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Children's encoding of simultaneity in British Sign Language narratives

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Abstract

Narrative discourse in BSL is first analyzed in an adult signer by describing how fixed and shifted sign space is used for reference and the encoding of simultaneity. Although children as young as 4 years old use parts of these sign spaces in isolation their combined use in encoding simultaneity in narrative is a major hurdle to achieving full mastery of British Sign Language (BSL). The paper describes the developmental trends in encoding simultaneity in BSL 'frog story' narratives from a group of 12 signing children, aged 4; 3 to 13; 4. We focus on the gradual control of reference in sign space. A transcription framework for recording this aspect of sign discourse is also outlined. The results point away from the role of iconicity and instead toward general patterns in narrative development as driving the organization of sign space and reference.

Keywords: Narrative development, British Sign Language, simultaneity, sign spaces, frog story

1 Introduction

Studying the linguistic structure of signed narrative discourse involves capturing uses of sign space to signal person *reference* and characterizing the different types of sign space available for encoding *temporal relations*. The laying out of a sequence of sign spaces is considered integral to the function of reference and also the description of a passage of events in signed narratives (Loew 1983; Emmorey 1999; Morgan 1999). The particular characterization of BSL discourse used in this paper revolves around the interaction of two types of space. The first type of space is the hemispheric zone in front of the signer, where fixed locations are established and where movement of inflected signs between these locations allows reference and anaphoric reference to be understood. Within this area, reference is also encoded through the use of person and object classifiers. Signers use this first sign space from the narrator's perspective, where they are external to the narrative.

The second type of sign space includes the signer's own body as a shifted referential location. This second option enables the signer to describe the interactions of characters in the narrative and the passage of narrative events, through the signer's own shifted-first person involvement in the scene. The signer is subsequently more internal to this second type of sign space. There are similarities between the concept of shifted-first person and what others have termed 'role shift' and 'constructed action' (e.g. Metzger 1994). In describing the activities of different referents, signers use both these types of sign space in isolation, as well as overlapping them.

The aim of this paper is to describe both adult and children's use of this interaction between sign spaces to describe complex narrative scenes. Children still in the process of developing their mastery of narrative devices offer an opportunity to see how this complex system unfolds. The use of a sign space for reference and the encoding of temporal relations is radically different in form to those devices used in a spoken language such as English. Despite the modality difference narrative poses a very similar problem for children developing BSL and presents clear development trends. This paper also proposes a transcription device for capturing in a static written form how signers establish and maintain reference and at the same time set out a passage of events in time through sign space.

The paper is organized as follows. In the next section we outline the use of the term *simultaneity* in the present study and explain the encoding of this temporal concept in both English and BSL. In the following section previous work on the development of simultaneity in children's spoken language narrative development is summarized. This section concludes with an overview of proposed developmental stages in the control of reference and the encoding of simultaneity. Following this the performance of 12 different-aged children in a signed narrative task is described, focusing on their attempts to encode simultaneity. In the discussion of the results the children's use of the fixed and shifted sign space is related to general models of narrative development and developmental patterns in BSL narrative discourse.

2 The encoding of simultaneity

One subcomponent of the narrative process is the encoding of simultaneity. This is the use of linguistic devices to encode the fact that different parts of a narrative event are co-occurring in time (e.g. Aksu-Koç & von Stutterheim 1994). The parts of an event take place within a shared temporal frame in the narrative. Marking simultaneity focuses attention entirely on this shared temporal relationship between two or more activities. There are different levels of complexity inherent in these markers. In examples (1) and (2) the speaker describes the temporal relations between participants and activities through a combination of tense and the simultaneity markers 'together' and 'and'. In (1) there is a single activity being described, 'watching the TV', both participants in the activity are bounded by a single temporal frame.

(1) John and Mary watched the TV together.

In example (2), the two activities of 'watching TV' and 'eating' make up subparts of the same event. The word 'and' encodes the temporal overlap between the two parts.

(2) John watched TV and ate.

If the scene to be described contains more information, for example two different referents involved in separate activities which are co-occurring, speakers of English use aspectual distinctions, temporal conjunctions and adverbials to overlap and

contrast both parts of the event. As an example of such a complex event, an adult speaker used (3) to describe the scene in Figure 1 (example from Berman & Slobin 1994).

(3) To the dog's amazement, he knocked the beehive off the tree while the boy was searching the trunk.
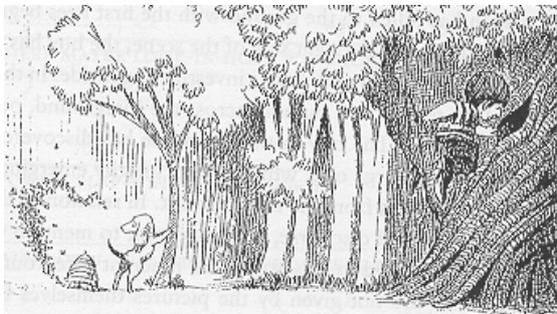
Picture 1
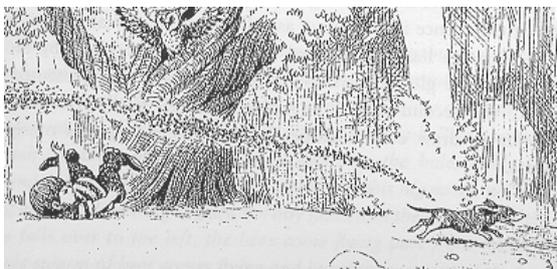
Picture 2

Figure 1: Pictures of the beehive and owl scenes (*Frog, where are you?* Mayer 1969).

Narrators are forced to make choices in how the description of two co-occurring parts of the event will unfold. In (3) the speaker, who has up till this point narrated from the perspective of the human referent 'the boy' as the central character, shifts the focus to the dog's actions. The dog is described as 'amazed' while the boy's actions are only factually re-counted by the narrator. This information from the narrator focuses the interlocutor on the dog's perspective temporarily. The two parts of the event are described in overlapped narrative time through the connective 'while,' thus the two

separate activities of 'knocking the beehive' and 'searching the tree trunk' are understood as happening at the same time.

Within a narrative, each event has its own time frame. Narrators make choices in how each subpart of an event will be ordered and overlapped in the plot. However surrounding the event is the overarching time frame of the passage of the narrative. Although the plot may take characters back and forward, for example through uses of 'earlier' or 'later', the overarching narrative time progresses from the beginning of the narrative to the end. In transcriptions of signed narratives in this paper an arrow marks the narrative time frame.

Returning to the example in (3), the speaker's description of the two activities is sequential, as the speaker can only talk about one part of the event at a time, yet we interpret the two subparts of the event as happening simultaneously. The constraint of sequential articulation is tied to the spoken language modality. Sign languages have different possibilities to encode simultaneity by talking about different parts of an event at the same time (Miller 1994; Engberg-Pedersen 1994). These devices are described in detail in section 4.

3 Simultaneity markers in English

The main linguistic devices available in English for expressing the level of simultaneity in (3) are temporal conjunctions, e.g. 'when', 'while' and 'as' and also temporal adverbials, e.g. 'at the same time', 'meantime', 'just as'. Temporal conjunctions coordinate the extent of simultaneity at the sentential level, whereas the temporal adverbials mark temporal relationships between parts of the event across the sentence boundary.

There are subtle semantic distinctions across the conjunctions 'when', 'while' and 'as', with 'as' being the most specific and also not coincidently, the last to be acquired by English speaking children (Silva 1991). There are also covert markers of simultaneity, for example a perceptual verb can indicate a temporal relationship.

(4) Up in the tree the boy saw the bees chasing the dog

This type of device, also apparent in the use of 'amazed' in (3), allows the narrator to bring in a referent's perspective and more involvement of characters. This technique has direct relevance for simultaneity marking in BSL. In spoken language, covert markers are a late development in children's narratives and are linked to literacy (Aksu-Koç & von Stutterheim 1994). This may be because written texts make use of covert markers more often and when considering the complex unfolding of an event in a static text, the older literate child has more time to analyze the discourse processes being used than when listening to an oral narrative.

4 Simultaneity Marking in BSL

The devices available in sign languages to encode simultaneity at the sentential level are rich and diverse (e.g. Engberg-Pedersen 1994; Miller 1994). The study of sign language at the level of discourse and narrative is a challenge for linguists partly because of issues to do with transcription (see Slobin et al 2001) and also because signers use a complex network of sign spaces including their own bodies for referential purposes.

Capturing the several layers of articulated signed information in a written form means being selective in what is transcribed. While a written transcription of a spoken language narrative may choose not to record uses of facial expression and gestural elements, these devices form an integral part of BSL grammar.

4.1 The role of sign space in narrative

Referential sign space has been studied previously in several contexts, including signed discourse (Metzger 1994; Engberg-Pedersen 1995; Fridman-Mintz & Liddell 1996; Lee et al 1997; Morgan 1996, 1999; Taub 2001) and also first language acquisition (Bellugi et al 1989; Bellugi, et al 1990; Morgan et al 2002; Morgan & Woll 2002).

The particular characterization of sign space used in this paper revolves around the interaction of two types of space: the fixed referential space (FRS) and the shifted referential space (SRS). As the discourse unfolds, sign space is continually changing and re-used for reference. The complexity of this interaction is suggested by the observation that when signers encode how two or more parts of an event are occurring simultaneously they pay great attention to their conversation partner's uptake of the message (i.e. they look at their interlocutor more).

The devices at the signer's disposal for encoding simultaneity differ from those described for English, but despite these modality differences simultaneity poses a very similar problem for children developing BSL and presents clear developmental trends. Before describing the developmental data we outline the framework for analyzing sign space, the transcription system used and similarities and differences with other approaches to characterizing how sign space functions in discourse.

4.2 The organization of referential space

The original use of the terms fixed and shifted referential space (FRS and SRS) is by Bellugi et al (1990). The present analysis uses the terms somewhat differently from this work. Space replaces what was called framework, and person/object classifiers are included in the FRS. The reason for this change in terminology stems from the author's wish to highlight the role of referential *sign space*. Although classifiers were not focused on by Bellugi et al (1990) they clearly perform a referential function and are articulated in the FRS.

4.2.1 The Fixed Referential Space (FRS)

The FRS is a hemisphere in front of the signer. Syntactic indices are established within this space by using a noun phrase and a point toward one area of space (IX). [1]

(5)   BOY IX
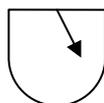
        'the boy'

Uses of pointing into sign space have different linguistic functions. In (5) the point is the first use of the FRS in the discourse and establishes an index for the referent NP 'boy'. A subsequent point towards this index functions as a pronominal and maintains reference.[2]

(6)   MORNING PRO WAKE
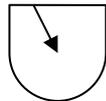
'in the morning he woke up'

A verb which allows morphological inflection for person agreement may move between these indexes to indicate subject and object relations (7 and Figure 2).

(7) ASK
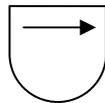
'(he) asks (her)'
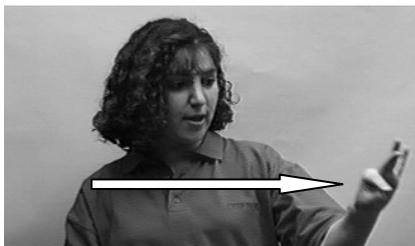
Figure 2: The use of agreement between two indexes in the FRS (see example 7)

Signers also use topographic maps within the FRS to describe spatial relationships between objects in the event being described (e.g. Emmorey & Falgier 1999). Sentences with embedded classifiers are also used in the FRS. The movement of the classifier for motor vehicle, as well as the position of the classifier for curved wide object (glossed **x**) is shown in Figure 3. The signer's right hand articulates the

classifier predicate CAR-MOVE and is accompanied by eyegaze along the path of movement (shown in Figure 3).

(8) CAR-MOVE-UNDER-BRIDGE

'the car passes under the bridge'
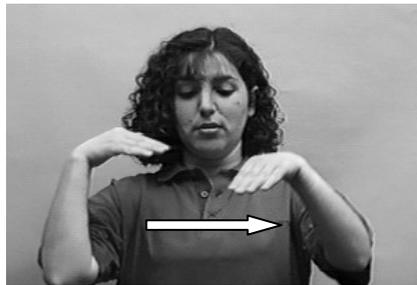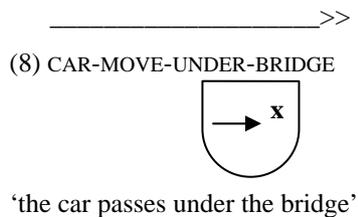
Figure 3: the use of classifiers in the FRS

As can be see from the eyegaze of the signer in Figure 3, which is directed towards the path of the dominant hand, the signer is narrating externally to the referents appearing in locations in sign space (that is, the signer does not look in the direction the car is going nor in the direction of a person on the bridge watching the car coming). In describing parts of an event as occurring simultaneously, signers may use different areas of the FRS to establish and maintain reference to characters, the temporal relationship between events is encoded by both areas of sign space sharing the same temporal frame.

Although common at the sentential level, it is rare that two different classifiers are articulated at the same time for two different referents if involved in two different activities at the discourse level. Signers could move the story between these distinct areas of the FRS (e.g. right and left) to maintain reference and encode the overlapped temporal frame. Thus simultaneity of activities may be marked through simultaneity

of articulation in short stretches of signing. But in narrative, signers often overlap the FRS with references made in the SRS in order to encode simultaneity.

4.2.2 The Shifted Referential Space (SRS)

Although the SRS overlaps with the FRS the main difference between the two is that the SRS extends to include the signer's own body as a referential index, and not just as the articulator of the sign message (the narrator). This has been termed 'role shift' (Loew 1983; Ahlgren & Bergman 1992), 'constructed action' (Metzger 1994), and 'shifted-first person' (e.g. Engberg-Pedersen 1995; Morgan 1999). Once the signer indicates that the SRS is active, pronominal points and agreement verbs may move between indexes in the SRS and the signer's own location, but be interpreted as reference to particular characters in the event being described. The markers of SRS are an eyeblink before or at the point of shift, followed by some movement of the head or upper body. [3] This allows the signer to report the actions, speech or thoughts of the referent in focus (example 9; see also Figure 4; the shift is shown with the symbol £ in the sign gloss and the SRS is indicated by a circle).

```
    __∅∅_____up
(9) £      JUMP-UP-BARKING
```
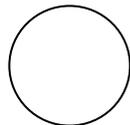
'jumping up barking'

Figure 4: Shifted first person in the SRS

4.3 FRS and SRS combinations: encoding simultaneity

There are two main ways in BSL that signers indicate the temporal overlap of two co-occurring subparts of an event. The first is lexical through a specific temporal marker and does not involve sign space. These lexical markers are often accompanied by shared eyegaze with the addressee as in (10).

```
        _____><
```
(10) SAME-TIME
    'at the same time'

The second option is through use of sign space. The two parts of the event involving two different characters can be described using both the SRF and FRF simultaneously. This does away with the need for a lexical marker of simultaneity. [4] As previously mentioned signers may use different areas of the FRS to articulate different but overlapping parts of an event. Two classifier constructions are articulated in different areas (shown through the symbols 'X') of the FRS as in (11)

(11)

   right hand: CL-**V**-DOG-JUMP

   left hand: CL-**G**-PERSON-STAND
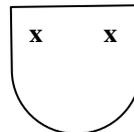
   '(the dog) jumped up while (the boy) stood nearby'

It is also possible for the signer to use different parts of their own bodies to refer to different referents while in shifted referential space. In the example in (12) the right hand articulates the activity of one referent 'eating' while the left hand articulates the second referent 'reading' in the right side of the SRS. This location was established through the index point previously.

(12)   Right hand: EAT PRO READ EAT
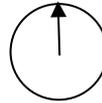
          Left hand: READ
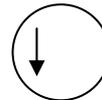
          'while I was eating, he read'

In this construction the signer's hands and upper body refer to different characters. Presumably there are articulatory and cognitive constraints on how much and for how long signers can overlap sign spaces and do different things with each hand (Miller 1994). Equally there may also be similar comprehension constraints from the conversation partner. The encoding of one particular complex piece of action (the local cohesion) needs to be balanced with the effective telling of the whole story (the global coherence). The narrator needs to think about how comprehensible these overlapped areas of referential sign space will be (see Anderson, Garod & Sanford 1983). This use of two areas of SRS is sometimes observed in signed poetry (Sutton-Spence & Woll 1997) and may be an alternative but stylistically marked option.

A more common option for the encoding of simultaneity is through the overlap of the FRS and the SRS (e.g. Winston 1995; Morgan 1999). BSL signers use this option to refer to the same character from two perspectives. Liddell (2000) refers to this as a 'grounded mental space'. In (13) the signer shows the fall from a tree of a referent through the classifier construction, as well as on her own body. The overlap of the two sign spaces is captured in the circle and semicircle schematic next to the illustration of the fall in Figure 5.

(13) CL-**V**-PERSON-FALL-FROM-CL-**5-TREE**

'…person falls from the tree…'
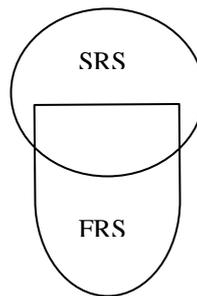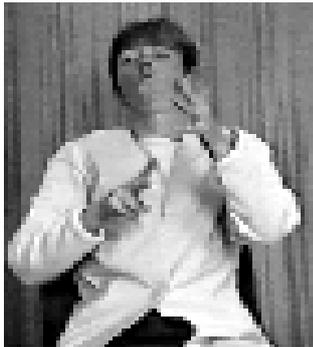
Figure 5: Overlapping of two sign spaces

Overlapping the FRS and SRS also allows the signer to refer to two characters acting in the same event as in (14). In this example the signer moves between the different sign spaces, building up the referential information piecemeal before overlapping the two final sign spaces (shown by overlap in the transcription) [5]. The boy's actions 'looking down' articulated in the SRS are overlapped with the actions of the dog 'sitting' through the classifier in the FRS. This example illustrates the passage of narrative time indicated by the black arrow over the gloss.

'the boy gazed on while the dog sat waiting nearby'
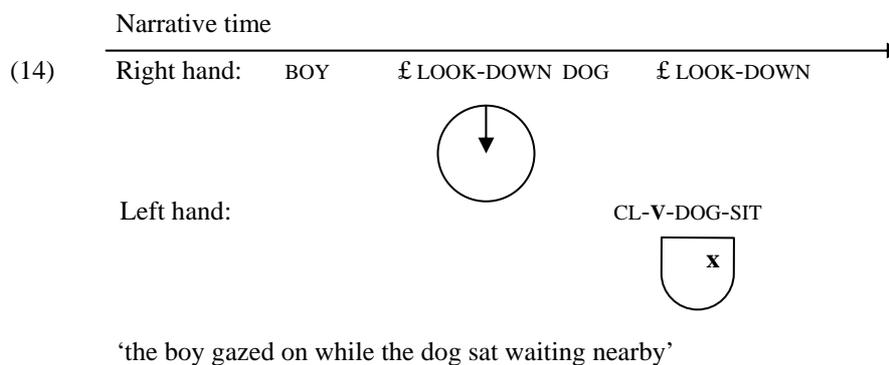
Lastly the signer can refer to separate activities through a combination of the FRS for one referent's activity and the SRS for a second referent's activity. This option is shown in (15) where the first subpart of the event is articulated twice. This reiteration,

where the completion of the first activity is not shown until the second referent is mentioned, allows the signer to encode both events within the same temporal frame.

(15) BOY CL-**V**-FALL DOG £ JUMP BEES SWARM BOY CL-**V**-FALL
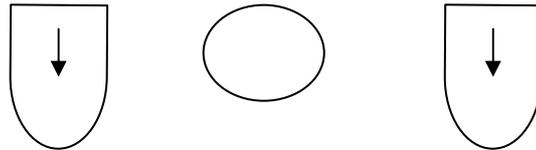
'As the boy was falling, the dog made the bees angry and then the boy hit the ground'

4. 4 Signaling functions of sign space

The signer signals that information is important for interpreting the use of sign space by looking momentarily towards the addressee while signing. These looks to the addressee act as guiding commentary (shown with the symbol >< in the sign gloss). They also allow the narrator to check for the addressee's comprehension of the transmitted message. The use of shared eyegaze is more frequent in more complex parts of BSL narrative, especially when simultaneous events are being encoded (Morgan 1999). Example (16) illustrates how the signer uses shared eyegaze while supplying some important information regarding the timing of two parts of an event.

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           _____><
```
(16) SAME-TIME
     'at the same time'

Gazes at the addressee with accompanying commentary are therefore important for the addressee's pragmatic interpretation of the narrator's use of sign space. Eyegaze not only structures the flow of information in narrative (Gee & Kegl 1983; Bahan & Supalla 1995) but also functions to establish shared interest and monitor comprehension.

Narrative discourse in BSL can thus be described as the setting up of a series of sign spaces. Transcribing the use of spatial information captures the position of various sign spaces and their interaction (Figure 6). For notation, the semicircle represents the FRS and the full circle represents the SRS. Information important for correct interpretation of referential space is signaled by shared eyegaze (><). Signers set up sign spaces along a temporal path, represented in the notated examples with an arrow. The same FRSs and SRSs are re-established several times during narrative to set up new events.
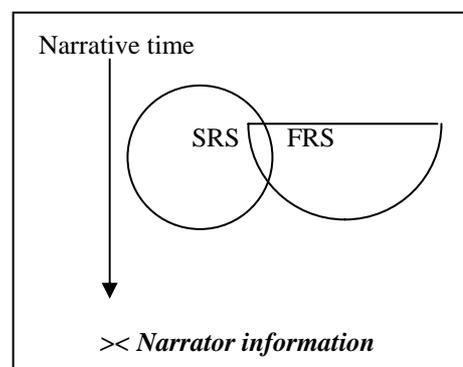
Figure 6: Interaction and use of sign spaces in narrative

The organization of sign space described in this section shares characteristics with other models, especially Liddell (1992, 1995). In a description of an American Sign Language (ASL) narrative, Fridman-Mintz & Liddell (1996: 56) suggest that the use of sign space is 'potentially very confusing'. The solution to this potential confusion is for signers to split up the narrative into a series of smaller conceptual spaces, which they term 'mental spaces'. Each mental space contains a limited number of elements. This approach stems from work by Liddell (1992, 1995) on token and surrogate sign space. Tokens are miniature imaginary figures that exist in areas of sign space assigned to third person roles. Surrogates are life size imaginary figures that signers interact with (as if physically present) in the discourse.

There are two points that Liddell emphasizes with token and surrogate space. Firstly, signers refer to these spaces through deictic gestural reference. This rules out anaphoric reference through pronominal points, classifiers or verb agreement. The

signer uses no abstract syntactic indexes (see Meier 2002 for a recent examination of this argument).

Secondly, sign space is motivated by and grounded in real world space. If a signer uses a token in the right side of sign space to refer to a school, this is because in the real world the school is in the east of the previously mentioned city (Fridman-Mintz & Liddell 1996). There are some overlaps in Liddell's model and the FRS and SRS approach. Sign space is systematically cleared and recycled, allowing the same area of sign space to act as an index for more than one referent but during different parts of the narrative. We add that there is parallel in the use of sign space and how a pronoun in English (e.g. 'he') may refer to several different characters in a narrative if the speaker re-establishes the identity of the antecedent at each successive part of the story. Pragmatic rules govern both the encoding and decoding of anaphora in signed and spoken discourse. Also each new sign space refers back to a previous sign space. Liddell writes that each mental space 'inherits partial structure' from the previous use of space.[6] Finally, Liddell argues that token space can be embedded into surrogate space, an option that has been outlined with FRS and SRS combinations in section 4.3.

5 The role of iconicity

Deixis, gesture and the grounding of sign space in real world spatial knowledge imply a large amount of iconicity in the token and surrogate approach. If young children were able to capitalize on this iconicity they would be at an advantage in their development of simultaneity markers compared to their same-age peers developing spoken languages. The word 'while' in English appears to involve very little iconicity, whereas devices articulated in sign space (e.g. classifiers) appear from a superficial analysis to be iconically motivated. If this modality difference in how simultaneity is encoded in BSL were transparent to the learner, its development in children's signing perhaps would follow a different trajectory to that described for the appearance of spoken language simultaneity markers such as 'while' in children's narratives. Even if BSL were to afford no developmental advantage, perhaps the errors observed in children's attempts to encode simultaneity in sign would differ qualitatively from

those described previously in the spoken language research, suggesting that although the difficulty in using these devices causes protracted development, the child's acquisition problem arises for different reasons.

Liddell provides no developmental data on the child's relative ease or difficulty in the use of tokens and surrogates. We might assume that children would acquire a token and surrogate system based on iconic, real or grounded space and gestural non-linguistic devices effortlessly compared to the long effortful acquisition of markers of simultaneity in spoken languages. In other aspects of sign language development the iconic and gestural route appears not to influence the child, although it may be a major resource for learning in the adult second language learner (Petitto 1986; Schick 1990; Morgan, et al, 2002).

6 The development of simultaneity marking in narrative

Adults encode the simultaneity of co-occurring events in narrative with very little effort. In contrast, in studies of several different languages, young children appear to develop this aspect of their narrative over a protracted period, despite having sophisticated non-narrative language skills (e.g. Berman & Slobin 1994; Silva 1991; Wigglesworth 1997). When two protagonists are competing for conceptual space as well as linguistic forms, the narrator must switch between different perspectives and signal these switches clearly to the conversation partner. Switching between characters influences the continuity of the narrative both locally at the event level and globally at the plot level (Berman 1988; Comrie 1982). In the context of the frog story narratives, the event level is the owl and bee scene and the global level is the whole narrative. The plot is made up of a series of events which each have their own referential organization and time frames, while the global level of the narrative is an overarching passage of time made up of an initial start, progressing through to a conclusion. It is the ability to manage both these types of narrative organization that identifies the mature user of a language.

At the local level, the marking of simultaneity in narrative poses a conceptual and linguistic challenge for the child. The encoding of simultaneity appears after the associated concept of sequentiality and its markers e.g. 'then', 'and', 'next' etc

(Bamberg 1986; Costerman & Bestgen 1991; Weist et al 1997). This is thought to be because tracking more than one referent in the same event is more demanding in a narrative task where the speaker is organizing the global structure of the narrative, as well as the description of specific events in the unfolding story (Acsu-Koç & von Stutterheim 1994; Silva 1991; Chen 2002). Although these studies use different methodologies (naturalistic and experimental), their general conclusion is that simultaneity markers such as 'while' are rare in children's language before 3 years and they are not used productively until after 7 years. Claims of their early appearance (Acsu-Koç & von Stutterheim 1994) may be tied to the simpler forms of markers (e.g. 'together') which describe a single activity in an event.

When describing events with co-occurring activities young children (before 6 years approximately) prefer to use the perspective of a main or thematic character, while older children (after 8 years approximately) are able to combine perspectives of two characters more easily (Karmiloff-Smith 1980; Slobin 1984; Aksu-Koç 1994; Berman & Slobin 1994).

Others have hypothesized stages in this development. For example, Bamberg (1987) proposes that the first system children use to encode co-occurrence is at the global plot level of organization. This can be seen in children's preference for sequences of nominal reference (17).

(17) …the boy fell-out and the bees were flying after the dog…
(5 year old; from Wigglesworth 1997: 295)

At the next level Bamberg describes children's attempts to focus on the local organization of reference through a thematic subject perspective. They focus inflexibly on one referent as being the central perspective despite apparently conflicting contexts coming from the plot.

(18) …the dog's sitting down, and he finds the beehive, and he's looking at it, and the boy's looking through a hole, and then he goes to the branch, and the dog is sitting down…
(6 year old; from Wigglesworth 1997: 298)

The final stage is reached when children are able to amalgamate both global and local levels of organization through an anaphoric strategy. While still controlling person reference at the event level, the child manages those changes in scene and activities demanded by the plot. The child allows more than one referent to take central focus within different events in the narrative without losing track of the overall plot (19).

(19) …and the boy looked down a hole, and a beaver came out, and the dog was shaking the tree where the beehive was, and he made the beehive fall, and the boy was looking in a tree…hole, and the owl, an owl came out and pushed him down…

(10 year old; from Wigglesworth 1997: 294)

Progression through these different levels is driven by conceptual re-organization of the functions of linguistic forms (e.g. noun phrases and pronouns). This is achieved through old forms taking on new referential functions.

In the next section we report on the specific aspect of simultaneity in young children's signed narratives and its development across a group of children acquiring BSL. This is a first step in our understanding of the development of encoding simultaneity and the control of sign space in discourse.

7 Method

7.1 Subjects

Narratives were collected from 12 deaf children exposed to BSL from infancy by their deaf parents or in early childhood by their hearing parents. All the children attended a Deaf day school, which had adopted a bilingual BSL/English policy. The hearing parents all signed with their children and were enrolled in adult sign language courses. In the school setting all the children had good models of fluent adult BSL and had been informally assessed as having good levels of BSL. [7] The ages ranged from 4;3 – 13;4 (Table 1). There were seven girls and five boys. None of the children had any known developmental impairments.

Table 1 Biographic information

Code	Age	Profoundly deaf from birth	Parents Deaf	Home language/s
c1	4;3	Yes		BSL/English
c2	4;9	Yes	yes	BSL/English
c3	5;6	Yes	yes	BSL /English
c4	5;7	Yes		BSL/SSE/English
c5	7;8	Yes	yes	BSL/English
c6	9;6	Yes		BSL/SSE/English
c7	9;10	Yes		BSL/SSE/English
c8	10;4	Yes		BSL/SSE/English
c9	11;6	Yes	yes	BSL/SSE/English
c10	11;10	Yes		BSL/SSE /English
c11	13;1	Yes		BSL/English
c12	13;4	Yes	yes	BSL/English

For comparison the children were grouped into three age groups as shown in Table 2.

Table 2 Age groups

Group 1	4-6 years	N=4
Group 2	7-10 years	N=4
Group 3	11-13 years	N=4

7.2 Materials

The narratives were elicited through a picture book task. *Frog, where are you?* (Mayer 1969) consists of 24 wordless pictures in various scenes depicting the

adventures of a young boy and his dog, as they search for his lost frog (as were seen in Figure 1). This material has been used in the study of young children's language development in several spoken and signed languages (see Berman & Slobin 1994).

The data described here is taken from the middle section of the frog story, where a complex scene depicts the simultaneous actions of the boy and the dog searching for the frog. We refer to this part of the story as the 'beehive and owl scene'.

7.3 Procedure

After familiarizing themselves with the book, children re-told narratives from memory in BSL to their Deaf class teacher. During the re-tell the picture book was not present. This method for collecting the story was chosen, because previous studies have shown that, if the book is present, young children use the surface of the picture book rather than sign space when telling the story (Baker, Bogaerde, Coerts & Woll 1999; Morgan 1998; Morgan submitted). The narrative was recorded on a video camera positioned next to the addressee. Trained deaf and hearing signers transcribed the signed narratives.

7.4 Analysis

The children's BSL narratives were coded for their use of:

1. Lexical markers of simultaneity
2. Spatial encoders of simultaneity through the FRS and the SRS
3. Signals of the functions of sign space to their conversation partner

As described in section 3.4 and in Figure 6, we have attempted to capture the dynamic use of sign space and the use of reference in the transcription that accompanies the glossed narratives. A vertical line pointing down the page indicates the passage of time. Uses of the FRS and the SRS are shown through semi and full circles respectively. When the narrator uses shared eyegaze with the addressee ($><$), parts of this commentary are included in the sign space transcription. Anaphoric reference to one of the characters from the narrative is marked by parenthesis. Dotted lines between representations of different sign spaces in the transcription indicate the relationship between a current and previous sign space.

8 Results and discussion

In order to contrast the children's developing system with the adult target, we first describe an adult frog story narrative, concentrating on the signer's encoding of the simultaneity of events in the beehive and owl scene. The adult narrative was transcribed (20) and schematized for the use of both the FRS and SRS (Figure 7).

(20)

```
                    --      ^^          ><
               ___  _____  _____
          //£ DOG JUMP-UP++ TRY CATCH HIVE FALL


                               <<
               _____  _____
            BOY NO-SEE £  LOOK-RIGHT  SHOCKED
```



```
          ><   --                        (squint-------
          ___  _____  _____
          TREE WIDE TRUNK HAVE HOLE £ BOY THINK


          --------------------) <<              θθ
          _____  _____  _____
          PRO-THERE MAYBE LOOK-IN-HOLE ++ SHOCK
```
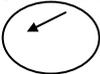


```
          ><              ^^
          _____  _____
          WHAT OWL £ FLAP-WINGS PECK-ANGRILY


          θθ      --           ><                  --
          ____  _____  _____  __
          BOY   BOY-FALL  //   SAME-TIME PRO-THERE  BEE
```
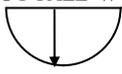


```
                                         <<
          _____  _____
          HIVE-FALL    PRO-THERE  BEE++ ANGRY LEAVE
```



```
          ><
          _____
          SWARM-FLY FLY  LONG-THIN-TRAIL-SWARM //
```



```
          --
          _____
          BOY-FALL-DOWN //
```
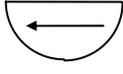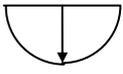
'...the dog is jumping up and down again and again, trying to get to the hive hanging from the tree when it falls onto the ground, the boy as he didn't see what happened turns around shocked. There is this big wide tree with a hole in the side of the trunk. The boy thinks to himself "in there maybe", he looks into the hole, really looking around inside and gets a real shock as there is this big nasty owl flapping away and pecking angrily, the boy falls from the tree, just as the beehive falls down over to the left, the bees come flying past from the hive, the whole swarm of bees comes flying and buzzing away out of the hive and in a huge cloud they come swarming towards the falling boy...'

Figure 7 Adult use of sign space
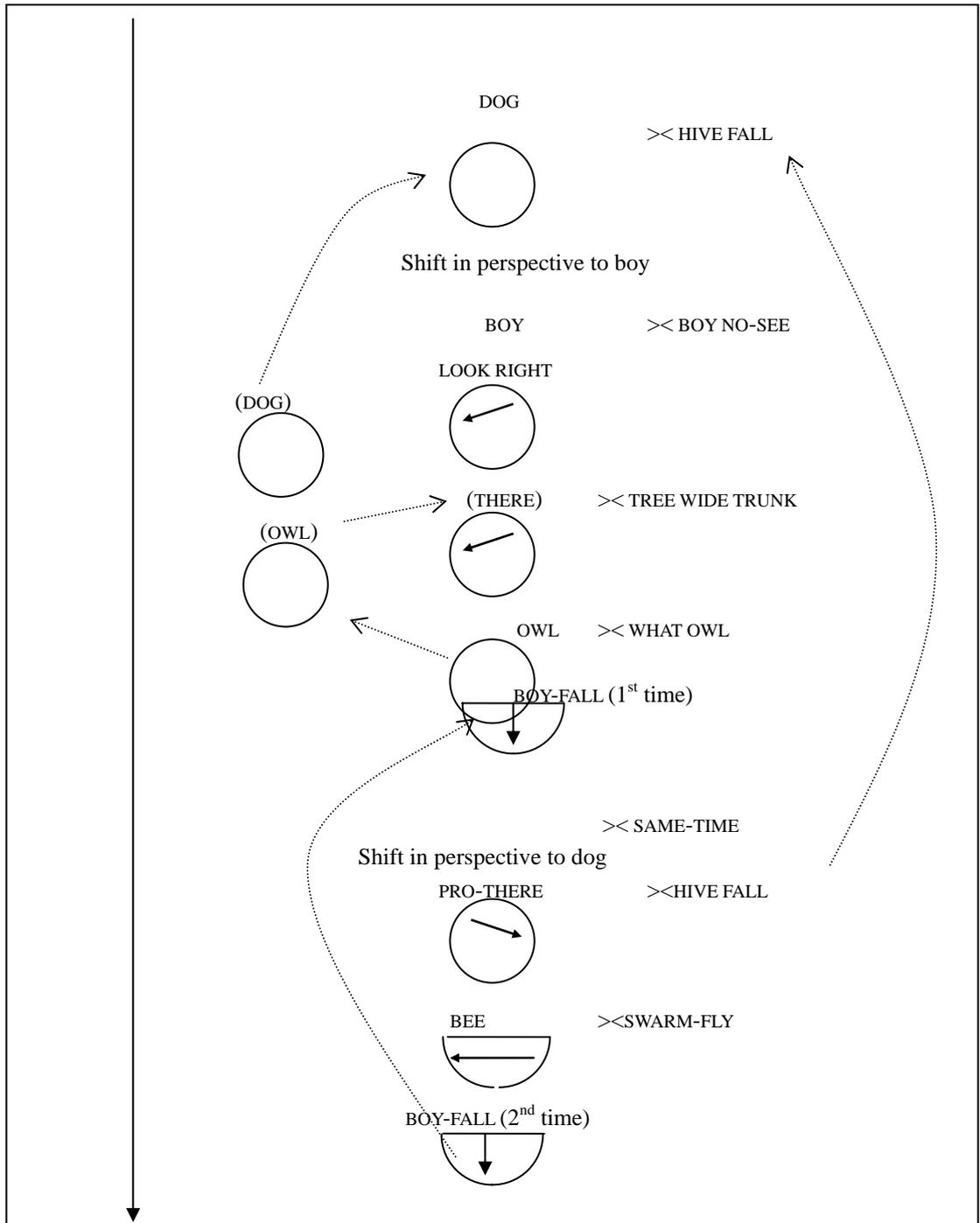
In (20) the signer set up two overlapping areas of sign space. The SRS was used to represent the actions of both the boy and the dog interchangeably. The signer sets up a series of SRS's shown by the line of circles passing down the transcription (Figure 7). Each of these SRS's relies on a previous piece of information for its successful identification as referential. The signer indicates the progression between these spaces and between the referents these spaces refer to, through the use of points and verb inflections (e.g. LOOK-RIGHT). By signing the fall of the boy and hive twice, the two parts of the event are overlapped in the local event time frame (shown as dotted lines).

Throughout the whole narrative (before and after this excerpt) there were examples of the signer combining the FRS with the SRS. For example in the middle (lines 4 – 6) of (20), the owl was shown in the SRS emerging from the tree and looking on as the boy was shown falling in the FRS from the same tree. This use of sign space is difficult to capture in a linear gloss, but is shown by the overlap of sign spaces in Figure 7. The adult signer uses a combination of SRS and FRS to encode the simultaneous parts of the event. The schematic representation of the use of sign space captures the combination of the SRS and FRS. The adult signer shows the movement of the owl as it leaves the tree through SRS while also showing the fall of the boy from the tree through a classifier predicate articulated in the FRS.

The adult signer manages the overall coherence of the narrative, as well as the local cohesion of each smaller section, by continual recycling of sign space and frequent looks to her addressee during this thirty-second excerpt (>< HIVE FALL, >< BOY NO-SEE, >< SAME-TIME). These gazes function to clear, overlay and switch the sign space currently active. There is a clear indication that the two parts of the event are occurring simultaneously through the lexical sign SAME-TIME. The main narrative device for overlapping the two parts of the event was by repeating the two falls: the fall of the boy is shown at the start of the event but not completed until the end of this part of the narrative.

We now turn to the developmental data.

8.1 Group 1 (4-6 yrs)

Simultaneity is not encoded in this group's narratives, either through lexical or spatial means. In the bee and owl section of the youngest children's narratives, there were very few uses of linked sign spaces in the FRS or SRS compared with the adult narrative in (20). Each time a referent was mentioned it was by a noun phrase rather than an anaphoric use of sign space. There were also no combinations of the FRS and SRS. Each part of the event was narrated from within the overarching narrative time frame. There was a re-counting of sequences of actions with no attempt to overlap or encode the simultaneity of the different parts of the event. The narratives were accompanied by very little information from the narrator to identify referents. Typical examples from two children aged 5;6 and 5;7 are shown in (21) and (22), respectively. In both examples, only one part of the two-part event is referred to. The limited use of linked sign space in (21) can be see by the absence of dotted lines in Figure 8.

(21)   --   <<   --
         _____ _____ _____
          DOG WALK SEE TREE-FALL LOOK BEE-PL

                         ^^

         _____   _____
          LEAVE BEE-HIVE   DOG £ BITE-PUSH

          >< VV ><   θθ
         ____ __ _____ _____
          BEE FALL-DOWN CATCH DOG CATCH

'...the dog is walking along and he sees a tree fall, and the bees are coming out of the hive, the dog is biting and pushing at the bee hive, it falls down and they try to catch the dog…'

Figure 8: child aged 5; 6 use of sign space

In Figure 8 we see that the child sets up a sequence of unrelated sign spaces. There is

one look to the addressee. Example (22) is from the oldest child in this group and

although this passage contains a lot of information, there is an absence of

simultaneity.

(22)

```
        ><    -       VV         <^    ><
       ____ _____ _____ _____ ____
        DOG BEE FALL DAMAGED+ GONE // DOG

        (hands--------------------) ><  <<
       _____ ____ _____
        TREE HANG-ON-BRANCH DOG £ PUSH SWAY TREE

                    ><VV  V>                ><
       _____ __ __ _____ _____
        CL-HIVE-SWING FALL BREAK DAMAGED+ BEE-FLY

        ><  << VV      -
       ___ __ _____ ___
        DOG GO SCARED RUN
```

'...the dog makes the bee fall and break and break it disappears, the dog sees a tree

with something hanging on the branch of the tree, the dog pushes at the tree which

sways back and forward, the hive moves and falls off onto the ground and breaks really gets squashed, the bees come flying out, the dog is scared and runs away...'

To summarize, the complexity of encoding simultaneity means the youngest children focus on only one of the two parts of the beehive and owl event. This parallels findings on same age children in spoken language, e.g. Aksu-Koç (1994). The difficulty in describing co-occurring events at this age appears therefore to be a general developmental issue, which includes children acquiring signed languages.

The specific demands made in a sign language are in the connected use of different sign spaces. The four children in the youngest age group did not use a series of interlinked sign spaces either in the FRS or the SRS in order to link the actions of the boy and dog. Each sign space was created with very little reference to previous spaces.

At this age children use a global or narrative time frame. Although there are two main referents (boy and dog) there is a single perspective on the event and reference is mainly through repeated nominal forms. This fits with what Bamberg (1987) proposed as a first system that children use to describe complex narrative events.

The children in this group used many of the linguistic devices available in BSL for person reference, e.g. classifiers, points and agreement verbs in the FRS and shifted first person in the SRS but all at the sentential level. They do not link these devices across their narratives. This confirms what Berman has coined a 'paradox' of language development. Children progress from mature mastery of their language at the sentential level to a complete lack of awareness of the new demands made of the same referential forms at the level of discourse (Berman 1988).

The children in group 1 used the least amount of information addressed towards their conversation partners, compared with all the other children. This suggests less developed pragmatic (and perhaps cognitive) skills in organizing information, monitoring ambiguity and checking their conversation partner's comprehension while they construct a narrative.

8.2 Group 2 (7-10 yrs)

The children in the next age group mention all the characters and include both the bee and owl events, suggesting narrative-structuring abilities have improved. Both events

are described but with little indication that they are happening at the same time. Although the narratives are longer and contain more detailed information than the younger age group, there is still a sequential ordering of the two events, with one character (the boy or the dog) dictating the temporal ordering of events in what Bamberg (1987) termed a 'thematic subject strategy.'

In example (23) from a child aged 7; 8, we can see an example of the combination of sign spaces. The owl and the boy are indicated by alternating between two SRS's (line 3).

(23)

θθ ><   θθ v>   ><

___ _____ __ _____ _____

SO THERE DOG WALK HIVE BEES-LEAVE MOUSE

              <v   θθ   <v

_____ _____ ____ _____

MAN BOY LOOK-INTO-HOLE NO YES LOOK-IN

>< --   θθ --   <<

__ _____ _ _____ ____

OWL $ FLY-ROUND STARTLE £ LOOK BOY DOG

_____

RUN BEE-SWARM   FOLLOW // WHAT SHRUG

'...so over there the dog is walking and there is a hive and bees are coming out; the mouse, the man , I mean the boy, is looking into the hole on the tree; yes looking into the hole; an owl comes flying out which scares the boy; the dog runs past; the bees are following him; and the boy shrugs "Oh, never mind"...'

The overlap between two SRS's in line 3 of (23) is shown in the schematized transcription in Figure 9.

Figure 9: Child aged 7;8 use of sign space

In Figure 9, we see the linked use of sign spaces. For example the final part of the event is where the boy is re-introduced through the SRS (WHAT SHRUG) this ellipsis inherits its information from the fourth previous sign space (BOY LOOK).

This example shows that although the children in this group are still in general narrating by describing a sequence of events and still not encoding the complex simultaneity of the two parts of the event, they are beginning to use linked referential spaces. In example (24) from an older child (10;4), we see how the passage of activities moves between the two referents without the need for nominal reference each time. Instead the child allows locations in sign space to serve a referential function. The perspective moves between the SRS and the FRS.

(24)   ><   -   >> -

_____ _____ _____ _____
LOOK-ROUND++ // BEE-PL++ DOG // BOY WALK

vv   -   θθ ^^   >< θθ
_____ ___ ___ _____ ___ ___
SEE CALL HOLE CALL £ BITE-NOSE HURT // DOG PUSH FALL

>> V>   ><   V>   ^^
____ _____ _____ _____ ___
LOOK LOOK-DOWN BEE HIVE BEE LOOK-DOWN BEE PUSH

-        ^^   ><   θθ
_____ _____ _____ ___
IGNORE // ROCK DEER // CL-STAND-ON-ROCK LOOK-ROUND //
                        X
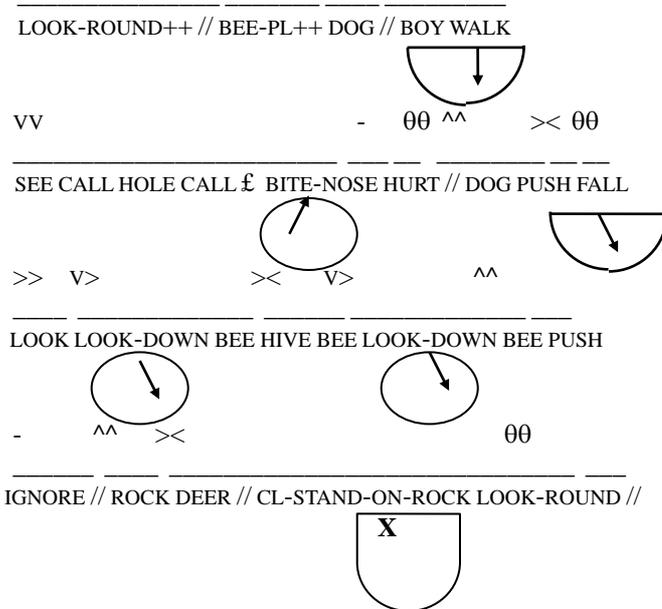
'...(he is) looking all over the place. The dog sees lots of bees. The boy is walking
along and he sees a hole he calls down in the hole and is bitten on the nose
painfully. The dog is pushing away and it falls down he sees the bee hive and
the bees (he is) looking down at them pushing at the tree. Then there is a rock
and a deer. (He is) standing on the rock looking around...'

In this group as a whole the progression between sign spaces is signaled by many
more looks to the conversation partner and narrator information than in the younger
age group. However compared with adult signers, switches between characters are
made without explicit shared eyegaze. As an example of this minimal use of
information to signal shifts, in the last part (lines 3-4) of (23), the child switches
between three characters (the owl then the boy and finally the dog) and between two
uses of the SRS (for the owl and the boy) and the FRS (for the bees), however the
whole utterance is described with the signer looking to the right side of sign space
(<<).

To summarize, the 7-10 year olds use a sequential rather than an overlapping
temporal frame. Sequential ordering of events has been argued to appear earlier than
simultaneous encoding in spoken language research (Costerman & Bestgen 1991;

Weist et al 1997). Children of this age acquiring spoken languages adopt a preference for using a thematic subject strategy (Aksu-Koç 1994; Berman & Slobin 1994; Karmiloff-Smith 1980; Slobin 1984).

In terms of narrative organization there were several indications that the signing children in this group were using a local or thematic subject strategy. In (23) the narrator searches for a character to tie to a thematic subject position in the discourse. This causes her to pause and make reference to a mouse, a man and finally the boy before continuing. Bamberg (1987) argues that these types of self-corrections in reference at this age are evidence for the child's overly rigid adherence to one discourse strategy despite the need to manage the surrounding discourse information. At this age the children are beginning to encode simultaneity but are still working on the co-control of global and local discourse constraints.

*7.3 Group 3 (11-13 yrs)*

In the narratives of the oldest children the two parts of the simultaneously occurring event are clearly set up at the start of their description and maintained across the discourse with pointing and looks towards different sign spaces. This means that the two different events could be linked temporally with each other. This is shown in example (25) from a child aged 11;10.

(25)

```
          >>                     (hands----------------------------) ><
     _____ _____  _____
          THERE   BOY  LOOK SEE TREE CL-HIVE-HANG-ON-BRANCH BEE-PL
```

```
          >>              --          <^  (hands----------) --
     _____ _____ _____ __ _____ _____
     HANG £SEE  THERE // BOY WALK SEE TREE HOLE-ON-TREE HOLE
```

```
                                              ><     --
     _____  _____ _____
     HOLE THERE BOY THINK THERE INSIDE FROG // GOOD CLIMB-UP
```

```
     VV         ^^      ><                      VV
     _____ _____ _____ ____
     LOOK-IN SHOCK  CL-FALL    HOLE OWL FLAP THERE FLAP //
```

```
     ><                 (hands-------------------) --
     _____ _____ _____
     LATER DOG LATER WHERE HIVE-FALL-OFF-BRANCH BEE-PL
```

```
     ><    >>   ><   >>   ><   >>  (hands---------------------
     _____ _____ ____ ____ ___ _____ ____ _____
     ANGRY THERE DOG FRIGHT DOG-RUN BEE-PL CL-COLLIDE-WITH
```

```
     -------) θθ                  --
     ____ _____ _____
     STING // BOY JUMP-OFF BOY WALK BOY WHERE CALL MY DOG
```

```
     <<        ><
     _____ _____
     COME-HERE WHERE FROG //
```
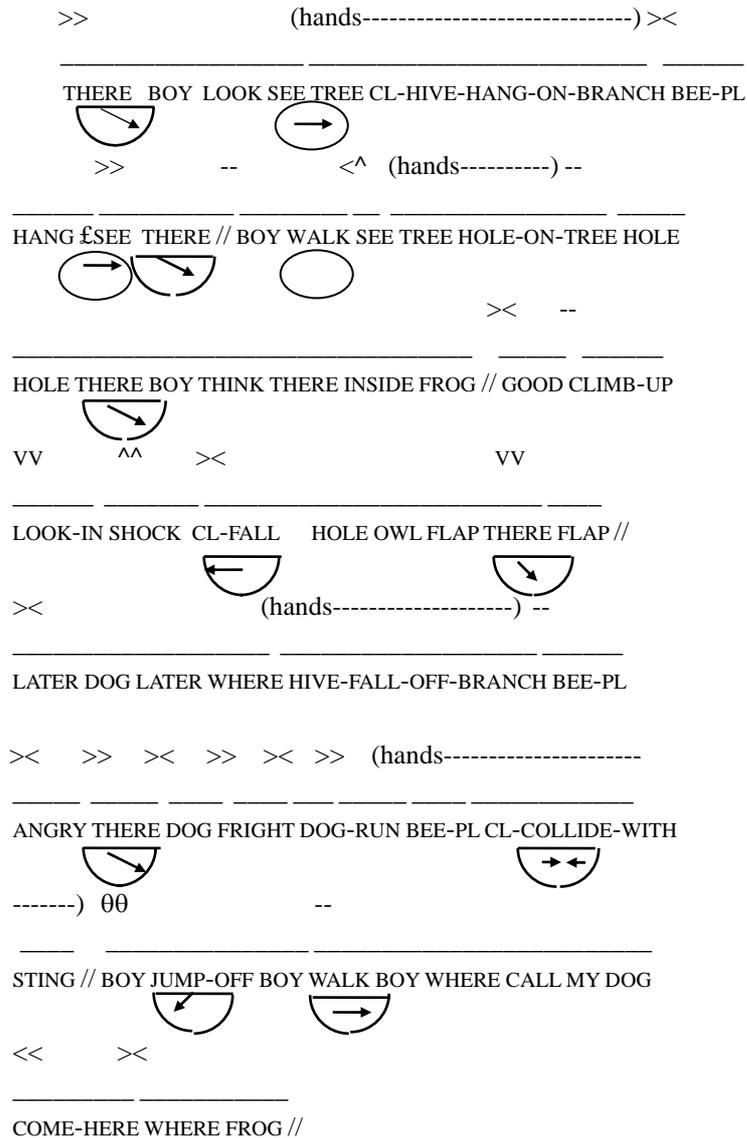
'Over here the boy is looking over at a tree, on the tree, a beehive is hanging from one of the branches, swinging back and forward, with lots of bees there, he sees it over there. The boy walks along and sees a big hole in a tree, the hole is on the side of the tree up in the air, the boy thinks that the frog might be inside the hole. Well, he climbs up and is looking into the hole; all of a sudden he falls back from the tree; in the hole there is an owl flapping away. The dog later on is over by the hive which has fallen from the branch on the tree and the bees are angrily

coming out of the hive; the dog runs right through there, being chased by the swarm of bees who are colliding with him and stinging him. The boy jumps down and carries on walking, calling "where is my dog"? He sees the dog "come on over here, where's the frog then"?'

The demands of clarifying which of the two parts of the event are linked to which sign space is seen in this child's repeated pronominal and locative referencing. This child also uses the repetition of the fall as a way to overlap the two parts of the event. In the final (line 8) of (25) this child resolved the problem of how to re-unite the two main characters of the narrative for the next section through an ingenious use of reported speech: '…sees the dog "come on over here where's the frog then"?'. An example from another child in this group illustrates how reported speech functions as a covert marker of simultaneity.

$$\rangle\langle \qquad\qquad \rangle\langle$$
(26) DOG LOOK-UP HIT MOVE WASP ANGRY WASP-FLY SEE BOY TERRIBLE

'…the dog starts to hit and move the wasps, some wasps fly out angrily, the boy sees this and is shocked "that's terrible".'

The strategy of repeating the fall of the boy on either sides of the dog's chase by the bees encodes the simultaneity of the two subparts the event. This is shown in schematic form in Figure 10.

THERE

BOY LOOK

TREE
x

SEE

THERE

BOY WALK

THERE BOY THINK

(BOY) FALL

OWL FLAP

THERE

DOG

THERE

DOG

(DOG & BEES) COLLIDE

BOY JUMP-OFF

BOY

BOY WHERE CALL MY DOG

(BOY)   (DOG)

><BEE-PL HANG

><GOOD CLIMB-UP

><CL-FALL

><LATER DOG LATER

><HIVE FALL-OFF-BRANCH

><BEE-PL ANGRY

>< DOG

><DOG RUN

><WHERE FROG
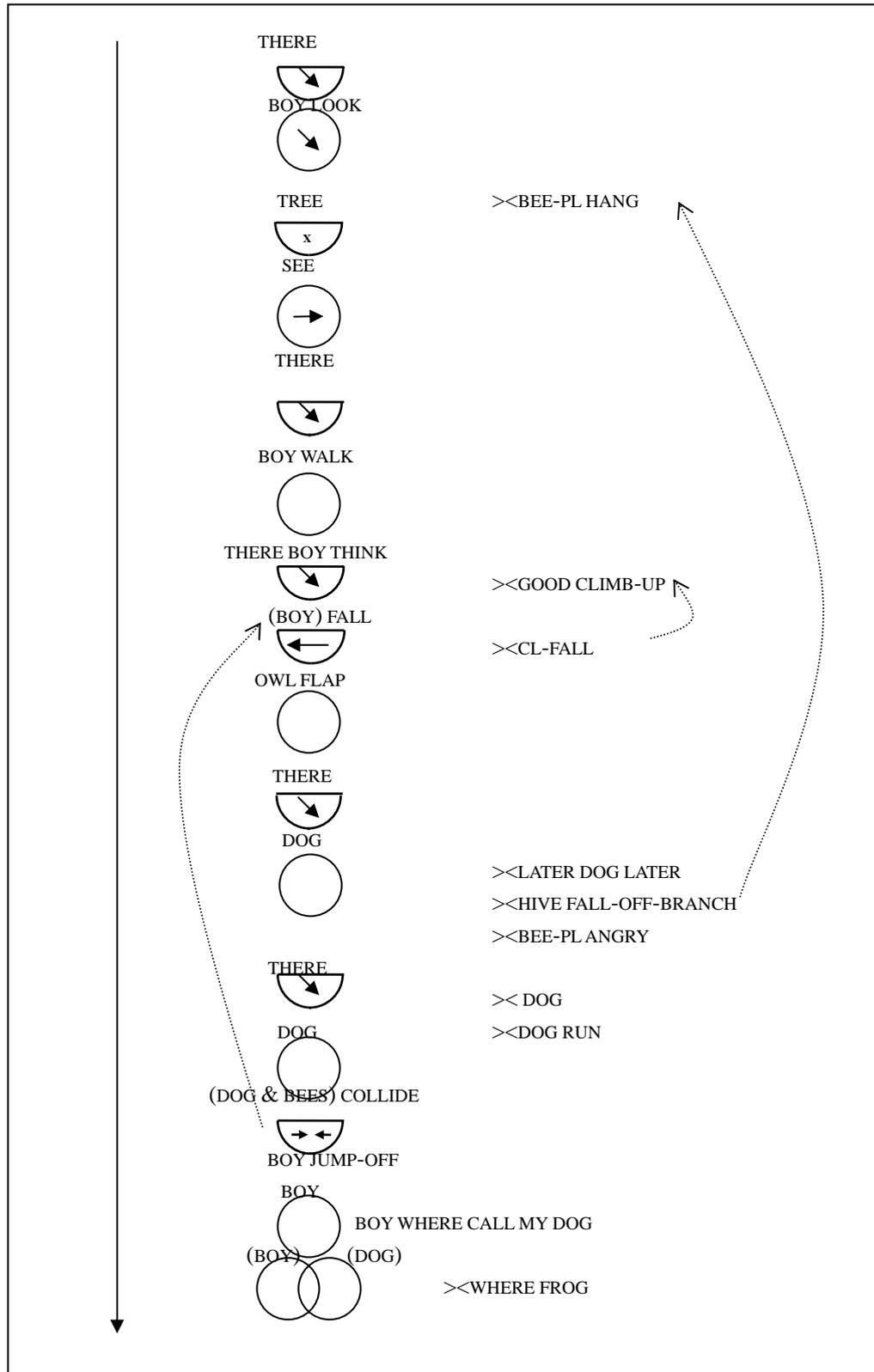
Figure 10: Child aged 11;10 use of sign space

In the final example from a child aged 13;4, we see how the simultaneous movement of the running dog and the falling boy are shown through several overlapped FRS and SRS combinations. The utterance begins with the sign DOG and a classifier predicate showing the direction of the dog as it runs, the signer then indicates that the dog sees the boy falling as he runs past. The FRS is now reused to show the fall of the boy and finally his reaction to the fall is recounted from the SRS.

(27)   DOG RUN+ PASS CL-RUN SEE   BOY CL-FALL

PAIN HURT-BUM NOTHING £ SHOUT
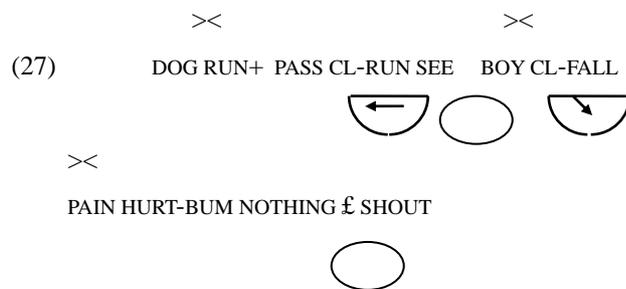
'…suddenly the dog flies past and sees the boy falling from the tree onto the ground "ouch that was painful on the bottom", he is shouting...'

The oldest children encode several types of simultaneity through spatial means. They use different combinations of sign space to overlap the event. This level of cohesion at the event or plot time frame is achieved while they are continuing to plan and stage the next sequence of events in the overall narrative passage. The conceptual difficulty in handling these different levels of narrative is therefore mastered at an age (after 11 years) previously described for several spoken language studies (e.g. Wigglesworth 1997). This oldest group used more narrative comments accompanied by shared eyegaze with the addressee than the younger children in both groups 1 and 2 (see several examples in utterances 25 –27). These eyegaze markers function to organize the information flow of the narrative by segmenting up the series of descriptions (Bahan & Supalla 1995; Gee & Kegl 1983). Mastery of the several functions of eyegaze is therefore an important indicator of a child's growing narrative skill. Only in this group was there a clear use of anaphoric reference across the narrative indicating that the children were in the final stage of the development of simultaneity marking proposed by Bamberg (1987).

9 Conclusions.

This was a preliminary study of the construction of narrative in a group of different aged children growing up using BSL. Clear developmental trends were observed across the three age groups. Despite the modality difference between sign and spoken language, the youngest children in this study produced very similar narratives in respect to their encoding of simultaneity marking as reported for same-age children acquiring English

These findings are in accordance with general trends identified in the work on spoken language narrative development and the use of simultaneity markers (Aksu-Koç 1994, Berman & Slobin 1994, Hickmann 1994) and add to the growing cross-linguistic data in this area. The modality in which signed language narrative is produced affords no developmental advantage related to the mapping of temporal concepts onto grammatically organized sign space. The development of narrative abilities in combining the co-occurring events is constrained by the semantic complexity of the concepts to be encoded (Silva 1991).

More work is required on different aspects of adult discourse and how signers map different temporal concepts onto sign space. More developmental data from larger numbers of children is extremely important before more conclusive conclusions can be made. Further work will develop a typology of temporal devices available in BSL, comparable to the set of adverbials and conjunctions in English. For example, do signers distinguish between different types of simultaneity in their setting out of sign space as English speakers do when they choose to use 'when', 'while' and 'as' to encode subtle changes in meaning?

The complex simultaneity inherent in the scenes depicted in the bee and owl event is a late development in children's signing. For the children in this study, these devices begin to appear from 11 years onwards. Before this, the patterns of reference organization are very similar to those described in the literature for their hearing peers. Although only a longitudinal study would reveal true developmental trends, the comparison across the age groups proves fruitful. Children begin with a preference for describing one of the two parts of the event. When two simultaneously occurring pieces of the scene are described, older children use a sequential ordering and adopt a thematic subject perspective. The anaphoric use of sign space appears in the oldest children but without clear signaling of the functions of each successive sign space. This suggests that in narrative development, young children are attempting to solve

the same underlying problem. The task for the child despite the modality differences is the mapping of the concept of simultaneity onto the available linguistic devices in the ambient language.

Signing children are developing a language that marks temporal distinctions through devices articulated in sign space. But the demands on the children appear to be those of organizing a linguistic system rather than one based on grounded deictic space and gesture. The mapping of complex concepts of overlapping time onto sign space is part of a protracted development.

Although sign gives no advantage in the acquisition of temporal concepts, there are interesting crosslinguistic differences. We observe many examples of young BSL signers attempting to use perceptual verbs, such as SEE and LOOK to encode the temporal overlap of the bee and owl event. This covert strategy is described as a late development in spoken language narrative and one triggered by literacy (Bamberg 1987). In the BSL data it appears as an option even in the 4-6 year olds. This highlights the need to consider data from different languages before accepting what is 'late' in discourse development. Across different languages, children focus earlier on the language-specific preferences for linguistic encoding of events in their target language (Berman & Slobin 1994).

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Appendix 1

Coding and transcription conventions

Gloss

Signs are represented by upper-case English glosses. Repetition of signs is marked by
'+'. Above the glosses, eyegaze markers such as blinks (∅∅), direction (left/right
or neutral space) and gaze towards the addressee (><) are indicated by a vertical
line across the affected segment. Shifts to the SRS are shown with the symbol £
in the sign gloss.

Sign-space

1. Semicircles represent the signer's use of the Fixed Referential Space (FRS), with
the flat edge nearest to the signer's perspective. The locative feature of a
classifier predicate is shown by the symbol 'X' placed in the semicircle.

2. A full circle represents the Shifted Referential Space (SRS). Arrows indicate the
direction of the determiner, pronoun or agreement verb's movement in both the
FRS and the SRS.

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[1] Signed sentences that appear in the text follow standard notation conventions. Signs are represented by upper-case English glosses. Repetition of signs is marked by '+'. Above the glosses, eyegaze markers such as blinks (∅∅), direction (left/right or neutral space) and gaze towards the addressee (><) are indicated by a vertical line across the affected segment. Semicircles represent the FRS with the flat edge nearest to the signer's perspective. The locative feature of a classifier predicate is shown by an 'X' in the Semicircle. A full circle represents the Shifted Referential Space (SRS). Arrows indicate the direction of the determiner, pronoun or agreement verb's movement in both the FRS and the SRS.

[2] There are no male or female marked pronominal points in BSL, we transcribe PRO as 'he' because the antecedent was male. In example (7) the previous antecedents were male and female.

[3] The saliency of the marker is tied to the amount of previous knowledge the conversation partner has for character identification.

[4] I have seen many BSL signers use lexical markers to encode simultaneity; especially SAME or SAME-TIME (see examples 10 and 16). It has been suggested to me by Frances Elton and June Smith, both Deaf and BSL native signers, that lexical temporal connectives and adverbials are unnecessary in BSL. Simultaneity can be marked exclusively through spatial devices. From this ongoing discussion, examples (11) to (15) have emerged. All these examples are available. Please contact the author.

[5] In (14) the sequence that the elements are articulated is shown by an arrow from left to right. In longer transcriptions, the order the events occur through the narrative will be shown by an arrow moving down the page through layers of glossed signs. Although the plot may take characters back and forward through mentions of 'earlier' or 'later', the overarching narrative time progresses from the beginning of the narrative to the end.

[6] In Fridman-Mintz & Liddell (1996), the linking of different areas of sign space across discourse was shown by arrows. I have borrowed this convention in the transcriptions here.

[7] At the time these data were collected, there was no standardized BSL assessment battery (see Herman 2002). Deaf teachers carried out all language assessment through informal measures.