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Transcription of child sign language

A focus on narrative*

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This paper describes some general difficulties in analysing child sign language data with an emphasis on the process of transcription. The particular issue of capturing how signers encode simultaneity in narrative is discussed.

Keywords: sign language acquisition, transcription, narratives

1. Introduction

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 in which sign language is produced has made it difficult to compare sign languages with each other because of a lack of an agreed normative transcription system to represent child forms of sign languages, articulated through movements of the hands, arms, body and face. Progress has also been hampered by the difficulty in storing transcribed sign data in a format which permits computer-based searches. 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, and this volume).

* 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). An earlier version of this paper appeared as Morgan (2003). 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. I would also like to thank Anne Baker for comments on this paper.

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This paper outlines some issues in studying child sign language at the level of transcription.

A transcription system can only record selected aspects of the language under study. This is equally true for speech and for sign (Pizzuto & Pietrandrea, 2001). Transcription allows us to capture in a static form one piece of the linguistic puzzle for later coding and analysis. The choice of transcription system used will depend on the specific research question asked. The transcription system adopted will mould the sign language data into a shape that is more accessible; in other words the transcription is not the same as the raw data (see papers in the special issue of *Sign Language and Linguistics* — Bergman, Boyes-Braem, Hanke & Pizzuto 2001).

In much child and adult sign language research there are striking differences between the written transcriptions provided by different authors. Depending on the level of analysis focused on, transcription may include a representation of the sign's form, information on accompanying nonmanual features, and use of sign space. Apart from some standard notation devices such as linked spoken language translations (glosses) and markers of sign modifications (e.g. '+' to mark repetition of a whole sign, or sub- and super-scripts 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 comment sets the goals for sign language transcription, and as a consequence for 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 transcribed examples with other scholars working on similar questions both in signed and spoken language.

As an example 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; http://childes.psy.cmu.edu/). Hoiting, Slobin and colleagues, in response to the observed shortcomings of current sign

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language transcription, have proposed a CHILDES-compatible transcription system to represent sign language morphology (Slobin et al. 2001).[1]

The structure of the paper is the following: first some special issues relating to child sign language research are reviewed including how child 'errors' are transcribed. I then describe recent work on sign language narrative development and how reference and space are coded and transcribed for in this genre. Limitations of the 'dynamic transcription system' are discussed in the final section.

2. The challenge of transcribing children's signing

When an adult sign is transcribed, at least five parameters (handshape, location, movement, palm orientation and facial action) can be recorded, using one of several transcription systems (see Bergman et al. 2001; Takkinen this volume). One of the most popular ways of representing a sign on paper is Stokoe notation (Stokoe 1960) or later modifications (e.g. Brennan et al. 1984). This system works well for presenting the general structure of single lexical signs. Stokoe's system is a notation system rather than a phonological transcription. For example, one of the BSL signs for DOG in Stokoe transcription would be represented as (Fig. 1).

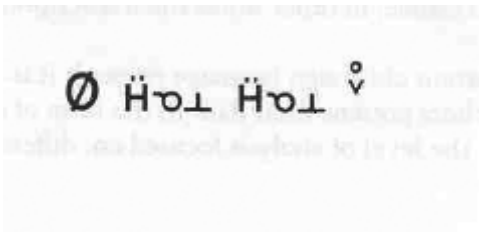

Figure 1. BSL sign DOG in a variant of Stokoe notation

This represents the sign's citation form. Underspecification begins with the symbol for location (Ø), which indicates the sign is produced in neutral sign space, that is, in front of the signer's body. Problems arise when it is necessary to transcribe the same sign in connected discourse in the presence of co-articulation. The citation forms of signs are modified in the context of normal communication and the researcher may wish to describe this phonetic modification

1. This paper focuses on transcription. For a more general discussion of the collection and analysis of child sign language data, see Baker, van den Bogaerde & Woll (this volume).

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(see Takkinen, this volume). Furthermore, in acquisition studies, a researcher may wish to note how the citation form of a sign might be produced in a radically different manner as a result of immature development.

Children modify sign forms as they acquire them. The suggested constraints responsible for some of these modifications have been a strong source of evidence for the analysis of signs at the phonological level (e.g. Bonvillian & Siedlecki 1996; Van der Hulst 1996). Young children systematically modify all parameters: handshape, movement, location, hand orientation and facial actions accompanying signs, so that these differ in form from those produced by adults in the input the children receive. These differences in production are resolved as children grow older.

Some of the features of children's signing that make phonological and morphological transcription difficult relate to the 'phonetic' properties of sign languages: the production of signs through movements of hands, arms and faces. Children have poorer motor control than adults and as a result, a sign or sequence of signs may be produced with extensive changes. 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 nonmanual features may be interspersed with general facial, head and body movements

Young children before the age of 3 years, as well as having immature phonetic and phonological development, lack pragmatic knowledge. For example, while signing they may move around, pick objects up, look away from the addressee, or produce signs in locations where they cannot be seen by the conversational partner, for example in the corner of a doll's house (Baker & van den Bogaerde 2005).

If the researcher is concerned with sign phonology, it will be important to record all phonetic modifications from the adult form in order to explore developmental patterns such as consonant harmony, reduction, assimilation or substitution (Morgan, in press). If the research is concerned with how the child productively uses sign and meaning combinations, then such phonetic detail is superfluous, and English glosses of the child's intended meaning may suffice e.g. DOG MEAT EAT 'Dogs eat meat'. The gloss 'dog' does not encode that e.g. across five tokens the sign was produced differently each time, nor whether there was any developmental progression towards the adult target phonological

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form across these five instances, but this would not be required for a study of semantic development.

Elaborate transcription methods, such as those referred to above, are in use, but these may be specific to a single research group, not suitable for storage in a database or not amenable to computer search algorithms. As an alternative, in presenting the results of research, many researchers provide line drawings, photos, and computer models of child sign forms or accompany glosses with stylised versions of the signs movement (see papers in Bergman et al. 2001).[2]

An example of the acquisition of verb agreement morphology in sign languages will illustrate some of the difficulties. Verb agreement morphology involves the movement of a sign between indexed locations in sign space to indicate the subject and object of a verb phrase. Transcription requires the capture of this movement in a static visual form. The exact area of sign space in which the sign moves cannot be captured unless exact map co-ordinates are used; instead most researchers mark the movement with a subscript which indicates only that there was movement between two locations., for example, a glossed verb with diacritics–$_1$GIVE$_2$ 'I give you'. The diacritics refer to person agreement — the verb GIVE moved from the first person location (the signer's own chest) towards the second person location (the addressee). If our research question concerns which category of person agreement morphology emerges first in children's signing (1st person to 2nd person or another combination), this transcription will serve our purposes. This gloss is, however, highly abstracted from the data: it does not tell us what the sign looked like, what the movement looked like and if there were any deviations made by the child from the target adult model. We do not know with this gloss what morphemic structure the sign has; as Hoiting & Slobin (2002) pointed out, we are influenced by the meaning of the English gloss. The gloss does not tell us what part of the sign represents the inflection used for person agreement. This example illustrates again the need for the type of transcription used to be determined by the research question.

The type of transcription must also be matched to the type of data collected. Data can be naturalistic or elicited; spontaneous conversation or narrative. Different data types present different problems for transcription, since different structures may predominate in different types of data. In the following section narratives and the problems they pose for transcription will be considered in more detail.

2. It should, however, be noted that there are issues about informant confidentiality when images of children are used (see Baker, Van den Bogaerde & Woll (this volume).

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3. Transcribing BSL narrative devices

When transcribing signed narratives, the transcription system has to capture glosses of signs at the level of sign meaning, information about sign forms, nonmanual features and also a record of the locations to which different spatial forms are directed through referential devices (e.g. Friedman 1975; Johnston 1991; Engberg-Pedersen 1994; Liddell 1995).

Languages have different linguistic resources for selecting and handling how people and objects are related in sentences and discourse. References to people in English, for example can be through noun phrases — 'the boy'; pronouns — 'he'; or through a verb phrase that relies on a previous overt mention of the referent — 'the boy saw the beehive, then **climbed** up the tree'. In sign languages reference is encoded through grammatical markers that function via agreement with locations in space. BSL, like many other sign languages, uses space to tie pronouns and noun phrases to their dependent referents and verb arguments, thereby indicating who did what to whom (Sutton-Spence & Woll. 1999).

In narrative the sign space is used and reused for referent locations which may continually change during the telling of a story. The ability of the transcription to capture the transitions between different uses of sign space is important when looking at how reference to people and locations are articulated in narrative. One such device is the establishment of overlapping representational spaces to indicate simultaneity. Morgan (1999) describes adult use of sign space in BSL for retelling 'Frog Story' narratives (Mayer 1987). In one particular episode of the Frog Story, simultaneous events occur in the same picture (see pictures 1 and 2 in Figure 2). The boy is searching for his frog in a tree and the dog has upset a beehive in picture 1 and in picture 2 the boy falls out of the tree frightened by the owl that appears while the dog is being chased by the bees. Adult signers normally narrate these events by setting up several interlinked sign spaces in quick succession.

The encoding of simultaneity in discourse, that is, when two events happen at the same time, reveals the complexity of using sign space (see Morgan 2002). A method for recording this use of sign space, which I call 'Dynamic Space Transcription', has been developed recently (see Morgan 1999, 2002 but also Liddell 1995). Signed discourse viewed in this way consists of a set of overlapping representational spaces. The system is schematised in Figure3.

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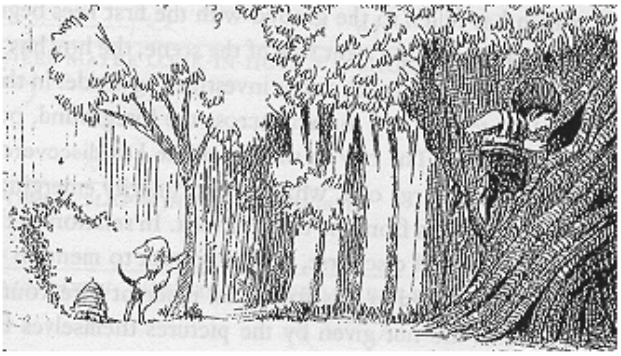
Picture 1



Picture 2

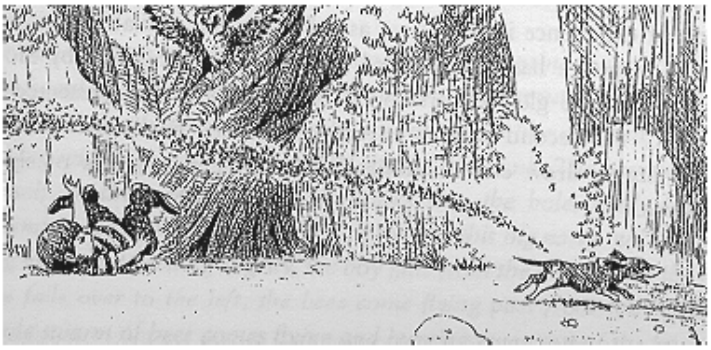


Figure 2. Illustrations from *Frog, where are you?*

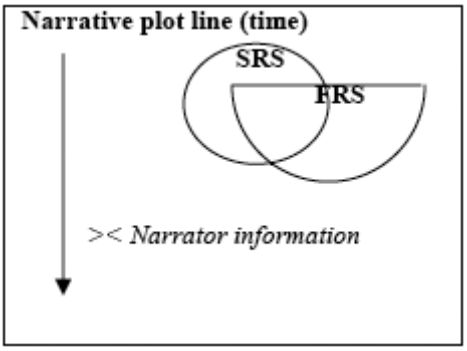


Figure 3. Interactions and use of space in narrative

The box in Figure 3 represents the narrative as a whole. Within the narrative, the the plot line is represented by the direction of the arrow. In characterising narrative discourse I have described two different uses of space: for locating referents in a kind of fixed template (Fixed Referential Space (FRS)) and 'role

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shift' for describing referents from a movable first person perspective (Shifted Referential Space (SRS)) (see Morgan 1999, 2002 for a fuller description of the SRS and FRS). The FRS and SRS can directly map how the signer used these sign space, with individual reference forms placed within these two spaces. Included alongside the time line are any discourse markers provided by the narrator to assist in interpretation of the use of sign space (glossed ><). To illustrate how this approach works, consider the sign utterance in (1) (see appendix for explanation of symbols used here and in later examples).

(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 nonmanual markers, especially eyegaze 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 a dynamic space transcription, interpretation becomes clearer. This is shown in Figure 4.

The movement to the first use of role shift in the SRS occurs when the dog's actions are being described and involves moving the dog to the right of sign space, resulting in an exchange of the two SRS's. This involves a reversal in perspective as the boy's perspective exchanges with that of the dog. 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 no further overt identification of BOY. Additional information for interpreting these switches in perspective and sign space is supplied by eyegaze towards the addressee. Eyegaze functions in these kinds of texts as a signal to 'pay attention' as well as being a means of

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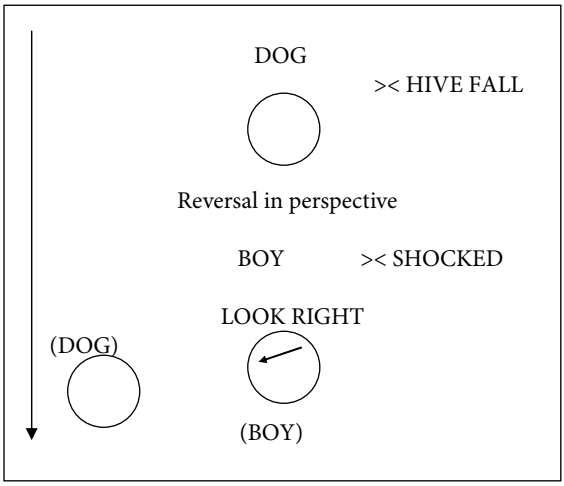

Figure 4. An illustration of the dynamic space

checking for understanding. In young signers (before 5–6 years) these looks to the addressee are absent for the most part. Children both in sign and spoken languages may begin to tell stories assuming that their addressees have full access to the identities of referents (Hickman, Kail & Roland, 1996). Through the school-age years children develop the pragmatic abilities to enable them to take into consideration other perspectives (see Morgan 2005).

Some work on children's use of simultaneity in BSL narratives has suggested that initially children cannot handle overlapped referential spaces but instead explain what happened to each character, e.g. the actions of the boy and the frog are presented in a linear sequence. This strategy,although it does provide information, fails to 'package' both events in the same time-frame (see Morgan 2002, 2005).

This very short piece of signed discourse presents us with many layers of meaning, each of which is required for a full understanding of reference across the discourse. In transcribing these different elements of the story expressed through noun phrases, pronouns, classifiers and role-shift, the real challenge is to show how they are all linked.

4. Limitations of the transcription system and future directions

As has become apparent in the discussion of narratives (Section 3), the transcription of signed language is inherently difficult because of the representation

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is static and does not capture the dynamic nature of the language. However, focusing on uses of the FRS and SRS can permit us to begin to describe the use of sign space in BSL.

Once the transcription assists us to demonstrate how sign space is used and re-used in sign language discourse, we can then move on to look at how children develop the ability to organize and manage this complex level of signing in their narratives.

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 the most exciting features of the sign language modality.

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Appendix. Notation devices used

Glosses

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

Eyegaze

SEARCH = scope of eyegaze
>< = mutual
-- = neutral
<< = right
>> = left
W = down
M = up
θθ = closed
<v = down + right
^> = up + left

Other symbols used

// = pause
£ = shifted first person
++ = repeated sign for grammatical purposes
CL- = classifier sign
pl- = pluralisation marker
$_{123}$ = syntactic indices

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