

ASSESSING SIGN LANGUAGE DEVELOPMENT

Rosalind Herman, Sallie Holmes, & Bencie Woll
Department of Language and Communication Science
City University, London

Background

Deaf education has undergone significant changes over the past one hundred years: none more major than the swing away from using sign languages at the end of the 19th century to the reverse of that trend today. Sign languages are increasingly being used in bilingual deaf education programmes in Europe and the USA (Kyle 1987, Strong 1988, Quigley & Paul 1987, Johnson, Liddell and Erting 1989).

Bilingual programmes seek to introduce deaf children to sign language through native signers from the moment their deafness is identified, with the aim of developing a first language in sign. Families need to acquire sign language too if they are to support their children's language development (Pickersgill & Gregory 1998).

It is critically important to have some way of monitoring the success of such programmes, and in particular the progress made by children in acquiring sign language. Indeed, for children to be appropriately placed and supported in education, we need to be able to fully describe their communication skills and needs as part of the process of developing an understanding of their educational needs.

With the exception of the pioneering work of Kyle and colleagues at Bristol University (Kyle 1990, Jansma 1994), there had been little research in the UK on assessment of BSL prior to the research reported here, and no standardised measures for use by professionals working with deaf children to assess children's developing competence in sign language.

Purposes of Sign Language Assessment

A number of assessments have been developed for different sign languages. These serve a variety of functions: to support linguistic research; to facilitate comparisons of deaf children's knowledge of SL structures with literacy performance; to assess trainee sign language interpreters; to provide functional tools for use in educational settings; as a means of recording a child's progress and to assist in planning intervention. Haug (1999) provides a comprehensive list of these. However, the usefulness of existing assessments is variable. Most assessments are unpublished. Published assessments are for the most part profiling instruments, and few report psychometric properties. A rationale is

rarely provided to justify the selection of test items. In particular, for tests of sign language acquisition, limited evidence is provided of the normal developmental path.

A UK survey was carried out in schools for deaf children and in units (special classes in mainstream schools) by Herman (1998a) to investigate approaches to the assessment of deaf children's signing skills in educational contexts where BSL is used. Respondents reported methods such as adapting existing tests of spoken language, adapting tests used to assess the developing skills of adults learning BSL and more informal video-based analyses looking at deaf children's communication in different contexts. Many of these methods may be criticised on the grounds that they are not norm-referenced, lack validity and are likely to be unreliable. Many assessors work alone and are typically hearing professionals who lack skills in and knowledge of sign language. Research indicates (e.g. Strong 1988) that deaf children are sensitive to the communication skills of their interlocutor and will adapt their own signing accordingly. This means that a hearing professional may tend to elicit more English-like samples of signing rather than true BSL, compared with a fluent deaf person.

When asked in the survey specifically what was assessed, a range of linguistic aspects of BSL were identified which, taken together, were impressive. However, the lack of agreement between different schools on which aspects were routinely assessed and how this was done was cause for concern.

Characteristics of existing assessments

Most schools and classes of deaf children were engaged in attempting sign language assessment (76% of schools and units), but the approach varied widely. Indeed, there was virtually no overlap between schools and classes in terms of what was assessed. There is clearly a need for agreement on approaches to assessment in order to facilitate comparison between individual children within and between different schools.

Linguistic topics which were reported as being assessed included: lexical development, syntax, morphological processes, verb classes, classifiers, narrative skills, and phonology. Language elicitation methods included picture description, spontaneous conversation, and storytelling, while receptive tasks resembled existing standardised tests of spoken language or functional/conversational tasks. Assessments were not based on normal development of BSL, and were often translations or adaptations of spoken language assessments, without full recognition of the differences between BSL and English grammatical development. Assessments were labour-intensive, with analysis time (rating scales, pass/fail scoring, checklists and linguistic analysis) varying from 1-20 hours per child assessment. A further difficulty was

that 72% of schools and units had no access to Deaf staff to undertake or analyse the assessments, and existing staff felt themselves to have inadequate language skills to undertake sign language assessments, particularly of productive language skills.

Requirements of sign language assessments

Respondents also provided comments on perceived assessment needs. The need for training in assessing deaf children was stressed, and a variety of assessment tools were felt necessary. These included vocabulary assessments, tests of syntax which were norm-referenced, tests of concept development, tests of comprehension of BSL questions, stories and instructions, and tests involving explanations. Assessments which took account of communication in real-life situations were felt to be important and the need for assessment to be economical on time was repeatedly stressed. This study provided the context for the development of the BSL Receptive Skills Test.

All assessments must meet criteria of validity and reliability. Those involved in assessment must assure themselves that assessment methods are valid, and that the assessment actually measures what it claims to measure. The procedure must be reliable: it must provide comparable results if repeated. These criteria are unlikely to be met if the test is not based on normal development or if the training requirements of personnel administering the assessment are not made explicit.

Research on sign language development

Relatively limited research is available on BSL development; however, there is considerable literature on the development of American Sign Language (ASL) grammar. Although BSL and ASL have distinct lexicons, they share many grammatical features. It was therefore possible to refer to research into both languages in order to ascertain what knowledge existed about development of specific features of grammar and, where this was described, what methods had been used to measure development (e.g. Lutes-Driscoll et al 1979). Much of this research is based on small numbers, hence results need to be interpreted with care. Nevertheless, this exercise led to the identification of a number of features of BSL grammar to be considered for inclusion in an assessment battery. Woll (1998) provides a summary of developmental milestones in BSL and ASL.

Another relevant area of research was identified which investigated sign language development in deaf children who are late learners' in comparison with children (typically those with deaf parents) who have early access to sign language (Galvan 1989; Mayberry 1993). Sign languages have a rich morphology and certain morphological aspects of sign language were reported to present particular problems to late learners. Taking into account the likelihood that future users of the test would certainly wish to assess such

children and that these morphological aspects may usefully discriminate between children with different levels of language competence, a decision was made to devote a significant proportion of the assessment battery to verb morphology.

Test development

Clearly there are a large number of possible assessments for sign languages which could be developed, including tests of receptive and expressive language, vocabulary, and communicative competence. Whichever are chosen, it is essential that they be appealing to the child, easy to use, economical on time, demonstrate reliability and validity, and be norm-referenced. To meet these aims requires decisions to be made about a number of issues. First among these is the choice of whether to standardise the test on native or on non-native signers. While non-native signers are in a large majority, standardisation on a population with such diverse experiences of language input make standardisation difficult. It was therefore decided to begin with a standardisation on native signing children. This of course, means that access to native signing children and adults is essential for the process of test development. In BSL, as in other sign languages, there is extensive regional lexical variation, which must be considered in devising a test that can be used widely throughout the country. As well as ensuring standard vocabulary, the test format needs to be standardised so that administration of the test by a large number of different individuals will still produce comparable test scores.

Assessment format

Receptive language skills are frequently neglected in the literature on sign language development. However this area is an important indicator of language potential and in skilled hands, is relatively straightforward to assess. Children's comprehension of signed instructions may be readily analysed by non-verbal responses such as the manipulation of toys or identification of pictures. On a practical level, there are advantages and disadvantages to each approach. When using toys, children may become too engaged with the materials to take part in the test. Use of pictorial material avoids the above pitfall, however care must be taken that pictures are easily recognisable and appealing to the age range of subjects. In addition, a range of effective distractor items must be selected to reduce guesswork and the location of the target picture on the page should be randomised.

Regardless of test format, where grammatical competence is being investigated, failure on the test due to other factors must be minimised, e.g. unfamiliarity with vocabulary, excessive memory load, fatigue effects due to the length of the test procedure, etc. Furthermore, test administration must be standardised in order that children are clear what is required of them and that all children receive the same test experience, e.g. the same items, the same number of

repetitions, the same degree of emphasis. etc. All published tests provide information about administration in the test manual. When the test is to be delivered in BSL, a major difficulty arises because there is no widely agreed method of writing down either the stimuli or test instructions in BSL. Our solution was to present the test entirely on video; this includes information for the child about what the test involves, practice items and individual test stimuli. Although this format has some constraints, it has significant advantages in that it standardises presentation of the test and requires minimal intervention by the test administrator.

Assessment of expressive language skills, although more evident in the research literature, presents a new set of problems when developing a reliable assessment tool. Some researchers (Jansma 1994) indicate that deaf children's responses to picture description tasks may not yield representative examples of BSL grammar when compared with other methods. Another problem which arises is that what the child produces on one occasion may not be directly comparable to what is produced on another occasion. Different children may focus on different parts of a picture in their description. Moreover, when looking for specific grammatical constructions, there are situations where production is optional rather than obligatory. If the child fails to produce the desired structure should we conclude that s/he cannot produce it? A further difficulty emerges when analysing children's BSL: how do we 'fix' the sample in order to look at it more closely when we cannot transcribe it? Because of the specific difficulties that arise in looking at expressive language, we decided to focus initially on a receptive skills assessment.

Which sample of children should be included in standardising the test?

The need to develop 'norm-referenced' tests was raised by many respondents in Herman's study (1998a). Such tests are organised developmentally, based on empirical data. However the difficulty in producing norm referenced tests for use with deaf children has been highlighted by the work of Kyle and colleagues (1990). They developed a vocabulary test and administered it to deaf children of different ages who were exposed to signing at school. The majority of subjects were from hearing families. The results contained such a high degree of variability that no consistent order of difficulty for items could be isolated. The research team concluded that no standardisation was therefore possible. Although tests are typically most needed for deaf children from hearing families, there are difficulties in standardising assessments on this group because of the variability of performance on language measures. This variability is due to the age at diagnosis of deafness, the age at exposure to signing, family commitment to use of BSL, the quality and quantity of BSL input, etc. Ideally, any standardisation should use a more homogeneous population. The most appropriate population to use when standardising a test of BSL development is

children from native signing backgrounds. These children receive consistent input in BSL from birth and are thus in a position to acquire BSL naturally. The language performance of deaf children from hearing families who acquire BSL mostly under less ideal circumstances can then be compared with this group. However, only 5% of deaf children are born into deaf families, therefore numbers are small. To increase the size of the sample, hearing children from deaf families were initially included to see if their BSL skills were comparable to those of deaf children. Selected deaf children from hearing families were also added to the sample. These children were identified by teachers as those for whom BSL was a first language and where BSL was introduced from an early age by consistent exposure to fluent language modes, either through an established bilingual educational programme, hearing parents with highly developed BSL skills, or contact with older deaf siblings who may also offer good language models in BSL.

The first version of the test battery was piloted on 40 children. Following analysis of the pilot results, a second version of the test battery was produced and administered to 138 children for standardisation.

Children included in the standardisation phase

Children in this phase ranged in age from 3 to 13 years. Three groups of children were included: 1) deaf and hearing children from deaf families; 2) deaf children from hearing families on established bilingual programmes; 3) selected deaf children from hearing families on Total Communication programmes.

Subjects

It was originally intended to test 300 children, however fewer children than originally hoped for were recruited. Although there should be more hearing children than deaf children in deaf families, hearing children are more difficult to locate since they are widely dispersed in mainstream schools. Deaf children on the other hand are more easily located via special education services, however their numbers are fewer. In order to boost numbers, selected deaf children from hearing families were added to the sample. These children were identified by teachers as those for whom BSL was a first language and where BSL was introduced from an early age by consistent exposure to fluent language models, either through an established bilingual educational programme, parents with unusually well developed BSL skills or contact with older deaf siblings. A total of 138 children located throughout England, Scotland and Northern Ireland were tested during the standardisation phase. The age range was 3:00- 13:00 and there were 76 girls and 72 boys. Children previously diagnosed as having additional handicaps were excluded from the sample. Results obtained from children scoring more than 2 standard deviations below the mean on non-verbal performance measures were excluded from subsequent analysis (n=3). Additional information was gathered about

each subject's age, gender, hearing status, education programme, exposure to BSL, parental hearing status and geographical location.

The sample comprised 138 children tested in England, Scotland and Northern Ireland:

- 76 girls, 62 boys
- 20 hearing, 118 deaf
- 78 from deaf signing families (group a)
- 23 on established bilingual programmes (group b)
- 37 on TC programmes (group 3)

Procedure

Subjects were assessed by two researchers: one deaf and one hearing, both fluent in BSL. The children completed non-verbal intelligence tests (Mosaics and Categories from the Snijders-Oomen test of non-verbal intelligence (1989), and the pilot **BSL Receptive Skills Test**. The mean non-verbal IQ scores for all subjects were within the average range (Table 1).

INSERT TABLE 1 HERE

Table 1. Non-verbal IQ scores

Subjects in the 3 groups varied in the average age at which they had begun to sign (Table 2). Children with deaf parents (group a) and those in bilingual programmes (group b) had begun to sign earlier than those in group 3.

INSERT TABLE 2 HERE

Table 2. Average age of beginning to sign

Receptive Skills Test (Herman, Holmes & Woll 1999)

This aims to assess understanding of syntactic and morphological aspects of BSL in children aged 3-11 years. The test has 2 components:

- a vocabulary check
- a video-based receptive test

The vocabulary check

The vocabulary used in the receptive test was selected for its relevance to young children and also because it is subject to very limited regional variation within the UK. Children confirm their knowledge of this vocabulary (24 items) through a simple picture-naming task (see Figure 1) which identifies signs which vary from those used in the test. In situations where their own sign varies from the

test sign, children are shown the test sign and in most cases will accept this version. For very young children, adaptations to subsequent testing may be necessary but in our experience this is rare.

INSERT FIGURE 1 HERE

Figure 1. Examples of vocabulary check cards

The video-based receptive test

The picture-naming task is followed by a receptive assessment, which has a video presentation format. The test used in the standardisation phase comprised 40 items, organised in order of difficulty, preceded by 3 practice items. Items assess children's knowledge of a range of BSL structures (morphology and syntax), negation, number and distribution, verb morphology and noun and verb distinction. The procedure involves the child watching a video of a deaf adult who introduces the test and then presents signed instructions to them. The video has fade-outs between items to allow children time to respond. Children respond by selecting the most appropriate picture from a choice of three or four in an attractive colour picture booklet (Figure 2). Younger children sometimes require a longer response time, necessitating stopping the video and restarting. Testing time varies from 12 minutes for children able to work through the test without stopping the tape, to 20 minutes for children who require more time to respond. In certain circumstances, the tester may present items live, e.g. when it is felt that vocabulary differences will interfere with the child's performance or when the child is unable to cope with responding to the video.

INSERT FIGURE 2 HERE

Figure 2. Sample test item

This target item is PEOPLE-QUEUING (classifier in spatial verb) The correct choice is in the upper right corner. The alternative choices represent: 1) PERSON QUEUING (number error); 2) CROWD-OF-PEOPLE (classifier error); 3) FENCE (phonological error - same handshape & location, but different orientation of the hands).

Scoring is both qualitative and quantitative: a pass/fail analysis which yields a raw score which can be converted to a standard score, and an error analysis which allows the tester to look in more detail at the pattern of errors made.

Performance of deaf and hearing subjects

Scores of 10 age-matched pairs of subjects (matched within 4 months of age but not matched for gender), one of whom was deaf, the other hearing, were

examined to see if there was a difference in score related to hearing status. The results of deaf and hearing children on the receptive test were not significantly different; therefore it was decided that both groups could be included in the standardisation phase.

Developmental pattern

Figure 3 represents the mean scores over the age range for the test. These raw scores are then converted to standard scores to give a final score for a child's performance on the test. The narrowing of the SD range for older children indicates that comprehension of BSL grammar is gradually mastered from the age of 3 and nearly completed by age 10.

INSERT FIGURE 3 HERE

Figure 3: Mean scores and standard deviations

Receptive test scores of children according to exposure to BSL

Receptive test scores were compared for children according to their exposure to BSL (via either deaf parents, an established bilingual educational programme or older deaf siblings) (Table 3).

INSERT TABLE 3 HERE

Table 3. Receptive test scores for the different groups

It was anticipated that children from deaf families would score more highly than children from hearing families. Interestingly, this was only true for the youngest age groups. Thereafter, children from hearing families who were on an established bilingual programme achieved the highest scores. Children without deaf siblings, in TC programmes, performed least well, supporting the view that exposure to fluent language models is necessary for native acquisition of BSL. There was no significant difference between children from deaf families and those children from hearing families with older deaf siblings. In retrospect, this finding can be explained. Most children from hearing families would be expected to demonstrate relatively poor BSL skills at a young age as they would have had less exposure to BSL at this stage due to later exposure to BSL compared with children from deaf families. However, deaf children on established bilingual programmes benefit from exposure to BSL being viewed as a priority. Such schools employ numbers of deaf staff, recognising the importance of fluent BSL skills, thereby raising quality and quantity of signing input that the children receive and positively influencing the perceived status of BSL. These factors would enhance the children's acquisition of BSL. Conversely, children from deaf families may start with an advantage, but in terms of later schooling are rarely to be found in bilingual educational settings. Most deaf

parents are satisfied that their children have good BSL skills and seek to enhance English skills, hence placement is more likely to be in an oral or Total Communication (sign-supported) environment, both of which view attainment of English skills as a priority. Such environments are likely to employ fewer deaf staff; indeed many of these deaf staff may be oral role models. Little emphasis is placed on BSL and hence both the input in and status of BSL is inferior to English. Under such circumstances, BSL remains a low-status language and BSL skills may not be developed to their maximum.

Summary of findings from Receptive Skills Test standardisation

- No differences between deaf and hearing children from deaf families
- No differences between children from deaf families and children on bilingual programmes
- Children on Total Communication programmes perform least well UNLESS they have access to deaf relatives who sign

Conclusion

The present project has successfully achieved its primary aim of beginning to develop a range of assessment materials and procedures, which are psychometrically robust and effective at assessing language development in BSL.

Although the sample size used to develop and standardise the test is relatively small, it represents a large proportion of the total population of children developing BSL as a first language within the designated age limits. It is hoped that in future, more children's scores will be added to this sample to increase the sample size. In addition, a second standardisation is planned based on the larger population of deaf children who use BSL but who have not been exposed to it under such ideal circumstances. The project has established that hearing and deaf children's BSL development is comparable, although the relationship between hearing children's BSL and English skills remains unresolved. The benefits of early and consistent exposure to BSL via a well-established bilingual education programme have been demonstrated. Finally, the project has produced a unique data set which will allow further investigation of language development in BSL.

Future Development

Most recently, the test has been used in research and diagnostic procedures to assess deaf children with possible language impairments in sign language. The developers are currently working closely with colleagues in a number of European countries to develop versions of the assessment in other sign languages, and assessments of productive language skills and vocabulary. This research has enabled professionals who work with deaf children to assess language development in BSL, thereby being able to credit deaf children's

achievements as well as identify deficits and facilitate objective measurement of progress and evaluation of intervention outcome.

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