A COMPARATIVE STUDY OF THE EFFECTS OF THE MAKATON VOCABULARY AND A LANGUAGE STIMULATION PROGRAMME ON THE COMMUNICATION ABILITIES OF MENTALLY HANDICAPPED ADULTS.

ELENOR MARJORY BIRKETT

DEPARTMENT OF ENGLISH LANGUAGE

UNIVERSITY OF GLASGOW

DEGREE OF M.LITT.

DECEMBER 1984

ACKNOWLEDGEMENTS

I am most grateful to Dr. M. K. C. MacMahon (Department of English Language), who has provided advice and support for my efforts from start to finish, and to Dr. A. W. Shirley (Department of Psychology) for his invaluable statistical assistance. There are also a number of colleagues to whom thanks are due: to Clinical Psychologists, James Furnell and June McDermont, for administering one of the assessments; to Paul Dickens, who provided sympathetic advice; to fellow Speech Therapists, Gail Robertson and Moira Bankier, for their support; and to Margaret Walker and other representatives of the Makaton Vocabulary Development Project for their interest and advice.

I would also like to express my gratitude to the hospital staff of both the Royal Scottish Hospital and Lynebank Hospital for their co-operation, and in particular to Janet Scott of the Speech Therapy Department at Lynebank.

In addition, I am most grateful to the twenty-four patients who readily took part in the study, and without whom this project would never have taken place.

Finally, I must express thanks to Lynne and John Wallis for patiently typing this project; to Joan Clarke for lovingly caring for my daughter whilst I worked; to my parents for their help. I also thank my two daughters Claire and Zoë, who have tolerated their Mum's pre-occupation with work. Above all, thanks are due to my husband John, at whose suggestion the project was begun and without whose help it would never have been completed.

LIST OF CONTENTS

ABSTRACT

This thesis considers the reasons for teaching sign language to mentally handicapped people and evaluates its success by examining both specific studies and some of the underlying psychological principles. This is followed by a linguistic appraisal of three sign language systems taught in the UK , with a particular examination of the Makaton Vocabulary.

The experiment which follows is an attempt to measure the relative effects of three different approaches to intervention on the communicative abilities of three groups of institutionalised mentally handicapped subjects. The results of the one group receiving Makaton Vocabulary (sign language) intervention are then considered in greater detail.

The results of the studies of sign acquisition and use are considered to be of particular interest for further research and possible improvements in teaching approaches.

Introduction

Sign languages have existed for hundreds of years in many different countries and have been used for communication by various communities, including Trappist Monks, American Indians and pre-lingually deaf people. The application with the mentally handicapped, however, has only been widely explored in the last twelve years. Researchers are generally agreed that many mentally handicapped people with communication problems learn to sign with greater ease than they can learn to speak, thus aiding their comprehension of language and their expressive abilities. The reasons why this should occur are unclear and further research is needed.

This present study examines some of the communication problems affecting mentally handicapped people and the contribution of sign languages to the improvement of their communication abilities. In particular, the contribution of the Makaton Vocabulary is examined, as it has emerged as the most popular manual system in use in the U.K.

It is one of the aims of this thesis to demonstrate that British Sign Language (BSL) and Makaton Vocabulary (henceforth the MV),which is derived from BSL, contain the crucial elements of language

structure as defined by Crystal (1976:26). A comparison of the MV and the other manual sign systems used with the mentally handicapped is made from both linguistic and teaching aspects.

In order to examine the contribution of manual signs to the communication abilities of the mentally handicapped, the present study was conducted. (It is decribed in detail in Section 3.) It aimed to study the acquisition of signs by the subjects and any correlation between the subjects' and nurses' use of signs. In addition, a comparison between two language stimulation programmes and a sign language programme was made so the effects of each could be examined.

An analysis of the results is presented in Section 4 followed by a discussion of the results in Section 5.

Section 1 SIGN LANGUAGES AND THE MENTALLY HANDICAPPED

During the late 1960's and throughout the 1970's there was a surge of interest in different countries in the contribution of sign language to the communicative abilities of the mentally handicapped. Much of the research was carried out in the United States and began with work on chimpanzees and other primates. When it was discovered that primates could be taught to communicate using sign language (Gardiner & Gardiner 1971) or with plastic symbols (Premack 1979), other researchers decided that these techniques might profitably be used with non-verbal humans who were functioning at an equally low intellectual level as primates (Bricker 1972:510).

Prior to this interest in manual communication, the clinical emphasis was on training deficient verbal skills. However, many of the mentally handicapped subjects failed to acquire any functional speech or to use words spontaneously (Carr 1979:358, Lovaas et al. 1966:707) giving rise to severe communication problems. The severity of communication problems varies: some people will never acquire any verbal expression or comprehension of language; others gain varying degrees of facility and may progress to limited, though adequate, communication skills (Ryan 1975:270).

Schaeffer et al. (1978:351), however, point out that when non-verbal children with severe communication problems can learn sign language, they use it spontaneously to:

i) express their desires, and

ii) describe the world and guide their own actions.

They claim that sign spontaneity gives these children spontaneous communication, albeit in a non-vocal mode.

1.2 Communication disorders and the application of sign languages

The range of communication disorders amongst the mentally handicapped is the same as for the normal population, although the incidence of disorder is much higher (Fawcus & Fawcus 1974:593). All mentally handicapped people are affected by retarded speech and language development to a greater or lesser degree. Some mentally retarded children never acquire speech and frequently live in institutions, often experiencing difficulty in communicating their basic needs and desires (Bonvillian & Nelson 1978:200). Ryan (1975:270) points out that they pass through the same stages of language development, but at a much slower rate than normal children.

Lenneberg (1973:53-55) concurs with this view and claims that all but the most profoundly handicapped show a degree of language ability. Mittler (1974:546-8) points out that although the retarded progress at a slower rate, they fail to attain linguistic maturity as does a normal child. Therefore, what begins as a delay in the child, ends up as being deviant in the adolescent and adult, which ultimately affects the quality of their communication and marks them out in society as being handicapped - probably more than their actual mental abilities warrant.

Lenneberg (1967:154-162, & 1973:49-60) offers evidence that neurophysiological maturation controls language acquisition. He claims that the optimal age for language learning is between two and thirteen years of age. By adolescence, if the subnormal person has never learned to speak, then he never will, due to the increased specialisation of brain cells as the brain matures with less capacity for readjustment. This evidence is now partly disputed, however, as evidence of speech development in adults, facilitated by the use of sign language programmes such as the M V , is amassing.

There is a greater incidence of hearing problems, some of which are neurological due to damage at some point in the central nervous system. Many also have

a susceptibility to conductive hearing losses, due to abnormal ear structures, or catarrhal problems causing intermittent loss as is frequently seen in Down's Syndrome patients. Yarter (1983:54) claims that the levels of hearing loss considered to cause comprehension problems in Down's children are too high. This may be applied to any retarded individual with a hearing loss who has not already developed a language system. She points out that a person with a working knowledge of the language can rely on redundancy and other clues to fill in much of the sound lost with a 25 to 30dB loss. Hearing losses of even 15dB, however, can adversely affect the auditory development and consequently speech development of normal children. As Yarter points out, what is true for a normal child is even more so for retarded children, delayed in all areas and possibly responding abnormally to visual, auditory and tactile experiences. In this way, the additional handicap of deafness on top of mental retardation can have disastrous effects on the speech and language of such individuals.

The early introduction of signing for these children can alleviate some of the communication problems by providing visual clues when the auditory channel fails. It may also enable the child to gain earlier understanding of the environment and provide a means

of expression should speech fail or prove incomprehensible.

One other communication problem mentioned by Fawcus & Fawcus (1974;603) is aphasia, which in its more severe form can be confused with deafness and mental handicap - although these may also be present in an aphasic subject. This condition was described by Morley (1972:156) as a 'breakdown in the comprehension and formulation of words, giving rise to a disturbance of thought and disorder of language'. These subjects may also respond to sign language where they fail to respond to spoken language.

Other causes of communication breakdown in the mentally handicapped may be:

i) a lack of stimulation or motivation to communicate, which is frequently noted in institutionalised subjects (Mittler 1974:540);

ii) neuromuscular disorders, resulting in a dysarthria which can range from a total inability to produce sounds, to a slurring, slow speech (Morley 1972:212);

iii) structural disorders, such as cleft palate. The value of using sign language

in these cases is perhaps less significant than for the previously mentioned categories of disorder.

Any one, or a combination of the above categories, will result in a communication breakdown. Low intelligence alone is enough to prevent the child from learning spontaneously, whilst the normal child easily learns language from its environment. The two appear to learn language differently. Mittler's survey of the language development of mentally handicapped school age children (1979:83) shows that of the school leavers at 16 years, 25% are unable to form a two-word sentence, 18% did not even use holophrases, 43% had no grammatical sentences. Only the remaining 17% were, apparently, more competent. Mittler comments that this development is considerably slower than would be predicted by their IQ alone. There must therefore be other factors influencing their language development.

1.3 Factors affecting language learning by the mentally handicapped

Miller & Yoder (1974:524-525) identified three categories of non-language behaviours which may affect language learning. Firstly, attention control and eye contact were notably poor, and there was high distractibility in the mentally handicapped

subjects. Secondly, the motivation to communicate was also low, due to repeated communication failures. Increasing motivation should be an integral part of any therapeutic intervention, and increasing success would erase the previous history of failure. Thirdly, cognitive behaviour may affect the language learning process. Cruttenden (1979:113) states that cognition precedes meaningful linguistic usage. The learning of language by mentally handicapped children may therefore be limited by their degree of cognitive competence.

The M V is reported to facilitate eye contact and attention control (Walker 1983:8), the first category mentioned in Miller & Yoder's summary. In addition to this facilitation, Walker (1976:vii) recommends using pictures instead of objects to counteract the high distractibility of the mentally handicapped subjects. She also takes into account the second point, that of increasing motivation to communicate, by introducing food and drink items during each teaching session, in order to encourage spontaneous signing(op.cit.:1-5).

Schiefelbusch & Hollis (1980:20) also contend that the sensory and perceptual ability of the child is critical for their pre-linguistic as well as linguistic development. Impairment of the sensory functions will lead to a distortion of the child's

conceptual structure. By teaching signing to a young Down's Syndrome child and her family, Le Prevost (1983:29) was able to identify her visual and auditory misperceptions and correct them before they were incorporated into the child's conceptual system, as the child's use of signs enabled interpretation of her unintelligible speech.

Fouts et al. (1979:305) point out that the inability to speak creates a loss of control over the environment, encouraging a learned helplessness. 'These children and, eventually, adults grow passive and indifferent to communication behaviours which generalises to other situations'.

One cognitive function which is known to affect language behaviour is that of short term memory (Clarke & Clarke 1974:283). The role of memory in general language learning is vital. Belmont & Butterfield (1975:29) propose that normal subjects memorise by using verbal labels, whereas the retarded use non-verbal labels, which the authors suggest is inferior to the verbal memory trace. This point may account for the relative success experienced by retarded subjects learning sign language. Reid & Kiernan (1979:200-203) propose that the inability to encode verbally could be related to the failure to learn language, as it is learned auditorily. They point out that manual

signs have the same representative function as words, but that the input and encoding categories are different, thus accounting for the relative success of sign language systems.

1.4 Sign Language Studies Reviewed

Generally the following studies fall into three categories :

i) in which sign language is used with autistic subjects

ii) in which sign language is used with Down's Syndrome subjects

iii) in which sign language is used with those with a non-specific mental handicap.

1.4.1 Sign Language and Autism

The group of subjects most widely reported as receiving sign language instruction is that of autistic individuals. Bonvillian & Nelson (1978:190) list the typical features as being a delayed onset of speech, echolalia, and mutism. In addition to a serious language handicap, they may also show ritualised movements, impaired social relationships and other profound behaviour disturbances.

Varying results were reported from the different studies. Most of the subjects were autistic children or young adults (23 years maximum). All studies report that the subjects acquired some signing ability (Miller & Miller 1973; Fulweiler & Fouts 1976; Schaeffer et al. 1978; Bonvillian & Nelson 1976; Konstantanareas et al. 1979; Baron & Isensee 1976), although the degree of spontaneous use of signs is rarely mentioned, except in two studies. The first, by Carr & Kologinsky (reported in Carr 1979:345-359), reports that the children involved in the study rarely used signs spontaneously. They were taught that a variety of foods would be available only if they initiated communication. The children began to sign spontaneously in the adult's presence, and this response was generalised to other adults. In the other study, Baron & Isensee (1976) report that their single subject, a twelve year old girl, learned to sign rapidly. They tested language comprehension in both sign language and speech and found that when the instructions were given in English, she frequently signed spontaneously, before making the appropriate response, which suggested that she might be using signs to mediate spoken language.

Schaeffer (1980:423) reports teaching three autistic boys (two were mute and one almost) sign

language and verbal imitation as separate skills. After four months they were taught to sign and speak simultaneously. One month later, the signs were inhibited by physically restraining their hands. Schaeffer reports that the facility for speech remained and they were later taught to speak both louder and faster.

Spontaneous speech was acquired by some other subjects in these studies. Miller & Miller (1973:65-85) report speech in only two subjects from a total of nineteen. Fulweiler & Fouts (1976:43-51) taught signs accompanied by speech to a five year old autistic boy for a total of twenty hours. He used a total of twenty-five signs, combining them with two-word and three-word phrases and also spontaneous speech in single words and two-word phrases. Bonvillian & Nelson (1978:196) point out that when using a speech-orientated programme, there is often less success after a much longer training period.

Bonvillian & Nelson (1976:339-347) report a longitudinal study on a twelve year old autistic boy as he learned sign language over three years. He had previously received many forms of speech and language intervention and failed at them all. Following the three year period, he used about four

hundred signs, whilst speech therapy, having concentrated on his articulation, had shown slow progress, with only nineteen partially intelligible words.

The study by Carr & Kologinsky (Carr 1979:345-359) also mentioned a decrease in self-stimulatory behaviour following sign language training. In explaining this, they suggest that this may be due to the child learning that he can actually control the behaviour of others so the self-stimulatory behaviour loses its function.

Carr (1979:345-359) reviewed seven studies investigating the use of sign language by fifty-two autistic subjects. He concludes that: following simultaneous speech and sign use, some children's speech improves, but for many the output is negligible; almost all make significant gains in their ability to use sign language. Carr points out two other significant features; firstly, the subjects selected are either mute, or almost mute; secondly, they typically have a low mental age, which is correlated with overselective attention. This overselectivity means that when words and gestures are paired, the child attends to the gesture rather than the word.

These conclusions have important implications for the communication training of autistic subjects and indicate that clinicians cannot afford to ignore the contribution of sign languages to the enhancing of communication skills.

1.4.2 Sign Language and Down's Syndrome

Yarter (1980;49) describes the classic picture of communication problems associated with Down's subjects· their expressive language lags behind their language comprehension, which masks their level of expressive language ability. The motor ability of Down's subjects is better than their language skills, and particularly important is their rapid facility for imitation, which is useful when considering them for sign language.

Hobson & Duncan (1979:33-37) investigated the retention of American Sign Language signs by nine adult 'non-verbal' Down's Syndrome subjects. They were taught over a period of six weeks to associate gestural signs with a series of pictures. Each subject was trained to produce the appropriate responses. There followed a two month period when all training was suspended. On re-testing, each

subject showed retention of signs, on average over 50%. The results also showed that the receptive sign vocabulary is greater than the expressive.

Yarter (1980:50) advocates the introduction of signs to Down's Syndrome infants. She supports this view by pointing out that at a very early age the pattern of failure in language can be set, as typically these children have great difficulty in progressing from the stage of pointing and vocalising a need to the more abstract stage of using a verbal symbol. She suggests that from the age of around ten months (if not younger), visual and verbal cues should be paired, with the child's imitation of the signs being encouraged. After consistent exposure to speech and signs over a period of time, the child often begins to use a sign to express a need or desire. At this point the child has moved beyond imitation towards understanding the symbolic element of language.

At a later stage of language development, signing can be used to encourage the development of syntax. It is therefore important to speak with correct grammatical constructions when signing, rather than cutting down the speech to a telegrammatic message.

The work of Le Prevost (1983:28-29) has pioneered the introduction of sign language (Makaton) to young

Down's Syndrome babies of ten months and under, in the UK. She is working with a larger sample than the one published case, and the results appear to be equally significant. She has monitored the motor and language development of a Down's Syndrome child from ten months to three years. Comparison of her motor and language skills at thirty-five months has shown that the child's language was at a twenty-six month level, compared to sixteen months for her motor development.

Le Prevost (op.cit.) introduced forty signs from Stages 1 and 2 of the M.V., to the mother of a ten month old Down's Syndrome child. The mother was encouraged to use the signs as much as possible, but not to expect any response from her child. When the child was seventeen months old, the mother was told to encourage her child to make signs. At eighteen months, thirty further signs were added and others have been gradually introduced since then.

Signing appeared to have an immediate effect on the mother-child relationship. The mother became 'more aware' of when her child was looking at her. This, in turn, made the mother ensure that the child was watching the appropriate stimuli. The child became more alert and responsive to communications directed at her. Speech and sign have developed simultaneously and have proven invaluable in

detecting and correcting the child's faulty visual perception of certain objects. For example, a fork was interpreted as a long-handled comb, apples as balloons. It also enabled any mis-articulated words to be clarified, which would otherwise have remained uncorrected or even totally misunderstood.

Le Prevost's study has set out to observe the effects of early introduction of Makaton. There has been no attempt to compare the progress with the speech and language of other Down's children. A comparison has been made with the mean speech and language age of Down's Syndrome girls, which according to Carr (1975:28-29) is as follows:

Carr: Child's CA - 36 months. Speech and language age - 17.6 months, standard deviation 3.64.

Le Prevost Child's CA - 36 months. Speech and language age - 25 months.

This study, therefore, would appear to indicate that some of the speech and language problems traditionally encountered in the Down's population have been alleviated by inter-relating speech and signs before speech appears.

1.4.3 Sign Language and Non-Specific Mental Handicap

One of the first studies exploring the value of sign language for the mentally handicapped was conducted by Bricker (1972:509-516), following an earlier study in which Bricker & Bricker (1970:101-111) unsuccessfully attempted to teach low-functioning children to name objects. Bricker (op.cit.) hypothesised that if the apparently meaningless verbal label were paired with a sign, the discrimination between various objects and words might be increased. Using twenty-six subjects under fifteen years of age, with severely limited language skills, she taught imitative sign movements which were then paired with appropriate words, then paired with appropriate objects. Periodic word-association tests were administered to both the control and experimental groups. The results indicated that imitative-sign training did facilitate word-object association. Her conclusion stated that the results justify further examination of the use of manual signs as an educational technique.

In the UK, Cornforth et al. have also investigated the use of sign language with deaf, mentally handicapped subjects in four large institutions. These signs were taken from British Sign Language and organised into the Makaton Vocabulary. The

results showed that of the forty-one subjects, all learnt to comprehend between sixty-six and one hundred and thirty-eight of the one hundred and forty-five signs available and that they all used between thirty-seven and one hundred and thirty-seven of the signs.

Kopchick et al. (1975:22-23) describe attempts to make sign language of more use to their subjects who, when out of the clinical environment, revert to their previously unsuccessful communication attempts. Twelve hospital aides were given daily instruction in sign language and trained to use signs simultaneously with speech at all times. All the hospital shifts were covered so that the subjects would be exposed to signing at any time of the day or night, for a six month period. The results showed that the control group's language age remained the same, while the experimental group increased their language level by twenty months. The aides also kept a record of the different signs used by the subjects over the six months and found that they used between forty-five and one hundred and thirty-four different signs.

Fenn & Rowe (1975:3-16), using the Paget-Gorman Sign System (PGSS), investigated the development of language through the medium of manual signs. They

used a 'telegraphic' approach, where only the essential information is signed, omitting tense indicators, articles, auxiliaries, etc. The seven children in the experimental group were aged between ten and thirteen years, most being diagnosed as severely deaf. Comprehension and expression were assessed and they were found to be functioning at the one-word level. Following the six month experimental period, all had learned to understand and express a wide variety of semantic structures, with all of Brown's (1973) categories of the first stage of language development appearing. Fenn & Rowe claim that communication is now possible on a far higher level than that of the basic level on which the project started.

Two more recent studies considered the relative effects of sign versus speech training on the communication abilities of adult mentally handicapped subjects. Wells (1981:323-333) studied the effects of Total Communication training versus traditional speech training on the articulation of three female subjects aged between eighteen and twenty-six years.(1) Their articulation was assessed before and after training. (The traditional approach included oral musculature exercises and vocal imitation.) The results showed that the Total Communication method produced more significant

improvement in their articulation than the traditional method.

Penner & Williams (1982:395-401) used ten severely retarded subjects from an institution, three of whom received sign training only, four received speech training only, and three received combined speech and sign training. They found that the sign labels were learned better than the verbal labels and that combined sign and verbal labelling improved verbal learning, but not sign learning.

Thus sign language has been shown to be effective for several types of mentally handicapped subjects, advancing their general communicative abilities beyond that which might have been expected from the more traditional approaches to remediation.

Schaeffer et al. (1978: 349) summarise the results from the sign language studies. They suggest four propositions:

1 That instruction in sign fosters spontaneous communication by children with severe language deficits.

2 That signing facilitates speech imitation by children with severe language deficits.

Significant factors in facilitation being·

i) The children had untapped expressive skills.

ii) Signing and speech may alleviate frustration and be more effective than signing alone.

iii) As the teacher speaks and signs, the child may realise that speech can be used to attain the goal.

iv) Generalised imitation, from imitation of the signs to speech imitation, may occur.

v) Success at signing may increase the child's confidence, so that he is willing to try expressive skills previously suppressed.

vi) Spontaneous signing may trigger concurrent vocalisation.

3 That sign language and speech can be integrated as signed speech, which may act as cues for each other.

4 The relation between sign language and goal attainment suggests a functional-development structure for the language acquisition programmes for the language

handicapped. (This has been utilised in the M V - see Walker 1983.)

1.5.1 The Psychology of Sign Language: a Cognitive Approach

Piaget & Inhelder (1969:51) claim that in the normal child, language and symbolic thought emerge at the same time. Imitation appears before language and is an essential prerequisite for the development of language. Language, having developed from imitation, provides a contact with other people which is more effective than imitation alone (op. cit.:55).

Pre-linguistic imitation is vital for the acquisition of any language with gestural, facial and vocal elements involved. According to Piaget & Inhelder (op. cit.) imitation appears early in the sensorimotor period (ten to twelve months) when someone performs as act in front of the child which is then repeated by the child. At this stage the representation only occurs in physical acts and not in thought. Examples of this type of imitation occur in some mentally handicapped people learning the MV who are unable to imitate the action without true comprehension of its function and who either

produce the sign randomly and at inappropriate moments, or who are unable to reproduce the sign unless the model is presented first.

Deferred imitation, however, which marks the dawning of the symbolic function, does not appear until the end of the sensorimotor period, at about eighteen months of age. At this stage, the child imitates the action following the disappearance of the model, which shows he is capable of internal representation (i.e. thought). This too may be illustrated by some learners of the MV. In these cases, the retention of a sign is shown by the appropriate use of the sign, when the stimulus is presented, and by their comprehension of the sign presented without accompanying speech.

The process of imitation leads to symbolic play, i.e. games of pretending, followed by the development of drawing, leading to the internalisation of imitation by a mental image; finally to the stage of verbal evocation, where previous events are represented by verbal symbols.

Bates (1976:37) also links Piagetian stages of development to the emergence of language, and she points out that at about sixteen months the child goes through a transitional phase from pre-verbal

performatives (a performative is the capacity to formulate and execute a communication) to that of using verbal performatives.

This coincides with the development of the symbolic function, and gradually the child progresses towards the facility for referential speech. Bates (op.cit.) also draws attention to the fact that at this stage not all meaning underlying the one or two worded proposition is symbolic (a proposition is something which is to be communicated). Bates (op.cit.:84) proposes that the lengthy one and two word stages are due to limits on the cognitive capacity of the child. The child thus encodes those elements of a structured situation that attract his attention, and their communications contain the most interesting information. At the Sensorimotor Stage Five, Bates observed children communicating with adults through gesture. Both Bates and Piaget note a significant shift to intentional communication at the end of this stage (eighteen months).

Fouts et al. (1979:317) point out that many mentally handicapped people reach the eighteen month milestone late or never at all. The implications for their language functions are obvious· some verbal and gestural imitation will be used, but not as intentional communication. Kahn (1975:640-643)

studied profoundly retarded children without expressive language and concluded that their linguistic development was linked to the sensorimotor levels. The group with some speech was functioning at Sensorimotor Stage Six and the others without speech, at Sensorimotor Stage Five. Woodward (1959:60-71) related the behaviour of one hundred and forty-seven mentally retarded children to Piaget's developmental stages and found that much of their behaviour, often thought to be bizarre, was related to these early stages of pre-representational behaviour.

1.5.2 A Pragmatic Approach

The recent development of serious research in the area of pragmatics also reflects the Piagetian approach. Bates (1976:3) defines pragmatics as 'rules for relating linguistic form to a given context'. The study of pragmatic aspects of language may be applied to any language whether spoken or signed.

Halliday (1975:18) has identified seven functions of language, following the emergence of the first words. These may be applied to spoken or signed languages. The only studies of pragmatic disorder that have been completed to date use language-

disordered subjects rather than mentally handicapped subjects (Miller 1978:419-436; Snyder 1978:161-180). The principles of their approach would be easily adaptable for use with the mentally handicapped. Most of the work which has been done in these studies has involved the pragmatic analysis of videotaped samples of the subject's interaction.

Miller (1982:57) has pioneered an investigation into the pragmatics of sign language and has related functions of sign use to four pragmatic categories, for ASL. These areas investigated are as follows:

i) presuppositions, or the assumption signers make about their conversational partners;

ii) deixis, or pointing or indexing, e.g. 'I' and 'him';

iii) topic-comment, the ways in which ASL users signed the contrast between 'conversational background, as indicated in ASL' and 'information that is judged by the signer to be new to the receiver' (Miller op. cit.:59);

iv) the last category being the varying degrees of 'directions of utterance' used to signal communicative intent.

Miller also undertook acquisition studies. However, only the preliminary aspects of the work are described. The future reports and completed studies promise to provide further verification for the pragmatic efficacy of sign language.

1.6 The Success of Sign Language

Although research has confirmed the viability of simultaneous speech and sign communication for mentally handicapped individuals, it is still not clear why those people who have been unwilling or unable to use spoken language are so successful in learning signs. Theories have been advanced to account for this success.

Baron & Isensee (1976) suggest that iconicity is one of the significant factors. (An iconic sign represents either the action or object it designates.) These signs are readily interpreted by an untrained viewer. Konstantanareas et al. (1978:231) propose that iconicity facilitates decoding and encoding of sign language. In their experiment, the subjects consistently produced superior scores for the iconic verbs and adjectives.

Skelly (1979:68) claims that Amer-Ind is more iconic than any other sign or signal system, such as ASL, and is therefore more easily learned. Daniloff

et al. (1983:99) point out that as yet there is no data on the response of retarded subjects' judgments of iconicity, although the signals rated most iconic by the non-retarded individuals also appeared to be the easiest to teach.

Wells (1981:323-333) suggests other reasons why sign language is more easily learned than speech:

i) a signed response is easier to teach, as the learner's hands can be placed in the appropriate positions, while the equivalent positioning of the vocal musculature cannot be readily achieved.

ii) Unsuccessful attempts at vocal communication are generally punished due to the unintelligibility of the words. Mentally handicapped individuals are frequently urged to communicate vocally, and yet experience consistent failure in transmitting the message either accurately or even at all. Pairing the word with a sign increases the likelihood of communication being understood and enables an immediate correction of articulation.

A further suggestion by Reid & Kiernan (1979:203) is that signs are encoded differently in short-term memory so that signed language is processed and

recalled more readily than verbal language.

Fischer & Newkirk (1979:194) also point out that signing proceeds at half the rate of speech, which gives the retarded person more time to receive the message, both visually and auditorily.

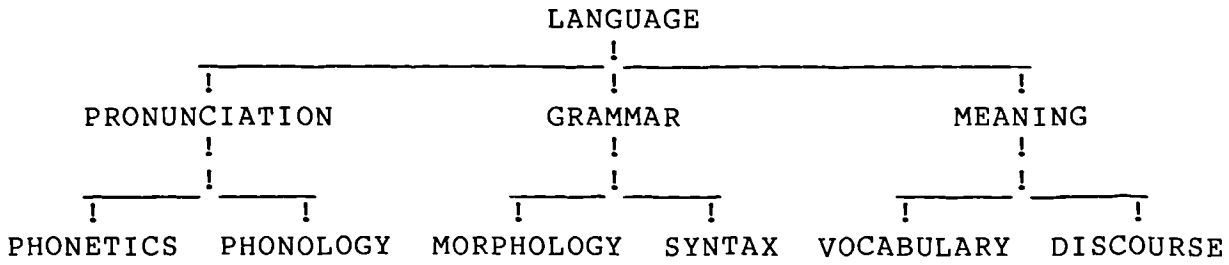
(1) See page 53 for a definition of Total Communication.

Section 2 Linguistic Analysis of Sign Languages (General) and the Makaton Vocabulary

2.1 Language Defined

Crystal (1976:26) points out that there are many possible models of the structure of language, each with their controversial points. He concludes that, despite some differences, all linguists agree that there are three basic components of spoken language structure: pronunciation, grammar and meaning. Crystal (op. cit.) defines the model of the levels of language structure in the following diagram:

LEVELS OF LANGUAGE



In order to avoid an 'over simplified and impressionistic picture of language', he claims it is necessary to study language in a systematic way, considering each level defined above.

This model has therefore been referred to when considering the linguistic viability of sign language in general, and the MV in particular, in an

effort to study them systematically. A less detailed, but nevertheless systematic, examination of the other manual language systems used with the mentally handicapped in the UK has followed Crystal's model.

2.2 Linguistics and the structure of sign language

In order to support this notion that sign languages are linguistically viable, a number of researchers have addressed themselves to a structural analysis of sign language (Stokoe 1960; Brennan et al. 1980). Stokoe's original analysis of American Sign Language (ASL) used new terminology to refer to the level in sign language which is analogous to the phonological level in spoken language. Thus in his analogy, cherology, cheremes and allochers are the equivalent of phonology, phonemes and allophones. Brennan et al. (1980:12) have noted that many linguists have reverted to the traditional terms for spoken language analysis and add that cross-linguistic comparisons are easier if the terminology is the same. (The author of this thesis has retained Stokoe's terminology for ease of identification).

Stokoe (1980:130) was careful to point out the way that signs differ from the words of a spoken

language, the major difference being that a spoken word consists of phonemes, which are necessarily represented sequentially, whilst a sign is made not only in time, but also in space simultaneously, with its elements contrasting visibly and not audibly (Maxwell 1983:174; Klima and Bellugi 1979:38).

This recent interest by linguists in the structure of sign languages has also shown that deaf people do use specific languages, which are unlike the normal spoken languages of their native country. The sign languages, having evolved separately from the spoken languages, differ from country to country. For example, the historical origins of French and American sign languages are the same. The French adopted the Spanish manual alphabet, under the influence of Jacob Pereire, a Spanish Jew who fled to France to avoid persecution in the eighteenth century. Then in 1760, l'Abbé de l'Epée founded the first school for the deaf in France and developed a systematised sign language through finger-spelling and the natural gestures used by the deaf pupils (Hough 1983:44). This education of the deaf continued, and in 1917 Le Clerc, a teacher of the deaf, left Paris for Connecticut where he trained teachers in schools for the deaf using the Spanish manual alphabet. Thus there is more similarity between ASL and FSL (as ASL evolved from FSL) than

between ASL and BSL.

A linguistic analysis of ASL was pioneered in the 1960's by Stokoe (1960). However, it was only recently that BSL has undergone any linguistic analysis (Brennan et al. op. cit.). One of the main problems has been obtaining and transcribing samples of sign language for analysis. Although video-taping has meant that a signed message can be recorded, the other problem of analysis which is time consuming is that of notating hand positions, shapes and movement as well as simultaneous body posture and facial expression, (Brennan and Colville 1979:265).

In 1980, the first major publication of an analysis of BSL based on Stokoe's original work was made. Brennan et al. (op. cit.) have described a method of sign transcription and identified many linguistic features hitherto disregarded. By their description of minimal sign pairs, they have established the contrastive elements and so provided a cherological analysis. Basically, there are four main parameters, although the fourth is arguably less important.(1) They are as follows: 'tab', the position of the sign in space; 'dez', the handshape or configuration of hands; 'sig', the movement required to produce the sign; 'ori', the relationship of hand configuration and the signer's body. Klima and Bellugi (1979:45)

propose that 'ori' is a minor parameter and an extension of 'dez'. Brennan et al. (op. cit.:7-8) provided evidence to show that it is a significant element and suggest that it may be more significant for BSL than ASL. In BSL 'ori' may be the only feature which distinguishes certain pairs of signs Brennan et al. (op.cit.:7). The signs HEAVY and WAIT are distinguished by palm orientation only. In the first case,the palms face up, and in the second, they face down.

In spoken languages, certain phonological processes such as assimilation, deletion and addition occur when morphemes are combined into words and phrases. Similar processes have been noted in ASL and BSL, although the evidence for this in BSL is less positive than for ASL, owing to the early stage of BSL research. Brennan et al. (op. cit.:237) quote an example from ASL. In the utterance WE REFUSE, the handshape used for WE is changed in anticipation of the initial handshape in the second sign REFUSE. So far, there is evidence that in BSL the manual tab is susceptible to assimilation. In some cases one component of a sign may be deleted. In the signed phrase I REMEMBER, 'the first two morphemes require the same handshape placed in different positions'. One of these is therefore

omitted (Brennan et al. op. cit.).

In speech there are devices which allow a smooth phonetic transition from one to another word. For example, a liaison which may occur in certain speakers in a phrase such as 'law and order' is an intrusive /r/, so that the transcription becomes /lɔr ən ɔdə/ instead of /lɔ ən ɔdə/. Brennan et al. (op. cit.:238) note that in BSL there are movement liaisons, made with a neutral handshape, enabling signing to flow smoothly. Such processes occur when a high level of fluency in any language has been attained. Although this fluency is attainable within the MV, it is unlikely that many of its handicapped users could demonstrate use of this sophisticated device.

The grammatical components of BSL consist of morphological and syntactic processes. As Brennan et al. (op. cit.:239) point out, morphological influences on language may vary from one language to another. However, the changes in morphemes may result in either grammatical changes, for example, in tense; or in lexical changes which modify the vocabulary item. In BSL there are changes of both types of process, although they indicate that the morphological process of derivation, reflected in affixation is much less prevalent than in spoken

languages, owing to the simultaneous nature of sign production. The morphological process of inflection is more commonly found. For example, in BSL a change in handshape can incorporate information about number into the form of the sign. The sign NEXT YEAR can be inflected to mean TWO YEARS TIME or THREE YEARS TIME by changing the handshape of the nonactive hand. Similarly, changes in position - 'tab', and orientation - 'ori' may combine to produce a meaningful change by incorporating information about the verb object into the single sign. Brennan et al. (op. cit.:240) use the example of the verb 'remind'. REMIND ME, REMIND YOU, and REMIND HIM are all produced with the same handshape, but the direction or position of the sign is altered to indicate the person concerned. This also occurs in verbs used in the MV, for example, LOOK AT ME, LOOK AT HIM. Movement or 'sig' can also be used to express various grammatical categories, such as pluralisation. The lexical changes resulting from a morphological change include the derivation of one wordclass category from another, such as deriving nouns from verbs and vice versa. For example, the signs CUP and TO DRINK or TEACH and TEACHER are virtually the same, being differentiated by context and use. This occurs in BSL and the MV. Brennan et al. (op. cit.) point out that their research is still at an early stage and that their

evidence cannot be seen as conclusive at present.

The syntactic processes are affected by two characteristics, those of spatiality and simultaneity. Signs are often placed in space, with a relationship between the placements, indicating syntactic information such as subject-object relations and pronominal reference. Simultaneous sign production is also a significant feature of sign language: while one hand may retain the first position, the second hand may produce signs indicating subsequent action. As well as simultaneous organisation in time and space, there are further features which often have a semantic function, those of body posture and facial expression. At times these elements may be the only distinguishing features of an utterance (Brennan et al. op. cit.:2). For example, the only distinction between the BSL signs ENOUGH and FED UP is in the appropriate facial expression accompanying the sign. Covington (1973:39-50) was the first to describe the elements of facial expression and body posture as being the equivalent of stress and intonation for sign language. Their function, when used simultaneously with the signs, is to colour the message, and indicate grammatical boundaries. Baker and Padden (1978:47-48) studied the use of eyeblinking by signers and found consistent occurrences of more eye

blinks at constituent boundaries. In addition, the "addressee" was found to blink at anticipated boundaries.

All signs occur in the "signing space" or location. This area extends from the top of the head to below the waist and from the extreme right to the extreme left of the signer. The use of this area depends on the signer, and it may be reduced to make secretive or quieter signs, or extended to make louder signs, for a larger audience (Hough 1983: 53). The MV, being primarily for the mentally handicapped, frequently makes use of this extended space to emphasise meaning. The rate of signing is also relevant, and again the MV tends to be executed more slowly and deliberately than BSL. This may be due to both limited comprehension abilities as well as limited physical expression abilities of the handicapped subjects.

A further significant feature that is contained in many signs of any sign language is that of iconicity. This feature in fact distinguishes signed and spoken languages. Iconic signs represent either the object or the action it designates and are distinct from arbitrary signs, which have no apparent link between the sign and the original meaning (Klima and Bellugi op. cit.:34). This

characteristic of iconicity has been used as a criticism of sign language, implying that it is an unsatisfactory element (Brennan et al. op. cit.:28). Maxwell (1983:179) describes vision as being more 'onomatopoeic' than audition, and therefore iconicity is a natural feature of sign language, missing from languages that rely on the auditory-verbal processes. Re-duplication of signs can also be classified as iconic. This may occur in the functions of pluralisation; iteration 'the psychopath killed and killed'; or elongation 'we waited and waited for the train' (Supalla and Newport 1978:112). The lexical component of BSL ensures that an idiosyncratic use of signs does not develop, as these would be unstable elements and highly dependent on the user. Within the lexicon of BSL, there are both iconic and arbitrary signs which are correctable and must conform to the standardised version (with limited dialectal variations) (Brennan et al. op. cit.:28).

With the evidence from such research accumulating, it must be recognised that sign language does contain most of the components considered to be essential for any viable language.

2.3 A Review of the Signing Systems Used in the UK

In this review, there follows a brief description of the four main signing systems used in this country. BSL has been included here in order to clarify any confusion between the use of BSL and Makaton, even though there is little mention in the literature of its use with the retarded.

Three systems, the Makaton Vocabulary, the Paget-Gorman Signing System (PGSS), and the Amer-Ind Gestural Code are compared briefly, according to the model of language structure defined by Crystal (1976:26). A more detailed description of the linguistic features of the MV is provided within each section.

The different approaches to teaching the three systems, as recommended by various practitioners are also considered. This section concludes with a consideration of the relative use and success of each system.

2.3.1 The Makaton Vocabulary

The MV was designed to teach BSL to 'mentally handicapped children and adults and other language handicapped people, in order to provide a basic means of communication; to encourage expressive

speech wherever possible; to develop an understanding of language through the visual medium of the signs' (Walker 1978:172). It originated as a project in 1972, to teach sign language to deaf, mentally handicapped adults in a hospital environment. It was devised by Margaret Walker, a Speech Therapist, and Kathy Johnson and Tony Cornforth, Psychiatric Hospital Visitors from the Royal Association for the Deaf and Dumb. The name Makaton was derived from the first letters of the names of these three original workers.

Originally, 145 signs were selected from BSL. However, the Vocabulary was revised in 1976 and now consists of three hundred and fifty signs, including more relevant vocabulary for the home and school environment. The three hundred and fifty words/signs are arranged into nine stages, each stage consisting of thirty-five to forty words. The nine stages have been specifically designed to introduce vocabulary in a developmental sequence. This approach is an attempt to guide 'the acquisition of core vocabulary of a highly useful set of concepts/words with efficient multiple use' (Walker and Armfield 1981:1). In addition, these signs can be combined into phrases and sentences, as well as presenting a core vocabulary for teaching

other signs, symbols, pictures, objects or any other combination of alternative communication tools (Walker and Armfield op. cit.).

2.3.2 British Sign Language

British Sign Language (BSL) is used by the pre-lingual deaf in the UK and consists of various signs, both manual and non-manual (i.e. facial expression and body postures). It has long been dismissed by educationalists as inferior to spoken language (Miller 1982:49), although this opinion is changing following a recent linguistic study of American Sign Language (Stokoe 1972:118). These same principles of study have been applied to BSL (Brennan et al. 1980). BSL has a unique word order quite unlike that of English. However, Deuchar (1977:348) has observed that there are two types of BSL in use by deaf adults: the first, using manual and non-manual signs follows BSL word order, the second uses English word order and signs, accompanied by speech, lipreading and finger-spelling. This is known as Total Communication. The former is used informally for spontaneous communication and has a lower status in the deaf community than the latter, which is used on formal occasions such as church services.

It has been included in this survey as in some centres teaching sign language, neither the developmental structure of Makaton is applied, nor do the signs chosen for use necessarily correspond to those in the Makaton lexicon.

2.3.3 The Paget-Gorman Sign System

The Paget-Gorman Sign System (PGSS) was originally devised in 1934 by Sir Richard Paget and Pierre Gorman (who was deaf himself), as a means of representing the English language with manual signs for use by deaf people and their educators. At the time, BSL was considered to be 'non-linguistic' and its use by the deaf community was not encouraged. Both men recognised the need of deaf people for some means of manual expression, and accordingly translated vocabulary and grammar into a manual representation. Initially it was used to help the deaf acquire English, as signs always accompany speech.

Well over three thousand signs can be produced. However, those with severe mental handicap may only use the root forms of the signs, without adding the linguistic complexities (Craig 1978:162). The PGSS can be taught according to any structured programme devised by the teacher or therapist, or it may be used informally.

2.3.4 Amer-Ind Gestural Code

Skelly (1979:6) has adapted the ancient American Indian gestural system of 'Hand Talk' for modern clinical application. The system itself evolved 'at the time of the great migration from Asia', when the nomadic people, speaking many languages and from many different backgrounds, encountered each other and could not communicate. The hand signal code was based on easily understood pantomime, and, consequently, Skelly claims, it is highly readable, even to the untrained viewer.

Skelly (op. cit.:7) claims that the style of Amer-Ind is basically 'telegraphic' and does not possess any of its own linguistic structure (op. cit.:109). She considers this to be one of the strengths of Amer-Ind, when its clinical application is for the language handicapped - in particular those with symbolic defects. Only the key features of the message are signalled, either preceding or accompanying the spoken message - and each signal conveys an idea, not word (op. cit.:110).

2.4 Comparative Features of the Three Systems : Subjects

The following table consists of a summary of the categories of subjects using each system, compiled from data published by Walker (1978:174; 1983:8),

Craig (1978:162-3), and Skelly (1979:28-55).

TABLE 1 A SUMMARY OF THE SUBJECTS REPORTED TO USE THE MV, PGSS AND AMER-IND

DISORDERS	MAKATON	PGSS	AMER-IND
Mental handicap Adults - Children	X	X	X
Mental & Physical Handicap Adults - Children	X	X	X
Autism	X	X	X
Deaf children, Normal IQ	X	X	
Expressive speech defects (Including rhythm problems)	X	X	
Cerebro-Vascular trauma	X		X
Surgical excision, e.g. Laryngectomy			X
Blind & Partially Sighted	X		
Deaf-blind		X	
Language disorder	X	X	

As may be seen from the table, MV is more widely used than either of the two other systems, although all the systems may have been applied to categories not marked. The PGSS has been used more with the hearing-impaired and language-disordered than either MV or Amer-Ind and to date there have been no reports of the PGSS being used with acquired disorders (e.g. cerebral trauma or surgical excision).

In contrast, much of Skelly's work has been concerned with the latter category of subject. These patients have previously developed language normally and subsequently suffered a cerebral trauma or undergone surgery. The subjects have demonstrated considerable success in learning Amer-Ind. This is unlike the main function of the MV or PGSS whose primary aim to teach language through the medium of signs to the developmentally impaired subject. These different types of damage also result in different types of problem, both linguistic and psychological, implying that Amer-Ind may be more suited to subjects with acquired disorders than to developmental disorders.

Skelly (op. cit.:50-56) has recorded data on sixty-six mentally handicapped subjects from three studies. Two subjects failed to complete training,

one of these was considered to require further eye-contact and attention training before starting on Amer-Ind. Interestingly, the Makaton Vocabulary is reported to improve performance in these areas, while signs are being learned (Walker and Armfield op. cit.:2). Of the sixty-four subjects who successfully completed training, forty-four were children and twenty were adult. All three studies reported varying degrees of success ranging from increased attention span and imitative abilities; improvements in overall behaviour; increased comprehension of signals; and vocalisation accompanying spontaneous signals (Podleski 1979:51; Freese and Frerker 1979:53; Duncan and Silverman 1979:55). The studies failed to use the same measurements or success criteria so that the results cannot be statistically compared.

There is no recognised criterion for the selection of subjects suitable for learning alternative communication systems. Kiernan (1981:139-151) has conducted a survey of the use of symbol and manual sign systems in England and Wales. He concludes that manual systems are used with the majority of the physically able children, where the most common criterion of selection is the integrity of upper limb function. He points out that criteria such as

the child's ability to recall signs or process the different types of input are rarely mentioned. 25.7% of the children in ESN(S) schools who used sign language could use ten or more words communicatively and Kiernan concludes in these cases the system was being used to teach syntax.

One of the main problems in selecting subjects for signing programmes is that there is a lack of suitable assessment procedures (Bonvillian and Nelson 1978:207). This was certainly one problem encountered in the design of this thesis. Nevertheless, so many studies have produced significant results that, despite the shortcomings of available assessments, the evidence is in support of the hypothesis that the mentally handicapped can learn and use sign language, thus enhancing their overall communicative abilities.

2.4.1 Comparison of Sign Production

PGSS is based on the use of twenty-one standard hand shapes and thirty-seven basic signs, used in different combinations (Rowe 1978:164). The basic signs group together words with a common basic concept, e.g. time, animals. This organisation of handshapes is similar to that of BSL in which a

certain handshape continues the theme throughout the signing system. For example, the handshape for GOOD is continued in the signs CLEVER and NICE. Brennan et al. (op. cit.), however, describe the four significant elements: place of production, significant movements, handshape, and the relation of signer's hands to the body ('tab', 'sig', 'dez', and 'ori').

Amer-Ind signals, however, are only described by their manner of execution. Skelly (op. cit.:113) describes three categories:

i) static, where the hand is held still in the posture, e.g. ADD

ii) kinetic, where the concept is conveyed through movement, e.g. ABOVE

iii) receptive, where the concept is conveyed by repeating the specified movement three times, e.g. ANGRY.

The manner of execution may be the only distinguishing factor between related signs: BRAIN static, KNOW kinetic, SMART repetitive. All three use the basic signal of pointing the index finger to the temple.

2.4.1.1 Analysis of Makaton production (cherology)

The basis for this analysis has been the work on BSL by Brennan et al. (op. cit.). The parameters of 'tab', 'dez', 'sig' and 'ori' are considered.

TAB analysis of the place of sign production..

All signs occur in the signing space and occupy any of five obvious physical spatial areas: the head, trunk, arms, hands and the area in front of the body. In BSL there are twenty-two major tab cheremes, and six major manual cheremes identified by Brennan et al. (op. cit.:52-85). The minor manual cheremes rarely occur in BSL and are not considered here. Makaton utilises all the tab cheremes and the major manual cheremes as follows:

whole head	HOW OLD?	wrist pronated	CHRISTMAS
forehead	CLEVER	wrist supinated	DOCTOR
eye	SEE	lower face/chin	HOW MANY?
nose	SISTER	mouth and lips	RED
ear	LISTEN	throat/neck	MEAT
chest	LIKE	upper trunk	TOILET
elbow	DOOR	lower trunk	HUNGRY
cheek	EASY	upper & lower trunk	SMART
upper arm	NURSE	upper & lower leg	TROUSERS
lower arm	GREEN		

Manual tabs

A tab CHRISTMAS

B tab GREEN

C tab BRICKS

5 tab BETWEEN

G tab QUICK

O tab MEDICINE

The manual tabs are produced with two hands, one assuming a more passive role than the other. They may be symmetrical as in the sign BRICKS, or assymetrical as in the sign GREEN.

DEZ analysis of the handshape or configuration of hands.

In BSL thirty-one basic handshapes, with nineteen main variants have been identified by Brennan et. al. (op. cit.). All signs are constructed with one or more of these shapes. Detailed study of the M V reveals, however, that twenty-three dez are represented out of the thirty-one. Of those not represented, it was found that they are either rare in BSL itself,or that the handshape requires complex co-ordination which would be unsuitable for use by the handicapped.

The dez analysis is as follows:

A	dez	MINE,YOUR	H	dez	DEAD
Ȧ	dez	GOOD	Ḧ	dez	DOG
Â	dez	MONEY	I	dez	BAD
B	dez	FISH	L	dez	CAN
B̈	dez	SHOP	R	dez	-
C	dez	CUP	V	dez	STAND
5	dez	PAIN	V̇	dez	-
5̈	dez	WORRIED, CLIMB	V̈	dez	FALL
G	dez	THINK	V̈̇	dez	-
Ĝ	dez	CHOOSE, VICAR	W	dez	MUMMY
G̈	dez	-	X	dez	SISTER
O	dez	EAT	Y	dez	PHONE
Ô	dez	SAND	ɣ	dez	-
E	dez	-	ʯ	dez	-
F	dez	ASK	ʎ	dez	TOILET

SIG the analysis of significant movements used in signing.

This analysis has traditionally posed problems, as there are many features which require consideration such as the body - the parts that move; the space - direction, level, distance and degree of movement; time - the amount of time taken to produce movements; and dynamics - the quality texture of the movement, partly due to the involvement of muscular energy. Brennan et al. (op. cit.:182), in their consideration of these factors, cite the example of

the sign QUICK which should include a rapid action, yet there is no way of transcribing this. Although Brennan et al. (op. cit.:181-212) have defined significant movements by means of contrastive analysis of minimal pairs, this has not proved transferable to Makaton, as many of these minimal pair types are too discreet for handicapped users. Instead, an analysis is presented here of the signs from the MV which demonstrate a *significant* movement, as revealed by minimal pairs. This is unique to Makaton, involving some signs that had to be adapted from the standard BSL signs. The minimal pairs are as follows:

Analysis of SIG in the M V - all these pairs are made with the identical hand or finger configuration.

Minimal pair	Movement
WHAT BUT	bilateral to right
WHICH AEROPLANE	bilateral right or left
EARLY LATE	backward forward
YESTERDAY TOMORROW	backward forward
LAST YEAR NEXT YEAR	backward forward
BEFORE AFTER	backward forward

BETWEEN	up and down
THROUGH	forwards
BIG	hands part
SMALL	hands move together
DAY	hands part
NIGHT	hands move together
HERE	small movement forward
THERE	large movement forward
WRITE	fine action
DRAW	coarser action
DOLL	static
BABY	bilateral
MINE	static
SORRY	circular
HORSE	static
RIDING A HORSE	moves forward
NOW	both hands move down
TODAY	both hands move down twice
SOFT	press cheek once
EASY	press cheek twice
HARD	press palm once
DIFFICULT	rotates on palm
PLAY	vertical circular
WHERE	horizontal circular
STANDING	static
JUMP	moves down with force

Basically, the type of movements used as significant in Makaton are either opposites, forwards and backwards, or static and moving. The exceptions such as NOW and TODAY, SOFT and EASY occur in the higher stages of the Vocabulary where the user has attained a more refined use of signs. WRITE and DRAW, which are taught earlier, are, however, more likely to be confused, although the context of their

use may overcome such problems.

ORI the relationship of the signer's hands to the body.

Two types of ori are significant in BSL. Palm and finger orientation would appear to be a significant feature in Makaton as well, as the following minimal pairs demonstrate:

PICTURE	fingers point away from body, horizontally
ROOM	fingers point downwards to floor
SANDWICH	top palm meets lower palm
ON	top back of hand meets lower back of hand
YOURS	palm vertically away from signer
HAVE	palm vertically towards signer
BICYCLE	palms face away from signer, rotate
RUN	palms face side of signer, rotate

These are the only minimal pairs used in Makaton. However, other signs appearing in the MV pair with signs appearing in BSL, for example, RABBIT in the MV and BSL, and HARE in BSL only. Thus by using the principle of contrasting and so setting up minimal pairs in sign language as in spoken language, important expressive elements have been identified - the cheremes.

2.4.2 Comparison of Grammars

Craig (1978:162) describes the PGSS as providing an accurate representation of English through manual signs. There is no claim that it is a language in its own right as the signs accompany spoken English. It is possible to represent every word by a sign, as well as additional signs to represent the grammatical features of English, e.g. tenses or verbs. As English itself is subject to variation from one situation to another (e.g. regional and stylistic variation), so the PGSS is adapted according to the speaker's needs. Those with a more severe linguistic handicap may use the root form of the sign rather than adding linguistic complexities.

In a similar way, MV represents English by signs. However, the key words in a sentence are signed only, although the signs should be always accompanied by correct grammatical speech. There are no means of representing all linguistic details e.g. verbs, and other features (e.g. tenses) are indicated by the context in which they occur. This may be one of the strengths of the system, as often such detail is irrelevant to the mentally handicapped user.

Unlike both the PGSS and Makaton, however, Skelly

(op. cit.:109) points out that Amer-Ind has no linguistic structure. Each signal conveys an idea, not a word. She claims the signals are 'action orientated', not nominally organised, so that, for example, the signals DRIVE plus OBJECT mean 'car', DRIVE plus PERSON mean 'driver'.

Skelly (op. cit.:110) also claims that it is inappropriate to use descriptive terms such as noun, verb or sentence etc. Amer-Ind conveys the message through a string of related signalled concepts. These are organised into three categories:

i) actions;

ii) actors - persons, animals or objects; and finally

iii) descriptors - relators, locators, timers or identifiers.

Skelly (op. cit.:109) decries any attempt to describe Amer-Ind in linguistic terms, suggesting that efforts to do so result in an attempt to shape it into a linguistic structure to which it is not suited.

2.4.2.1 Analysis of Makaton grammar

In this section only one aspect of analysis is relevant for consideration, that of word-class categories. Other aspects related to the grammatical description of BSL have been discussed previously (section 2.2 this thesis) and also apply to Makaton.

Leech et al. (1982:41-54) establish eleven word-class categories,which the author has applied to the MV in order to study the distribution of vocabulary items. They are as follows:

nouns	169	(more are possible with pointing and miming. For example parts of the body are indicated by pointing to them.)
verbs	68	
adjectives	46	
adverbs	21	
pronouns	14	
prepositions	7	
interjections	8	
determiners	6	
enumerators	14	
conjunctions	3	
operator-verb	1	

Some items may be classified twice, depending on their use. For example:

MORE	determiner or pronoun
MANY	determiner, pronoun or adjective
THROUGH	preposition or adverb
NEAR	preposition or adverb

As may be seen from the distribution, the MV provides a scattering of vocabulary items throughout the eleven categories. This enables the signer to select and combine items from any category as required.

2.4.3 Comparison of Lexicons

The MV has been deliberately kept small (three hundred and fifty words/signs), in keeping with Mein and O'Connor's findings (1960:130-147) that severely subnormal adults have a small vocabulary of 'core' words on which they depend heavily and a larger, specialised vocabulary which is used less frequently. The memory loading of a small vocabulary is lower, and the signs have been selected 'with economy in mind' (Walker 1978:179). Examples such as GIVE and WHERE can also be used in situations where BRING and FETCH or FIND might have been used.

Even for those subjects with good receptive language ability, the nine Stages present the signs in convenient groupings for easy learning. Jones et al. (1982:36), however, suggest that there is no evidence to support such a reliance on a fixed vocabulary. They suggest the vocabularies for the handicapped be developed according to their communicative needs. The problem with this approach is that the subsequent vocabulary is only as good as its selector, with the subject being unable to have any choice in the selection. The individual teacher/ therapist would also be required to know a fairly extensive sign vocabulary to enable such individual selection, posing problems for communication between subjects and other staff. Finally, such selected vocabularies may not encourage the linguistic development, but be over burdened with nouns, merely encouraging labelling which, as Brown (1973:172-3) points out, is only one of the early functions of communication.

Amer-Ind consists of two hundred and fifty signals, which Skelly terms 'concept labels' (op. cit.:114). In common with PGSS and MV, she claims that these can be used or combined in such a way that many more word/concepts are possible (two thousand, five hundred at least). The original two hundred and fifty may be extended by a further two hundred and

fifty 'agglutinations' (op. cit.:112). For example, LIBRARY is composed of SHELTER plus READ; BOOKSTORE is composed of SHELTER plus READ plus MONEY.

The two hundred and fifty signals have been selected by a clinical team and have been checked for 'current usefulness, ease of execution and transmission success' (Skelly op. cit.:21). In addition, they have been checked for authenticity by older Indians, who are accomplished signallers and teachers. A few signals have been added to accommodate the needs of the twentieth century.

Neither the PGSS nor Amer-Ind impose such a rigorous structure as Makaton on the selection of signs/signals for teaching. Nevertheless,it may be postulated that when selecting any vocabulary for the severely handicapped, any early signs would correspond to those in the early stages of the MV. In order to test this, a comparison between the three hundred and fifty signs has been carried out:

TABLE 2 THE REPRESENTATION OF AMER-IND SIGNALS WITHIN THE MAKATON STAGES

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
26	15	19	19	17
Stage 6	Stage 7	Stage 8	Stage 9	
12	8	10	10	

The total number of Amer-Ind signals corresponding to signs from the MV is one hundred and thirty-six, or 54% a highly significant percentage.

2.4.3.1 Analysis of Makaton - Lexis and Semantics

One noted feature of Makaton is the plurality of function of some signs. For example, CUP, DRINK and the verb TO DRINK are all signed in the same way, yet the context of use determines which meaning is appropriate. So far a total of forty-five of these signs have been identified, nineteen being nouns, while the rest include a scattering of determiners, adverbs, adjectives, interjections, pronouns, prepositions and verbs. This does not take into account the verb tenses, which are also often indicated by the context of the phrase or sentence and which involve all sixty-six verbs. Nevertheless, by classifying the vocabulary items into groups or sets, it can be seen that the core vocabulary covers a wide range of lexical items.

TABLE 3 DISTRIBUTION OF LEXICAL ITEMS THROUGH THE NINE STAGES OF THE MAKATON VOCABULARY

ITEMS	STAGES									
	1	2	3	4	5	6	7	8	9	TOTAL
NOUNS: people										
Family: MOTHER	4	1	-	1	-	-	-	-	-	6
Occupational: DOCTOR	2	-	-	3	5	-	-	-	5	15
General: MAN	-	5	-	2	-	-	-	-	1	8
Religious: GOD	-	-	-	-	1	-	-	-	2	3
Food Items: BISCUIT	2	7	5	-	-	-	-	7	-	21
Every day objects: CHAIR	7	11	-	1Ø	4	-	-	4	-	36
Outside/Countryside: TREE	1	2	-	2	3	2	5	-	-	15
Town: SHOP	-	-	-	-	2	2	-	-	-	4
Animals: DOG	-	3	7	-	-	-	-	-	-	1Ø
Drink/Liquid: MILK	1	2	1	1	-	-	-	2	-	7
Vehicles: CAR	2	-	4	-	-	-	-	-	1	7

Infrequent events: HOLIDAY	-	-	-	-	1	1	-	3	1	6
Illness: PAIN	-	-	-	-	-	-	-	-	7	7
Personal: NAME	-	-	1	3	1	1	-	-	-	6
Toys: BALL	-	5	-	-	-	-	-	-	-	5
Weather: SNOW	-	-	-	-	-	-	4	-	-	4
Aids: WHEELCHAIR	-	-	-	-	-	-	-	-	3	3
Handicap: DEAF	-	-	-	-	-	-	-	-	3	3
Days of week: SUNDAY	-	-	-	-	-	-	-	2	-	2
Time: TIME	-	-	-	-	-	-	1	-	-	1
Parts of the body: FOOT)									Unspecified	
Clothing: SHOES)									Numbers	
Rooms: KITCHEN)									Total	169
VERBS: active: TO WORK	9	6	11	6	6	6	2	4	1	44
Personal care: TO SHAVE	2	-	4	-	-	-	-	-	-	6
Creative: TO MAKE	-	-	-	9	-	-	-	-	-	9

Stative verbs: TO KNOW	-	-	1	2	2	2	-	2	-	9
									Total	68
ADJECTIVES: Colour: RED	-	-	-	-	-	9	-	-	-	9
Description of state: GOOD	2	4	3	-	9	8	2	4	-	32
Emotion: HAPPY	-	-	1	-	3	-	1	-	-	5
									Total	46
ADVERBS: of time: NOW	-	-	1	-	-	-	9	-	-	10
Of place: HERE	2	-	2	1	-	-	-	3	-	8
Wh-adverbs: WHERE	2	-	-	-	-	-	-	1	-	3
									Total	21
PRONOUNS: personal: ME	2	-	-	4	-	-	-	-	-	6
Possessive: MINE	-	-	4	-	-	2	-	-	-	6
General: MORE	-	-	1	-	-	-	-	1	-	2
Wh-pronouns: WHO	-	-	-	-	-	2	-	-	-	2
									Total	16

PREPOSITIONS: IN	-	-	-	3	-	1	-	3	-	7
INTERJECTIONS:										
Greetings: HELLO	3	-	-	-	-	-	-	-	-	3
General: SORRY	4	-	1	-	-	-	-	-	-	5
									Total	8
DETERMINERS: THIS	3	-	1	-	-	-	2	-	-	6
ENUMERATORS: ONE	-	-	-	-	-	1	1Ø	3	-	14
CONJUNCTIONS: AND	-	1	-	-	-	1	-	1	-	3

In addition to these items, there are eight set phrases, which are represented by one sign, but consist of several components in English:

3 questions e.g. HOW ARE YOU?
5 noun phrases e.g. GOOD MORNING

As in the section on word-class categories, some items are classified twice, according to their possible functions. In addition to those previously mentioned, others include:

FISH - food or animal

WHEELCHAIR - vehicle, aid.

From this summary it will be realised that the MV covers a broad section of items enabling complex messages to be constructed.

Armfield (1982:6) applied Brown's (1973) relational definitions to Stage 1 of the MV. Brown (op. cit.) assembled a list of possible combinations and semantic relations that make up telegraphic speech. He also noted that certain semantic structures often expressed in a single word can be used in telegraphic speech, for example: naming, negation, non-existence, denial, rejection, cessation of questions and 'wh' questions. Armfield (op. cit.:6) suggests the reason for the popularity of Makaton may be that it embodies certain developmental

psycholinguistic principles; in other words it follows the normal language development pattern. His analysis and conclusions follow.

MOTHER - DOCTOR These signs/words may be used as agents, objects, entities or possessors.

DRINK-CAR These signs/words may be used as objects, entities,possessions and actions.

I (ME) -YOUR In sign language there is an argument for using these signs earlier than they would appear in spoken language, as they may be used in place of specific signs for significant people (MOTHER - DOCTOR). They may also be used as agents, possessors, objects and imply action (e.g. 'you go' signed as YOU).

HERE - THERE 'This' and 'that' may be used interchangeably with these, and are thought to be an early form of nomination.

WHERE? - WHAT? The two basic 'wh' questions. They may not be learned at this early stage, but are often used by the instructor.

TO SLEEP (BED) - TO GIVE Mostly action signs, though some overlap with objects and entities (BATH and DRINK). The inclusion of verb signs at this

early stage enables 'telegraphic' signing with a vocabulary of less than ten words. The success of the Vocabulary might be partly due to this factor.

YES and NO The inclusion of YES gives more scope than just the YES answer. For example, 'Yes I'll have some of that' or 'I'm happy' are potential uses of the sign. NO offers a greater variety of meanings - denial, rejection, refusal, non-existence and cessation of action.

GOOD, BAD, PLEASE, THANK YOU, GOOD MORNING and GOOD BYE. These are socially significant terms that are included in vocabularies of some older handicapped children/adults. They are not included in the psycholinguistic analysis of normal speech.

Armfield (op. cit.) notes that only one of Brown's list of relations is missing from Stage 1, that of recurrence, as in MORE (Stage 3). He also points out that many of the single signs have multiple semantic purposes. He suggests that this factor may be one of the strengths of the MV, as many people who teach the handicapped advocate introducing one concept at a time.

Armfield (op. cit.) concludes that the 'Makaton Vocabulary has successfully incorporated the

principles of language development as described by certain psycholinguists into a practical and useful programme for stimulating communication for persons with severe communication impairment.'

2.4.4 A Functional Overview

This final consideration of the viability of the three systems as a means of teaching language briefly considers the use of Amer-Ind and the PGSS, and details Makaton more fully according to the Hallidayan principles for analysing the functions of language.

Firstly, Skelly (op. cit.:109) has disclaimed any use of Amer-Ind for the teaching of language structure. Therefore, the use of Amer-Ind signals is to string concepts together rather than to encourage a progression from early language use to a more mature use. The PGSS and Makaton,however, both attempt to encourage language development.

Much of the following analysis of Makaton is applicable to the PGSS, with one exception: Denmark (1983) contends that the value of the PGSS is nowadays limited as it is a manufactured system and as such is rather inflexible. It does not always provide an adequate representation of certain

concepts, there being no provision for these within the rules of sign construction. For example, UPSIDE DOWN is signed by pointing UP then to the SIDE and then DOWN, whereas in BSL the concept is represented by the hands appearing to hold a container which is then turned upside down, the hands finishing in a reversed position. Thus BSL and MV may provide a more iconic representation of a concept than the PGSS, relating more readily to the function of the sign and the context of its use.

Language, as a vehicle for learning about the culture and social system, must be used appropriately and in context. Halliday (1975:120) considers that the linguistic system is part of the social system and that both are highly interdependent. He considers that the early psycho-linguistic theories fail to take into account how or why the child moves from his own system into the adult system (op. cit.:3). Although Halliday (op. cit.) uses as his model a child learning his first language, the structure and principles can be applied to the learning of language by the mentally handicapped, who are considered to follow the principles of normal language development, albeit more slowly.

The Hallidayan principles were applied to the actual

use of language and signs during the teaching session and to the potential use of construction within the confines of the Vocabulary. As far as the potential of the MV is concerned, it is clear from examining the types of phrases and sentences that can be constructed from the core Vocabulary that a highly complex level of language use may be expressed. For example:

"Where are you going on holiday next year?" Spoken.
"WHERE YOU GO HOLIDAY NEXT YEAR?" Signed.

"Can you carry my books please, as my bag is heavy?" Spoken.
"CAN YOU CARRY MY BOOKS PLEASE, BECAUSE MY BAG HEAVY?" Signed.

During the study, reported in this thesis, the subjects were exposed to signs from Stages 1 - 4 and 9 of the Vocabulary. Even with these limitations it would be possible to use language at Phase III levels, according to Halliday's classification. For example:

"Go and draw me a picture of a house, some trees and flowers" Spoken.

"GO AND DRAW PICTURE HOUSE SOME TREES AND FLOWERS" Signed.

"The boy and girl are going outside to look for the dog" Spoken.

"BOY AND GIRL GO OUTSIDE TO LOOK FOR DOG" Signed.

The Vocabulary is also fairly flexible and may be used at the Phase I or Phase II levels. For example:

PHASE I (With signs from Stage I only)

Instrumental	DRINK	glossed as "I want a drink"
Regulatory	BED	glossed as "Go to bed"
Interactional	HELLO	glossed as "Hello"
Personal	GOOD	glossed as "I like that"
Heuristic	THAT	glossed as "What is called"
Imaginative	EAT	glossed as "I'd like to eat that"

PHASE II

Pragmatic	"HELLO, COME SEE TV" glossed as "Hello, come and see what's on television"
Mathetic	"THAT'S MY BOOK" glossed as "That's my book"

An analysis of the phrases and sentences most frequently used during the experimental period showed that "Phase II pragmatic" phrases were used frequently. For example:

"WHAT'S THAT?"

"WHERE'S X?"

"GIVE ME X"

These were used in order to encourage a response. At other times during the sessions, Phase III signed and spoken phrases and sentences were used. For example:

"DO YOU WANT A BISCUIT?"

The subjects's response tended to be either Phase I or Phase II with a few responses at Phase III level.

PHASE I

Interactional HELLO glossed as 'Hello'

Instrumental DRINK glossed as 'I want a drink'

PHASE II

Pragmatic CUP (spoken and signed combined with a questioning glance or smile, thus demanding a response.)
glossed as 'It's a cup, am I right?'

Mathetic CUP (spoken and signed)
glossed as 'It's a cup'

PHASE III (transition into adult speech)

"Me got sore foot" accompanied by gestures and appropriate facial expressions with groans.

Glossed as "I've got a very sore foot and I want sympathy"

As may be seen, while the subjects were learning signing and language, they tended to use the early phases either as holophrases or simple two or three word phrases. It may be hypothesised that as the subjects acquire more language and greater fluency they will progress to Phase III and adult use.

2.5 Teaching Materials

Walker (1976) has produced a book of language programmes for use with the MV, in which she sets out her recommended teaching procedures for individuals or groups. She aims to present small, structured steps so that the subjects can make easy progress. Unlike the recommendations for either the PGSS or Amer-Ind, Walker (1976:vii) teaches signs with the aid of pictures first, then progresses to objects and real situations. She thus aims to overcome any attention problems and establish a teaching/response pattern, which previously had proven to be slower when using objects. This has aroused some criticism (Bailey 1978), and he has advocated using objects first.

The materials suggested for teaching the PGSS are three-dimensional. In common with Makaton, however,

everyday situations are used in the teaching as well as more formal sessions. Sign imitation is often the first aim, which, Rowe claims, increases eye-contact (1978:166). She states that the aim of teaching a sign system is to achieve a 'continuous signing environment' which leads to more effective learning (op. cit.:167).

Skelly (op. cit.:174) has described a sequence of teaching the retarded, always with the use of reality objects. She also mentions the use of meaningful signals relevant to the situation, such as hand washing, music or enjoyable activities.

The recommended Makaton procedure of using pictures first is unique among the three systems. In the author's clinical experience of using both pictures or objects first when teaching signs, the former approach results in greater success, the objects proving too great a distraction.

2.6 Teaching Techniques

In common with clinicians using other manual sign systems, Craig (1978:162) observes that speech is often much improved in some language disordered users, even to the point of normal speech being

developed and signing dropped. Rowe (1978:165), however, points out that the method of teaching the PGSS to severely subnormal children has often been inappropriate. The approach to teaching must be structured so that vocabulary and basic sentence structure are learned. Initially, therefore, a 'telegraphic' form is signed, e.g. BRICK CUPBOARD; PUT BRICKS CUPBOARD; the target sentence being: PUT THE BRICKS IN THE CUPBOARD.

In all three systems, the use of either individual or group treatment is possible, depending on what the subject requires. The length of session and frequency all depend on the time available to the clinician. However, the more the signs are used and the more frequent the sessions, it is assumed that the user will grow more proficient. Skelly (1979:122) also advocates setting goals for the subject, with sufficiently small steps to ensure success.

For all subjects learning MV, the developmental approach is recommended. Teaching, therefore, begins at Stage I, which must be worked through thoroughly before progressing to the next Stage. For those subjects with poor language skills, this ensures an introduction to words and concepts in order of 'communicative priority' (Walker and

Armfield 1981). When the subject reaches his potential, he will have a basic but 'workable communicative medium related to his understanding and ability' (Walker 1978:178). For others with greater ability, a systematic progression through all stages is possible.

The use of the MV signs should always be accompanied by correct grammatical speech; the same is true for the PGSS. Amer-Ind, however, is more flexible in its application, and simultaneous speech and sign is not always necessary or desirable (Skelly 1979:110). Such simultaneous use of speech and signs does give the learner the opportunity to increase his lip-reading skills where possible, as well as being aided in his understanding of the verbal message. Teaching for all three systems can take place on two levels. Walker (1978:182) identifies these as the formal and informal levels. The formal use ensures a thorough knowledge of the signs, and the session is conducted by the instructor/teacher. Informal use, however, should occur at all times during the everyday situations, in order to overcome the failure of subjects to use signs away from the teaching environment. This use will also facilitate the generalisation of signs.

Basically, the techniques employed in behaviour

modification are applied when teaching signs. The target response is identified. However, it is the responsibility of the clinician to identify small enough steps to ensure success.

Kiernan (1974:744-747) summarises these techniques as:

i) SHAPING when the subject is rewarded for successive approximations to the target, starting with physical modelling of the hands, but with less intervention as the teaching progresses.

ii) PROMPT AND FADE which may include physical guidance or verbal or visual prompting, which is faded as the required behaviour appears.

iii) IMITATION OR MODELLING where the response is modelled and imitation allowed before the cue is removed. (This may lead to deferred imitation.)

A reward system is also required to reinforce the correct response.

Schaeffer et al. (1978:317-352) claim that the technique of imitation is overused, although, when training people to use sign language, some imitation is necessary. They suggest this overuse leads to a

failure to understand or use negatives, e.g. when the teacher attempts to correct the subject, the latter will use NO, rather than change his/her response. As the teacher gives instructions, overuse of imitation means that the subject will repeat the instruction. Finally, a stuttering effect is produced as the subject repeats the same sign time after time. These points are all valid, though not necessarily produced in all subjects.

The approach to teaching MV signs is based first on imitation. Should that fail, then the technique of shaping is employed. Prompting may also be used, especially once the signs have been successfully imitated. This procedure has been followed in the current research, with one or two modifications, which will be described later.

Harlin (1980) examined the MV teaching procedures, her hypothesis being that a difference in training procedures would result in a difference in the acquisition of signs and in the retention of signs. Her conclusions (op. cit.:42) supported Walker's (1976) recommended training techniques, there being no significant differences between the three experimental groups who were trained by imitation, prompting and a combination of imitation and

prompting. Harlin (op. cit.) suggests that the imitation procedure may be slightly more significant than the others, following marginally improved performance with the imitation procedure.

2.7.1 The Growth of Makaton

The MV has been increasingly used in schools, hospitals and training centres over the last ten years. A survey of its use in Special Schools in England and Wales over the years 1978, 1979, 1980 and 1982 (the only year which included Scotland) was conducted by researchers at the Thomas Coram Research Unit (Reid, Jones and Kiernan 1983). In the survey they considered the following signing systems; MV, the PGSS, Amer-Ind, BSL and 'others'. The results are as follows;

TABLE 4 RESULT FOR ESN SCHOOLS

	England & Wales			England, Wales & Scotland
	1978	1979	1980	1982
	%	%	%	%
Makaton	70.3	81.2	91.2	95.0
PGSS	27.9	16.0	4.8	3.7
Amer-Ind			0.3	
BSL	1.8	4.0	2.4	1.3
Number of samples (Not a percentage)			330	457
Percentage using a signing system	53.1	90.9	80.5	98.9

(Table taken from Walker 1983 :1)

It is clear from these figures that signing is increasingly used in schools for the mentally handicapped - in particular, the MV. Although a similar survey has yet to be completed for the adult training centres and hospitals, it is obvious that the MV has grown in use. Since 1976, over thirty thousand people, including parents and professionals working with the handicapped, have attended workshops and training courses organised by the Makaton Vocabulary Development Project (MVDP) (Walker

1983:1). The Project was set up in 1978 to cope with the demand for information and training. Since then a network of Regional Representatives has been established to cope with local training and advice.

2.7.2 The Success of Makaton

Walker and Armfield (1981:2) give the following reasons to account for the greater popularity of the MV:

1 Makaton appears to be the only signing system divided into developmental stages.

2 The Vocabulary provides a guide for deciding on priorities for both experienced and inexperienced people working with the Vocabulary.

3 The range of vocabulary has been selected so that as concepts are learned they can be combined into two and three-word sentences or longer.

4 A source of frustration for many who wish to explore sign language as an alternative means of communication is that the initial training requires weeks of study, which is not so with Makaton, as communication can begin even with Stage 1.

In addition to the latter point made by Walker and Armfield (op. cit.), there is a lack of availability of training facilities for potential users of other systems.

The overwhelming success of the MV may be due to a combination of the above reasons and its relative strengths in comparison with the other available systems, namely:

i) That the MV has been more widely applied to various types of disorder than either the PGSS or Amer-Ind .

ii) That the MV complies with the essential features of any language as described by Crystal (1976:26), as well as complying with the pragmatic aspects of language. The PGSS fulfils the model of language structure (Crystal op. cit.) but the signs do not relate as well to their underlying concepts and do not fulfil the pragmatic function as readily as Makaton.

Amer-Ind, however, does not comply with the model of language. Skelly (1979:109) points out that the code has no grammatical structure, and that it is inappropriate to attempt to describe Amer-

Ind in such terms. The signals do, however, relate well to their basic concepts, and correspond to the context of use, thus fulfilling the pragmatic function.

In conclusion, the MV does appear to provide a controlled method of teaching language to the mentally handicapped and other language handicapped people as claimed by Walker (1978:172). Its strengths lie in both its structure (developmental and linguistic) as well as in the organisation of its resources, both in training and published resource materials.

2.8 Aims and Hypotheses of the Present Study

As stated in the Introduction, one of the aims of this thesis is to examine the linguistic composition of the MV and compare it with other manual sign systems used in the UK. Having completed this examination in Section 2, it is clear that there are some unanswered questions as to why the MV is effective. Firstly, Walker and Armfield (1981) claim the MV to be a developmentally based language programme, taught with signs. Is it the signing element or is it the developmental nature of the programme that is the variable which is the crucial

factor in encouraging communication? Secondly, how rapidly do the mentally handicapped learn to sign and does their sign comprehension exceed their sign use, as occurs in normal speech development? Thirdly, to what degree is the amount of signs used by the mentally handicapped related to the amount used in their environment by non-handicapped users? It is the aim of the next sections of this thesis to suggest answers to these questions.

The hypotheses arising out of these aims are as follows:

1 That Group Two will show more significant changes in their comprehension of language, their socialisation and use of manual signs than either Groups One or Three, with Group One showing slightly more significant changes in these areas than Group Three.

2 That Groups Two and Three will show more significant changes in their oral expressive language and articulatory abilities than Group Two, these being corrected during the sessions of intervention.

3 The manual signs acquired and used by the subjects in Group Two will reflect the development of the Vocabulary, with more signs being used from the earlier stages. The majority of signs used will be contained in Stage One, the next greatest number of signs being from Stage Two, then progressively fewer from Stages Three, Four and Nine respectively.

4 That the manual signs used by the subjects and nurses will show a correlation.

5 That the number of manual signs comprehended by each subject will be significantly greater than the number of manual signs used by each subject.

(1) Abercrombie (1965:123) defines a parameter as "a variable, an ingredient which is constantly present but changing in value".

Section 3 Method

3.1 Subjects

The subjects for this study were drawn from two wards in two different hospitals - the Royal Scottish National Hospital at Larbert (R.S.N.H.), and Lynebank Hospital, Dunfermline. Both hospitals are long-stay institutions for mentally and physically handicapped people of all ages. The R.S.N.H. has 1118 patients, although the juvenile section, where twelve of the subjects live, caters for 344, whilst Lynebank Hospital has 440 patients. Each ward concerned with this study had 28 patients, twelve of whom were experimental subjects. The daily routine of the subjects was similar: ten of the subjects from each ward attended some form of occupational therapy during the day, and the two remaining subjects from each ward worked with the hospital porters or in the stores.

In order to obtain as close a match in subjects as possible, it was necessary to use a ward in a different hospital, that of Lynebank. Within the R.S.N.H. there was no comparable group of subjects, nor a comparable ward environment-two factors which could be significant in a study of this nature. Despite all these considerations, it will be seen that the Lynebank subjects' general language

abilities were slightly higher before therapeutic intervention than the abilities of the R.S.N.H. subjects. In addition, the controllable variables cannot account for individual differences in temperament.

The subjects of this study were all male, aged between eighteen and fifty years, with a mean age of 31.4 years. The R.S.N.H. subjects were, on average, slightly younger than those of Lynebank - 29.6 years compared to 33.2 years. However, the age range of subjects from Lynebank was greater.

The twenty-four subjects were selected by means of a screening questionnaire, taken from the communication section of the Behaviour Assessment Battery, by Kiernan and Jones (1977). The charge nurse, with the aid of the author, completed these screenings, and all subjects with some degree of speech and language deficit were selected for further assessment. All fifty-five were also required to pass the imitation section of the B.A.B.

The selection criteria for inclusion in the project consisted of the following: a low level of verbal expressive ablity; some motivation to communicate. All selected subjects would normally be considered for speech therapy intervention.

TABLE 5 SUBJECTS

Subject	Medical Diagnosis	Age Ys.Ms	Length of Hospitalisth. Ys.Ms	Behaviour Problems
1	Down's	31.11	14.8	-
2	Down's	29.4	15.5	+
3	Epilepsy Hyperkinetic Deaf	26.11	12.10	+
4	Down's Epilepsy	34.7	26.0	-
5	Down's	30.1	24.8	-
6	Hypopituitarism Autistic	25.3	8.0	+
7	Epilepsy Hemiparesis	23.0	15.7	+
8	Down's	29.7	26.11	-
9	Autistic Deaf	30.5	12.6	+
10	Down's	35.6	24.8	-
11	Unspecified	26.2	14.5	-
12	Epilepsy Spastic Diplegia	20.5	15.10	-
13	Epilepsy Spastic Diplegia	34.1	30.0	-
14	Unspecified	48.9	35.1	-
15	Epilepsy Meningitis	24.1	19.3	+
16	Down's Deaf	33.10	29.8	-
17	Psychotic	33.1	14.10	+
18	Unspecified	50.1	11.0	-

Subject	Medical Diagnosis	Age Ys.Ms	Length of Hospitalisation Ys.Ms	Behaviour Problems
19	Kalman's Syndrome	29.Ø	12.8	+
2Ø	Hemiparesis Epilepsy	25.Ø	18.11	+
21	Down's	18.4	14.2	-
22	Epilepsy	31.5	14.1Ø	-
23	Down's	44.9	35.6	-
24	Epilepsy Hemiparesis	3Ø.5	13.4	-

The medical conditions of the subjects were varied, although the highest proportion of any one disorder represented was nine subjects with Down's Syndrome; four had some degree of physical impairment - spastic diplegia and hemiparesis, although none was severe. Three subjects were psychotic/autistic and two had glandular disorders. Epilepsy involved nine subjects and was often associated with other medical conditions. Three subjects were deaf. The degree of mental deficiency was rated by the consultant psychiatrists as moderate to severe, according to the World Health Organisation classification of 1968. Nine of the subjects had a history of behaviour problems, although in most cases details were scanty and appeared to be subjective reports.

The medical supervision was provided by the

Physician Superintendents of both hospitals.

3.2 Design

Providing well-matched subjects proved difficult, given the individual aetiologies and the necessity of finding a large sample from each ward. The subjects were therefore randomly assigned to four groups, two groups on each ward. Groups One, Two and Three were experimental, whilst Group Four was the control. Each group received a different form of intervention. Groups One and Two followed an identical language programme, using the stages and teaching procedures recommended by the Makaton Language Programme manual(Walker 1976). Group One, however, received the stimulation without manual signs, while Group Two received the stimulation with signing. This was to compare the effects of a manual versus a non-manual language programme. Group Three were given general language stimulation, not following any particular programme, in order to compare these different forms of intervention with especial interest in the effects of a developmental as opposed to a non-developmental programme. Group Four, the control, received no intervention at all.

3.3 Materials

a) A set of black and white pictures, mounted on card, were used for the Makaton Language programmes

for Groups One and Two. These were taken from: Photographic Teaching Materials (P.T.M.); Developmental Learning Materials (D.L.M.); and the First Words photographs.[1]

There was one picture for every vocabulary item from Stages 1 to 4 and 9 of the Makaton Vocabulary, except for those items which could not be pictorially represented - for example, WHAT? The measurements of the pictures were not identical, but no picture exceeded 6" by 6". (See Appendix 2 for list of vocabulary not pictorially represented.)

b) The language programme given to Group Three was made up from various language stimulation materials, which, in the light of clinical experience, have proven useful for this type of programme. Selected elements of DISTAR Language 1 were used, particularly to encourage verbal expression. Lessons 1, 2, 3, 4, 5, 10, 11, 13, 14, 17, 18, 20, 22, 23 were selected for the picture material. Other stimulation material came from Jim's People 1, 2 and 3 (Thomas et al.:1973), L.D.A. cards, Sequences I and II; P.T.M. cards from the noun, verb and sequence packs.[1] Ladybird Books, the Farm and the Zoo. All pictures were black and white.

c) All experimental groups were given tea and/or

coffee, with either bread, butter and jam, or cake, or biscuits, as an integrated part of the programme, in order to encourage both comprehension of speech and/or gesture and expression as well as social interaction. This also encourages a functional use of communication, rather than a response to picture only, which may lead to labelling or pointing.

3.4 Procedure

3.4.1 Assessment

In R.S.N.H. the assessments were carried out in a quiet room adjacent to the ward. The Lynebank subjects were tested in the Speech Therapy clinic, with which the subjects were allowed to grow familiar prior to testing, to offset the effects of unfamiliarity. The room was close to the therapy department where most subjects spent their day. Assessments spanned a four day period before and after intervention, with a delay in four subjects' completed profiles, owing to their being on holiday. This was not thought to affect the final scores, however.

The author carried out all assessments except for the Vineland Social Maturity Scale (Doll 1953), which was administered by two clinical

psychologists, who were unaware of the grouping of the subjects. Although the tests were re-administered within a relatively short space of time - approximately six months - the subjects were not taught or corrected when using the assessments, so learning should not have occurred due to familiarity with the material. The tests were given in a random order, to counterbalance any order effects.

3.4.2 Phases of Intervention

Each phase of intervention took place over a twelve week period and consisted of ten weekly sessions, lasting between three quarters of an hour and an hour. The extra two weeks in each phase allowed for holidays and illness. The teaching sessions in both cases were on the ward. Both wards were fairly similar in layout, in that they were single storey buildings, with a sitting area adjoining the dining area. As most of the other patients were out at work or therapy, the wards were quiet during the day. For each group involved, the six subjects were seated in a semi-circle around a coffee table, with the experimenter facing them, so that all were within easy reach should physical assistance be required for any of the tasks involved. A coffee table, rather than a large dining table, was used, so

that the hands of both experimenter and subjects could be seen and also to create an atmosphere of relaxation. The sitting area of the ward was used and any nurse available was encouraged to watch from a distance, so that techniques of language stimulation might be shared. A deliberate effort was made to spend a similar amount of time on each subject, and their seating order was rotated to offset the effects that the order of teaching might have - e.g. the last having greater exposure to the material.

Phase 1 Group One was exposed to ten weeks of language stimulation, covering the Makaton Stages 1 to 4 and 9. Black and white pictures of the vocabulary were shown and the name slowly articulated twice. Each picture was then shown to each subject individually and the name repeated. The subject was then encouraged to repeat the word, and following his attempt, a correct or good attempt was verbally reinforced, the correct version being emphasised by the experimenter. This procedure was followed for each subject before the next picture was introduced. When verbs were used, they were always linked with a noun,e.g. "the man's washing", to give a model of word-combination. After six pictures had been presented in the above manner,

comprehension probes were carried out. (See Phase Two for details of vocabulary taught.)

At the end of each session, the subjects were given a choice of drinks and food, so that they would have to indicate preference and have to formulate a request. This part of the programme also enabled those vocabulary items that could not be pictorially represented to be taught in their appropriate context, such as "PLEASE, THANK YOU, MORE" etc.

Phase II Group Two was exposed to ten weeks of sign language teaching covering the same stages as in Phase I and using the same vocabulary from week to week. The same black and white pictures were presented and the name and sign repeated twice. Each picture was shown to each subject individually and the name and sign repeated. The subject was then encouraged to make the sign, with or without the accompanying word. This process involved direct imitation. Should the subject fail to imitate the sign correctly, or initiate any movement himself, then the experimenter modelled the sign and name again, while the subject copied. In extreme cases of difficulty, the experimenter moulded the subject's movements, but this was rare. In those cases where the sign was re-modelled, it was not repeated following the subject's final attempt at making the sign, so that the correct version was only shown to

each subject the same number of times. In those cases where a good attempt was made, the appropriate behaviour was verbally and manually rewarded and the sign repeated once. As with the previous group, the session concluded with a selection of food and drink.

COMPREHENSION PROBES were conducted after six consecutive items had been demonstrated. A record of these was kept, so that any one sign producing consistent problems might be identified for further work. Each subject was required to point out the appropriate picture, following the stimulus of a sign only (the verbal cue was excluded). The procedure was identical for the verbal-only programme, except that the words were used in the place of signs. The six pictures were laid on the table directly in front of the subject and the probe completed. The pictures were re-orientated for each subject. When recording the responses to signs, the experimenter had sheets of prepared forms to record the responses alongside the vocabulary items; therefore only a brief tick or dash was required. The criteria for sign comprehension was that the subject had to indicate the correct choice within ten seconds of the stimulus being presented. This allowed time for scanning the pictures and for

the generally slower response rate of these subjects. As there were more elements involved than mere selection, the subject was required to recognise pictures to scan and select, but even the poorest was beginning to achieve some success by the end of the ten week period.

Phase III This involved Group Four in Lynebank Hospital. For a twelve week period no intervention took place with Group Four, this being the control group. Group Four's phase preceded that of Group Three to counterbalance any contamination there might be during the period of language stimulation with Group Three, such as increased nurse involvement with the subjects, or the added stimulus of the experimenter's presence.

Phase IV Group Three were exposed to ten weeks general language stimulation, during a twelve week period. As with the Makaton groups, black and white pictures were used to control any variable that might be introduced by the use of colour pictures. Picture naming proceeded in the same manner as mentioned previously, with each subject taking a turn. Emphasis was laid on the articulation. The subjects were also required to describe pictures and the use of word-combinations encouraged. Sequenced material was presented, from simple

activities to a complete story and the subjects were encouraged to describe the events. Many of the subjects in Group Three were unable to use more than one word at a time, but they were still encouraged to contribute to the Group. As with the other groups, a deliberate attempt was made to spend the same amount of time with each subject, despite their responses. The subject's comprehension was also checked for each item, in the same way as for Groups One and Two. To conclude the session, this Group, in common with the others, were given a selection of food and drink.

(See Appendix 3 for details of vocabulary items taught to Groups One and Two.)

3.4.3 Nurse Involvement

In an effort to prepare the nurses for the subject's signing skills, three one hour teaching sessions for Makaton were conducted with the ward staff. A video-tape was also made and left on the ward for the nurses to view during other practice sessions. The nurses were encouraged to practise signing, out of sight of the patients, in order to attain some fluency before the signs were introduced. To counterbalance this involvement with staff in the R.S.N.H., an equal amount of time was spent with the

nursing staff at Lynebank Hospital, discussing the patients and the stimulation of speech and language in a hospital environment. The nurses were also required to reinforce any attempts at signing or improved articulation on a daily basis.

Those nurses concerned with the Makaton programme subjects also filled in charts daily, noting any attempts to sign by the subjects, and recording the type of signing used. Two charts were provided weekly, one each for the early and late nursing shifts. Any problems were checked weekly.

(See Appendix 4 for a copy of the charts used).

Following a pilot study, it was decided that the charts had to satisfy the following criteria:

i) They must be easily completed.

ii) The scoring system must be simple and easily managed.

iii) The scoring was necessarily subjective, so two nurses from each shift were identified as being responsible for completing the chart. (Two were required to cover sickness and off-duty days.) It was recognised that the charts would not

necessarily be filled in accurately. However, they provided a partial record of the subjects' use of signs.

Following the completion of the first two phases, three nurses were asked to complete a questionnaire to record which signs they used most. In this way any predicted correlation between the subjects' and the nurses' use of signs could be identified.

The nurses on both hospital wards were required to encourage and reinforce other language behaviours shown by any of the experimental subjects.

3.4.4 Control of Variables

In the preceding paragraphs, a few of the deliberate controls have been mentioned. There now follows a summary of these and other controls that were taken into account when designing the experiment:

1 Subject control was sought with regard to their sex, numbers and environment. It proved extremely difficult to provide a matched environment, which was the reason for using a second hospital. There will never be two identical wards either with regard to environment, staff and especially the patients. However, as close

a match as possible was sought.

2 The tests were administered in random order to counterbalance any possible order effects.

3 The length of each session was the same, as was the number of sessions: ten sessions in twelve weeks.

4 The sessions for all groups were conducted on the ward and at the same time of day - 9.30 am, to offset the effects of tiredness or alertness, to which these subjects seem particularly susceptible.

5 The programmes were as controlled as possible with particular attention being paid to the following:

i) materials, all pictures being black and white

ii) length of interaction given to each subject

iii) the order of stimulus presented to each subject was changed weekly

iv) the programmes for Groups One and Two were identical so that the contribution of sign

versus speech could be examined. (As these programmes were necessarily rigidly controlled, it does not follow that they were the best way of teaching language).

v) the experimenter was aware of the possible bias towards certain groups during the intervention, and a deliberate effort to eliminate this was made.

6 The order of intervention was also important to eliminate any contamination effects. For example, the signed Makaton programme followed the unsigned to avoid any contamination of signs. The language programme phase for Group Three followed the phase of no intervention for Group Four to avoid possible contamination from increased language stimulation in the ward.

These following points achieved only partial control:

7 The level of nurse interest and involvement. Despite equal amounts of time being devoted to instruction on both wards, the individual nurses' responses could not be controlled.

8 Greater emphasis was placed on the nurse involvement with signs than speech and language, for obviously the former is an area of new skills. It must be recognised that the nurses are fluent in their native language, and cannot attain that fluency in such a short time in another medium. Measures to encourage their use of signing and their reinforcement of the subjects were introduced, in the shape of a daily recording form showing the subjects' use of signs. The results of these charts will be discussed later; however, only partial control of this variable was realised.

(1) Addresses of the publishers of these materials are as follows:

Developmental Learning Materials: Taskmaster Ltd, Morris Road, Leicester

Distar Language 1: Siegfried, Engelmann and Jean Osborn: 1976,1972,1969: Science Research Associates Inc, Henley-on-Thames

First Words: Ref No 7011/504: Bill Graham: University of Nottingham

Jim's People: Thomas, B. Gaskin, S. Herriot, P: HILO Offset of Colchester

Learning Development Aids: Duke Street, Wisbech, Cambs PE13 2AE

Photographic Teaching Materials: Winslow Press, 23 Horn Street, Winslow, Bucks MK18 3AP

Section 4 Results

4.1 Assessments used

Various assessment measures were administered to provide as complete a profile of the subjects' communication abilities as possible. In common with with other workers in the area of mental handicap, problems were encountered in finding suitable assessments for adult mentally handicapped subjects (Kiernan 1981:141). Most standardised tests are not for use with the handicapped, and the presentation of the child-orientated materials used in the tests is far from ideal when assessing adults.

The following tests were administered:

4.1.1 Behaviour Assessment Battery (Kiernan & Jones 1977)

This was used as an initial screening assessment. The questionnaire section of the communication assessment was completed with the assistance of one of the ward nurses who was well acquainted with the subjects. Following this, the Imitation Section was completed for each subject under consideration for selection. The criteria for selection were: that each subject should demonstrate moderate-severe speech and language deficit; all subjects should pass the Imitation Section of the Assessment. This assessment was suitable for screening only, as the

results could not be organised for analysis.

4.1.2 The Edinburgh Articulation Test (Anthony, Bogle, Ingram & McIsaac 1971)

The E.A.T. provides an articulatory assessment, which in usual clinical application provides a raw score, which can be converted into standard scores or the 'articulation age' of the subject. There is also a qualitative assessment analysis, which provides the clinician with categories covering the degrees of maturity of articulation ranging from 'very immature' to 'adult form' as well as category for 'atypical substitutions' (op. cit.:33).

All but five of the subjects scored below the minimal three years of age, so their degree of deviation, even from their mental age, was obviously great (with five subjects obtaining no score at all). Even those subjects who scored above this produced relatively low scores.

4.1.3 The Reynell Developmental Language Scales (Reynell revised edition 1977)

These scales aim to assess the expressive language and verbal comprehension between the ages of six months and six years. They may be administered to subjects who are developmentally retarded (op.

cit.:8) and whose language is functioning between these ages. Reynell claims the scales have a developmental orientation (op. cit.:9). The assessment materials are, however, geared to children and are not well suited for use with adult mentally handicapped subjects. In additional, the Expressive Language Section includes test pictures which are scored subjectively and rely on good visual perception and discrimination as the pictures are relatively small and complex. They may be acceptable for normal children, but are less so for mentally handicapped, especially those confined to institutions who may never have seen, for example, potatoes being dug, as depicted, or washing being hung out, as in another picture.

This general unsuitability of this assessment for use with adult mentally handicapped people, however, may be slightly offset by the fact that all subjects were tested and therefore all exposed to the same materials. The raw scores were converted to the equivalent ages, but the standard deviations were ignored, as none of the subjects obtained a score above 4.2 years for either Expressive Language or Verbal Comprehension.

Although the test was considered less than satisfactory for assessment purposes, there were no

other language assessments available to the author at that time.

4.1.4 The Vineland Social Maturity Scale (Doll 1953)

This scale was designed as a measure of social competence, taking into account many areas of the individual's development. For example: self-help; locomotion; occupation; communication; self-direction; and socialisation. Doll (op. cit.:10) defines social competence as 'the functional ability of the human organism for exercising personal independence and social responsibility'. Thus an overall impression of ability may be gained about the subject, rather than focusing on one or two areas, as in some intelligence tests, which may result in a distorted profile. For example, for those individuals whose main disability is in communication, a verbally based test would produce a much lower score than a non-verbal test.

The scale is completed by interviewing a close contact of the subject, who knows him/her well. The Total Score can then be converted into an Equivalent Social-Age Value.

The Scale was administered by two clinical psychologists, who had no knowledge of the groupings

of the subjects. It was selected in order to provide a quick measurement of overall performance, and each administration for each set of twelve subjects was completed in half a day.

Certain questions contained in the test may be considered somewhat out of date, for example: item 91 'Follows current events' (Doll op.cit.:204). The average pass age of this item is reported to be 15.35 years. However, this fails to account for a greater awareness nowadays at a younger age of current events encouraged by television news programmes and quizzes for children.

Nevertheless, the Vineland Scale has provided a standardised measurement which can be used for mentally handicapped adults, unlike the communication assessments available.

4.1.5 The Makaton Gesture Test

(See Appendix 12 for the list of Vocabulary included in the test).

This was devised by the author for this experiment. It aimed to provide a measurement of:

i) Expressive responses to a set of pictures,

either spoken or gestural. Any gestures made by the subject which corresponded to the appropriate Makaton sign were scored. A note was made of whether speech was attempted, though this score was ultimately not used. The test of Expression preceded the measurement of comprehension.

ii) The comprehension of Makaton signs was then tested, so that the appropriate gesture was not shown prior to this part of the test. This was administered by presenting the subjects with the first three pictures and showing a Makaton sign. The subject was then encouraged to select the picture representing the sign. Should the subject fail, then the experimenter repeated the sign and pointed to the appropriate picture. This was repeated for three pictures only. Should the subject continue to fail, only the first half of the test was completed. All pictures were presented in sets of three, and when the subject had selected a picture in response to a sign, the appropriate picture was removed and another added. The order of all three

pictures was altered, so that the subject did not receive any clues about the next sign to be presented. (The selection of items for inclusion in the test was based on a random selection of 33% of the one hundred and seventy-six signs available from Stages One to Four and Stage Nine. The same pictures that were used for the experiment were used in the test.)

The test was administered to all twenty-four subjects before and after the intervention. It had previously been administered to six subjects for a small pilot study. These subjects had coped well, and the test was used. It should be added, however, that this test was an ad hoc measurement, devised mainly to give the experimenter some record of the subject's gestural responses and comprehension prior to the Makaton intervention. There were no attempts at standardisation. It is also recognised that a stricter degree of gesture measurement may be required, as has been recommended by Fawcett & Clibbens (1983:13-21). Their study aims to measure the gestural efforts of subjects learning to sign with precision. Thus any improvement in the quality of their signs can be measured.

4.2.1 Results

The four formal assessment tests administered to the twenty-four subjects were considered first. An analysis of variance was applied to these results. However, there was found to be no significant differences between any of the four groups. The results of these tests are presented in Appendix 7. On studying these results, it may be seen that the Control Group showed minimal or no changes in their test scores, whilst all three Experimental groups showed some improvement in their scores. These improved test scores were unfortunately too small to be statistically significant.

These results therefore failed to support the first two hypotheses:

1 that Group Two will show more significant changes in their comprehension of language, their socialisation and their use of manual signs than either Groups One or Three.

2 that Groups One and Three will show more significant changes in their oral expressive language than Group Two.

The results from the Makaton Gesture Test were then

considered in greater detail than any of the other formal assessments, as a closer examination may lead to positive suggestions for future research and indicate criteria for the selection of suitable subjects for learning the MV. This will be considered in Section 5.

TABLE 6 THE AVERAGE USE OF GESTURE BY EACH GROUP (1)

Groups	Pre-Intervention		Post-Intervention	
	Mean Score	SD	Mean Score	SD
One	6.ØØ	6.Ø66	5.89	5.92
Two	2.33	1.53	5.89	9.93
Three	Ø.5Ø	Ø.ØØ	16.ØØ	Ø.ØØ
Four	1.22	Ø.88	Ø.87	Ø.72

These results indicated that Group Two showed an increase in their use of gestures following Makaton training. As with the next set of results, the inter-group comparison failed to show the increase as statistically significant, mainly due to the large variation between the scores of individual subjects.

TABLE 7 THE AVERAGE COMPREHENSION OF MAKATON SIGNS BY EACH GROUP (1)

Groups	Pre-Intervention		Post-Intervention	
	Mean	SD	Mean	SD
One	18.5Ø	7.91	18.ØØ	9.44
Two	1Ø.86	1Ø.86	12.83	12.91
Three	8.ØØ	7.16	7.ØØ	6.81
Four	8.16	7.73	7.33	7.22

The mean scores for Group Two showed an increase in their comprehension of Makaton signs.

4.2.2 Group Two Results

The results of the tests applied to Group Two subjects only were considered next. These were compiled from: the daily rating chart completed by the nurses; the comprehension probes administered during each session; and the nurses' questionnaires, rating their own use of Makaton signs.

TABLE 8 THE DISTRIBUTION OF THE TOTAL NUMBER OF MAKATON SIGNS USED BY GROUP TWO

Makaton Stages	Total Number of Signs Used	Responses Prompted	Spontaneous Responses
One	448	196	122
Two	323	163	77
Three	18	11	6
Four	16	8	7
Nine	3	1	2
Sig	p = Ø.ØØ8	p = Ø.ØØ8	p = Ø.Ø42

Key:

Responses Prompted - a prompted response was considered to be any response which was limited, requiring the nurse's encouragement, or any physically assisted response.

Spontaneous Response - a spontaneous response was a recognised Makaton sign produced by the subject without any prompting by the nurse.

Tests of randomisation were applied to these results, the level of probability being set at p = Ø.ØØ5 owing to the small sample size.

The results of the total number of signs used by the subjects supported the hypothesis that the developmental nature of the Vocabulary was reflected

in the distribution of use of the signs throughout the five stages taught. In other words, the earlier the Stage, the more signs were used from that Stage by the subjects. The significance of the distribution was high, at a level of p = Ø.ØØ8.

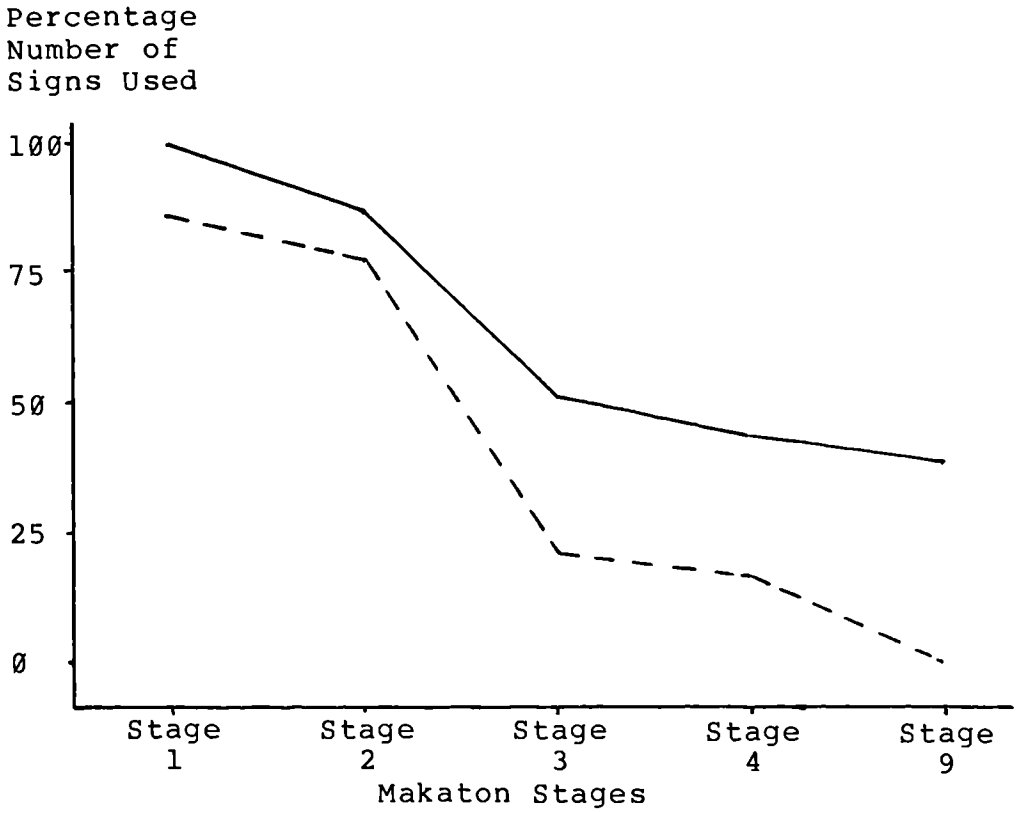
A breakdown of the total number of signs used into the type of Response Prompted and Spontaneous Response categories confirmed the support of the hypothesis. The first category, however, was more highly significant, at a level of p = Ø.ØØ8. The Spontaneous Response category revealed a slight variation from the pattern, with a small reversal in Stages Three and Four. This reduced the significance level to p = Ø.Ø42, which was still considered significant.

The correlation between the nurses' and subjects' use of signs was then examined. The data was taken from the daily rating chart and the nurses' questionnaires, which rated the nurses' use of signs.

TABLE 9 THE CORRELATION BETWEEN THE NURSES' AND SUBJECTS' USE OF DIFFERENT SIGNS.

Stages	Total Signs Possible	Nurses Raw Score	Nurses % Score	Subjects Raw Score	Subjects % Score
One	39	39	100	34	87
Two	38	34	87	29	76
Three	38	19	50	9	24
Four	39	18	46	9	23
Nine	23	10	43	2	9

GRAPH 1 THE CORRELATION OF DIFFERENT SIGNS USED BY GROUP 2 AND 3 NURSES



Key: Nurses _____ Subjects -----

The application of Spearman's r revealed an extremely close correlation of Ø.975. The accompanying Graph 1 illustrates this correlation. This result supported the fourth hypothesis that there would be a correlation between the nurses' and the subjects' use of different signs.

The subjects' comprehension and expressive use of the Makaton signs were then considered. The data was taken from the weekly comprehension probes and the daily rating chart. As several subjects failed to use any signs from Stage Nine, although they comprehended some signs, this stage was excluded from the comparison to avoid any statistical bias.

TABLE 1Ø INDIVIDUAL SUBJECTS' TOTALS OF THE PERCENTAGE OF DIFFERENT MAKATON SIGNS COMPREHENDED AND USED (2) (Stages One - Four)

	Subjects						Total	Total Mean	SD
	1	2	3	4	5	6			
Comprehension	317	17Ø	369	369	329	143	1697	7Ø.71	29.71
Expression	97	94	143	158	115	71	678	28.25	22.79

As may be observed from the individual subjects' results as well as the groups' performance, comprehension of signs exceeded that of sign use. This supported the fifth hypothesis that the number

of manual signs comprehended by each subject will be greater than the number of signs used by each subject.

(1) Details of the results from Tables R6 and R7 can be found in Appendices 8 and 9.

(2) Full details of the comparison of individual subjects' sign comprehension and use are given in Appendix 11.

Section 5 Discussion and Conclusions

5.1 Discussion

The current investigation derived from what the author considered to be a practical need rather than a purely academic exercise. In common with researchers in both the US. and the UK. (Schaeffer et al. 1978, Bonvillian & Nelson 1978, Cornforth et al. see pages 20-22 and 28 this thesis), the author had observed significant changes in communicative behaviour in mentally handicapped adults and children following sign language training, although the reasons for such changes are not well understood (See pages 38-40 this thesis). This present study was an attempt to introduce different language stimulation procedures and to observe any changes in the communication patterns of four groups of subjects living in a common ward environment.

Only one other published study (Kopchick et al. 1975, see page 29 this thesis) has attempted intervention with subjects at ward level. Most researchers have selected individual subjects who may have been predicted as being most likely to benefit from sign language training. These subjects have been withdrawn from a non-signing environment, given

instruction, and returned to the environment, where any attempts at signed communication often remain misunderstood and negatively re-inforced.

The main reason for working at ward level is the same as given by Kopchick et al. (1975:22): that of providing an environment with the constant stimulation of language in the auditory and visual form. Ward-based intervention as opposed to withdrawing individuals from different environments, therefore, involved other less controllable variables, the most notable being:

i) the level of nurse interest and involvement, which introduces personality variables;

ii) that in order to re-inforce the signing, in the same manner as verbal communication is re-inforced, the nurses must be prepared to learn and use sign language fluently (see page 116 this thesis).

In this study, however, although the nurses were trained in signing, they tended to limit the signs used to those that they judged to be most useful. Despite the amount of training given, a fluent signing environment was not possible, mainly due to a lack of confidence voiced by the nursing staff, who

admitted that when under pressure of staff shortage, or in periods of intense patient involvement, they reverted to speech only.

The reasons for using sign language rather than conventional therapeutic procedures have been outlined previously in Section 1. In examining the studies from the US. and the UK., the majority of researchers aim to teach both language comprehension and provide a means of expression for the subjects, following the failure of conventional therapy. (Schaeffer 1980,Bonvillian & Nelson 1976, see pages 13 and 22 this thesis) Kiernan (1981, see page 59 this thesis) points out that some clinicians are using sign language to teach syntax. Two researchers, Yarter (1980) and Le Prevost,(1983 see pages 24-27 this thesis), both concerned with young Down's Syndrome children, anticipated poor linguistic performances in their subjects and introduced signing in order to teach language with the additional visual cues, before natural language acquisition failed. In general, therefore, sign language programmes are generally being used to teach language through the medium of signs.

No researchers have reported giving any consideration as to which system best fulfils the

general aim of teaching language to the mentally handicapped. The general assumption appears to be that all sign languages are equally effective. A comparison of the three systems most commonly used in the UK., the MV, the PGSS and Amer-Ind, reveals however, that there are differences between the systems which should be considered before selection.

According to Crystal's (1976) definition of the structure of language, the MV and the PGSS fulfil the important categories of production, grammar and meaning. Amer-Ind, however, by Skelly's (1979, see page 55 this thesis) own claim, has no linguistic structure. Amer-Ind therefore cannot share the same aim as MV and the PGSS, that of teaching language to the handicapped. Amer-Ind does, however, provide an alternative means of communication. As the Amer-Ind research has been predominantly with adults who have acquired language defects, it may well be better suited to that category of subject than either the MV or the PGSS.

Both the MV and the PGSS organise their signs according to the rules of English grammar. However, the main difference between the MV and the PGSS is that the MV is organised into a structured, developmental language teaching programme (Walker and Armfield 1981, see page 52 this thesis). This organisation is

unique amongst all sign language systems. The PGSS has no such structure. In addition, the PGSS, being a manufactured system, does not always represent concepts as obviously as a 'natural' sign language (see page 95, this thesis).

The detailed analysis of the linguistic structure of the MV contained in Section 2 is unique. The analysis was carried out in order to show that the MV fulfils Crystal's (1976) definitions of the essential features of language structure. It also details ways in which there are modifications to the BSL structure described by Brennan et al. (1980, see pages 42-50 this thesis), such as the omission of certain complex handshapes, to allow for the poorer co-ordination in many of the mentally handicapped users.

This analysis also provides a major linguistic justification for the use of the MV as a vehicle for teaching language for mentally handicapped adults, which has been long overdue. In a recent article, Bell (1984:5-7) draws attention to the need for such linguistic analysis and definition of sign language systems used with the mentally handicapped.

The suggestions accounting for the success of the MV

are summarised in Section 2.7.2 (pages 94-96 this thesis. With the further evidence provided by the linguistic analysis, it is suggested that of the three systems, the MV, the PGSS and Amer-Ind, the MV is best suited to fulfilling the clinical objectives of teaching language to the mentally handicapped.

5.2 Discussion of test results

The failure of the formal assessments (the R.D.L.S., the E.A.T. and Vineland) to reveal any significant differences between the groups is somewhat surprising, in view of the results from other studies. This was probably due to a combination of factors rather than any one in particular. Firstly, in common with other researchers, the author failed to find suitable formal communication assessments for the adult subjects (Kiernan 1981, see page 118 this thesis). The Vineland Test of Social Maturity (Doll 1953) was the only assessment specifically designed for adult mentally handicapped subjects. This, however, is essentially a non-language test. Although the Communication Section of Behaviour Assessment Battery (1977) was considered, it proved unsuitable for statistical comparison. The tests used were designed for children and standardised on a non-handicapped population. In view of the evidence that cognitive

competence affects language learning (Woodward 1959, Kahn 1975, Bates 1976, see pages 34-36 this thesis), a suitable basis for assessment may be the cognitive performance of the individual.

It is proposed that this could be based on Piaget's definition of cognitive performance, rather than the measured language performance of the individual. Thus the subject's readiness and potential for language learning would be known and a suitable type of language stimulation provided.

Secondly, there may have been improvements in areas that were not assessed. For example, some subjects attempted to communicate more with staff and other patients. Bodily contact also increased with some subjects. However, these were anecdotal reports and could not be included amongst the results for purposes of statistical calculation.

Thirdly, the variation between individual subjects in each group was so great that any statistical changes in some of the results were invalidated. For example, some subjects scored relatively well, whilst others failed to score at all on the same assessment. In order to overcome this variation, it is therefore suggested that either stricter subject selection criteria should be applied, or a test

designed which measures more than the verbal aspects of communication. It was a failure to score in this latter area that accounted for the variation in scores - yet these are the very subjects for whom non-verbal communication techniques are intended.

Fourthly, the time-span of twelve weeks may be too short to reveal significant changes in communication. Walker's original research was conducted with two-hourly training sessions, once a week for nine months. This present study had time constraints placed upon it by the hospital authorities, and the work on each ward had to be completed within six months. A longer period of intervention might have produced different results.

As a result of the interaction of these factors, the following two hypotheses were not supported:

1 That Group Two will show more significant changes in their comprehension of language, their socialisation and use of manual signs than either Groups One or Three, with Group One showing slightly more significant changes in these areas than Group Three.

2 That Groups Two and Three will show more significant changes in their expressive language and articulation than Group Two, these being corrected during the sessions of intervention.

The Makaton Gesture Test, which was devised by the author for this study, also failed to reveal any significant differences between the groups. The analysis of variance was applied, but the results were invalidated by the large variance between individual scores. A closer analysis of the scores reveals features which may be useful for further research.

All subjects receiving Makaton Sign language intervention showed an increase in both their expression and comprehension of signs.

A more detailed examination of the comprehension results reveals that certain subjects from all three experimental groups showed considerably higher sign comprehension abilities than the other subjects:

In Group One, subjects 5 and 6: scoring 48 and 51

In Group Two, subjects *1Ø and *12: scoring 47 and 48

In Group Three, subject 16: scoring 41

*subjects 10 and 12 from Group Two also showed the greatest improvement in their acquisition and use of signs. A raw score gain of thirty-five signs was recorded for both subjects.

It is suggested that certain subjects may have a pre-disposition to respond to signs. The features of these subjects are as follows:

i) Three Down's Syndrome, one deaf and one dysarthric.

ii) All scored above 7 years on the Vineland Test of Social Maturity.

iii) All scored below 3 years on the Edinburgh Articulation Test.

iv) The language comprehension abilities exceeded their expression by at least five months.

The common profile was that of generally depressed linguistic abilities, with especially poor expressive abilities, in particular articulation, compared to their lowest level of social competence.

Before any conclusion about the pre-disposing factors can be drawn, it is recommended that a larger sample of mentally handicapped subjects be

assessed and any common features identified. The total sample of 24 subjects is too small for conclusive evidence, as is the sample of six subjects receiving sign instruction in Group Two. It is worth noting, however, that those two subjects showing the greatest pre-intervention comprehension abilities also showed the greatest gain in sign use after sign language training.

Following assessment with a larger sample, it may be possible to begin identifying those subjects who would benefit from sign language intervention. When considering the results from Group Two, it should be borne in mind that although the sample size is small, many researchers working with sign language and mentally handicapped individuals have used smaller samples (Baron & Isenee 1976, Schaeffer 1980, Bonvillian & Nelson 1976, Le Prevost 1983, see pages 21-27 this thesis). In fact Halliday (1975, see page 36 this thesis) based his description of the functions and development of child language on a single subject. The Group Two results may therefore provide useful pointers to the results of future research.

Table 3 (see pages 74-77 this thesis), illustrates the number of Makaton signs used by Group Two subjects from the five Stages taught. The results from all

three categories of sign use are significant, supporting the third hypothesis that the manual signs used by these subjects will reflect the developmental nature of the Vocabulary with the greatest number of signs being used from Stage One, with progressively fewer through Stages Two, Three, Four and Nine.

Closer investigation of the distribution of signs, however, reveals that whilst the signs in Stages One and Two are the most used, with a large difference between the two stages, there is an extremely small amount of differentiation between Stages Three and Four. In 'Spontaneous Response', the use of signs from Stages Three and Four is in fact reversed, although by only one sign. This small decrease suggests there are other factors for consideration which may be summarised as either:

i) Stages Three and Four are less developmental in their organisation than other Stages; or

ii) elements of the Vocabulary in these Stages have a different relevance to adult subjects than to children. As the adults are more conditioned to some aspects of institutional life than children of

equivalent linguistic ability, Mittler's (1974, see page 14 this thesis) suggestion that, in adults, language delay becomes language deviance appears to be confirmed.

One other factor which must be considered in conjunction with these findings is the support for the fourth hypothesis, that of close correlation between the nurses' sign use and that of the subjects. The results from the correlation study reveals an extremely close correlation of Ø.975 - in particular, the reduction in the rate of differentiation between Stages Three and Four as correlated. This preliminary investigation into the communicative relationship between staff and patients may reflect either:

i) a particular feature of the Vocabulary e.g. its developmental structure; or

ii) the fact that the nurses' sign use strongly influences the subjects' sign use. As the nurses' signing always exceeded that of the subjects, it is unlikely that the subjects would exert the significant influence on the nurses' choice of signs.

There are, therefore, two major implications arising from the support of the third and fourth hypotheses

which warrant further investigation:

1 A closer examination of the claimed Developmental Structure of the Vocabulary is required. Although Armfield's research (1981, see page 78 this thesis) partly supports the claim, he has only considered Stage One. The results here point to the need for considering Stages Three and Four. A consideration of the Vocabulary content of these Stages shows that in Stage Three there is a predominance of outdoor activities and vocabulary items. Stage Four concentrates on school and work vocabulary - or indoor activities which may account for the institutionalised adults' increased sign responses in this Stage. (1) Although there is no evidence to discount Walker's claim (see page 52 this thesis) that the Stages are arranged in a developmental psycholinguistic sequence, it is suggested that an investigation into this aspect of the Vocabulary should be conducted with samples of both adults and children, so that any differences between adult and child acquisition may be revealed.

2 The whole aspect of nurse/patient communication requires further investigation. This would clarify to some extent the degree of influence the nurses' communicative behaviour has on that of the patients. In such a study it would also be relevant to investigate what factor or factors influence the nurses' selection of signing vocabulary. For example, is it based on the signs the nurse is most fluent in using, or is it based on the nurse's judgement of what the subject can understand?

From such an investigation, it may well emerge that in order to produce the most effective changes in the patients' communication, intervention should be concentrated initially on the nursing staff.

Finally, a consideration of Table 10 (See page 131 this thesis) reveals that the fifth hypothesis, that of sign comprehension exceeding sign use, was supported. This reflects the trend of spoken language development and confirms Hobson and Duncan's findings (1979, see page 24 this thesis) that the receptive sign Vocabulary is greater than the expressive.

This finding has implications for teaching, in that there should be a concentration on developing a receptive sign vocabulary prior to developing sign production. This emphasis on sign reception was used in Le Prevost's work (1983, see pages 25-27this thesis) and is justified by these results.

5.3 Summary of suggestions for further research

Three areas have clearly emerged from the results of this study as being in need of further investigation. They are as follows:

1 The developmental organisation of the Makaton Vocabulary, especially with regard to Stages Three and Four. It is also suggested that adult and child acquisition be considered separately, in view of their differing life experiences and environments.

2 The development of specific clinical assessments for measuring:

i) gestural abilities and

ii) communicative abilities of the mentally handicapped adult.

In view of the evidence that cognitive competence pre-determines language ability, it is suggested that any assessment should consider the cognitive as well as the actual language performance of the individual.

3 The communicative relationship and interaction between nurse/caretaker and the mentally handicapped person may provide valuable insight into the influence exerted by the caretaker. Factors which should be taken into consideration are:

i) the caretaker's own view of the mentally handicapped person's communicative abilities and prognosis;

ii) the established patterns of interaction between caretaker and subject.

5.4 Conclusions

The conclusions drawn from both the consideration of the use of the MV as a vehicle for teaching language and the results of this present study are as follows:

1 The MV contains all the essential features of a language, as defined by Crystal. The

use of the MV for teaching language to the mentally handicapped is therefore linguistically justified.

2 Although the developmental structure of the Vocabulary is only partially supported by research, it has been demonstrated that of the three systems used in the UK (the MV, the PGSS and Amer-Ind), the MV best fulfils the above mentioned clinical aims.

3 Improved assessment procedures should make it possible to identify characteristics of those individuals who will benefit from sign language training.

4 It is clear that the nurses exert an influence over the communicative performance of their patients. This factor should be more fully investigated so that it can be exploited to the nurses' and patients' mutual benefit.

5 That, as with spoken language, the receptive sign vocabulary is greater than the expressive.

BIBLIOGRAPHY

ABERCROMBIE,D. (1965) Studies in Phonetics and Linguistics. Oxford University Press.

ANTHONY,A,BOGLE,D,INGRAM,T.,McISAAC,M(1971) The Edinburgh Articulation Test. E &S Livingstone.

ARMFIELD, A. (1982) Applying psycholinguistics when planning alternative communication for persons with severe communication impairment. Unpublished paper available from:31, Firwood Drive, Camberley, Surrey.

BAILEY, R. D. (1978) Makaton Success: Fact and Artefact. Apex Dec 1978, Vol 6, No3.

BAKER, C. & PADDEN, C. (1978) Focusing on the nonmanual components of ASL. In SIPLE,P (ed) Understanding Language Through Sign Language Research. New York: Academic Press.

BARON, N. & ISENSEE, L. (1976) Effectiveness of manual versus spoken language with an autistic child. Unpublished paper available from: Brown University, Providence, Rhode Island.

BARON, N., ISENSEE, L. & DAVIS, A.(1977) Iconicity and learnability: teaching sign language to autistic children. Paper presented at the Second Annual Boston University Conference on

Language Development. Boston, Mass. 1977, 10-11.

BATES, E.(1976) Language and Context: The Study of the Acquisition of Pragmatics. New York: Academic Press.

BELL, I. (1984) Communication and language in mental handicap. 1. Meaningful terms. Mental Handicap Vol 12, March 1984, 5-7.

BELMONT, J. M. & BUTTERFIELD, E. C. (1975) The relations of short-term memory to development and intelligence. In LIPSITT, P. & REESE, H. (eds) Advances in Child Development and Behaviour. 1975, Vol 1, 29. New York: Academic Press.

BONVILLIAN,J. D. & NELSON, K. E.(1976) Sign language acquisition in a mute autistic boy. J. Speech & Hear. Dis. 1976, 41, 339-347.

BONVILLIAN,J. D. & NELSON,K. E.(1978) Development of sign language in autistic children and other language-handicapped individuals. In SIPLE, P (ed) Understanding Language Through Sign Research. New York: Academic Press.

BRENNAN, M. & COLVILLE, M. (1979) A British Sign Language research project. Sign Language Study 24, 1979 253-272.

BRENNAN, M., COLVILLE, M. & LAWSON, L. (1980) Words in Hand: A Structural Analysis of British Sign Language. Edinburgh: BSL Research project, Moray House.

BRICKER, D. D.(1972) Imitative Sign Training as a facilitator of word-object association with low-functioning children.Am. J. Ment. D. 1972, Vol 76, no 5, 509-516.

BRICKER, W. & BRICKER, D.(1970) see end of bibliography.

BROWN, R. (1973) A First Language: The Early Stages. Cambridge, Mass:Harvard University Press.

CARR, E. G. (1979) Teaching autistic children to use sign language. Some research issues.J. Aut. & Dev. Dis. 1979, 9, (4), 345-359.

CARR, J. (1975) Young Children With Down's Syndrome London: Butterworth.

CLARKE, A. M. & CLARKE, A. D. B.(1974) Experimental Studies: an overview. In CLARKE,A.M. & CLARKE, A. D. B. (eds) Mental Deficiency: The Changing Outlook. London: Methuen.

CRAIG, E. (1978) Introducing the Paget-Gorman Sign System. In TEBBS, T. (co-ordinator) Ways and Means. Somerset: Globe Education.

CORNFORTH, A., JOHNSTON,K. & WALKER M.(1974) Makaton Vocabulary; Teaching Sign Language to Deaf, Mentally Handicapped People. Apex June 1974, Vol 2. No 1.

COVINGTON, V. (1973) Features of Stress in ASL Sign Language Study 2, 1973, 39-50.

CRUTTENDEN, A. (1979) Language in Infancy and Childhood. Manchester University Press.

CRYSTAL, D. (1976) Child Language, Learning and Linguistics. London: Edward Arnold.

DANILOFF,J. K., LLOYD,L. L., & FRISTOE,M.(1983) Amer-Ind transparency. J. Speech & Hear. Dis. 1983, 48, 98-103.

DENMARK, J. (1983) Deafness in mental handicap. Unpublished paper presented at a meeting of Specific Interest Group (Mental Handicap) at Ninewells Hospital, Dundee.

DEUCHAR, M. (1977) Sign Language diglossia in a British deaf community. Sign Language Study 17, 1977, 347-356.

DOLL, E. A. (1953) Measurement of Social Competence. American Guidance Service, Inc.

DUNCAN, J. L. & SILVERMAN, F. L. (1979) Impacts of

learning Amer-Ind on mentally retarded children. In SKELLY, M. Amer-Ind Gestural Code Based on Universal American Indian Hand Talk. New York: Elsevier.

FAWCETT,G. F. & CLIBBENS, J. S.(1983) The Acquisition of Signs by the Mentally Handicapped: Measurement Criteria. Brit. J. of Dis. Commun. 1983, Vol 18,1, pp 13-21.

FAWCUS, M. & FAWCUS, R. (1974) Disorders of Communication. In Clarke,A.M. & Clarke A. D. B. (eds) Mental Deficiency: The Changing Outlook. London: Methuen.

FENN, G. & ROWE, J. (1975), An experiment in manual communication. Brit. J. of Dis. Commun. April 1975, Vol 1Ø, No 1, 3-16.

FISCHER, S. & NEWKIRK, D.(1979) The rate of speaking and signing. In KLIMA, S. & BELLUGI, B. (eds) The Signs of Language. Cambridge, Mass: Harvard University Press.

FOUTS, R. S., COUCH, J. B. & O'NEILL, C. R. (1979) Strategies for primate language teaching. In SCHIEFELBUSCH, R. & HOLLIS, J. (eds) Language Intervention From Ape to Child. Baltimore: University Park Press.

FREESE, J. & FRERKER, V. (1979) Amer-Ind in mental retardation. In SKELLY, M. Amer-Ind Gestural

Code Based on Universal American Indian Hand Talk. New York: Elsevier.

FULWEILER, R. L. & FOUTS, R. S.(1976) Acquisition of American Sign Langauge by a non-communicating autistic child. J. Autism Child. Schizophrenia 6, 43-51.

GARDINER,R. A. & GARDINER, B. T.(1971) Ameslan: two-way communications with an infant chimpanzee. In SCHRIER, A. M. & STOLLNITZ, F. (eds) Behavior of Non-Human Primates Vol 4, 117-184. New York: Academic Press.

HALLIDAY, M. A. K. (1975) Learning How to Mean: Explorations in the Development of Language. London: Edward Arnold.

HARLIN, M. (1980) Makaton training with the mentally handicapped: A comparative study. Unpublished M. Phil thesis, University of Edinburgh.

HOBSON, P. A. & DUNCAN, P. (1979) Sign learning and profoundly retarded people. Mental Reta. Feb 1979, 17, 33-37.

HOUGH, J.(1983)Louder Than Words. Cambridge: Great Ouse Press.

JONES, L., REID, B., & KIERNAN, C. (1982) Signs and Symbols: The 1980 Survey. Special Ed: Forward Trends 9(2) 34-37.

KAHN, J. V. (1975) Relationships of Piaget's sensorimotor period to language acquisition of profoundly retarded children. Am. J. Ment. Def. 79, 640-643.

KIERNAN, C. (1974) Behaviour modification. In CLARKE, A. M. & CLARKE, A. D. B. (eds) Mental Deficiency: The Changing Outlook. London: Methuen.

KIERNAN, C. (1981) A strategy for research on the use of nonvocal systems of communication. J. Aut. & Devel. Dis. 1981, 11, (1), 139-151.

KIERNAN, C. & JONES, L. (1977) Behaviour Assessment Battery. Windsor: N.F.E.R. - Nelson.

KLIMA, E. & BELLUGI,B. (1979) The Signs of Language. Cambridge, Mass: Harvard University Press.

KONSTANTANAREAS, M., OXMAN, J. & WEBSTER, C. (1978) Iconicity: Effects of the acquisition of sign language by autistic and other severely dysfunctional children. In SIPLE, P. (ed) Understanding Language Through Sign Language Research. New York: Academic Press.

KONSTANTANAREAS, M., WEBSTER, C. & OXMAN, J. (1979) Manual language acquisition and its influence on other areas of functioning for autistic and

autistic-like children. J. Child Psy. 1979, 20, 337-350.

KOPCHICK, G., ROMBACH, D. & SMILOVITZ, R. (1975) A Total Communication Environment in an Institution. Ment. Reta. June 1975, 13, 22-23.

LEECH, G., DEUCHAR,M. & HOOGENRAAD, R.(1982) English Grammar for Today. London & Basingstoke: Macmillan.

LENNEBERG, E. H. (1967) Biological Foundations of Language. New York: Wiley.

LENNEBERG, E. H. (1973) Biological aspects of language. In MILLER, G. (ed) Communication, Language and Meaning - Psychological Perspectives. New York: Basic Books.

LE PREVOST,P. A. (1983) Using the Makaton Vocabulary in early language training with a Down's baby: a single case study. Ment. Handicap Vol II, March 1983.

LOVAAS, O. I., BERBERICH, J. P., PERLOFF, B. F. & SCHAEFFER, B. (1966) Acquisition of imitative speech by schizophrenic children. SCI 1966, 151, 705-707.

MANOLSON, H. A. (1979) Parent training: a means of implementing pragmatics in early language remediation. Hum. Commun. 1979, 4, 275-282.

MAXWELL, M. M. (1983) Chafe's generative semantics and the structure of American Sign Language. Sign Lang. Stud. 39, 1983, 169-185.

MEIN, R. & O'CONNOR, N. (1960) A study of the oral vocabularies of severely subnormal patients. J Ment. Defic. Res. 4:130-147.

MILLER, L. (1982) Pragmatics and sign language: Characteristics and acquisition. Audiol. Vol vii,No 4. April 1982, 49-61.

MILLER, A. & MILLER, E. E. (1973) Cognitive-developmental training with elevated boards and sign language. J. Autism Child Schizophrenia 1973, 3,65-85.

MILLER, J. E. & YODER, D. E .(1974) An ontogenetic language teaching strategy for retarded children. In SCHIEFELBUSCH,R. L. & LLOYD,L. L. (eds) Language Perspectives - Acquisition, Retardation and Intervention. Baltimore: University Park Press.

MITTLER, P. J. (1974) Language and communication. In CLARKE, A. M. & CLARKE, A. D. B. (eds) Mental

Deficiency: The Changing Outlook. London: Methuen.

MITTLER, P. J. (1976) Assessment for language learning. In BERRY, P. (ed) Language and Communication in the Mentally Handicapped. London: Edward Arnold.

MITTLER, P. J. (1979) People Not Patients. London: Methuen.

MORLEY, M.E. (1972) The Development and Disorders of Speech in Childhood. London & Edinburgh: Churchill Livingstone.

PENNER,K. A. & WILLIAMS,W. (1982) Comparison of sign versus verbal symbol training in retarded adults. Percept. Mot. Skills 1982, 55, 395-401.

PIAGET,J. & INHELDER,B. (1969) The Psychology of the Child. London: Routledge & Kegan Paul.

PODLESKI, J. (1979) Amer-Ind with the mentally retarded. In SKELLY, M. Amer-Ind Gestural Code Based on Universal American Indian Hand Talk. New York: Elsevier.

PREMACK,D. (1979) A functional analysis of language. In SCHIEFELBUSCH,R. & HOLLIS,J. (eds) Language Intervention from Ape to Child. Baltimore:

University Park Press.

REYNELL, J. (Revised edition 1977) The Reynell Developmental Language Scales Windsor: N.F.E.R. Nelson.

REID, B. & KIERNAN,C. (1979) Spoken words and manual signs as encoding categories in short-term memory for mentally retarded children. Am. J. Ment. D. 1979, 84, 200-203.

REID, B., JONES, L. & KIERNAN, C. (1983) Research supplement Special Ed: Forward Trends Vol 10, No 1.

ROWE, J. (1978) Paget-Gorman Sign System: Manual communication as an alternative method. In TEBBS, T. (co-ordinator) Ways and Means Somerset: Globe Education.

RYAN, J. (1975) Mental subnormality and language development. In LENNEBERG, E. & LENNEBERG, E. (eds) Foundations of Language: A Multi-disciplinary Approach Vol 2. New York: Academic Press.

SCHAEFFER, B. (1980) Spontaneous language through signed speech. In SCHIEFELBUSCH, R. (ed) Nonspeech Language and Communication. Baltimore: University Park Press.

SCHAEFFER,B., KOLLINZAS, G., MUSIL, A. & MCDOWELL, P.

(1978) Spontaneous verbal language for autistic children through signed speech. Sign. Lang. Stud. 21, 317-352.

SCHIEFELBUSCH, R. & HOLLIS, J. (1980) A general system for nonspeech language. In SCHIEFELBUSCH, R. (ed) Nonspeech Language and Communication. Baltimore: University Park Press.

SKELLY, M. (1979) Amer-Ind Gestural Code Based on Universal American Indian Hand Talk. New York: Elsevier.

SNYDER, L. S. (1978) Communicative and cognitive abilities and disabilities in the sensorimotor period. Merrill-Palmer Q Vol 24, No 3, 1978, 161-180.

STOKOE, W. E. (1960) Sign language structure: an outline of the visual communication system of the American deaf. Stud. Ling. Occasional Papers No 8. University of Buffalo.

STOKOE, W. E. (1972) Semantics and Human Sign Language. The Hague: Mouton

STOKOE, W. E. (1980) The study and use of sign language. In SCHIEFELBUSCH, R. (ed) Nonspeech Language and Communication. Baltimore:

University Park Press.

SUPALLA, T. & NEWPORT, E. (1978) *The derivation of* nouns and verbs in ASL. In SIPLE, P. (ed) Understanding Language Through Sign Language Research. New York: Academic Press.

WALKER, M. (1973) An experimental evaluation of the success of a system of communication for the deaf mentally handicapped. MSC Thesis (Unpublished) University of London.

WALKER, M. (1976) Language Programmes for Use with the Revised Makaton Vocabulary. Makaton Vocabulary Development Project, 31 Firwood Drive, Camberley, Surrey.

WALKER, M. (1978) The Makaton Vocabulary. In TEBBS, T. (co-ordinator) Ways and Means. Somerset: Globe Education.

WALKER, M. (1983) Makaton in the 198Ø's. Paper presented at Project Horizon Conference, University of Essex 1983. Available from Makaton Vocabulary Development Project, 31 Firwood Drive, Camberley, Surrey.

WALKER, M. & ARMFIELD, A. (1981) What is the Makaton Vocabulary? Special Ed: Forward Trends, Vol 8, No 3.

WELLS,M. E.(1981) The effects of Total Communication training versus traditional speech training on word articulation in severely mentally retarded individuals. Appl. Res. Ment. Retard. ol 2, 323-333, 1981.

WOODWARD, M. (1959) The behaviour of idiots interpreted by Piaget's theory of sensori-motor development. Brit. J. Ed. Psychol. 1959, 29, 60-71.

YARTER, B. M. (1980) Speech and language programmes for the Down's population. Semin. Speech. Lang. & Hear. Vol 1, No 1.

BRICKER, W. & BRICKER, D. (1970) A program of language training for the severely language handicapped child. Except. Child. 1970, a, 101-111.

APPENDIX 1 LIST OF THE MAKATON VOCABULARY STAGES ONE - NINE

This has been reproduced with the kind permission of Margaret Walker.

STAGE ONE	STAGE TWO	STAGE THREE	STAGE FOUR
Mummy (Mother)	Man	Sweets	Teacher
Daddy (Father)	Lady	Cigarettes	Boss
Brother	Boy	Apple	Friend
Sister	Girl	Orange	Children
Nurse	Baby (Doll)	Banana	Name
Doctor	Bread	Fish	School
Drink (Cup)	Butter	Rabbit	Work
Biscuit	Egg	Horse	Outside
Dinner	Milk	Cow	Cupboard
Toilet	Tea	Pig	Pen (Pencil)
Bed	Sugar	Sheep	Paper
Chair	Cake	Butterfly	Scissors (Cut)
Table	Jam	Boat	Picture
House (Home)	Ice-cream	Train	Sand
Car (Bus)	Door	Aeroplane	Water
I (Me)	Window	Bicycle	Thread (String)
You	Fire (Heating)	To have	Paint
Where?	T.V.	To walk	Key
What?	Lamp (Light)	To run	Box
Here	Telephone	To kick	To put
There	Dog	To dig	To make/do
To sleep (Bed)	Cat	To ride (Horse)	To sew
To drink (Cup)	Bird	To jump	To cook
To eat (Food)	Tree	To climb	To sing
To look (See)	Flower	To swim	To play
To stand-up	Knife (Cut)	To fall	To know
To sit	Fork	To shave	To think
To wash	Spoon	To brush hair	To work
To bath	Plate	To brush teeth	To read
To go	Book	Big	To write (Draw)
To come	Teddy	Small	To paint
To give	Bricks	More	To teach
Good (O.K.) (Hello)	Ball	Up	To build
Bad (Naughty)	And	Down	To break
Yes	Hot	My (Mine)	We (Us)
No	Cold	Your (Yours)	They (Them)
Please (Thank you)	Clean	Sorry	In
Good morning	Dirty	Now	On
Goodbye			Under

STAGE NINE: ADDITIONAL VOCABULARY

Handicap		Specific			People
Deaf	Medicine	Sick	Hearing Aid	Soldier	Farmer
Dumb	Tablet	Ill	Spectacles	Sailor	People
Blind	Injection	Pain	Wheelchair	King	God (suggest sign Jesus)
	Operation	Dead	How are you?	Queen	

Clothing: Mimed

Parts of the Body: Mimed

STAGE FIVE	STAGE SIX	STAGE SEVEN	STAGE EIGHT
Priest	Country	Numbers 1-10	To choose
Milkman	Town	How much ?	To win
Postman	Sea	How many ?	To dance
Policeman	Cinema	How old ?	To find
Fireman	Holiday	Many (A lot)	To understand
Church	Colour	Some (Few)	To remember
Shop	Red	Time (Hour)	Birthday
Road	Blue	To-day	Christmas
Garden	Green (Grass)	To-morrow	Party
Fire (Blaze)	Yellow	Yesterday	Parcel
Post-box	Black	Next week	Balloons
Money	White	Next year	Photograph
Bag (Carry)	Brown	Last week	Camera
Letter (Stamp)	Orange	Last year	Mirror
Time (Watch)	To begin	Long time ago	Radio
To carry	To finish	Saturday	Newspaper
To throw	To bring	Sunday	Sandwich
To catch	To ask	Night	Beer
To stop	To speak	Day	Sausages
To help	To listen	When ?	Meat
To like	To be able (can)	Always	Potato
To want	To forget	Again	Bacon
To quarrel	To grow	Late	Cheese
Quick	Same	Early	Coffee
Slow	Different	Before	Tomato
Happy (Pleased)	New	After	First
Sad (Miserable)	Old	Wages	Last
Difficult (Hard)	Beautiful	To buy	Next
Easy (Soft)	Smart	To save	Over
Strong	Nice	Sun	Through
Heavy	Kind	Rain	Near (Close)
Clever	Ours	Wind	Between
Angry	Theirs	Snow	Lucky
Frightened	Another	Stars	Hungry
To be patient	With	Moon	Thirsty
Mistake	Who ?	Sky	Worried
Trouble (Matter)	Which ?	Careful	Really (True)
But		Expensive (Pain)	Why ?
			Because

Names: For family or close acquaintance, often the initial letter of the name is finger spelt, or some noticeable feature, e.g. little boy - spectacles is signed.

Rooms: No specific signs for rooms, e.g. classroom, bathroom, but the deaf sign the verb e.g. to bath conveys bathroom, to cook conveys kitchen, for classroom suggest school.

APPENDIX 2 LIST OF THOSE ITEMS *NOT PICTORIALY REPRESENTED* FOR USE WITH THE MAKATON VOCABULARY INTERVENTION PROGRAMMES

STAGE ONE	STAGE TWO	STAGE THREE
I (Me)	And	To have
You		More
Where?		My (Mine)
What?		Your (Yours)
Here		Sorry
There		Now
Good (O.K.) (Hello)		
Bad (Naughty)		
Yes		
No		
Please (Thank you)		
Good morning		
Goodbye		

STAGE FOUR	STAGE NINE
Name	Dead
To put	God (Suggest sign Jesus)
To make/do	How are you?
To know	
To think	
We (Us)	
They (Them)	

APPENDIX 3 MAKATON PROGRAMME

Notes: It is not recommended that this language programme be used in its present form for teaching signs, or as a language programme. In an effort to control variables, there was little use of objects in the environment for teaching purposes, which would normally be recommended. The structure of the sessions was also rather rigid, with little variation in routine. In addition, there was no allowance for individual rates of learning, the vocabulary items were all presented at least twice, during the ten weeks.

Comprehension probes were administered after every six vocabulary items throughout the ten weeks.

The following programmes were used for Groups One and Two:

Week 1

Vocabulary introduced:

1) Social: HELLO, HOW ARE YOU? SIT DOWN THERE

2) Pictures: BED, TOILET, CAR, BISCUIT, DRINK, CHAIR, NURSE, DOCTOR, TABLE, DINNER, HOUSE, BATH, MAN SLEEPING, MAN DRINKING, MAN EATING, BABY WASHING, BABY BATHING

3) Tea, milk, sugar and biscuits provided.

Extra Vocabulary used: LOOK AT ME, DO YOU WANT TEA?

DO YOU WANT A BISCUIT? STAND UP, GOOD BYE.

Week 2

1) HELLO, GO AND SIT DOWN THERE, ARE YOU ALRIGHT?

2) BED, TOILET, CAR, BISCUIT, DRINK, CHAIR, NURSE, DOCTOR, TABLE, DINNER, HOUSE, BATH, MAN SLEEPING, MAN DRINKING, MAN EATING, BABY WASHING, BABY BATHING, MAN, LADY, BOY, GIRL, BABY, BREAD, BUTTER, MILK, TEA, SUGAR.

3) Tea, milk, sugar, bread, butter and biscuits.
Extra vocabulary: LOOK AT IT (the picture), OKAY?

Week 3

1) HELLO, HOW ARE YOU? ARE YOU WELL? GOOD, COME HERE, GO AND SIT DOWN THERE.

2) Use cards already introduced to stimulate use of: WHAT, DRINK, TOILET, CAR, BABY WASHING, NURSE, BISCUIT, BED, DOCTOR, CHAIR, TABLE, MAN EATING, BABY BATHING, introduction of concept 'GIVE ME'.
DINNER, HOUSE, BUS, MAN SLEEPING, MAN DRINKING, MAN, LADY, BOY, GIRL, BABY, BREAD, BUTTER, MILK, TEA, JAM, ICE-CREAM, DOOR, WINDOW, FIRE, T.V., LAMP, TELEPHONE, CAT, DOG, BIRD, TREE, FLOWER, KNIFE, FORK, SPOON, PLATE, BOOK, BALL,

3) Tea, milk, sugar, biscuits, cake.
Extra Vocabulary: "X DO YOU WANT A CUP OF TEA ?"

WHAT DO YOU SAY? PLEASE, THANK YOU, SIT DOWN

NB. Vocabulary such as GIVE ME, WHAT and WHERE cannot be taught using one picture, so pictures already familiar to the subject were used to teach and elicit the appropriate word/gesture.

Week 4

1) HELLO, HOW ARE YOU? ARE YOU OK.? GOOD or SORRY (as appropriate), YOU X SIT DOWN HERE, COME HERE.

2) MAN, LADY, BOY, GIRL, BABY.
BREAD, BUTTER, CAKE, DOOR, LAMP, SPOON. WHERE introduced, and used throughout session.
KNIFE, FORK, EGG, WINDOW, FIRE, PLATE, MILK, TEA, T.V., TELEPHONE, DOG, CAT.
SUGAR, JAM, ICE-CREAM, BIRD, TREE, FLOWER.
BOOK, TEDDY, BALL, CLEAN, DIRTY.
SWEETS, APPLE, ORANGE, BANANA, CIGARETTES.
FISH, RABBIT, HORSE, COW, PIG, SHEEP.

3) Biscuits, cake, milk, tea, sugar, coffee.

Extra vocabulary: DO YOU WANT X? WHAT DO YOU SAY? YOU'VE ALL BEEN VERY GOOD, STAND UP, GOODBYE.

Week 5

1) HELLO. HOW ARE YOU? ARE YOU WELL? GOOD, SORRY. SIT DOWN HERE, COME HERE, OKAY.

2) BAD, HOT, COLD, FIRE

BOOK, TEDDY, BRICKS, BALL, DIRTY, CLEAN.

SWEETS, CIGARETTES, APPLE, ORANGE, BANANA.

FISH, RABBIT, HORSE, COW, PIG SHEEP.

BUTTERFLY, BOAT, TRAIN, AEROPLANE, BICYCLE.

HAVE,MINE, YOURS. Taught by distributing pictures: I HAVE X, YOU HAVE X, THIS IS MINE, THAT IS YOURS, ETC.

BOY WALKING, BOY RUNNING, BOY KICKING, BOY DIGGING.

3) Tea, coffee, milk, sugar, cake.

WEEK 6

1) HELLO, HOW ARE YOU? GOOD/SORRY, SIT DOWN THERE, COME HERE.

2) BUTTERFLY, PLANE, BIKE, TRAIN, BOAT.

GIRL JUMPING, GIRL BRUSHING HAIR, MAN SWIMMING, MAN SHAVING, BOY SWIMMING, BOY RIDING.

BIG and SMALL. Pictures of big and small train, and big and small dog.

UP and DOWN. Pictures of a boy up the chute and down the chute. Pictures of a boy up the ladder and down the ladder.

TEACHER, CHILDREN, WORK, OUTSIDE, PENCIL.

LADY MAKING..., LADY SEWING, LADY COOKING, GIRL PAINTING,GIRL WRITING, GIRL READING, GIRL FALLING, PAPER, SCISSORS, THREAD, KEYS, BOX.

3) Tea, bread, butter, cake, coffee, milk, sugar.

Extra vocabulary; NAME, NO, MONEY, SORRY, WORK, OUTSIDE, TODAY.

WEEK 7

1) GOOD MORNING, HOW ARE YOU? GOOD/SORRY. SIT DOWN HERE PLEASE.

2) HOT, COLD, UP, DOWN (see previous week for methods), TO HAVE, MINE, YOURS.
BOY WALKING, BOY RUNNING, BOY KICKING, BOY RIDING, BOY JUMPING.
PENCIL, PAPER, SCISSORS, PICTURE, THREAD, KEY. LADY SEWING, LADY COOKING, LADY MAKING..., GIRL READING, GIRL WRITING, GIRL PAINTING.
BOY CLIMBING, BOY SWIMMING, GIRL FALLING, GIRL BRUSHING.
TEACHER, SCHOOL, FRIEND, WATER, SAND, CHILDREN.
OUTSIDE, BOX, PLAY, MAN WORKING.

3) Tea, coffee, cake, biscuits, milk, sugar.
Extra vocabulary; PUT, MORE, NOW, MINE, YOURS, ON, KNOW.

Week 8

1) GOOD MORNING, HOW ARE YOU? GOOD/SORRY, SIT DOWN THERE PLEASE.

2) BOSS, FRIEND, SCHOOL, CUPBOARD, SAND, WATER.
PICTURE, GIRL SINGING, GIRL PLAYING, GIRL BREAKING

GLASS, MAN BUILDING, MAN THINKING.

WE (US), BIG, SMALL (see previous weeks for materials), IN, ON, UNDER.

MUMMY, DADDY, BROTHER, SISTER (using pictures from P.T.M. Family series).

SHOE, SOCK, SHIRT, TROUSERS, JUMPER, GLASSES, (using pictures from the P.T.M. photo library).

Body parts: HEAD, ARMS, HANDS, LEGS, FEET, TUMMY, EYES, EARS, NOSE. These were taught using own bodies rather than pictures, as there were none suitable.

3) Tea, coffee, milk, sugar, bread, butter, jam, cake, biscuits.

Extra vocabulary used: PUT, MORE, FINISHED MINE, YOURS, THEY, KNOW, THINK.

Week 9

1) GOOD MORNING. HOW ARE YOU? IS IT HOT TODAY? IS IT COLD TODAY?

2) MUMMY, DADDY, BROTHER, SISTER.

MAN BUILDING, GIRL BREAKING GLASS, IN, ON, UNDER.

DEAF, DUMB, BLIND, INJECTION, MEDICINE, TABLET*

OPERATION, SICK, ILL, PAIN, DEAD, PEOPLE*.

HEARING AID, WHEELCHAIR, SOLDIER, KING, QUEEN, FARMER, JESUS.

SHOE, SOCK, TROUSERS, JUMPER, SHIRT, GLASSES.

3) Tea, coffee, milk, sugar, biscuits, cake, bread, butter.

* For those items where there were no photographs available, one basic picture was used - a man - and a pictoral representation of the item made. E.g. for DEAF, the man had a thick line drawn at his ear; for OPERATION, a scar.

Week 10

1) GOOD MORNING, HOW ARE YOU? GOOD/SORRY, IS IT HOT TODAY? IS IT COLD TODAY?

2) BOSS, CUPBOARD, GIRL SINGING, GIRL PLAYING, SCHOOL, TEACHER.
DEAF, DUMB, BLIND, MEDICINE, TABLET, INJECTION.
HEARING AID, SOLDIER, WHEELCHAIR, KING, QUEEN, FARMER, JESUS.
Body parts: HEAD, ARMS, HANDS, LEGS, FEET, TUMMY, EYES, EARS, NOSE.
Clothing: SHOE, SOCK, TROUSERS, JUMPER, SHIRT, GLASSES.

3) Tea, coffee, milk, sugar, bread, butter, cake.

Extra vocabulary: PUT, KNOW, THINK, THEY, WE.

APPENDIX 4 NURSES' DAILY RATING CHART

KEY TO THE MAKATON RATING CHART

To record the subject's daily use of signs.

1 Write any spontaneous signs used by patient in the box provided.

2 After a sign has been recorded for 5 consecutive days, there is no need for further recording of that sign.

3 The rating is subjective, so it is preferable that the same nurse fills in the charts when on duty.

RATING

Ø No response

1 Limited response/or any physically assisted response.

2 One spontaneous sign.

3 Two or more spontaneous signs.

q Add "q" after number if the patient signs in response to a question.

Week: 7	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Late Shift	Sign	Sign	Sign	Sign	Sign	Sign	Sign
JMC	Key Butter	Sugar Tea Money	Good Boy Man	Thank you Please Milk		Milk Tea Sugar Jam Plate Man Biscuit House	
FD	Bus Man		Baby		Boy Mummy Daddy House		Dinner Plate Toilet

GP	Tea	Car Ward	Hello No Yes Boy Girl Daddy	Lady Man Girl Boy Dog Cat Bird		Car Bus Good Bad No Yes Goodbye	Mummy Daddy House Sweets Sugar Tea Milk
KS	Milk Sugar Key	House Boy Girl Mummy Sugar	Milk Tea Sugar Cup Apple		Please No Yes Where Thank you Tree	Lady Man Fork Knife Boy Girl Spoon Cake Biscuit Plate	Milk Tea Sugar Drink Orange
JS	Hello Yes No	Dinner Tea Milk Sugar	Boy Girl Mummy Daddy	Pass	Pass	Pass	Pass

DMC	Dinner	Dinner Knife Fork	Dinner	Dinner	Dinner	Dinner	Dinner

APPENDIX 5 RECORD SHEET FOR COMPREHENSION TASKS FOR GROUP TWO

NAME	VOCABULARY					
	BED	CHAIR	TOILET	CUP	BISCUIT	CAR
JS	x	x	x	x	x	x
JMC	x	x	x	x	x	x
DMC	x	-	-	x	x	x
GP	x	x	x	x	x	x
KS	x	x	x	x	x	x
	HOUSE	DOCTOR	NURSE	BATH	DINNER	TABLE
JS	-	x	x	x	x	x
KMC	2	x	x	x	x	x
DMC	-	-	-	-	-	-
GP	x	x	x	x	x	x
KS	-	x	x	x	x	x
	TO BATH	TO EAT	TO DRINK	TO EAT	TO SLEEP	
JS	x	x	x	x	x	
JMC	x	x	x	x	x	
DMC	x	-	-	-	x	
GP	x	x	x	x	x	
KS	x	x	x	x	x	
	BOY	GIRL	MAN	WOMAN	BABY	
JS	-	x	2	-	x	
JMC	x	2	x	x	x	
DMC	-	-	-	-	x	
GP	x	x	x	x	x	
KS	x	x	x	2	x	

KEY: x Sign Comprehended at first presentation, 2 Sign comprehended at second presentation, - Sign not comprehended.

APPENDIX 6 INDIVIDUAL SUBJECTS' RECORDING SHEET

STAGE 4

VOCABULARY WORD/SIGN	WEEK INTRODUCED	WEEK COMPREHENDED	WEEKS USED IN SESSION
Teacher	6	6 7	6 7
Boss	8	8	8 9
Friend	7	7	7 9
Children	6	6 7	6
Name	6	7	6
School	7	7	9
Work	6	6 7	6
Outside	6	6 7	6 7
Cupboard	8		8 9

Pen (Pencil)	6	Ø 7	6 7
Paper		6 7	
Scissors (Cut)	6	6 7	6
Picture	7	7	9
Sand		7	
Water	7	7	9
Thread (String)	6	6 7	6
Paint		6 7	
Key		6 7	
Box	6	6 7	6
To put	7	7	8 1Ø
To make/do	6	6 7	6
To sew		7	
To cook	6	6 7	6 7
To sing	8		8 9

To play	7	7	7 8
To know	9		9 10
To think	8		8
To work	6	6 7	6 7
To read		6 7	
To write (draw)		6 7	
To paint		6 7	
To teach	6	6 7	6 7
To build	8		8 10
To break			10
We (us)	8		8 9
They (them)	9		9
In	8		8 10
On	7	7	7
Under	8		8 10

APPENDIX 7 TEST RESULTS

ROYAL SCOTTISH NATIONAL HOSPITAL

	RDLS ys.m		EAT ys.		VINE LAND ys.	MAKATON raw score	
Subject	Exp	Comp	RS	AE	AE	Ges	Comp
Group 1							
1	2.4	2.3	13	-3.Ø	5.4	6	19
	2.4	2.4	27	-3.Ø	5.8	6	21
2	1.11	1.3	9	-3.Ø	5.4	3	4
	2.Ø	1.9	14	-3.Ø	5.5	3	5
3	1.7	2.9	Ø	-3.Ø	3.8	4	3
	1.11	2.8	9	-3.Ø	3.5	4	5
4	2.3	2.5	11	-3.Ø	6.Ø	2	1Ø
	2.4	2.5	1Ø	-3.Ø	6.Ø	4	8
5	2.Ø	2.5	16	-3.Ø	7.8	2	48
	2.5	2.6	22	-3.Ø	8.Ø	2	51
6	-1.Ø	-1.Ø	Ø	-3.Ø	8.5	25	51
	-1.Ø	-1.Ø	Ø	-3.Ø	8.6	25	5Ø
Group 2							
7	1.11	3.5	2	-3.Ø	5.8	6	25
	2.4	4.3	6	-3.Ø	6.5	35	5Ø
8	3.6	2.1	21	-3.Ø	7.2	Ø	21
	3.8	2.6	22	-3.Ø	7.2	6	39
9	-1.Ø	-1.Ø	Ø	-3.Ø	4.Ø	Ø	Ø
	-1.Ø	-1.Ø	Ø	-3.Ø	4.2	6	6
1Ø	1.5	3.Ø	1	-3.Ø	9.5	5	47
	1.6	3.4	1	-3.Ø	1Ø.3	4Ø	56

	RDLS ys.m		EAT ys.		VINE LAND ys.	MAKATON raw score	
Subject	Exp	Comp	RS	AE	AE	Ges	Comp
Group 2							
11	-1.Ø -1.Ø	2.Ø 2.2	Ø Ø	-3.Ø -3.Ø	3.5 4.2	3 24	27 42
12	3.1 3.8	3.8 4.3	8 8	-3.Ø -3.Ø	7.Ø 7.2	6 41	48 58
LYNEBANK HOSPITAL							
Group 3							
13	1.6 1.7	1.2 1.4	Ø Ø	-3.Ø -3.Ø	5.6 5.9	1 Ø	8 1Ø
14	3.5 4.2	3.8 4.1	45 48	4.25 4.5	7.8 7.8	Ø Ø	14 16
15	1.9 1.11	1.8 2.1	23 38	-3.Ø 3.5	5.Ø 5.Ø	1 Ø	23 24
16	2.4 2.9	3.Ø 3.2	9 17	-3.Ø -3.Ø	7.2 7.2	Ø Ø	41 4Ø
17	4.1 4.1	2.11 2.11	27 34	-3.Ø 3.25	6.5 6.5	1 Ø	24 2Ø
18	2.1Ø 3.1Ø	3.6 3.8	13 21	-3.Ø -3.Ø	6.3 6.3	Ø Ø	18 18
Group 4 (Control)							
19	4.2 4.Ø	3.7 3.8	51 53	4.5 4.75	7.6 7.6	1 Ø	32 21
2Ø	3.5 3.Ø	2.1Ø 2.1Ø	18 24	-3.Ø -3.Ø	6.3 6.3	Ø Ø	21 22

	RDLS ys.m		EAT ys.		VINE LAND ys.	MAKATON raw score	
Subject	Exp	Comp	RS	AE	AE	Ges	Comp
Group 4 (Control)							
21	-1.Ø	-1.Ø	Ø	-3.Ø	5.6	2	1
	-1.Ø	-1.Ø	Ø	-3.Ø	5.6	3	3
22	3.11	3.8	29	-3.Ø	7.4	Ø	25
	3.9	3.6	29	-3.Ø	7.4	1	34
23	2.9	3.2	39	3.5	7.Ø	4	34
	2.1Ø	3.2	42	3.75	7.Ø	Ø	3Ø
24	1.11	2.2	9	-3.Ø	5.Ø	Ø	2Ø
	1.11	2.1	12	-3.Ø	5.Ø	Ø	18

APPENDIX 8 ACCOMPANYING TABLE 6 - THE AVERAGE USE OF GESTURE BY EACH GROUP

MEAN DEVIATION SCORES

Pre-intervention		Post-intervention	
Group 1			
Subjects	1 : 1	Subjects	1 : 1.33
	2 : 4		2 : 4.33
	3 : 3		3 : 3.33
	4 : 5		4 : 3.33
	5 : 5		5 : 5.33
	6 : 18		6 : 17.67
Mean : 7		Mean : 5.89	
SD : 6.066		SD : 5.92	
Group 2			
Subjects	7 : 2.67	Subjects	7 : 9.67
	8 : 3.33		8 : 19.33
	9 : 3.33		9 : 19.33
	10 : 1.67		10 : 30.67
	11 : 0.33		11 : 1.33
	12 : 2.67		12 : 15.67
Mean : 2.33		Mean : 16	
SD : 1.53		SD : 9.93	
Group 3			
Subjects	13 : 0.5	Subjects	13 : 0
	14 : 0.5		14 : 0
	15 : 0.5		15 : 0
	16 : 0.5		16 : 0
	17 : 0.5		17 : 0
	18 : 0.5		18 : 0
Mean : 0.5		Mean : 0	
SD : 0.0		SD : 0.0	

Group 4

Subjects	19 : Ø.16	Subjects 19 : Ø.66
	2Ø : 1.16	2Ø : Ø.66
	21 : Ø.84	21 : 2.34
	22 : 1.16	22 : Ø.34
	23 : 2.84	23 : Ø.66
	24 : 1.16	24 : Ø.66
Mean	: 1.22	Mean Ø.87
SD	: Ø.88	SD : Ø.72

APPENDIX 9 ACCOMPANYING TABLE 7 - COMPREHENSION OF MAKATON SIGNS BY EACH GROUP

Pre-intervention		Post-intervention	
Group 1			
Subjects	1 : 5	Subjects	1 : 2
	2 : 20		2 : 18
	3 : 21		3 : 18
	4 : 14		4 : 15
	5 : 24		5 : 28
	6 : 27		6 : 27
Mean : 18.5		Mean : 18	
SD : 7.91		SD : 9.44	
Group 2			
Subjects	7 : 3	Subjects	7 : 8
	8 : 7		8 : 3
	9 : 28		9 : 36
	10 : 19		10 : 14
	11 : 1		11 : 0
	12 : 20		12 : 16
Mean : 13		Mean : 12.38	
SD:		SD:	
Group 3			
Subjects	13 : 13	Subjects	13 : 11
	14 : 7		14 : 5
	15 : 2		15 : 3
	16 : 20		16 : 19
	17 : 3		17 : 1
	18 : 3		18 : 3
Mean : 8		Mean : 7	
SD : 7.16		SD : 6.81	

Group 4

Subjects		
	19	10
	20	1
	21	21
	22	3
	23	12
	24	2

Mean : 8.16
SD : 7.73

Subjects		
	19	0
	20	1
	21	18
	22	13
	23	9
	24	3

Mean : 7.33
SD : 7.22

APPENDIX 10 SUMMARY OF NURSES' QUESTIONNAIRE RESULTS

How often did you use the following signs?

	OFTEN	SOMETIMES	NEVER
STAGE ONE			
Mummy (Mother)	1	2	-
Daddy (Father)	1	2	-
Brother	-	1	2
Sister	-	2	1
Nurse	1	1	1
Doctor	-	2	-
Drink (Cup)	3	-	-
Biscuit	3	-	-
Dinner	3	-	-
Toilet	-	3	-
Bed	1	2	-
Chair	1	2	-
Table	2	1	-
House (Home)	1	2	-
Car (Bus)	2	1	-
I (Me)	2	1	-
You	3	-	-
Where	-	1	2
What	-	-	3
Here	1	1	1
There	-	1	2
To sleep (Bed)	-	3	-
To drink (Cup)	2	1	-
To look (See)	2	1	-
To stand up	1	2	-
To sit	2	1	-
To wash	1	2	-
To bath	1	2	-
To go	3	-	-
To give	1	2	-
Good (Alright)	3	-	-
Bad	2	1	-
Yes	-	2	1
No	1	2	-
Please (Thank you)	2	1	-

Good Morning	3	-	-
Goodbye	3	-	-
STAGE TWO			
Man	2	1	-
Lady	2	1	-
Boy	2	1	-
Girl	2	1	-
Baby (Doll)	2	1	-
Bread	2	1	-
Butter	3	-	-
Egg	2	-	1
Milk	3	-	-
Tea	3	-	-
Sugar	3	-	-
Cake	3	-	-
Jam	-	3	-
Ice-cream	-	1	2
Door	-	2	1
Window	-	2	1
Fire	-	2	1
TV	-	2	1
Lamp (Light)	-	2	1
Telephone	1	2	-
Dog	-	1	2
Cat	-	-	3
Bird	-	1	2
Tree	-	-	3
Flower	-	-	3
Knife (Cut)	3	-	-
Fork	3	-	-
Spoon	3	-	-
Plate	3	-	-
Book	-	1	2
Teddy	-	1	2
Bricks	-	-	3
Ball	-	3	-
And	-	1	2
Hot	-	2	1
Cold	-	1	2
Clean	-	2	1
Dirty	-	2	1

STAGE THREE

Sweets	-	2	1
Cigarettes	-	-	3
Apple	-	2	1
Orange	-	2	1
Banana	-	3	-
Fish	-	1	2
Rabbit	-	1	2
Horse	-	-	3
Cow	-	-	3
Pig	-	-	3
Sheep	-	-	3
Butterfly	-	-	3
Boat	-	-	3
Train	-	1	2
Aeroplane	-	-	3
Bicycle	-	-	3
To have	-	-	3
To walk	-	-	3
To run	-	-	3
To kick	-	-	3
To dig	-	-	3
To ride (Horse)	-	-	3
To jump	-	-	3
To climb	-	1	2
To swim	-	-	3
To fall			
To shave	3	-	-
To brush hair	2	1	-
To brush teeth	3	-	-
Big	-	3	-
Small	-	3	-
More	-	2	1
Up	1	-	2
Down	1	-	2
My (Mine)	-	1	2
Your (Yours)	-	3	-
Sorry	-	1	2
Now	-	-	3

APPENDIX 11 COMPARISON OF THE COMPREHENSION AND EXPRESSIVE ABILITIES OF THE SIX SUBJECTS (to accompany Table R1Ø)

Subjects

	1		2		3		4		5		6		
	RS	%	RS	%	RS	%	RS	%	RS	%	RS	%	
Makaton Stages 1	35	9Ø	38	97	39	1ØØ	39	1ØØ	36	92	12	31	Comp
	19	49	22	56	29	74	29	74	25	64	12	31	Exp
2	34	89	5	13	35	92	35	92	33	87	15	39	Comp
	11	29	9	24	17	45	18	47	14	37	12	32	Exp
3	28	74	15	39	38	1ØØ	38	1ØØ	33	87	19	5Ø	Comp
	4	11	4	11	4	11	9	24	4	11	1	3	Exp
4	25	64	4	1Ø	31	79	31	79	24	62	9	23	Comp
	3	8	1	3	5	13	5	13	1	3	2	5	Exp
9	23	1ØØ	21	91	23	1ØØ	23	1ØØ	23	1ØØ	4	17	Comp
	1	4	Ø	Ø	Ø	Ø	1	4	Ø	Ø	Ø	Ø	Exp

Key: RS = Raw Score

% = Percentage of Signs Used From Each Stage

APPENDIX 12 ASSESSMENT OF MAKATON VOCABULARY:LIST OF VOCABULARY ITEMS TESTED

	Expressive Response		Comprehension
	Speech	Gesture	
Nurse			
Doctor			
Dinner			
Bed			
House			
Car			
To drink			
To eat			
To look			
To stand up			
To sit			
To wash			
To go			
Bad			
Man			
Boy			
Girl			
Bread			
Egg			
Milk			
Cake			
Door			

Lamp

Dog

Cat

Plate

Teddy

Sweets

Cigarettes

Banana

Fish

Horse

Bicycle

To run

To kick

To dig

To jump

To climb

To brush hair

Down

Teacher

Friend

Paper

Scissors

Paint

Box

To sew

To cook

To play

To work

To read

On

Under

Blind

Tablet

Dead

Queen

Farmer