Input and interaction in deaf families
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2 LANGUAGE IN DEAF FAMILIES

2.1 What is a deaf family?

In describing the languages used in a deaf family, we should first establish what we understand a deaf family to be. Lane (1984), Padden and Humphries (1988), Kyle (1990) and Lucas and Valli (1992) amongst others have studied the deaf communities in the USA and England. These authors suggested that not the degree of audiological deafness decides whether or not a person considers him/herself to be deaf, but the degree of identification with the deaf community. A distinction was found between audiological deafness and cultural deafness and they used the terms 'deaf' (audiological) and 'Deaf' (cultural) to describe the two concepts. One of the deciding characteristics of a deaf person appears to be his/her use of and competence in a sign language. In turn this is influenced by factors such as onset of deafness (pre- or post-lingual deafness), degree of deafness (e.g. ≥90 decibel (dB) hearing loss), having a relationship with another deaf person, identification with and participation in the deaf community, etc. Baker-Shenk (1983) describes the deaf community as an ethnic community.

In the Netherlands the estimated number of persons with a severe hearing impairment is ± 290.000 (see Méé r dan een gebaar 1997). The number of prelingually deaf persons at any one point is estimated to be between 4.000 (Breed and Swaans-Joha 1986) and 14.000 (Schermer 1990), depending on how narrow or broad a definition of prelingual is used. We will follow Schermer who used 'deaf from birth or before three years of age'. A part of the prelingually deaf population can be considered to belong to the deaf community, i.e. they use Sign Language of

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1 'Méé r dan een gebaar' is the final report of the Commission Sign Language of the Netherlands, which was instituted in 1996 by the State Secretary of Education and the State Secretary of Welfare to investigate the best way to recognize Sign Language of the Netherlands as an official language in the Netherlands. This is expected to be realized in 2002.
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In the Netherlands (SLN), they have a deaf partner and consider themselves to be active members of the deaf community. From 1980 onward the deaf community has been slowly organizing itself into a (heterogeneous) cultural minority. Only a few socio-linguistic studies of this process have been done and so unfortunately not much information is available on the Dutch situation (but see Breed and Swaans-Johaa 1986; Méérdan eengebaar 1997; Rodenburg 1986; Tervoort 1983; Voorhoeve 1989). For this reason it is not possible to make a clear distinction between deaf versus Deaf in the Dutch situation, and we will use the term deaf without it having further social or cultural implications.

The number of deaf children that have two deaf parents is estimated to be between 3 and 5% of all deaf children, and 10% have one deaf parent (Quigly and Paul 1984; Schermer 1990). Mallory, Zingle and Schein (1993) explain this low percentage.

[...] deaf parented families are not likely to be uniformly deaf, given the 90% rule; deaf children are born to hearing parents approximately 90% of the time; deaf adults marry deaf spouses 90% of the time; deaf couples tend to bear hearing children approximately 90% of the time. (Schein 1989, Schein and Delk 1974). (Mallory et al. 1993:73)

There are few families where both parents and children are deaf but they form the core of any deaf community. Despite their small number they pass on their language together with the cultural and social values to their own and the next generation in a natural environment.

As stated above, we know that approximately 90% of all deaf children have hearing parents. Hearing parents normally have no competence in sign language and generally know very little of deafness and all it entails for a young child, at the time when deafness is confirmed in their child. The socialization and enculturation processes into the deaf community of most deaf children of hearing parents starts therefore not at birth, but at a later age, usually between two or three, when the child begins to attend a school for the deaf. Here, often for the first time, the children come into contact with deaf children of deaf parents, other deaf children with hearing parents and deaf adults.

Most deaf parents have hearing children (Mallory et al. 1993). Padden (1980) discussed whether or not hearing children of deaf parents belong to the deaf community. If the family uses a sign language and the parents identify with the deaf community and are also identified as such by others, the hearing children may achieve native competence in their sign language, and will be able to distinguish 'hearing culture behavior' from 'deaf culture behavior' (Schermer 1990:9). Usually these hearing children are called CODA's (Children Of Deaf Adults).

According to Mallory et al. (1993) 10% of the deaf marry a hearing person. If this hearing person is a CODA, the family language most probably will be a sign

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2 See Crasborn, Coerts, van der Kooij, Baker and van der Hulst (1999) for an overview of research in SLN.
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language. Mixed deaf and hearing parentage of this nature would still mean that the children in such a family are raised in a deaf environment. However, if the hearing person is not a CODA, there is more chance that the family language will not be a sign language.

Based on the above we can now decide that a deaf family is a family where the deaf parents (or one deaf and one CODA parent) use sign language with their deaf and/or hearing children and where the children are in contact with 'deaf culture behavior'. On the basis of this definition we will exclude families with hearing parents and deaf children from our discussion of deaf families. Below we shall briefly describe the different combinations of hearing status in persons that are possible in a deaf family together with the various linguistic possibilities. There are two main combinations:

a) The parent(s) are deaf and the child is deaf (DPDC).
b) The parent(s) are deaf and the child is hearing (DPHC)

In families with one or two deaf parents the children are predominantly hearing. Only 5-10% of the children of deaf parents is also deaf. As we mentioned before, it is families such as these that may play an important role in the deaf community. The study of the interaction and the communication between deaf parents and their deaf children can teach us about linguistic, social and cultural values that prevail in the deaf community. More insight in the development of these second or third generation deaf children may help us to improve counseling guidelines for the majority of deaf children who have hearing parents.

In the next sections we will discuss the situations where the parents are deaf with either deaf or hearing children. This will be done separately since the language input can or will be different in each case.

2.2 Language input in deaf families

2.2.1 The problem of multilingual input

Deaf parents use different languages in different contexts. In the study by Mallory et al. (1993) on intergenerational communication modes in deaf-parented families, the interaction pattern between hearing grandparents, deaf parents and their hearing children (mean age 12;6) is described. Of 14 deaf parents 11 report using ASL with each other, but only 4 (29%) say that they use ASL with their hearing children. The other deaf parents do use some form of signing (Signed English (SE) mixed with ASL). The children themselves were described as using a 'generic' form of sign, which appeared to follow English word order and included much fingerspelling, lacked SE detail, and included little ASL redundancy." (1993:78). These children did not distinguish between ASL and SE. Only 4 out of 15 children used distinct linguistic modes, meaning that they used SE with fingerspelling or ASL and English. Mallory et al. (1993) concluded that "parents and children typically modified their usual language mode to effect dyadic communication." (1993:80).
For the Netherlands, Breed and Swaans-Joha (1986:117) described how many Dutch deaf adults use spoken language with hearing friends or relatives (73%), sign language with deaf friends or extended family (65%) and 41% use sign language at home, which included deaf or hearing partners and deaf or hearing children. 14% of the children of these deaf adults were deaf or hard of hearing (o.c.:114), but unfortunately it was not made explicit which language was used with the hearing or with the deaf children. The percentage of 41% sign language at home is higher than that found by Mallory et al. (1993) in the United States.

Most deaf persons are assumed to be bilinguals (Grosjean 1992). Dufour (1997) considers there to be three types of bilingualism associated with sign language:

a) sign-sign bilinguals: individuals who know a sign language as a first language and learn another sign language as a second language

b) speech-sign bilinguals: individuals who primarily use a spoken language and who learn a sign language sometime in their lifetime

c) sign-text bilinguals: deaf individuals who acquire a sign language as a first language and, because of their deafness, can only learn the written form of the spoken language of the community they live in.

The main distinction between the last two types of bilinguals lies in their access to the full aspects of the spoken language. According to Dufour speech-sign bilinguals have no constraints in acquiring language in either modality, whereas sign-text bilinguals have a limited access to the oral aspects of spoken languages (1997:306). However in his category of speech-sign bilinguals he disregards those deaf people who are raised orally, that is with a spoken language. This spoken language is then their first language, but because of their hearing impairment the ultimate level of that language may not be comparable to that of hearing native speakers. Category c), the sign-text bilinguals does not include those deaf people who do manage to acquire the spoken language to (near-) native level. Clearly the competence in the spoken and sign language of the parent is important in considering input as discussed earlier in section 1.4.1.

The two different modalities of sign and speech offer the possibility to sign and speak at the same time. Bernstein, Maxwell and Matthews (1985) and Maxwell, Bernstein and Mears (1990) found that such simultaneous sign and speech production usually follows the grammar of the spoken language, whereas the signing is incomplete and often abbreviated. Speech-sign bilinguals would often use this variety. However, sign-text bilinguals, whose first language is a sign language, are also reported to use a simultaneous mode where the sign grammar is used, and spoken words (usually produced without voice) are inserted in the utterances (Lucas and Valli 1992). The role of mouthed words is important in deciding the status of the languages in the input. They can be structurally part of the sign language, in which case the input will be monolingual although signed and spoken. They can be the result of interference or be used as loan words in which case the input is mixed and consists of two languages (see Boyes-Braem forthcoming; Ebbinghaus and Hessmann 1990; 1996; Schermer 1990). It could also be the case that the
combination of simultaneously produced signs and words together form a third system as defined by Romaine (1995) (see section 1.4.1). It is also possible that different versions of this simultaneous mode exist, comparable to newly developing mixed languages (see for instance Bakker 1992 on spoken languages). To what extent the subjects in the studies of Mallory et al. (1993) or Breed and Swaans-Joha (1986) were using the different structures of ASL and English and SLN and Dutch as separate languages or mixed is not known. The exact structure of the languages used was not described.

In her dissertation Schermer (1990) demonstrated that oral and spoken components play an important role in SLN, as in many sign languages investigated thus far (for instance Ebbinghaus (GSL) 1990; Pimiä (FSL) 1990. Coerts (1992) pursues this further for SLN. Schermer defines oral components as "lip/mouth movements, often together with head and face movements, that are not related to the spoken language, that are either optional or required as part of the sign" (1990:17). Spoken components were defined as "lip/mouth movements that refer to a lexical item from a spoken language" (1990:17).

She found that the majority of spoken components could be categorized as follows:
1) sign plus spoken component that represents part of a Dutch lexical item
2) sign plus spoken component that specifies, disambiguates or complements a sign; the spoken component can either represent a complete or a part of a Dutch lexical item
3) sign plus a spoken component that does not have one of the functions of 2) and that represents a complete Dutch lexical item

She describes language use in two situations: a structured situation, where deaf adults were asked to read a written story in Dutch, to memorize the content and to convey the story in their own 'words' to their deaf partners. The second, spontaneous situation consisted of free or spontaneous language between two informants (1990:74).

The deaf adults used signed and spoken components simultaneously in 79.8% of their language production in the structured situation and in the spontaneous situation in 74.4% (1990:77). She concludes that

[...] the structured language samples show a strong influence from the Dutch syntax which can be inferred from the word/sign order that is used, the continuous presence of spoken components; the absence of syntactic uses of the signing space [...] and the absence of [...] nonmanual signals such as the oral component. [1990:82]

The spontaneous language setting elicited a type of communication system that differs from the spoken Dutch and demonstrates features of the grammar of known sign languages such as topic comment word order and the use of syntactic signing space to express relationships between parts of a sentence. (Schermer 1990:87)
Spoken components can have several functions within sign interaction. They can be redundant (i.e. they add no lexical or morphological information). But they can also be used to disambiguate a sign, or to add to or specify the meaning of a sign. Or they can be used to indicate time and person of verbs. Schermer maintains that it is the type of spoken component that occurs that indicates the type of language that is used, rather than the frequency of occurrence of spoken components (see also section 6.3 and Chapter 9). Redundant spoken components in the signed language production would suggest more Dutch influence, and they would not be intrinsic to the sign language.

Ebbinghaus and Hessmann (1996) argue against a sign-centered perspective such as taken by Schermer and propose a comprehensive approach to the problem of dealing with spoken elements in sign languages. They say that spoken words (voiced or mouthed) "may be a natural ingredient of signed utterances even without contributing to their meanings in any obvious way" (1996:27). These would include words called 'redundant' by Schermer (1990) and others (e.g. Bergman 1984; Boyes-Braem 1984; Coerts 1992). Also there are other cases where words cannot be considered redundant, so they think it is more natural to assume that words are used because they are functional (Ebbinghaus and Hessmann 1996:41; Bos 1998). So the presence of spoken or mouthed words in signed utterances would not necessarily indicate that a third, mixed system is being used – the syntactic structure of the mixed utterance as a whole must be considered to gain insights into the functions of the signed and spoken parts. Redundancy of spoken words in a signed context in itself has proven to be no criterion on the basis of which one can establish whether only a sign language is used or a mixed mode.

In the Netherlands the linguistic input to deaf or hearing children has not yet been described. Some research has been done on the influence of SLN input or input of Sign Supported Dutch (SSD) immediately preceding the language production of deaf children (± age 8;0) in a school situation (Keppels and Jansma 1994).3

Until the 1980's sign language was not used in the schools for the deaf in the Netherlands. This means that many deaf people were raised with spoken Dutch as their first language. They sometimes did not learn to sign until after they left school and began to participate in the deaf community. Dufour would consider these deaf people to be speech-sign bilinguals, but their grasp of and fluency in the spoken language would not be native-like. Some Dutch deaf people who have deaf parents can be considered sign-text bilinguals with varying degrees of fluency of speech. As described in section 1.4.1, Romaine (1995) discusses the possibility of a third type of input in bilingual situations, where the two languages of the parents are mixed. This would seem possible in the situation of deaf parents using SLN and Dutch with their children. A mixed form of signs and words could be considered to be such a third

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3 Current work (Fortgens in prep.) is examining the language production of deaf children with a hearing teacher and deaf teacher, assuming differences in input as described in Keppels and Jansma (1994).
system, and has been described as contact signing by Lucas and Valli (1992) for parents using ASL and English. We do not know whether parents use mixed input. In particular if speaking and signing is combined in one utterance in such a way that both channels are necessary for the complete proposition, then there is evidence that the third system exists.

Considering the different language backgrounds of deaf people in the Netherlands, and the different possibilities for language choice, it is imperative that the language input offered by deaf parents in deaf-parented families is described in detail. We cannot simply assume that the input will be spoken Dutch, or Sign Language of the Netherlands. Since the two modalities allow for simultaneous use of signs and words, the exact nature of the input needs to be established in order to properly evaluate the role of this input in the acquisition process of the children. In the light of the discussion by Romaine of a third system it is plausible to consider utterances in which words and signs are produced together, as forming a separate system, separate from 'pure' spoken utterances or 'pure' sign utterances. This discussion will be returned to in section 5.3.

2.2.2 Deaf parents with deaf children (DPDC)

When deaf parents use a sign language in the interaction with their infant, the child has potentially full access to the language, just as a hearing child of hearing parents has full access to the spoken language. The sign language is used in all situations, with different people and on a range of subjects, and in this way the child comes into contact with the language in a natural way. Several researchers have described the sign language acquisition process of deaf children of deaf parents. They found that the developmental process is similar to that of hearing children of hearing parents (for ASL Newport and Meier 1985; Bonvillian and Folven 1993; Petitto and Marentette 1993; for BSL Carter 1983; for Italian Sign Language (LIS) Caselli 1983; Caselli and Volterra 1990; Volterra and Caselli 1985). In sign language acquisition the same global stages are found as in spoken language acquisition, that is, babbling, one-sign utterances, then two or more sign utterances, and the beginning of the use of syntactic rules.

However, several studies on the interaction between deaf mothers and their deaf children revealed that the quantity of sign language during the first year of the child's life was very small (Britain: Kyle et al. 1987; USA: Maestas y Moores 1980). The deaf mothers (all native signers in these studies) used mainly spoken language. Only around the child's first birthday did they start signing as expected (Kyle et al. 1987). Harris, Clibbens, Chasin and Tibbitts (1989) additionally found that British deaf mothers offer their deaf infants less language than hearing mothers offer hearing children at several points in time (see Gallaway and Woll 1994). Kyle et al. (1987), Harris et al. (1989) and Harris (1992) attribute the smaller amount of language use during the first year of the child's life to the fact that deaf mothers appear to 'train' their children in visual attention behavior. Harris summarizes as follows.
One reason why the amount of signing that the deaf children received was considerably less than the least amount of speech received by a hearing child stemmed from the requirements of visual attention. [...] the majority of signed utterances were made by the mother while the child was looking at her. [...] the proportion of utterances seen by the child increased with age - suggesting that it gradually became easier for mothers to make signs visible. [...] These data suggest that a deaf mother typically signs only when there is a good chance that her child will be able to see what she is signing. The hearing mother, of course, does not operate under the same constraint of visual attention, and so there are potentially many more opportunities to talk than to sign because a child does not have to look at the mother in order to hear what she is saying. (Harris 1992:101)

The most striking difference between hearing mother-child interaction and deaf mother-child interaction is that deaf mothers using a sign language cannot both hold their deaf baby and communicate in sign language at the same time. Several mothers have told us that even if their hands are free to sign, they feel uncomfortable signing to very young children. From an Italian study of two hearing babies and their mothers by D'Odorico and Levorato (1990:13) we know that "at about 8/9 months of age communicative exchanges by eye contact undergo an important change of strategy". They and many others, found that at this age children begin taking a greater interest in the surrounding environment and that the child has to learn to divide its visual attention between what it is observing and its mother. Hearing mothers, when playing with their baby, can monitor the eye-gaze direction of the child and comment on whatever it is looking at. The deaf mother, however, must first follow the eye-gaze of her child to establish what it is interested in, then attract the child's visual attention before she can comment (in sign) on what the child is seeing. Masur (1990) reports on a study by Murphy and Messer (1977).

9 month-olds were capable of following a point and looking at the object only when the mother's hand and the object were in the same visual field; however, the infants could not follow points directed across their midlines. [...] The majority of the sample of 14 month-old infants, however, had developed the ability to follow such points. (Masur 1990:19)

These facts more or less coincide with the increased use of sign language by the deaf mothers in the Kyle and Harris' data studies. Harris (1992) observes that by 1;4 the deaf children of deaf parents in her study could perceive 80% of all utterances offered to them (uptake, see section 1.3.1). This means that 80% of the input could serve as possible intake for the child. The child's intake can only be measured by looking at his/her language production.

There is a clear development in the accessibility of input. Harris claims that deaf mothers find it easier to make signs visible as the children grow older. This supports
the idea that mother and child both contribute to the accessibility of the conversation.

In fact, all mothers can be said to train their children to react to certain signals used to gain their attention. Hearing children must also learn, for instance, that, if their mothers call their name, they are supposed to respond to her. But within the special requirements of sign language communication we might expect different strategies from the deaf mothers. The quantity of the signed and spoken input of deaf parents to their deaf children must be described, together with the accessibility of the input to the child. The next step is then to describe the linguistic output of the child and compare it to the input.

Not much is known about the quality of the sign language input to deaf children. We know of only a few studies that look into vocabulary input (e.g. ASL: Launer 1982). Some American studies have described the sign language acquisition of deaf children, but do not cover the exact nature of the input, which is implicitly taken to be adult-like ASL (e.g. Newport and Meier 1985). Usually no reference is made at all as to whether or not spoken language is used, or even mouthing, and if so to what extent. A few studies (USA: Kantor 1980; Launer 1982; Swisher 1992; Britain: Gregory 1985a/b; Harris et al. 1988; Kyle, Woll and Ackerman 1989) describe signing adapted to the linguistic or cognitive developmental level of the child, or describe aspects related to visual attention within the interaction of deaf mother-child dyads.

Kyle et al. (1987:222) found that deaf mothers used "[...] fewer questions, and more report-type utterances" in the interaction with their children compared to hearing mothers (see 1.3.2). Initially the sign language input is rather simple, with a high proportion of naming utterances. Kyle et al. related this to the 'training' of visual attention by the mothers during the first year(s) of life, which is essential to sign interaction (see Chapter 6).

Pine's reference to these aspects seems to be relevant.

For example, if the task in the earlier stages is to learn a basic vocabulary and effective ways of expressing simple semantic forms and pragmatic functions, then very simple CDS may well be the most facilitative. On the other hand, as the child's task shifts to the acquisition of morphological and syntactic rules, it will probably be the case that more complex input is required. (Pine 1994:25)

If this is especially true for the mothers using signs (while training the attention-giving behavior), we can expect many labeling utterances during the early years. More complex language will be used once the visual attention-giving behavior of the children is adequate (see Chapter 6). Moores and Moores (USA 1982) and Mills and Coerts (Netherlands 1990) describe a few functional differences in the use of signed and spoken language of deaf mothers to their infants (age ≤ 1;6). They found that emotional and affective utterances seem to be linked to spoken language in the
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input to young deaf or hearing children, while utterances pertaining to objects are produced in signs. Gregory and Barlow (1986) (children aged 2;0 and 3;0) and Woll and Kyle (1989) found that the utterances of deaf mothers consisted mainly of one sign. Gallaway and Woll (1994) attribute this to the dominant function of naming.

Utterance function also showed striking differences. Hearing mothers asked many more questions than did the deaf mothers, whose most frequent utterance function was naming. (Gallaway and Woll 1994:210)

Jamieson (USA: 1994) studied the different instructional strategies used by deaf mothers with children aged 4;9 up to 5;5 compared to hearing mothers. She found that deaf mothers concentrated their instructions at the levels of comments and directives. These deaf mothers also made less use of questions than the hearing mothers did. Jamieson suggests that this may be because the continuation of visual contact is at some time more important than asking questions on the task at hand.

General structural descriptions of the input to deaf children of deaf parents have not been found, but there are some articles that focus on a single aspect of sign grammar. For instance, Reilly and colleagues have been studying the use of non-manual grammatical markers of parents in the ASL input to young children (Reilly, McIntire and Bellugi 1990; Snitzer-Reilly and Bellugi 1996). Since both affective feelings and grammatical markers are expressed on the face, they examined how children learned to distinguish between these two functions. They found that mothers did not start using non-manual markers in ASL in a grammatical way with their children from the age of 2;0 on.

2.2.3 Deaf parents with hearing children (DPHC)

Not much is known about the actual language situation during the early years of hearing children in deaf families. Some information has become available over the last few years. Schiff-Myers (1988) gives a comprehensive overview of research on the spoken language production of hearing children of deaf parents. Mallory et al. (1993) give information on the language mode that deaf parents report using with their hearing children.

The results of this study indicate that although deaf parents did report ASL as the preferred language mode with spouse, over two-thirds use some form of language mixture involving English structure in communicating with hearing offspring. That means that for at least part of the time they move away from the structure and inflection patterns of ASL to a mode of language with English sentence order (SE). To this, some parents add an approximate speech component, mouthing key words, with or without voice. For their part, the children tend not to rely on ASL but on a "generic" form of sign-plus-
fingerspelling, roughly paralleling their spoken English. (Mallory et al. 1993:80)

These interview data suggest that, also depending on age and/or birth order, hearing children acquire quite different aspects of sign language. The descriptions by the parents and the children of their language use revealed widely differing degrees of sign language fluency among siblings, and of deaf and hearing siblings' differential use of language modes (1993:87). From the studies described by Schiff-Myers it is unclear whether these deaf parents sometimes were using sign language (ASL), spoken language (English), deaf speech without signs, or mixed signing and speaking at the same time. It is possible that we can speak of a 'third system' (Romaine 1995) in the case of simultaneous signing and speaking. The interesting question remains what effect such a mixed input would have on the production of the hearing children. Unfortunately, nowhere in these studies have the structural aspects of the input been described.

Schiff-Myers writes that the spoken language of the deaf adults is often "unintelligible because of hyponasal speech with numerous omissions and inappropriate stress patterns [...] and has limited syntax" (Schiff-Myers 1988:56), but what is meant by limited syntax is not specified. There is no detailed information on the quantity of input.

2.3 Language production of children in deaf families

2.3.1 Language production of deaf children of deaf parents

As mentioned in 2.2.2, an early study in this area from Newport and Meier (ASL 1985) showed that deaf children that acquire a sign language as their first language follow more or less the same path of language development as do hearing children of hearing parents acquiring a spoken language. Boyes-Braem (USA 1974/1990) and Bonvillian and his colleagues (for instance Bonvillian, Richards and Ibrahim Saah (USA 1996)) amongst others have done phonological acquisition studies. As with spoken language, the phonological forms used by deaf children differ greatly from that of adult signers in the early years of language acquisition.

Other researchers have demonstrated that deaf children start to 'babble' in sign around the age of 8 months (USA: Petitto and Marentette 1991). We use the term movements for these babbles, following Caselli and Volterra (1990); these movements carry no symbolic meaning (see for a further description Chapter 4).

Petitto and Marentette (1991) claim that only deaf or hearing children who receive structured (i.e. syntactic) input, either in the visual-gestural or in the oral-auditory modality, will produce appropriate 'babbling' behavior in that modality. Others claim that no sign language input is necessary for children to produce movements (Meier and Willerman 1995) (see also section 2.3.2). It is thus of importance to
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determine whether syntax is present in the input and compare the use of movements in the output of deaf and hearing children with the input they received.

The first symbolic (or representational) signs appear around the first birthday (USA: Bonvillian and Folven 1993; Italy: Caselli and Volterra 1990). Caselli and Volterra (1990:277) maintain that the emerging ability of children to combine two representational signs or words "crucially depend[s] on exposure to a linguistic input", namely input of combinations of (at least) two representational signs for the acquisition of a sign language, and combinations of (at least) two representational words for the acquisition of a spoken language. Children start with combinations of Points and representational signs and around the age of 1;8 they begin to combine representational signs – the beginning of the application of grammatical rules in their output. Caselli and Volterra claim that the combination of a deictic sign (or Point) and a representational symbol is not evidence that a linguistic system is being used - only the combination of two or more representational symbols indicates the presence of syntax. Goldin-Meadow and her colleagues (Goldin-Meadow and Mylander 1983; Goldin-Meadow, Mylander and Butcher 1993; Wang, Mylander and Goldin-Meadow 1995) found that deaf children of hearing parents with no sign language input seemed to construct a sign language system of their own (including combinations of deictic signs and a representational sign. However, Volterra (1983) and Volterra and Caselli (1985) state that the gesture production of these deaf children should be analyzed according to criteria also applied to the gestures of hearing children of hearing parents and of deaf children of deaf parents. In a study similar to Goldin-Meadow and her colleagues they found that all children combine deictic gestures with referential words or signs, but that only children exposed to a sign language combine referential gestures or signs with referential gestures/signs. After reanalyses of the data of Goldin-Meadows and her colleagues they established that deaf children who have had no sign input combined deictic gestures with referential gestures, but never a referential gesture with a referential gesture. Gallaway and Woll (1994) summarize:

Since children both exposed and not exposed to adult models of sign can use symbolic gestures and combinations of gestures to communicate, these do not depend on exposure to a linguistic model. What does depend on exposure is the ability to combine symbols (referential gestures) with each other. This indicates that the symbolic capacity (meaning) and combinatorial capacity (syntax) are separate, that both are necessary to the development of language, and that the ability to use the two together depends on adult input. (Gallaway and Woll 1994:217)

These differences in input, and their subsequent influence on the language production of the children make it all the more important to give a full description of combinations of representational signs or words that occur in the input.
The study of pronominal reference in sign languages is complicated by the overlap in form between non-linguistic pointing and linguistic pointing. This aspect in ASL has been studied by Petitto (1987) and Pizzuto (1990). Around age 0;10 non-linguistic pointing to self, to other people and objects appears. Petitto maintains that between 1;0 and 1;5 pointing to persons stops, although pointing to objects is maintained. However, these findings were not supported by Pizzuto. Around 1;6 linguistic pointing to other people begins, and pointing to addressee between 2;0 and 2;5. By 2;5 1st, 2nd and 3rd person are correctly distinguished. Lexical compounds begin to appear between 3;6 and 3;11, and innovative compounds between 4;0 and 4;11, although they are not adult-like either in phonology or in meaning.

There have also been several studies on the acquisition of morphology and syntax. Meier (ASL 1982), Bellugi (ASL 1988) and Reilly et al. (ASL 1990) studied the acquisition of verb-agreement, the acquisition of syntax and space, and conditionals respectively. Verbs (in citation form)4 appear in the lexicon between 1;6 and 1;11 but there is no verb morphology. This does not begin to appear until between 2;0 and 2;5, and then usually as unanalyzed rote forms. There is some overgeneralization of the verb inflection rule, with plain verbs inflected where this is not grammatical in adult sign language (BSL Woll 1998). So far not many studies have focused on the acquisition of the rules for the (non-)realization of subjects and/or objects (but see Coerts and Mills 1994; Coerts 1999, SLN).

Sign languages are classifier languages, that is they include morphemes called 'classifiers' whose function it is to classify nouns according to inherent characteristics of their referents (Allen 1977 in Siple 1997:34). Between 2;6 and 2;11 classifiers begin to appear in spatial verbs.5 There is no morphological marking of manner on verbs yet. The first productive use of verb agreement occurs at the beginning of this period. Between 3;6 and 3;11 movement and manner can be observed in certain verbs, but produced sequentially rather than simultaneously towards the end of this period (Woll 1998). Not until 5;11 is the mastery of most morphology completed, although polymorphemic forms still cause difficulty (Woll 1998) and are not acquired fully until the end of the 9th year.

Although the speech production and comprehension of hearing-impaired or deaf children has received a fair amount of attention only little research has been done on the functional spoken language development of deaf children of deaf parents. Maxwell (1989) describes a deaf girl's (Alice) speech from 1;6 to 7;5. Her parents did use speech with Alice, although ASL was the dominant mode in the family.

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4 The citation form of a sign is understood to be the least complex form that represents the whole paradigm and from which the other forms can most directly be derived (Appel et al. 1992:78).
Alice paid attention to speech around her and could occasionally use speech to repair communicative failure in sign. Up to age 3 there was very little vocal production [...], but by age 3 Alice produced short segments of speech and began to speechread with some understanding. Nevertheless, she hardly used speech at all until after 4;3; it was not a major productive mode for her until 5;5. By 7;5 she had sorted out the associations between different manual modes (sign, fingerspelling) and speech, and switched appropriately. (Maxwell 1989:39)

Mogford (1988) summarizes research done on the acquisition of spoken language for severely hearing impaired or deaf children in general. It is both deviant and severely delayed.

Several studies have been done on the attentional behavior of deaf children of deaf parents. As we already discussed in section 2.2.2, deaf parents appear to train their young deaf children in visual attention, especially so during their first years of life. Deaf children raised with a sign language learn at an early age to check back with their conversational partner to see whether or not linguistic information may be offered (Harris et al. 1987; Harris and Mohay 1997). A few studies have been done on the development of this skill after the first year (Siple, Akamatsu and Loew 1990; Swisher 1992; Baker and van den Bogaerde 1996; Richmond-Welty and Siple 1999; van den Bogaerde 1999). The major characteristics of behavior of visual attention in sign language communication are apparently acquired before the age of 3;0.

2.3.2 Language production of hearing children of deaf parents
Several studies have been carried out on these groups of children. Some of the earliest descriptions of the language production of hearing children of deaf parents come from Critchley (1967) and Brejle (1971) (both mentioned in Schiff-Meyers 1988:48/49). More research has been done by Schiff and Ventry (1976), Mayberry (1976), Murphy and Slorach (1983), Todd (1975), Todd and Aitchison (1980), Sachs and Johnson (1976) and Sachs, Bard and Johnson (1981). Only four studies reported on language or communicative problems in these children (Critchley 1967; Brejle 1971; Sachs et al. 1972 and Todd 1972). But these problems referred to the acquisition of the spoken language. Mayberry (1976) also reports a focus on spoken language. Not much attention has been paid to the sign language development of these children.

Meier and Willerman (1995) argue that sign babbles can be expected in hearing children anyway. They claim that hearing children may produce babbles because:
1) the rhythmical organization of speech may trigger rhythmically-organized gestures
2) sighted children of hearing parents receive visual feedback from their own gesturing, unlike deaf children who receive little or no auditory feedback from their own vocalizations
3) even the children of non-signing parents receive some nonlinguistic gestural input. Based on their findings we could thus expect similar movement production by deaf and hearing children.
Further it is not clear what to expect in the sign language production of these children. The hearing children of deaf parents are usually exposed to two languages from an early age.
Schiff-Myers (1988) describes the early sensitivity of these children to their linguistic environment.

Schiff (1976, 1978) found that five 2-year-olds used proportionally more signs, more exaggerated and whispered speech and shorter utterances with their deaf mothers than they did with the normal speaking investigator. Therefore [...] the children were already making modifications in their utterances seemingly based upon the linguistic differences of the listener. In addition, these children showed some awareness that their parents did not hear [...] Older hearing children of deaf parents become bilingual and use two systems to communicate, one with the deaf and one with the hearing (Lenneberg 1967; Schiff and Ventry 1976). Perhaps children who learn Standard English without any problems are those who realize early in development that they are learning two languages. Like the bilingual child who learns two languages simultaneously, the hearing child of deaf parents might need to identify one language (deaf speech +/- ASL) with their parents, and the second language (Standard English) with others. If the children perceive their parents' oral language as different, then they should not be confused by the seeming 'irregularities' in input in the oral language they hear. (Schiff-Myers 1988:61)

The use of voice is an aspect, which clearly reflects awareness of the mother's deafness.
Prinz and Prinz (1979; 1981) and Griffith (1985; 1990) describe the linguistic behavior of hearing children with one deaf and one hearing parent. At a very young age (≤ 2;0) the two children in these studies seem to be aware of the hearing status of their parents and other conversational partners. They try to adjust their language production accordingly. At one point Griffith (1990) maintains that hearing children who are raised with two languages in two channels (i.e. ASL and English) have the advantage that through combinations of the two channels, these children can express even more complex utterances than if they use one channel at the time (1990:241).
No information is available at all about children in the Dutch context.

2.4 Summary

In this chapter the language use in deaf families has been discussed. We established that deaf families are families where both the parents are deaf (or one hearing
CODA), who use sign language as their main means of communication with their deaf or hearing children, and who pass on the social and cultural values of the 'deaf cultural world' in a natural way. Hearing parents with deaf children do not fall in this category although they are the larger group. The languages used by deaf parents within the family may vary according to their educational background, their identification with the deaf culture and also the hearing status of their partner and their children. They use both a sign language and a spoken language in different context. They also use a combined system of signing and speaking. The status of this is unclear but may form a third mixed system.

From the relatively few studies of input it appears that during the early years deaf and hearing children who receive sign language input may receive less language than do hearing children of deaf parents. This is probably linked to the accessibility of the input: mothers spend time 'training' their young children to pay visual attention to their signing.

There appear to be fewer questions in the input compared to hearing parents with hearing children. Naming is a predominant function, expressed in one-sign utterances between ages 2;0 and 3;0. Affective function is expressed in spoken utterances at an early age. Non-manual markers (for affective markers and grammatical markers) are not present in the input prior to age 2;0. Hearing children of deaf parents also receive a mixed language input – signing and speaking. Since there are no good descriptions of the input, it is not clear if it is the same as to deaf children of deaf parents.

From studies of sign languages other than SLN we know that deaf children acquire the sign language used in their family more or less in the same way that hearing children acquire the spoken language of their parents. There are of course some differences in the interaction. Within sign language communication settings it is of the highest importance that children learn to pay appropriate visual attention to the sign language that is offered. We know that children begin their language production with (prelinguistic) babbles and then proceed to their first signs. We know very little of the content of their vocabulary, or of the proportional relation between nouns and verbs, for instance. The acquisition of the verbal system starts fairly late (around 2;0 – 2;6) and is not finished until the children are much older, around 9;0 in ASL or BSL. For Sign Language of the Netherlands no description exists yet of the acquisition of the morpho-syntactic system. Spoken language acquisition is severely delayed. Hearing children of deaf parents usually seem to acquire the spoken language effortlessly and to communicate on the whole without problems with their deaf parents. In what language is not clear.

This study will address these areas in the Dutch situation. A description of the input offered by the deaf mothers, and the output of the children will be made. In all areas
we will look at the development over time and consider the relation between the input and the output. We will also study the influence of the hearing status of the child in the interaction between the mothers and the children.