What a Deaf Child Needs to See: Advantages of a Natural Sign Language over a Sign System

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How and why did Siegmund Prillwitz succeed in getting DGS [German Sign Language] recognized without extensive traveling from congress to congress, like so many colleagues in our field? This question intrigued me (N.H.) in the years after our first meeting in 1984 in Hamburg, when I didn’t see him in the following series of sign language conferences in Europe and the United States. Indeed, he was among the first sign language researchers in northwestern Europe—open, eager, and enthusiastic to discover the structure of DGS and promote the acceptance of “his” sign language in his orally-oriented country. In 2001, visiting the Institut für Deutsche Gebärdensprache, I finally settled on the answer to my question. Siegmund didn’t have to travel: His talent was to send people out from Hamburg and to attract people to Hamburg to discuss work and ideas about many sign languages. He succeeded in this with the support of his ostfriesische Gastfreundlichkeit: Kaffee, Kuchen, Gemütlichkeit. By doing so, he kept every visitor caught by his sense of Deaf art, history, and culture—broadening the visitor’s vision. Indeed, Siegmund doesn’t have to travel extensively. He sends his ideas out as exports, just as the Port of Hamburg distributes valuable products across the world.

Sign Languages and Sign Systems

Deaf children need to see meaningful communication. That much goes without saying. And in our post-oralist world, this means that deaf children have to see handshapes and bodies moving in space, along with mobile eyes and faces. Furthermore, because the vast majority of deaf children are born to hearing parents who do not know how to communicate effectively without their voices, it is the responsibility of society to quickly prepare those parents in some form of visual/manual communication. This responsibility was accepted by the Royal Institute for the Deaf “H. D. Guyot,” in the northern part of the Netherlands, about twenty years ago. However, in the first years it seemed that hearing parents could best be helped by use of a bimodal communication system—that is, by learning to use some meaningful signs while speaking out loud to their children. The Institute made use of elements of the Sign Language of the Netherlands (SLN), accompanied by spoken Dutch. The result was a hybrid that was not quite a language: Sign-Supported Dutch (SSD).

1 Similar hybrids have been created in other countries, and some are still in use. These are, at best, sign systems, but not sign languages. (For discussion, see, e.g., Schick & Moeller, 1992; Supalla, 1991; Wilbur, 1979.)

1 We will use the English acronyms SLN and SSD, corresponding to NGT (Nederlands Gebarentaal) and NmG (Nederlands ondersteund met Gebaren).
The essence of a sign system is that messages are formulated and transmitted according to the lexicon, morphology, and syntax of a spoken language. The communicator actually speaks out loud—using Dutch in the case of SSD—and attempts to simultaneously sign manual lexical elements that can be accommodated to the rhythm and structure of the spoken language. Some extreme versions of sign systems used in the United States, make use of specially created manual indications of bound morphemes and function words. SSD does not go this far, however, although it does make use of some signs for Dutch prepositions and verb particles. In any event, by accepting Dutch as the organizing principle, the hands cannot present a natural sign language, nor can the face play its role as part of the grammatical system.

By 1995, the Guyot Institute abandoned SSD as a primary means of communication for deaf children and their parents. SSD was not succeeding as a primary language for parent-child communication beyond a rather basic level, and it had proven to be difficult for teachers and service personnel to use. Furthermore, Deaf staff workers found the system unmanageable for advanced communication. It is the aim of our contribution to show—on the basis of psycholinguistic research—that it was a wise decision to replace SSD by SLN. Deaf children need to see meaningful communication in a natural language in order to successfully acquire a first language, and hearing parents need such a language in order to successfully communicate with their deaf children. And, in the schools, hearing and Deaf teachers need a natural sign language in order to meet their pedagogical goals.

The research is based on video recordings made by the first author over the course of twelve years (1988-2000), spanning the SSD and SLN eras at the Institute. Children were recorded regularly in their homes and in the Institute’s nursery school, starting with early observations before the second year of life and continuing until age 3. The sample includes 26 children with hearing parents, 13 learning SSD and 13 learning SLN; there is a comparison sample of 4 children with Deaf parents, learning SLN as a fully natural language. (See Table 1.)

<table>
<thead>
<tr>
<th>Language</th>
<th>Parents</th>
<th>Age Range</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLN</td>
<td>Deaf</td>
<td>1;3–3;0</td>
<td>4</td>
</tr>
<tr>
<td>SLN</td>
<td>Hearing</td>
<td>1;4–3;0</td>
<td>13</td>
</tr>
<tr>
<td>SSD</td>
<td>Hearing</td>
<td>1;5–3;0</td>
<td>13</td>
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</tbody>
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The Role of the Parent: Child-Directed Communication

In all situations of language acquisition, the parent serves as a model for communication and provides the child with access to the language. Parents and other speakers are the source of word meanings and grammatical constructions. Through the use of such discourse patterns as question-answer sequences, planning, narrative, and so forth, children are socialized in the linguistic and communicative practices of the community. There is a large body of research on child-directed speech, across a number of languages, showing that parents naturally make various adjustments in communicating with infants and toddlers (see Snow 1995). For example, child-directed speech has special intonation contours, simplification of vocabulary and syntax, and much repetition. As the child shows abilities to join in interaction, parents gradually increase the level of complexity of their own messages, allowing the child to grow as a communicative partner.

Studies of Deaf parents show similar patterns of child-directed signing (Holzrichter 2000, Masataka 2000). Parents are careful to sign within the child’s field of vision, using
signs that are larger or slower than usual, close to the child—often even on the child’s body. They are adept at gaining and maintaining the child’s visual attention. And early sign input, like early speech input, is characterized by short, simple utterances with much repetition.

An important aspect of child-directed communication—whether in speech or sign—is variation. It is natural, when attempting to secure the child’s comprehension, not only to repeat, but to repeat with slight changes of vocabulary or word order. This is not a conscious process, but it is almost unavoidable when the child doesn’t fully comprehend or comply. Previous research suggests that systematic variation in child-directed speech can provide the child with valuable information about the lexical and grammatical structures of the language (Küntay & Slobin 1996, in press; Naigles 1996; Naigles & Hoff-Ginsberg 1995). As we will show, hearing parents who are learning SLN are able—remarkably quickly—to provide their deaf children with meaningful patterns of child-directed signing and variation, while parents trained in SSD, by comparison, are quite limited. This is not the fault of the parents or of the training procedures. The pre-1995 SSD classes were serious attempts to teach hearing parents and teachers how to communicate with deaf children, and the adult pupils were devoted learners. Apparently there is something in the nature of a sign system that is not conducive to the long-term growth of successful communication.

Variation in Child-Directed Signing

What can a parent do if a child does not immediately respond to a parental question, request, or imperative? There are several possibilities, from simple to more complex. We will give brief examples of each, drawing from our data. (For more details on “variation sets” in child-directed communication, see Küntay & Slobin, 1996.)

**Repetition without Variation**

The least demanding strategy is to simply repeat what one has said, using the same items, in the same order. From a developmental point of view, this seems to be the first technique used by parents—but it is soon followed by more elaborate forms in the course of the child’s linguistic and cognitive growth. It is, however, this type of simple variation that we typically find in the child-directed signing of the hearing parents who have been taught SSD. Repetition without variation remains a dominant strategy for these parents throughout the age range under study. The following is an example of a hearing mother signing to a child of age 2;11. She wants the child to gather up the toys that have been scattered about, and is limited in her verb lexicon.²

(1) \begin{align*}
\text{HELP CLEAN-UP.} \\
\text{YOU HELP CLEAN-UP.} \\
\text{CLEAN-UP.}
\end{align*}

Simple repetition of this sort may sometimes succeed in drawing the child’s attention to the desired behavior, and to some relevant lexical items—but it does not open possibilities for dialog or for further exploration of linguistic possibilities.

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² Signs are transcribed in capital letters. Although this level of transcription is sufficient for the present purposes, in our developmental psycholinguistic research we have found it necessary to transcribe signs (manual and nonmanual) at the level of meaning components, using the Berkeley Transcription System (BTS). For information on BTS see (Hoiting & Slobin 2002, Slobin et al. 2000).
Repetition with Variation

More sophisticated repetitions require that the parent have a degree of flexible control of lexical and grammatical options. This comes as the child shows increasing capacity to act as a conversational partner. At this level of child-directed communication, the parent holds the general content of the message constant, but tries out different versions—different “variations on a theme.” Child-directed signing in SLN, like child-directed speech in a range of languages, shows several types of variation (REFERENCES). The parent can:

- change grammatical marking;
- change lexical items;
- change word order;
- add and delete lexical items.

The following is an example of repetition with variation in the SLN signing of a mother to a child of 2:x. The mother has only been learning SLN for x months, but is already capable of this level of variation. She is trying to interest the child in reading a book. She varies the verb: READ, LOOK-AT; and she elaborates the descriptions of a book to be read: FARM (≡a book about a farm), NEW BOOK.

(2) BOOK READ?
BOOK READ?
FARM?
BOOK LOOK-AT?
NEW BOOK?
LOOK-AT?

We suggest that the mother feels free to explore the possibilities of variation because she is not tied to finding signed equivalents for Dutch words and sentences, and because her training—even at this beginning level—has provided her with an appropriate SLN lexicon and basic sign order rules.

Repetition with Variation and Elaboration

When the child begins to respond—becoming an interactive partner with the parent—the parent is encouraged to elaborate and vary the message further. This is, of course, due to the child’s increasing indications of linguistic and cognitive competence. We present the following example, from a Deaf father to a child of 2:9, in order to show the high degree of variation that is available in normal SLN communication. In this situation, the child and the father are seated on a couch, and a visiting, hearing adult is on a nearby chair. There is a play kitchen at some distance, and the father and visitor try to engage the child in going to the kitchen and bringing them something to drink. What is especially interesting in this “variation set” is the father’s fine-tuning of the object that he wants the child to get from the kitchen: COFFEE, COFFEE-POT, GREEN, GREEN COFFEE-POT. He also opens up possibilities for inference, going from I WANT COFFEE to TAKE-TO-ME COFFEE. In the process, there is variation in word order and considerable use of deixis, both as individual points and as incorporated in the verb TAKE.

(3) I WANT COFFEE POINT_{to-kitchen} WANT.
(Visitor: YOU. I WANT TEA WANT YUMMY.)
TAKE-TO-ME TEA POINT_{to-kitchen}.
COFFEE TAKE-TO-ME POINT_{to-kitchen}.
COFFEE POINT_{to-kitchen}.
GREEN TAKE-TO-ME GREEN COFFEE-POT POINT_{to-kitchen}.
At some point, the child joins into the parent’s repetitions and variations, and dialog starts to emerge. Little interactive dialogs are already possible with minimal SLN, as shown in the following example of a hearing mother and her daughter of age 2;4. The mother has only been learning SLN for eight months, but can respond to her child’s initiative with a short “variation set” that engages the child. Indeed, the child herself ends the discussion with a little elaboration of her own. The topic is a candle-holder that has five arms, some with candles, and some empty. The child begins, and the mother carries on:

(4)  Child:  POINT at-empty-holder GONE.
Mother:  POINT GONE POINT TOO-BAD.
             EXTINGUISH EXTINGUISH POINT TOO-BAD.
Child:  GONE.
            POINT at-a-candle-
            POINT at-empty-holder-
            POINT at-a-candle-
Mother:  ONE GONE, YES.
Child:  POINT at-empty-holder-
Mother:  POINT at-empty-holder SAME.
Child:  POINT at-other-empty-holder GONE.
Mother:  SAME GONE.
            SAME GONE.
Child:  POINT at-first-empty-holder-
Mother:  SAME GONE.
Child:  POINT at-second-empty-holder-
Mother:  YES.
Child:  YES.
Mother:  GONE.
Child:  POINT at-base-of-candle-holder-
            DON’T KNOW.
            BROKEN?
            POINT at-base-of-candle-holder-

Constraints of Co-speech Signing

We do not find these sorts of variations, elaborations, and emergent dialogs in our SSD-trained families from before 1995. It seems that a hearing parent, formulating utterances out loud in Dutch, is not open to the flexibility of reordering signs that we find in SLN. Rather, utterance production is paced by the timing and rhythm of Dutch, producing sign sequences that are often difficult for the child to interpret. Consider the following example, produced by an experienced SSD-using mother. She has been using SSD for three years, and is addressing her second deaf child—a boy of age 2;11. They are looking at a picture book together and the child wants to make a drawing. Let us first consider just her signing, since this is, after all, the only input that the deaf child actually receives in this situation:

(5)(a)  KNOW?
            POINT at-child-
            POINT at-child-and-self-
            HOUSE.
            DRAW.
            POINT far-off-

The message is not very clear. It seems to mean something like: ‘Do you know? You, you and I, draw a house, somewhere over there in the distance.’ But now let us line up the signing with the speaking. The mother probably can’t help but believe that the child can also process
what she is saying. Putting the two parallel messages together, we can determine that she was trying to suggest that the child draw a house like the one that they had drawn earlier: ‘Do you remember that we drew a house together?’ (Weet je nog... toen wij samen een huis getekend hebben? ‘Do you still know... when we together a house have drawn?’) The Dutch words in the second column were produced at the same time as the signs in the first column.

(5)(b) KNOW? weet je nog (=do you still know) 
POINT at-child- teen (=when) 
POINT at-child-and-self- wij (=we) 
HOUSE. samen (=together) 
DRAW. een huis (=a house) 
POINT far-off getekend (=drew) 
hebben (=have)

A corresponding SLN version of the mother’s communicative intent might be: KNOW? EARLIER. POINT two-fingers-between-self-and-child HOUSE DRAW. KNOW? It is evident, from this one example, that Dutch and SLN belong to two quite different language types, with different systems of word order and morphology. This mother—as experienced as she was in simultaneous speech and sign—was compelled to use some sign to accompany the final Dutch auxiliary, hebben ‘have’, but all she did was point vaguely behind her. The child did not respond to her message, and a dialog did not ensue. Instead, the mother began to draw.

Our SLN videotapes are quite different. What does SLN input provide that SSD input does not? SLN input gives the child experience with:

- signs in many different contexts
- lexical choices
- appropriate verb forms, with multiple components
- models for sentence construction
- models for speech acts (questions, requests, demands, plans, etc.)
- principles of visual discourse

In brief, SLN input provides the tools for building a natural language in the manual/visual modality.

Our conclusion, after having examined hours of SSD videotapes, is that Sign-Supported Dutch does not work sufficiently if the child does not know Dutch. Systems like SSD can be useful between Deaf and hearing adults who are bilingual in SLN and Dutch, and for those hard-of-hearing children who have some access to the spoken language. And such systems can be useful for pedagogical purposes of contrastive linguistics, once students have some command of SLN. But they do not function successfully as a first language for deaf children or as a second language for their hearing parents. To conclude, we present some preliminary data to support these claims.

Children Learning SLN and SSD: Some Comparative Data

The research is still in progress. Here we present a preliminary analysis of a subsample of five children learning SLN and five learning SSD, all from hearing parents, and all in the age range of 2–3. The data come from BTS transcriptions of the children’s signing in natural interaction with their parents at home. The children all have normal intelligence; for each group we have used 180 minutes of videotape.
Utterance Length

To begin with, consider simple utterance length. Figure 1 presents the percentage of utterances, across the two samples, that have two or more signs. The figure shows that the majority of longer utterances (67%) are produced by children learning SLN.

The contrast between the two groups is even stronger when we consider utterances with three or more signs, as shown in Figure 2. The figure shows the numbers of utterances with 3, 4, and 4+ signs. For each of these utterance lengths, the SLN children produce a greater number of signs. We also see a sharp decline in utterance length for the SSD group, but not for the SLN group (compare the columns for 4 signs and 4+ signs for the two groups). In brief, with increasing utterance length the SSD children fall farther and farther behind the SLN children.

In addition to these quantitative differences between the two groups, there are also qualitative differences. The SSD children use fewer questions, and show less variety in sentence type overall. Such lack of variety in sentence types, of course, provides limited data for discovering rules of word order and ellipsis in the language.
Morphological Complexity

Finally consider children’s use of verbs that allow for variation of handshape and directionality—that is, signs that have internal complexity. Figure 3 shows that all of the five SLN-learning children (100%) made use of complex verbs, but only two of the five SSD-learning children (40%) did so. Clearly, SSD input does not provide sufficient models of the substitutable components of sign language verbs.

The pattern is even more striking if we group together all of the complex verbs used by these seven children, as shown in Figure 4. The SSD children make up 29% of this group, but they produced only 10% of the complex verbs in our transcripts. That is, 90% of the complex verbs were produced by the five SLN children. It is apparent that SSD has limiting consequences at the level of the word, as well as at the level of the sentence.

Figure 3.
Percentage of Children using Complex Verbs

<table>
<thead>
<tr>
<th>SLN</th>
<th>SSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Figure 4.
Percentage of Complex Verbs per Group

- SLN: 90%
- SSD: 10%
Discussion

As these preliminary data suggest, children receiving primary input in SSD—by the age of 3—produce shorter and less complex utterances than children exposed to SLN. We propose that the explanation lies in the collection of burdens imposed on parents who use SSD.

The most basic issue, of course, is that the grammar of SSD is based on Dutch, rather than on principles of sign language organization. This means that verbs exist only in citation forms, and movement in space cannot be used for agreement. Furthermore, the face is not used, thus depriving SSD of the necessary simultaneous use of operators on the face and lexical items on the hands. Therefore, the hands must deal with all grammatical issues, rather than the division of labor between hands and face that exists in natural sign languages.

Another consequence of reliance on Dutch syntax is that users of SSD don’t have recourse to the natural reordering of signs for functions such as foregrounding, topicalization, emphasis, and so forth. And, in general, it is difficult to coordinate speaking and signing. This combination of factors prevents most SSD-using parents from feeling confident with the system, because they are not provided with sufficient means for creating an automatized and flexible means of communication. Thus their children receive a limited and often noncoherent sign input. The burden imposed on the parents becomes a burden imposed on the child, as reflected in our findings.

One might wonder why we have raised this issues in the 2000s, after having abandoned SSD in the 1990s. The answer is that sign systems have again attracted attention, as a possible form of input for deaf children with cochlear implants. We would argue that these children have to acquire a natural language as a first language—and the only accessible language, in the early years, is a natural sign language. And, because the parents must communicate with these children, the parents must also be trained in a sign language that they can effectively master and use with their children. Therefore we are continuing with our research in comparing SSD and SLN in the 1990s, with the hope of easing the way for deaf children and their parents in this decade. It is now the policy of the school of the Guyot Institute that all parents should use SLN with their children, regardless of their hope for eventual success of cochlear implantation. Further research on SSD and SLN can provide linguistic and psycholinguistic grounding for issues of language learning and education.

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References


