of 8.5 months, and achievement of the 10 sign milestone at a mean age of 13.2 months (compared to Nelson's (1973) mean of 15.1 months for English-speaking children). They identify two sign combinations at a mean of 17 months (range 12.5 to 22 months) in comparison to a range of 18-21 months in speaking children (Slobin, 1971). These differences are significant ( $t(27) = 2.67, p < .02$ ). Schlesinger and Meadow's findings (1977) are similar; they claim that two sign combinations occur at a mean of 14 months, and that signing children reach the 100 sign vocabulary milestone at a time when speaking children only have 50-word vocabularies.

Volterra (1985) and Caselli (1987) criticize these findings, claiming that this sort of comparison is not valid without looking at the development of gesture in hearing-speaking children as well. Volterra concludes that early deictic gestures occur in both deaf-signing and hearing-speaking children. These are then followed by the development of signs or referential gestures and words. Caselli (1987) claims that two-sign or two-word combinations occur at around the same age of 18 months in both signing and speaking children.

The major problem with claims about relatively early acquisition of sign language as compared with the acquisition of spoken language lies with the interpretation of data. Two factors affect this; the degree of interpretation of a child's behaviour as linguistic, and the surface discontinuity between gesture and spoken language development in hearing children in contrast to the surface continuity in the development of gesture and sign language.

In identifying child behaviour as linguistic, parents are likely to interpret babbling as words if there is a degree of phonetic resemblance. However, they are unlikely to assign meanings to gestures and ascribe the same status to these as early language. Deaf parents, however, seek meaning in gesture rather than in vocalization. Just as hearing parents with a hearing child give a rich interpretation of utterances which relate phonetically to real words, so too do deaf parents of a deaf child interpret gestures and other body movements which resemble signs as actual early language.

The apparent continuity in form of gesture and signs would provide two plausible explanations for earlier development of signs as compared to words: firstly, "articulation with the hand which is temporally slower than the one with the tongue could offer greater perspicuity to the infant learner of gestures than the one who learns through words" (Volterra, 1986); and as discussed above, children using signs do not need to switch modality while making the transition from pre-linguistic to linguistic interaction.

Pizzuto (1985) and Petitto (1985) have presented convincing evidence for the discontinuity hypothesis. The presence of visual identity between the pointing gesture and some pronouns in sign language does not facilitate the mastering of the pronominal system. In other words, while there is a widely reported phenomenon of pronoun reversal in children acquiring a spoken language, we would expect children acquiring a sign language to have no problems with the acquisition of "ME" and "YOU", since the gestures and the signs appear to be the same. Petitto (1985) has studied a deaf child learning American Sign Language who went through the same errors as hearing children make: using the term "YOU" when she meant "ME".

### **Motherese and sign language acquisition**

Sign language acquisition research can also shed light on topics connected with interaction in the first year of life. Schaffer (1977) and Snow and Ferguson (1977) provide examples of the large number of studies of the earliest "conversations" between mothers and their babies. By presenting continual repetition in reoccurring contexts, mothers offer ideal learning situations from which infants can extract linguistic rules for later language use. This model presents mothers and infants as participants in pre-linguistic dialogue. Snow (1977) has observed changes in the mother's part in this interaction, moving from talk about infants' feelings and states in the first six months to talking about events and actions in the external world. Sylvester-Bradley and Trevarthen (1978) and others maintain that such changes in the mother's speech are indirect responses to developmental changes in the child. As the child's focus of attention moves from the mother's face to objects in the environment in the 5 - 7 month period, a change in the mother's interaction style occurs as a response to the child's increasing interest in real world objects. As the child progressively relates with greater interest to objects than to faces, it might be predicted that deafness will cause increasing difficulty with establishing and maintaining communication.

Research on language development in deaf infants with hearing parents who communicate only in spoken language has identified problems in the development of attention and turn-taking, primarily because the complementary nature of normal early interaction is disturbed. These children cannot hear the language of their hearing mothers and thus the "fine tuning" predicted by studies of hearing children and their mothers does not take place. The result is a failure to develop normal interaction. Gregory and Barlow (in press) and Swisher and Christie (in press) have noted the frequency of overlapping speech and the absence of turn-taking patterns in interactions between deaf children and hearing parents. As our focus in this study is on families where the mothers are deaf, we are concerned with how the use of sign language by the mothers constrains the type of fine tuning occurring in interaction. Understanding the

approach of a deaf mother not only provides information about how sign language functions, but also about how deaf infants with hearing parents might be expected to behave if hearing parents used interaction strategies suitable for a deaf child.

Gregory and Barlow (in press) found that only 7% of acts by mothers were unrelated to a child's activity where both participants in the interaction were deaf, but 41% of deaf children's acts were followed by unrelated acts where the mothers were hearing. Gregory and Barlow suggest that the problem for deaf children of hearing parents is not the limited linguistic input they receive, but the difficulty in establishing pre-linguistic skills.

It is also important when comparing the behaviour of deaf and hearing mothers to include features of deaf culture as a possible cause for any differences found. Researchers have recognized that patterns of mothers' behaviour in interaction are related to culture.

"How caregivers and children speak and act towards one another is linked to cultural patterns that extend and have consequences beyond the specific interactions observed." (Schieffelin and Ochs, 1983, p.116)

Baker and Cokely (1980) see centrality of membership of the deaf community as determined by a number of overlapping criteria. These include audiological, linguistic, social and political. Freeman, Carbin and Boese (1981), in their statements on the importance of deaf culture, as distinct from community, include knowledge, belief, art, morals and law, all mediated by language. The deaf community are a non-literate society (both in sign language and in English), without access to many features of modern western culture, such as telephones and radio. There are also distinct aspects of deaf society which differ from those of the surrounding hearing community. These include, for example, a different function for personal names, compared with their use in the hearing community. Deaf people normally receive unique personal names, often based on some physical feature or deriving from sign play with their English names ("SQUINT-EYE", or "TREES" for a person names "Woods"). Neither these names nor hearing community names have any vocative function. Other differences between the deaf and hearing communities can be found in many aspects of social structure. It should also be noted that if measurable hearing loss is a determining criterion for membership of the community, then deaf parents may not view hearing children as potential members of their community, and this may have implications, for example, for language choice.

## Summary

While only a subset of the analysis has been presented here as Tables, the findings from these analyses can be summarized as follows:

1. Deaf mothers with hearing children did not simply use sign language in interaction. They initially used spoken language in their earliest interactions with the child to the exclusion of British Sign Language.

2. The rate of utterance production and utterance length was less than that of hearing mothers and also was less complex linguistically.

3. While the overall proportion of information-salient utterances was similar throughout the three recording periods, there was considerable variation in the type of utterance. Deaf mothers questioned less, but used naming and unstructured utterances more.

## Second Year Sample

### **Subjects**

Five children have been included in this part of the analysis: two hearing children and three deaf children, all with deaf mothers. Recordings were made monthly at home by a deaf researcher, using a hand-held camera with no artificial lighting, in order to obtain data as naturalistic as possible. During the sessions, recordings were made at random intervals over a two-hour period, preceded by a five-minute play session using a selection of toys and books brought by the researcher. A total of 30 minutes is recorded at each occasion. For this part of the analysis, only the five minute play session has been included from recordings made at 1.0 year; 1.3; 1.6 and 1.9.

### Voiced and Voiceless Signing

All the deaf mothers used signing with their children in this age group; the most noticeable difference between those with hearing children and those with deaf children was in the use of voice to accompany sign. Only one of the three mothers with deaf children articulated English words while signing; both mothers of hearing children articulated English words while signing. Reference will be made to this in the discussion below in relation to cultural explanations for deaf mothers' behaviour.

### **Attention-getting**

One major difference between the use of sign language and spoken language is that interaction in sign language requires visual attention to the speaker. As Harris, Clibbens, Tibbits and Chasin (1987) have pointed out:

"The problem for the deaf child learning to sign is this: both the adult language and the social context to which that language relates have to be visually attended and, therefore, the young deaf child has to divide attention between the language presented to him/her and the relevant context. (p. 229)

Harris and colleagues analyzed the proportion of signed utterances presented in the child's visual field according to the mother's attentional strategy. For the two children studied, only 7% and 4% of mothers' utterances respectively were preceded by tapping the child to gain his or her attention at the ages of 7 and 10 months. They explain that although tapping occurred more frequently, it was not a successful strategy in that it did not result in the child turning towards the mother much of the time. The most successful strategy adopted by the mothers was to sign within the child's existing focus of attention,



either by moving the sign to a different location, moving herself into the child's line of sight, or, rarely, by adjusting the child's position.

Tapping as an attention getting device occurs much less rarely with hearing mothers of hearing children; the most usual strategy for gaining a hearing child's attention is the use of vocatives, most often the child's name. If maternal behaviour is tuned to the child's potential, then we would expect deaf mothers with hearing children to call them to attract their attention; if maternal behaviour is drawn from the mother's potential, then we would expect tapping to be used.

All attention-getting devices used by the mother were coded for each five-minute period of interaction. The figures are present in Table 8.1.

Table 8.1. Frequency of attention-getting devices used by deaf mothers with deaf or hearing children in 5-minute play session.

Child age	1	1.3	1.6	1.9
Tapping				
Deaf child	7	11	14	6
Hearing child	1	9	9	7
Vocative				
Deaf	0	0	0	0
Hearing	0	1	3	0

As can be seen from the table, tapping was the most frequent attention-getting device used by the mother, whether or not the child could hear, with a very small number of vocatives used only by the mothers of the hearing children. It may be concluded, therefore, that attention-getting was not tuned to the child's ability to hear. The increase in use of tapping and vocatives between 1 and 1.6 and decrease from 1.6 to 1.9 may be related to developmental changes in the child. Before 1 year the mother most often moved herself or pointed into the child's line of vision; after 1 year 6 months the child mastered a strategy of automatically looking up at the mother as part of turn-taking behaviour.

Apart from tapping and waving, there was frequent use of pointing by the mother. This was coded separately from attention-getting, as unlike

tapping, pointing is integrated into sign utterances. Pointing most often took the form of touching with the index finger the object to which the child was attending; the mother reached round the child and pointed; the child turned round to face the mother and she continued with her utterance. Following Swisher and Christie (1986) we counted the

number of points used by the mothers in the five-minute samples and the percentage of "effective" points. These were defined as points followed by the child's gaze to the mother's following utterance.

The number of points and percentage of "effective" points produced by our sample of deaf mothers (37 points per 100 utterances, of which 89% were effective) was comparable to Swisher and Christie's hard-of-hearing mother (41 points per 100 utterances; 93% effective). In contrast, the hearing mothers of deaf children in their study produced only 18 points per 100 utterances of which only 43% were effective.

### Naming

Gregory and Barlow (1986) compared looking at picture books by deaf mother and child pairs, hearing mother and child pairs, and hearing mothers with deaf children. They found that deaf pairs attended much more to the book than either of the other two pairs. This was at least partly because hearing mothers with deaf children often elaborated on the contents of the book, talking about a past event, or another object in the room, while deaf mothers never did so. They hypothesised that there were potential difficulties for deaf children in dividing their attention between the task and the other person when using visual communication, and that limiting the context to the immediate task reduced this problem.

It is not surprising, therefore, that much of the five minute play sessions, particularly before 1 year 9 months was taken up by naming games, where the mother adopted a tutorial role, teaching the child signs for objects. This was largely accomplished by the mother pointing to an object or a picture of an object, and either providing a model sign for the child or by signing "WHAT'S THAT". Unlike the sign "WHAT" in interaction between adults, which is produced by holding the hand with index finger extended and pointing upwards, palm away from the body, "WHAT'S-THAT" is articulated by holding the flat hand, palm up, in front of the body.

Model utterances, usually consisting of a single sign, varied in significant ways from the articulation of the same sign in other contexts. Models were characterised by extensive reduplication of a sign's movement, often at slow speed, and movement across a large area. Several examples will make this clear. The sign "AIRPLANE" is normally made in the following way: the thumb and little fingers are extended from the fist, palm down, and the hand moves at shoulder height in a short arc across the body. In providing a model of "AIRPLANE", the sign had the same handshape, but often moved to the extreme left of signing space, was then turned and brought back to the right side of the body with swooping movements and then returned to the left again, sometimes finishing on the child's body. Movements were reduplicated as many as 10 times, compared with a single repeated movement in other contexts.

The mothers often provided a model of a sign for the child, and then acknowledged either the child's attempt to articulate the sign or some other indication by the child that he or she had understood the utterance, such as the child pointing at the appropriate picture. The acknowledgements showed little reduplication or other alteration from the

usual form. In Table 8.2 below, a selection of signs is presented with the number of reduplicated movements indicated when occurring as models or acknowledgements.

Table 2. Mean number of reduplicated movements in mothers' naming models and naming acknowledgements in free play sessions

Sign	Model	Acknowledgement
Airplane	3	1
Boat	2	1
Car	7	2
Cat	6	3
House	2	1
Motorbike	6	2
Rabbit	3	2
Train	5	2
Tree	3	2
	Grouped Means	
	4	2

Mothers thus provided models of signs for children that were visually and temporally expanded, only when they wanted the child to attend to and copy the form. This type of modelling sometimes also included actual manipulation by the mother of the child's arm and hand to articulate the sign.

### **Length of Utterance**

The subjective impression of hearing people looking at these recordings is that the amount of signing produced by the mothers is much less than the amount of speech that one would expect hearing mothers to produce. Gregory and Barlow (1986) found that the deaf mothers in their study spent less than half as much time signing to their children as hearing mothers spent speaking. We did not have a comparable control group for the children in our study but our results were similar to Gregory and Barlow. Mean length of utterance produced by deaf mothers was also shorter than for hearing mothers with children of the same age, but as explained above, this is likely to be due to the much greater amount of reduplication and extended time taken to articulate model signs.

## Discussion

To understand the differences between deaf and hearing mothers it is necessary to look both at cultural and situational demands. Using coding systems based on spoken language interaction causes problems in analysis. For example, British Sign Language is a language which is inflected for aspect and manner. Counting signs to determine mean length of utterance will underestimate the complexity of signed utterances. As has been noted in relation to naming models, signs can be altered in manner of articulation in ways which are unavailable to spoken languages and so cannot be directly compared.

Deaf mothers of hearing children tell us that although they know their children can hear they find it difficult to communicate if the child is not looking at them. This may explain the lack of vocatives in the mothers' communication and account for the observation that whether or not a child can hear, a deaf mother's interactions differ from a hearing mother's. Unlike spoken language interaction, where it may be assumed that the verbal message can at least be heard without the child directing his attention to it, in sign language communication the child must attend visually to the message as it begins, or it is missed. Sign communication can only take place when both parties look at one another. As the child's interest in the world around increases, the mother's control of infant's eye gaze becomes more difficult. For a hearing mother and child, the problem is less, because she can talk during object play. The deaf mother is faced with the task of gaining attention to give information, and she needs to engage her child's attention before beginning to sign. We might predict that the deaf mother would engage in more overt attempts to break eye gaze to obtain the child's attention, and a tendency to avoid signing while attracting the child's attention. Deaf mothers in the early recordings achieve this training of attention by constantly placing themselves in a location to interrupt the child's line of gaze. Deaf mothers appear to view early interaction as a means of focussing the child's gaze and providing training in attention games. While this results in an apparently small amount of interaction, and repetitive utterances when compared with hearing mothers, the result is the successful development of language at a comparable rate and level to that of hearing children with hearing parents.

## APPENDIX 1: Scales Used

### LANGUAGE SCALE

Name: D.O.B. Date first filmed at:

G. Gesell RG: Ruth Griffiths

Birth to 4 weeks

1. Face impassive (blank; not expressive) (G)
2. Makes small throaty noises (G)

8 Weeks

3. Starts to smile (G)
4. Alert expression (G)
5. Looks at person directly (G)
6. Vocalisation (sounds): single vowel sounds (G)

Coos (12 wks) (G)

Chuckles (12 wks) (G)

Laughs (16 wks) (G)

Squeals (20 wks) (G)

Grunts and growls (24 wks)

m-m-m (28 wks) (G)

Polysyllabic vowel sounds (e.g. oo-oo

ah-ah) (28 wks) (G)

Single consonant, e.g. da. ba. ka.

(32 wks) (G)

Da-da etc. (36 wks) (G)

Talks in jargon with English

intonation (1;1) (G)

12 weeks

7. "Talks" back to you if you nod head and talk to him (G)

24 weeks

8. Makes sounds ("Talks") to you and to toys. (You don't have to start talking to baby first) (G)

9. Copies sounds, e.g. "baa", cough etc.

10. Comprehension; (what the baby understands)

Responds to Name and to "No" (What does baby do, how do you know baby understands own name and "No"?) (G)

Always say if signed or spoken or both

Understands "bye", "clap-hands". At first needs gesture (G)

Gives you a toy if you ask and hold out hand (1;0) (G)

Know a few things by name. Will point to them. (1;4) (G) (What will baby point to?)

40 weeks

11. Vocabulary: (On interview form always say if vocabulary is signed or spoken or both, and when the baby uses the word or sign)

Shakes head for "No" (RG)

Says/sign Dada and Mama, with meaning (G)

Has one "Word" (Spoken or signed) as well as

Dada and Mama (G)

Has two words/signs (1;0) (G)

Has 3/4 words/signs (1;1) (G)

Has 4/6 words/signs (1;3) (G)

Has 10 words/signs (1;6) (G)

Has 20 words/signs (1;9) (G)

Uses I, me, you (2;0) (G)

15 months (1;3)

12. Book: Pats pictures (G)

Looks at picture if you point to it. (G)

21 months (1;9)

13. Combines 2 signs or words (G)

14. Uses a 3-word/sign sentence (2;0) (G)

30 months (2;6)

15. Says full name if you ask him (G)

36 months (3;0)

16. Uses plurals (G)

17. Answers "Are you a girl or a boy?" (G)

## SELF-HELP/SOCIAL SCALE

Name:                      D.O.B.              Age at first recording

V = Vineland.      G. = Gesell.      C = Cohen and Gross

### Birth to 12 weeks

1. Does baby have 2 feeds at night? Write down when has only 1 night feed. (G)
2. Does baby look at a person moving round the room? (G)
3. Does baby smile if you smile at him? Write date when starts to smile. (G)

### 12 weeks

4. Baby lying on back, does he look at you (not all round the room)? (G)
5. Does baby look at his hands a lot? (G)
6. Does baby pull at his clothes? (G)
7. Does the baby laugh? (V)
8. Can the baby hold his head up without help? (V)

### 16 weeks

9. Does baby smile at you first, before you smile at him? (G)
10. If baby sees food, does he get excited? What does he do? (G)
11. Does baby play with his hands, putting both hands together? (G)
12. Does baby pick up objects near him? (V)
13. Does baby reach out to people he knows? (V)
14. Can baby roll over from tummy to back, and from back to tummy? (V)
15. Does baby try to grab objects just out of reach? (V)



16. Sits, propped up, for 10-15 minutes?. (G)
17. Is baby happy if you leave him playing by himself for 15 minutes? (V)

20 weeks

18. Smiles at himself in mirror? (G)
19. Bottle-fed: Pats bottle with both hands (G)

24 weeks

20. Knows the difference between people he knows and strangers.  
How do you know baby can tell the difference? (G)
21. Grabs his foot to play with it (G)
22. Play: Sits propped up for 30 minutes (G)
23. Mirror: Smiles and talks to self in mirror (G)
24. Lifts his arms up when you are about to lift him up (RG)
25. Lifts his arms up and stretches them when he wants you to lift him up (RG)

28 weeks

26. Sit up by himself without falling over? (V)
27. Play: Lies on back and puts foot in mouth (G)
28. Mirror: Reaches out and pats self in mirror (G)
29. Starts to feed self with fingers (C)
30. Holds spoon and plays with it (C)

32 weeks

31. Play: Bites and chews toys (G)
32. Keeps on reaching out for toys just out of reach (G)
33. Knows strangers from friends (RG)

(How do you know baby can tell the difference?)

36 weeks

34. Can baby stand up by holding onto a table/rail etc.? (V) (G)
35. Does baby copy you if you talk to him? (V) (G)  
(Should copy sound mother makes)
36. Feeding: Holds bottle (G)
37. Feeds self biscuit or rusk (G)

40 weeks

38. Waves bye-bye (G)
39. Plays patacake (G)
40. Moves around the floor (Any way)
41. Drinks from a cup or glass with help (V) (G)

#### MOTOR DEVELOPMENT SCALE

G = Gesell      RG = Ruth Griffiths      C = Cohen and Gross  
Name:              D.O.B.              Date first filmed

- Birth to 4 weeks
1. Lying on front can baby lift up chin? (RG)
  2. Lying on back: Does baby push with his feet against your hands? (RG)
  3. Lying on back: Does the baby usually have his head to one side? (G)
  4. Lying on back: Can the baby roll over a little way? (G)
  5. Pull the baby to sitting: Does his head lag behind? (G)
  6. Lying on back: Does baby wave his hand in a fist?  
Loosely closed  
Open (G)
  7. Put a rattle into baby's hand, does he: Drop it? (G)  
Hold it for short time  
and then drop it? (C)  
Grab hold of rattle? (C)
- 8 weeks
8. Lying on front: Can baby lift up his head? (RG)
  9. Lying on back: Does baby kick (strong kicks) (RG)
  10. Sitting: Does baby's head bob (move) up and down? (G)
- 12 weeks
11. In the bath: Does baby kick a lot? (RG)
  12. Lying on tummy: Arms bent

- stretched out in front (G)
13. Lying on tummy: Legs bent
    - stretched out (G)
  14. Can baby roll from side to back? (RG)
    - 16 weeks
  15. Lying on back: Do baby's hands touch each other? (G)
  16. Sitting: Head steady? (G)
  17. Lying on back: Does baby clutch at things? (G)
  18. Cube: Reaches for cube but may not hold it (17 wks) (C)
    - Can hold one cube in each hand (18 wks) (C)
    - Holds cube in hand and passes to other hand (22 wks) (C)
    - Holds in whole hand (20 wks) (G)
    - Holds with thumb & two fingers, cube touches palm (28wks) (G)
    - Holds with thumb & two fingers, cube NOT touching palm (36 wks) (G)
    - Holds two cubes in one hand (1;1) (G)
    - Builds tower of two cubes (1;3) (G)
    - Builds tower of 3 or 4 cubes (1;6) (G)
    - Builds tower of 5/6/7/8/9/10 cubes. How many? (Up to 3;0) (G)
    - 20 weeks
  19. Pull baby up to sitting position: Head does NOT lag behind (G)
  20. Lying down: Can baby roll from side to side? (RG)
    - 24 weeks
  21. Lying on back: Does baby lift legs up high? (G)
    - Plays with own toes? (RG)
    - Can baby roll to tummy? (G)
  22. Sitting in chair: Can baby sit up straight? (G)
    - 28 weeks
  23. Lying on back: Lifts head up? (G)
    - Lifts up head and shoulders? (RG)
    - Rolls over to tummy? (RG)
  24. Sitting: Sits with weight on hands, for short time (G)
    - Sits up for short time (G)
    - Starts on hands and knees, then sits (30 wks) (G)
    - Sits for 1 minute, unsteady (32 wks) (G)
    - Sits for 10 minutes or more, steady (36 wks) (G)
    - Sits, leans forwards and sits up again. (36 wks) (G)
    - Sits for any time, steady (40 wks) (G)
    - Sits and moves onto tummy (40 wks) (G)
    - Sits and pivots round (48 wks) (G)
  25. Pellet: Rakes with whole hand and touches pellet (G)
    - Rakes with thumb and two fingers (32 wks) (G)
    - Rakes with thumb and one finger (scissors) but does NOT pick up pellet. (32 wks) (G)
    - Picks up pellet with scissor-grasp (36 wks) (G)
    - Picks up pellet with pincer-grasp (40 wks) (G)
    - Tries to put pellet in bottle, but fails (52 wks) (G)
    - Puts pellet in bottle (no demonstration) (1;3) (G)
    - 10 into bottle in 30 seconds (3;0) (G)
    - 32 weeks
  26. Lying on tummy: Can baby pivot round? (G)

27. On tummy: Can baby creep around? (G)  
Tries to crawl? (RG)  
Crawls, forwards or backwards (RG)  
36 weeks
28. Stands up holding table or rail (G)  
Pulls self up using table or rail and stands (40 wks) (G)  
Stands at table or rail, lifts up foot and puts it down  
again (44 wks) (G)  
Stands at table or rail and walks around holding table  
(48 wks) (G)  
Walks with two hands held (48 wks) (G)  
Walks with one hand held (52 wks) (G)  
Stands by self for very short time (1;1) (G)  
Walks a few steps, starts, stops (1;3) (G)  
Walks and falls (collapses) (1;3) (G)  
Likes to walk instead of creeping (1;3) (G)  
Walks; rarely falls over (1;6) (G)  
Starts on back, rolls to tummy and stands up (1;1) (C)  
Walks sideways, several steps (1;2) (C)  
Walks fast; runs stiffly (1;6) (G)  
Walks backwards, a few steps (18 mths) (RG)  
Walks pulling toy on string (19 mths) (RG)  
Walks and squats down (1;9) (G)  
Walks and picks up toy from floor without falling (1;6-1;11) (C)  
Runs well, no falling (2;0) (G)  
Walks backwards 10 feet in straight line (2;3) (C)  
Walks on tiptoe; a few steps (Show child how) (2;1-2;6) (C;G)  
Walks on tiptoe 10 feet (Show how) (2;5) (C)  
Tries to stand on one foot (2;6) (G)  
Stands on one foot, very short time (3;0) (G)  
Stands on one foot, 2 seconds (3;6) (G)  
Runs around things and around corners (3;0-4;0) (C)  
Balances on one foot for 5 seconds (3;3) (C)  
42 weeks
29. Ball: Throws or rolls ball (G) (C)  
Flings ball (throws ball hard) (1;2) (C)  
Throws ball overhand (1;3-2;3) (C)  
Throws ball overhead (1;7) (C)  
Throws ball without falling (2;0-2;5) (C)  
Throws ball overhand 4 feet (2;6) (C)  
Throws ball underhand (2;6-3;0) (C)  
Throws ball 10 feet (3;0) (C)  
Throws using elbow and shoulder (3;0-4;0) (C)  
44 weeks
30. Drawing: Copies scribbling (G)  
Scribbles by self (1;2) (G) (C)  
Copies vertical line (2;0) (G)  
Copies V-strokes (2;0) (C)  
Copies circular lines (2;0) (G) (C)  
Draws circles and dots by self (2;0) (C)  
Copies horizontal line (2;0-2;6) (C,G)

- (C)
- Draws vertical and horizontal lines by self (2;6-2;11)
  - Holds Crayon by fingers (2;6) (G)
  - Draws a cross shape (2 strokes) by self (2;6) (G)
  - Copies a cross (3;0-4;0) (C)
  - Draws a cross by self (3;0-3;6) (C)
  - Copies a circle (3;0) (G)
  - Draws a circle by self (3;0) (C)
  - Traces diamond (3;6) (G)
  - Copies a square (3;6) (C)
  - 15 months
  - 31. Helps turn the pages of a book (G)
  - Turns pages by self, 2 or 3 at a time (1;6) (G)
  - Turns pages one at a time (2;0) (G)
  - 32. Stairs: Creeps up (G)
  - Walks up, holding rail or wall (1;5-1;9) (C,G)
  - Walks down, holding rail or wall (1;5) (C)
  - Creeps backwards down stairs (1;6-1;11) (C)
  - Walks up with one hand held (1;6) (G)
  - Walks down, one hand held (1;9) (G)
  - Walks up and down alone; 2 feet on each step (2;0) (G)
  - Walks up like adult, one foot on each stair (3;0) (G)
  - 18 months
  - 33. Seats self on small chair
  - Climbs into adult chair (G)
  - Climbs down from adult chair without help (1;9) (C)
  - 34. Large ball: Walks into large ball (G)
  - Kicks large ball (Show child how) (1;9) (G)
  - Kicks ball (No demonstration) (2;0) (G)
  - 30 months (2;6)
  - 35. Jumps: Both feet off floor (G)
  - 36. Jumps from bottom stair (2;0) (C)
  - Jumps from second stair (2;3) (C)
  - Jumps from second step and lands 4 inches away (2;4) (C)
  - 14 inches away (2;5) (C)
  - 24 inches away (2;5) (C)
  - 37. Jumps over string 2 inches high (2;5) (C)
  - 8 inches high (2;5) (C)
  - 38. Long jump: more than 8 inches (2;7) (C)
  - 39. Hops: on one foot for 2 or more hops (2;5) (C)
  - 36 months
  - 40. Skip (3;0-4;0) (C)
  - 41. Rides trike using pedals (G)

## APPENDIX 2: Questions to Parents

Like to explain your previous background when you had children, your informations, ideas. I ask in block questions and answer short.

Questions about who looked after your..... when.....  
was one year old (12 months).

1. Most who look after child?
  
2. Most who
  - (a) feed child?
  - (b) dress child?
  - (c) bath child?
  - (d) Story tell child?
  - (e) child play who?
  
3.
  - (a) tell stories how often?
  - (b) play with, every day or weekend?
  
4.
  - (a) nappy who change?
  - (b) might baby crying who up?
  
5. Yesterday child who with?

Work day

Rest day

6.00 - 8.00am

8.00 - 10.00am

10.00 - 12.00am

12.00 - 2.00pm

2.00 - 4.00pm

4.00 - 6.00pm

6.00 - 8.00pm

6. Normal baby bedtime?

7. Sleep baby what time?

#### Information

Ask, when people have children, find out how know about families, how know about children. Some people read books, others ask Doctor, nurse or watch TV or have own mind about children.

8. You, how find out about children?

9. All help you have, separate them and think help a lot, little or nothing

	A lot	little	nothing
a. book read help			
b. watch TV baby programme help			
c. ask people help			
d. watch people help			
e. when you young, what you remember help			
f. your own feeling about children help			

10. Have names of people, think tell you informations or advice helped you.

A lot            little    nothing

a. what about your mother - father

or husband's mother - father

b. what about your older relatives

like brother, sister, aunty,uncle

c. what about relatives with children

same age yours

d. what about friends with children

e. what about doctor or nurses

f. what about teachers, social

workers

g. think anybody help

11. Some help little, some help big, who biggest help?

12. Now, other mothers and fathers with same age children you mix?

Where?



How many times?

13. Your child play with other children some age?

How many times?

14. (If deaf child) how often play together with deaf children?

#### Development

Children all grow different. Some fast, some slow. Some good doing things some not good doing things. Mother and father know what to expect and talk then most children can do or children do average. I like to ask about it.

15. What average age child can do

Offer to mother

- |                       |              |
|-----------------------|--------------|
| a. walk               | 6-18 months  |
| b. sit up             | 3-12 months  |
| c. things reach       | 2-9 months   |
| d. blocks build tower | 15-28 months |
| e. crawl              | 3-12 months  |

What average age, child can do

- |                                   |            |
|-----------------------------------|------------|
| g. moving light, watch and follow | 0-6 months |
| h. over the room see things clear | 0-6 months |

- |                                     |            |
|-------------------------------------|------------|
| i. know mother's face               | 0-6 months |
| j. shock or jump when sound         | 0-6 months |
| k. know mother's voice (if hearing) | 0-6 months |
| l. mother talks or sign, baby smile | 0-6 months |

What average age, child can do

- |                          |             |
|--------------------------|-------------|
| m. hold up arms, want up | 6-18 months |
| n. things point at       | 6-18 months |

(If don't know average, take a guess)

Your Experience (Deaf parent only)