# Transcription of child sign language*

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* Parts of this research were presented at the 'Intersign' meeting on Child Sign Language (September 1999) at City University, London and the Linguistics Association of Great Britain meeting (April 2002). The transcription system presented has been the result of discussion with several colleagues. I would like to thank in particular Bencie Woll, Judy Kegl, Elena Pizzuto, Beppie van den Bogaerde, Maria Sidonio Armas Pais and Jim Kyle.

**Abstract.**

The study of child sign language has emerged from the growing interest in cross-linguistic comparisons of language development, stimulated greatly by the early work on American Sign Language (ASL) (e.g. Newport & Meier 1986). However the modality sign language is produced in has made comparisons with other languages difficult (including between different sign languages). This has been due in part to lack of an agreed normative transcription system because of the difficulty in representing child forms of fluid three-dimensional linguistic packages. Progress has also been hampered by the difficulty in storing transcribed sign data amenable to computer searching. Despite these early challenges, current research findings on child sign language acquisition are greatly contributing to the study of language acquisition (see Morgan & Woll, 2002). This paper outlines some issues in studying child sign language at the level of transcription. Recent advances and vistas for future work are presented.

## Introduction

Any transcription system is used to record only selected aspects of the sign stream (Pizzuto & Pietrandrea, 2001). It allows us to capture in a static form one piece of the linguistic puzzle for later coding and analysis. The type of transcription system used will depend on the specific research question asked. The transcription system adopted will mould the sign language into a shape that is more accessible; in other words the transcription is not the same as the raw data.

In much current child sign language research it is striking how differently each set of authors present their data in the form of a written transcription. Depending on the level of analysis focused on, different authors put down in print a representation of the sign's form, accompanying non-manual features or use of sign space. Apart from some standard notation devices such as associated spoken language translations (glosses) and different markers of sign modifications e.g. '+' to mark repetition of a whole sign or subscripts to show agreement relations (diacritics), very little direct comparison between sign languages is possible based on the written transcription alone. Hoiting and Slobin make these two important points:

> '…a mixed system of glosses and diacritics is inaccessible to computer programs of the sort used in child language research. More seriously, the glosses represent the nearest translation equivalent in the spoken language of the particular community, making it impossible to carry out serious linguistic analysis of the sign language itself.'

(Hoiting & Slobin, 2002, p60)

This quote sets the agenda for our future goals for sign language transcription (and as a consequence child sign language research). A good transcription system should allow researchers to do two main things:

1. Exploit computer technologies for searching and collating coded utterances
2. Share particular transcribed examples with other scholars working on similar questions both in signed and spoken language.

As a test case of how a computer archived normative transcription system can stimulate research, consider the advances that have been made since the advent of CHILDES (MacWhinney 2000). Hoiting, Slobin and colleagues, in response to the suggested shortcomings of current sign language transcription have come up with a preliminary solution to the problem (Slobin et al, 2001).[1]

**The challenge of transcribing children's signing.**

When a single adult sign is transcribed there are at least five parameters (handshape, location, movement, palm orientation and facial action), which can be recorded, using one of several transcription systems (Haug 1999). One of the most popular ways of representing a sign on paper

[1] This paper focuses on selected aspects of transcription. There is a very comprehensive *child sign language field work manual* available on the web site: http://www.sign-lang.uni-hamburg.de/intersign/Workshop4/Baker/Baker.html

is Stokoe notation (Stokoe 1960) or later modifications (Brennan 1990). This is ideal for presenting the general structure of a sign. Stokoe's transcription system is a notation rather than phonological transcription. One of the BSL signs for DOG in Stokoe transcription is represented as:

Insert figure 1 of Stokoe notation of DOG

This is a representation of the sign articulated with all parameters as in the citation form. Underspecification begins with the symbol for location (Φ), which indicates the sign is produced in neutral sign space (somewhere in front of the signer's body). More serious problems arise when one wants to transcribe the same sign in connected discourse (where processes of co-articulation occur). Signs get mutated in normal communication and the researcher may be interested in describing this phonetic mutation. Children acquiring a sign language make modifications to signs. The suggested constraints responsible for these modifications have been a great source of evidence for the analysis of sign at the phonological level (e.g. Bonvillian & Siedlecki 1996, Van der Hulst 1996). To summarise this work, young children use systematically modified handshapes, movements, locations, palm-orientations and facial actions that accompany signs, compared with the forms produced by adults in the input to these same children. These differences in production are resolved through development.

Some of the unique features of children's signing that make phonological and morphological transcription difficult are linked to the phonetics of sign languages i.e. signs are produced through movement of hands, arms and faces. Young children before age 3 years, as well as having immature phonological development lack metalinguistic and pragmatic knowledge. While signing they may move around, pick objects up, look away from the addressee, or produce signs in unseeable locations (for example in the corner of a doll house). A sign or sequence of signs may be produced with extreme motoric distortion. For example:

1. Two handed signs may be produced with one hand
2. One handed signs may be produced with two hands
3. Parts of signs may be omitted as they are co-articulated with the next sign in a sequence
4. Manual and non-manual features may be interspersed with general facial, head and body movements in an unmarked manner

If the research question is at the level of sign phonology, all these distortions are important if common patterns in development such as consonant harmony, reduction, assimilation or substitution are to be identified (Stoneman *in prep*). If the question is how the child is productively using sign and meaning combinations, English glosses of the child's intended meaning are enough e.g. DOG MEAT EAT 'Dogs eat meat'. The gloss DOG does not tell you that across five tokens the sign was produced differently

each time or that there was any developmental progression towards the adult target phonological form across these five instances.

More elaborate transcription methods are available but these may be unique to the research group doing the transcription, un-storable in a database or not amenable to computer search algorithms. Many researchers provide line drawings, photos, and computer models of child sign forms or accompany the gloss with stylistic versions of the signs movement. These are useful but do not get around the digital search necessity nor capture the dynamic nature of the sign.[2]

To take the example of verb agreement morphology in sign languages: the movement of a sign between indexed locations in sign space to indicate the subject and object of a verb phrase. Transcription involves capturing this movement in a static visual form. The exact part of sign space the sign moves between cannot be captured unless exact map co-ordinates are used, instead most researchers indicate the movement by a subscript which indicates only that there was movement between two locations (e.g. horizontally or vertically).

When we transcribe the child data we look for modifications in the signs movement that resemble the adult form in the appropriate syntactic context. Our finished transcription is a glossed verb with diacritics - $_1$GIVE$_2$ 'I give you'. If our research question concerns which category of person agreement morphology emerges first in children's signing (first to second

[2] There are also many issues about informant confidentiality with child data presented as images.

person or another combination), this transcription will serve our purposes. This gloss does not tell us what the sign looked like, what the movement looked like and if there were any distortions made by the child from the target adult model. We do not know with this gloss what morphemic structure the sign has; as Slobin has pointed out previously, we are influenced by the English gloss' meaning. The gloss does not tell us what part of the sign is the inflection used for person agreement. This example illustrates that the type of transcription used should be determined by the research question.

**Collecting child sign language**

Raw data can be either naturalistic or elicited. With naturalistic data collection there are additional problems with filming children's signing to do with modality. A sound recorder captures most of what a child says even if the child is moving around. With signing children it is sometimes difficult to capture eye gaze without a camera focused on the child's face but then aspects of the context or adult sign input are lost, unless more than one camera is used. One camera can be on the child and the second on the room and wider participants in the interaction. This is also useful, as most of what a 2-3 year old children sign, has some relation to what has just been produced by the adult addressee. It is also useful if relevant contextual information not on camera is described by one of the researchers as a form of commentary to the camera while the filming is taking place. Using a fine-grain transcription tool such as 'Sign-stream' (Neidle et al 1997) depends on clearly visible video data.

With elicited data there is a problem with using pictures, books, videos or objects as young children often use these as artificial sign space, signing onto the pages of the book or signing with the object. There are many ingenious methods of getting the child to sign naturally; most depend on several hours of careful rapport building with the child. With older children story re-telling can be one useful way of collecting data. With previous exposure to story telling a 2;6 - 3 year old can be persuaded to retell a short narrative after leafing through a picture book.

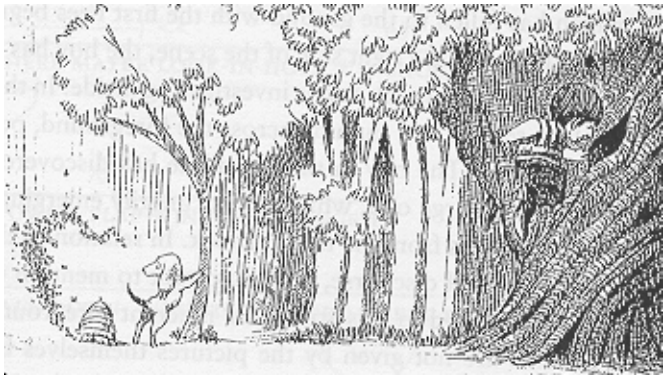
**Transcribing BSL narrative devices**

When transcribing signed narrative, the transcription system has to capture glosses of signs for the level of sign meaning, aspects of the sign form, non-manual features and also a record of where different spatial forms are directed through referential devices (e.g. Friedman 1975, Johnston 1991, Engberg-Pedersen 1994, Liddell 1995).

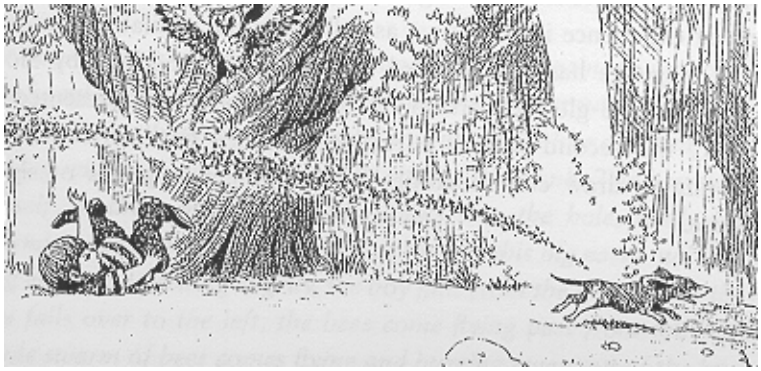
Capturing the transition between sign space in the transcription is important when looking at particular narrative devices. The encoding of simultaneity in discourse (when two events happen at the same time) by children reveals the complexity of using sign space (see Morgan 2002). In Morgan (1999) I described adult's use of sign space for retelling 'frog story' narratives. In one particular episode of the frog story signers normally narrate events by setting up several interlinked sign spaces in quick succession (see figure 1).

Figure 1 Selected segment of the 'frog story'.

Picture 1

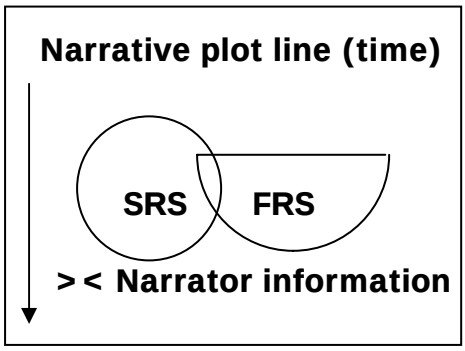


Picture 2



Recently I have been developing a method of recording this use of sign space in what I term 'Dynamic Space Transcription' (see also Liddell, 1995). Signed discourse viewed in this way is a set of overlapping representational spaces. The system is schematised in figure 2.

Figure 2 Interaction and use of sign spaces in narrative.




The box represents the narrative as a whole. Within the narrative, there is a plot line represented by the direction of the arrow. The two uses of sign space, the Fixed referential Space and the Shifted Referential Space (FRS & SRS) can be placed in a direct mapping of how the signer used these sign spaces (for a full description of SRS and FRS see Morgan, 1999, 2002). Individual reference forms can be placed within these two spaces. Included alongside the time line are any discourse markers from the narrator for the interpretation of the use of sign space (glossed ><). At the moment this transcription is static.

To illustrate how this works consider the sign utterance

(1) DOG JUMP-UP++ TRY CATCH-HIVE FALL BOY NO-SEE £ LOOK-RIGHT-SHOCKED

'...the dog is jumping up and down again and again, trying to get to the hive hanging from the tree when it falls onto the ground, the boy as he didn't see what happened turns around shocked...'

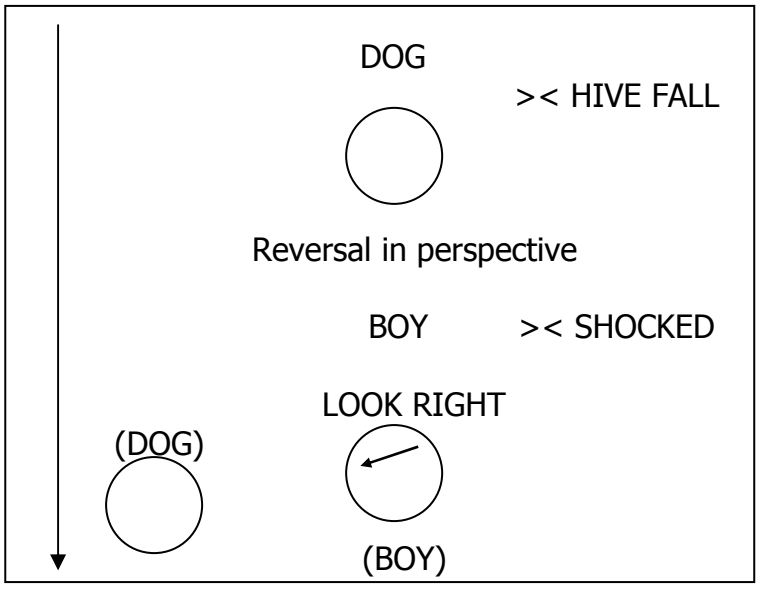
This part of the frog story involves the signer establishing the areas of sign space that will be used to move between the boy and the dog. A fuller gloss captures some of the use of non-manual markers, especially eye-gaze and the direction of verb movements in the SRS.

(2)

```
                    --      ^^          ><
                   _____ ___________ _________________________
// £ DOG JUMP-UP++ TRY CATCH-HIVE FALL
                        <<
                  _____________ ____________________________
BOY NO-SEE £   LOOK-RIGHT-SHOCKED
                              ◡
```

The interaction between sign spaces is not evident in this form of transcription. If we take the sign space out of the transcription and represent it as in dynamic space transcription, things become clearer. This is shown in figure 3.

Figure 3. Dynamic space transcription of 'frog story segment'



The movement between the first SRS where the dog's actions are being described involves moving the dog to the right of sign space. The two SRS's have been exchanged. This involves a reversal in perspective as the boy's perspective exchanges with the dogs. The adult signer uses Noun Phrases to make sure the identity of the SRS's are clear. Once this has been established the signer uses a sole verb inflection with no overt identification (BOY). Additional information for interpreting these switches in perspective and sign space is supplied with eye gaze towards the addressee.

**Limitations of the transcription system and future directions**

The transcription of signed language is inherently difficult because of the static nature of the representation and the requirement of capturing the dynamicity of the language. However selecting out aspects for further scrutiny has allowed us to describe the use of sign space in BSL and its development in young children (e.g. Morgan et al 2002). We see that the same sign space and the same linguistic forms serve several different functions depending at what level the analysis takes place. The use of dynamic space transcription reveals some of the complex transitions that take place in discourse. A major aim for the future is to animate the dynamic space transcription to capture some of this language modality's most exciting features.

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Appendices

1. Notation devices used

Gloss

LITTLE-GIRL = approximate English gloss of signs. Where more than one English word is required this is indicated through a hyphenated gloss

t-o-m = fingerspelling

'*...the little girl...'* = English translation, where '...' indicates it is taken from a larger piece of discourse

Movement of signs in sign space

= from right

= across body

 = towards body



 = right + up

 = left + down

eye-gaze

SEARCH = scope of eye-gaze

>< = mutual

-- = neutral

<< = right

>> = left

W = down

M = up

θθ = closed

<v = down + right

^> = up + left

Other glosses

// = pause

£ = shifted first person

++ = repeated sign for grammatical purposes

CL- = classifier sign

pl- = pluralisation marker

$_{123}$ = syntactic indices