

1 THE ROLE OF LANGUAGE INPUT IN ACQUISITION THEORIES

1.1 Introduction

Input cannot be considered separately from the interactive situation in which it is provided. In the literature on language acquisition language input and the interaction between adult and child have been assigned roles of varying importance. Input is considered inconsequential in some language acquisition theories, in others it plays a crucial role. In all theories of child development interaction is considered important for the cognitive, emotional and social development of the child. In language acquisition its role is judged as minimal in some theories and all-important in others, besides being very much culturally defined (e.g. Ochs 1983; Schieffelin 1985).

That children need to be at least exposed to a language in some sort of interaction in order to be able to acquire language is, however, beyond dispute (see for an overview Skuze 1988; Mayberry and Eichen 1991). A well-known example of the consequences of the deprivation of language in a child is the description of Genie by Curtiss (1977). Another case was presented by Emmorey, Grant and Ewan (1994) who describe the linguistic isolation of a 16-year old Guatemalan deaf girl, Anna, and the first steps towards the acquisition of American Sign Language (ASL) after her arrival in the United States. Not much is known, however, about *how much* language children must be exposed to, to be able to acquire a language. Is there a minimum amount of language a child needs to encounter, in other words does a minimum-exposure threshold exist? Hearing children of signing deaf parents often receive little input in a spoken language, being exposed primarily to a sign language. They provide evidence on this issue. From a study by Sachs and Johnson (1976) we know for example, that a hearing child of deaf parents who received only spoken English from television did not acquire that spoken language. Apparently just having access to a language is not sufficient for acquiring it. This is supported by findings of Schiff (1979), who concluded that hearing children of deaf parents can develop a spoken language normally, provided they are in contact with hearing speakers for a minimum of 5-10 hours a week, and watch some television (Schiff-Myers 1988:54). Recent research in spoken languages also indicates that the amount of language in the input *is* indeed relevant for the acquisition of language (Hart and Risley 1995). For bilingual or trilingual input this is also true (De Houwer 1999).

There are also circumstances where a child does have daily and full access to input but where the input language itself is 'poorly structured'. Even if the quantity of input apparently is sufficient, the quality of the input may be inadequate. The same

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question arises – what quality must the input have for the child to be able to acquire that language? Is there a minimal quality threshold?

Within the group of children receiving 'poorly structured input', hearing children of deaf parents form again a special group. The parents usually produce speech which has been described as having "[...] limited syntax, abnormal phonology and atypical intonation patterns" (Mogford and Bishop 1988:242). The robust character of the language acquisition process is shown by the fact that most hearing children of deaf parents do not show these same restrictions in their language production. They do not simply 'imitate' the spoken language of their deaf parents, they add to it. Granted, they usually have access to normally spoken language through other sources like hearing relatives, neighbors, peers, etc., but the first language contact will be with their parents. It is therefore important to describe qualitative aspects of language input, in order to be able to examine its influences on structural aspects in the output of the children.

Besides being offered spoken language many hearing children of deaf parents also receive sign language input. They are thus often raised in a bilingual situation. This is also true for deaf children of deaf parents. Even if their home language is a sign language, all deaf children necessarily have to become bilingual. They will have to acquire the spoken language of their environment within the limits of their (hearing) abilities in its spoken form, or at least in its written form.

By comparing the language acquisition process under various conditions it should be possible to identify those factors that are necessary for normal language development, and identify those that are not. Mogford and Bishop (1988) stated this as follows.

These variations in the conditions in which language is acquired can be regarded as natural experiments that would not be feasible or ethical under normal experimental conditions, but which allow us to dissociate factors that are usually associated in normal development. (Mogford and Bishop 1988:24)

It is the aim of this thesis to study the bilingual language input of deaf mothers to their deaf and hearing children and to describe the role that the quantity and the quality of their language input plays in the language acquisition process of their children.

1.2 Input and interaction in theories of language acquisition

As mentioned above, in the last decades there has been a controversy in the field of language acquisition between those theories that attribute a small (or no) role to language input or interaction (nature), and those attributing it a more important role (nurture).

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The earliest studies on child language in our times are the so-called diary studies (e.g. Stern and Stern 1907). Parents described the language development of their children. In general the idea (often implicit) was that the child was the learner. Little attention was paid to the environment as an influence. Later Chomsky (1965) expressed this in a much stronger form. He believed that the input children receive was degenerate and an insufficient basis for language learning. In this theory language acquisition is explained on the basis of assuming that children have innate language learning capacities that enable them to acquire language *despite* the impoverished input. Working in this same framework Pinker in his 1994 publication proposed that language is an instinct, that has evolved out of adaptation throughout the evolution of man. The innate linguistic capacities contain universal grammatical principles that are subsequently set according to the language-specific characteristics in the input. Another advocate of this theory is Bickerton (1981) who proposed that children with incomplete and 'simple' input (a Pidgin) themselves create a fully-fledged language (a Creole) based on their innate language capacities. Other nativist researchers like Borer and Wexler (1987) and Pinker (1994) believe that at a genetically predetermined time the principles of language become available to the child.

The quantity and quality of the language input has little weight in all of the above theories, since children construe regularities themselves from their innate capacities. They must however have some input on which the innate capacities can work.

Since the 1920's there has existed a school of thought in psychology called behaviorism. These psychologists believe that the environment was all-important in the (language) learning process of the child. They attributed very little internal structure to the child except general abilities (Ingram 1989). According to this theory (e.g. Skinner 1957) the child learns all behavior through stimulus, response, associations and reinforcement and in the same way the meaning of words and the grammar of the language is learned. Quantity and quality of input are not unimportant, but the main focus lies on the behavior of the parent (environment). In the more recent connectionist theories (e.g. McClelland and Rumelhart 1986) which are frequently linked to behaviorism, input to the neural network is certainly crucial.¹

From the field of child psychology there have been those (for example Piaget 1955; 1971; Slobin 1977; Bates, Bretherton and Snyder 1988) who view language as one of the many cognitive capacities or skills the child has to acquire, like memory or attention. The linguistic system is build up by the child in interaction with his/her caretakers and this language development goes hand in hand with the development of general forms of knowledge. Linguistic input and communicative interaction both play an important role in these views. The child and the adult can both

¹ See Adema (1999) for a full description of the comparison between behaviorism and connectionism.

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contribute to the process of language acquisition. Vygotski as a social interactionist also acknowledged the important role of language and communication in the general development of the child (see Zaitseva, Pursglove and Gregory 1999 for a recent overview of his theory). Often it is not clear what part innate capacities might play in learning but they are not ruled out.

Other researchers are explicit that innate capacities as well as input and interaction play a role in the acquisition process. Wells (1985) was of the following opinion.

If we now return to the question of the relative contribution of child and adult to the process of language learning, it is clear that the answer must be stated in terms of an interaction. Interaction, first, between the child's predisposition to learn to communicate and the model of language provided by those who communicate with him. Interaction, also, in the form of the specific conversations that provide the evidence from which the child learns and feedback on how his own communications are interpreted by others. (Wells 1985:415)

Cross-linguistic studies (e.g., Slobin 1985 and later) have indicated that no one form of input or interaction is responsible for language acquisition. In different linguistic communities language is offered to children in significantly different ways, and yet the children acquire their mother tongue more or less at the same age along the same route.

In this study we take the combined point of view, that is that the child acquires a language through interaction with caretakers, that the linguistic input serves the child as a model on which to build up assumptions about the grammatical structure of that language, and that innate capacities are involved. In an account of language acquisition it is of great importance to describe the (quality of) the grammatical structure of the language model that the child has access to. This is the aim of this thesis for one particular language situation.

1.3 Quantity and quality of input

1.3.1 Quantity of language input

Not much is known about the actual quantity of language input during the different phases of language development. Although many studies have concentrated on the amount of language produced by children, not much research has been done on the amount of input and its role in language acquisition (but see Hart and Risley 1995; 1999).

In Table 1.1 we present an overview of data on the quantity of language, expressed in number of utterances, offered to children in several studies in different

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languages. The number of utterances is corrected in each case for 10 minutes of interaction.

Table 1.1 Overview of number of utterances in 10 minutes of input in Dutch, German, English, American Sign Language (ASL), British Sign Language (BSL) and English and signing combined

Language and Source	Age of children	(Range of) no. of utterances corrected for 10 minutes
DUTCH		
<i>van der Stelt</i> (1993)		
6 mothers	1;0	68 - 198
6 mothers	1;6	158 - 194
4 mothers	2;0	170 - 200
<i>Wijnands</i> (forthcoming)		
2 mothers	1;11 - 2;1	188 - 300
2 mothers	2;5 - 2;8	196 - 306
2 mothers	2;11 - 3;1	144 - 227
<i>Jansonius-Schultheiss</i> (1999)	2;0	117 - 290
9 mothers		
GERMAN		
<i>Wagner</i> (1985)	1;5	41 - 131
ENGLISH		
<i>Kaye</i> (1980)	infants	
36 mothers	(≤ 26 wks)	210 (mean)
	2;0	145 (mean)
<i>Snow</i> (1977)	1;0	84 - 200
<i>Hampson and Nelson</i> (1993)	1;1	89 - 305
45 mothers	1;1 - 2;0	182 (mean)
<i>Bernstein-Ratner</i> (pc)	1;6 - 2;2	47
<i>Moerk</i> (1983)		
<i>Wells</i> (1985)	2;0 and 3;0	± 44 (mean)
125 parents		
<i>Hart and Risley</i> (1999)	1;0	52 (mean)
42 mothers	2;0	67 (mean)
	3;0	54 (mean)
ASL		
<i>Kantor</i> ^a (1982)		
Mother of Mich	1;0 - 1;8	± 12 - ± 28
Mother of Erin	1;8 - 2;6	± 16 - ± 71
(only selected utterances!)		
BSL		
<i>Harris et al.</i> (1988)	1;4	20 - 51
	1;8	45 - 74
<i>Harris</i> (1992)		
three mothers	0;10	21 - 60
four mothers	1;4	7 - 50
four mothers	1;8	22 - 73
English + signing		
<i>Woll et al.</i> (1988)		
three mothers	0;9	± 141 - 190

^a These sessions were between 45 and 60 minutes; correction is approximate.

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From Table 1.1 it is clear that huge individual differences may occur in the number of utterances that children receive at different ages, in different languages. In general we see an increase in amount of input as the children grow older, up to age 2;6-3;0 (Wijnands in Table 1.1). Wijnands' study of Dutch suggests that at age three there is a slight decrease. The smaller amount of language around age three agrees with findings of Hart and Risley (1999) who observed that after age 2;4 the American parents in their longitudinal study show a strong decrease in the number of utterances addressed to their children (1999:121). They explain this fact that by this age the parents consider the children to be turning into fluent enough talkers. They are also ready to acknowledge the growing maturity of the children with regard to communication and interaction (1999:124). The children are broadening their horizon, and begin playing outside with other children etc. They could now be treated the same as the 'other' children in the family and not as the baby who needed special (linguistic) attention. The amount of language directly addressed to the child decreased between the ages of 2;4 and 3;0. Barton and Tomasello (1994) found that in dyadic interaction children usually contribute half of the conversation, but it was not specified at what age this could be expected. If the children's participation increases over time, it is to be expected that the mother's contribution decreases.

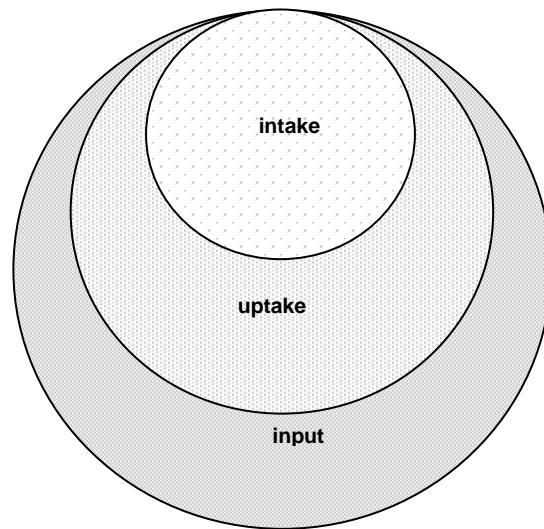
In the signed languages ASL and BSL the range of the number of utterances in 10 minutes seems a little less than in the spoken languages. This could have implications since the amount of language offered is considered to be facilitative to the acquisition of language in general (Hart and Risley 1999). Snow (1994) considers quantity relevant for vocabulary. She makes the following observation.

One of the more sophisticated analyses of input effects on language acquisition so far reported, that by Huttenlocher, Haight, Bryk, Sletzer and Lyons (1991), utilizing Hierarchical Linear Modeling, found that *amount* of maternal talk during the observation was the best predictor of children's growth in vocabulary (Snow 1994:9).

If this is the case, then the smaller amount of signed language during the early years might have its influence on the rate of language acquisition or at least vocabulary learning.

Thus far we have talked about input with little discussion of the term. The quantity of input can be viewed from the perspective of the adult but also from the perspective of the child. The accessibility of the input is important. If input is being offered but not perceived by the child, no input can actually take place. This will not occur very often in the case of spoken input, although television background noise has been reported as distracting from input (Ward and Birkett 1994; Cooper and Clibbens 1999). However, in the case of sign input accessibility is a clear issue. In sign language interaction it is imperative that the partners in conversation can see each other (Siple 1978). If the mother is signing but the child is not looking, no

actual input can occur. This aspect has already been discussed by, amongst others, Harris, Clibbens, Tibbitts and Chasin (for BSL 1987), Kyle, Ackerman and Woll (for BSL 1987), Woll, Kyle and Ackerman (BSL 1988) and Swisher (for ASL 1991). They make a link between the amount of input offered and accessibility and claim that during the early stages of language acquisition deaf mothers offer their children less language than hearing mothers do to their hearing children, because they assume that the children are still learning to pay visual attention to the mothers. Establishing the amount of sign or spoken input offered is not enough. We must also establish how much of the input is actually accessible to the child. Harris (1992) uses the term 'uptake' for this accessible input and defines this as "that part of the input that is actually attended to by the child" (1992:44). Uptake is clearly less than input. Uptake itself however has to be processed by the child. Since child production is less than the adult model, researchers have introduced a level of 'intake'. This intake is defined as "the features attended to and processed by the child (Richards and Gallaway 1994:262). Figure 1.1 depicts the relation between input, uptake and intake.



Input: language offered to the child

Uptake: part of the input that is attended to by the child (Harris 1992)

Intake: features attended to and processed by the child
(Richards and Gallaway 1994)

Figure 1.1 Relation between input, uptake and intake

We have already mentioned that children of deaf parents are often raised bilingually. It is important to realize that children who are offered more than one language during the initial years of language acquisition necessarily receive less

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input *per language* than monolingual children do. De Houwer (1999) found that input in a language X does not automatically imply the use of that language X in the production of the children (1999:2). Whether or not a language is used by a child is related, amongst other things, to the proportion of the different languages that are offered and to the number of family members that use the languages with the children or amongst themselves. What we need to establish then is the amount of input of each language the child has access to over time, and compare that amount to the amounts of that same language offered to monolingual children. These data would give us more insight whether or not a 'minimum exposure threshold' exists (see section 1.1) in the context of bilingual language acquisition, and help establish where the threshold lies.

In our study we will look at the input (quantity and quality), uptake (accessibility) and intake (through the output of the children) in the bilingual language situation of deaf and hearing children of deaf parents.

1.3.2 *Quality of language input*

The quantity of input/uptake is important but, as mentioned above, the quality is probably also relevant. The structures that are offered, the vocabulary and language functions may all have an influence on what the children can learn.

Classic studies like Snow and Ferguson (1977) have made it clear that the language addressed to children (motherese or Child Directed Speech, CDS) is different from language addressed to adults, such as exaggerated intonation, specific vocabulary items and even specific grammatical structures. CDS is claimed to be facilitative for language acquisition, and even necessary in some frameworks. However, the relationship between CDS and the child's acquisition is not as straightforward as some studies would like us to believe (Pine 1994:15). Pine summarizes why CDS is used and concludes, with others, that mothers are primarily trying to engage their child in conversation, not to teach the child the language (Snow 1986). In this section some of the research done on input will be discussed in relationship to the main areas of language (see Gallaway and Richards 1994 for a review). Richards (1994) warns that the effects and non-effects of CDS are to be interpreted with care, because the methodology and interpretation of results in many studies often pose problems. No aspect in CDS has been actually proven to be necessary for the acquisition of language. He argues that much more research is needed in order to inventorize the different circumstances of language acquisition, and the exact role of language input.

Vocalizations are the earliest phonological productions of children – initially they make sounds that can occur in all languages, but as they grow older their vocalizations consist only of those sounds found in their input. Later vocalizations become babbles, rhythmic alternations of vowels and consonants, which carry no linguistic meaning yet. Interactive play with vocalizations has been studied

amongst others by van der Stelt (1993) working within a Vygotskian framework. The alternate production by mother and child of vocalizations, where mutual imitation plays a role, is considered by van der Stelt as early turn-taking behavior, and as such plays an important role in early interaction. Do the equivalents of vocalizations in sign language, called movements by Caselli and Volterra (1990), play a similar role in sign language acquisition?

The next stage in the child's linguistic production are the first words. To quote Eve Clark: "Words make a language. [...] Words come first in language acquisition." (1993:1). It is therefore of importance to describe the lexicon that mothers offer their children at the different stages of language acquisition, and also to describe the development of the vocabulary of the children. The first meaningful or representational words are generally produced around the child's first birthday. Usually combinations begin to occur once the child has acquired about 50 words (Ingram 1989). We also know that there may be a period when the vocabulary increases at a fast rate (vocabulary spurt, amongst others Clark 1993). How the vocabulary develops and at what rate in relation to input is an important issue.

For instance, research has shown that children seem to acquire more nouns than verbs in their early vocabularies (Gentner (1982); Goldfield (1993) and Shatz (1994) for English, and Caselli, Bates, Casadio, Fenson, Fenson, Sanderl and Weir (1995) for Italian). One explanation for a preponderance of nouns in children's output could be that the input they receive contains more nouns than verbs. This was indeed found by Gillis and Verlinden (1988), who studied both the Dutch input to and the language production of a Dutch boy between the ages of 0;11 and 2;0. They conclude that Dutch children learn more nouns than verbs because 1) they hear nouns more frequently, 2) nouns occur more frequently in salient positions in adult sentences and 3) pragmatic aspects of child-directed speech predict a noun-predominance in the child's vocabulary (1988:65). The frequencies for Dutch are higher than for English and Italian (see Table 1.2). However, not all languages have such a clear 'noun bias'. Tardif, Shatz and Naigles (1996:7; 1997) compared the input from English, Italian and Mandarin speaking parents and found that there were more verbs than nouns in Mandarin input even more so than in the English and Italian input (see Table 1.2).

Table 1.2 Noun ratios found by Gillis & Verlinden (1988)² and Tardif et al. (1996) in the input and the output of Dutch, English, Italian and Mandarin speaking parents and their children at approximately age 2;0

² Gillis and Verlinden (1998) give the raw data for the parent on page 30, Table 4 (noun tokens: 422, verb tokens: 221), and for the child on page 24, Table 2 (noun tokens: 273, verb tokens: 67).

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	Dutch	English	Italian	Mandarin
Input of parents N/(N+V) tokens	.66	.32	.32	.20
Output of children N/(N+V) tokens	.80	.63	.53	.39

(Children acquiring Mandarin as their first language also had more verbs than nouns in their early vocabulary). Their conclusion was that differences in noun-emphasis in the input explain differences in noun biases of the children (1996:11). The lexical richness in the input to children of course influences their acquisition of the vocabulary of their language(s) (see also Hart and Risley (1995).

Many researchers assume that different syntactic structures in input must be clearly identifiable in terms of form in order for children to be able to acquire them and to identify their function. Others assume the opposite, that is function leads to the acquisition of form (Bates et al. 1988), so the functions must be clear in the input.

It is not always easy to identify functions reliably; the context plays an important role here (e.g., Ninio, Snow, Pan and Rollins 1994). For instance, questions may be put in the form of a declarative, or vice versa. Pragmatic aspects always play a role in the interpretation of the meaning of an utterance, independent of its form. The child has to learn to distinguish these different functions and the form they may take, and to interpret deviations from the standard form according to accepted pragmatic rules.

Pine (1994) points out that declaratives are less common in CDS than in adult conversations, and that they increase in frequency as the child grows older. The high proportion of questions in the spoken input is interpreted by some researchers as a way of passing the conversational turn to the child. As the child becomes a more able partner in conversation, questions become less manifest in the input. If the presence of many interrogatives in the input serves different functions in the input, these functions must be described. Also it must be established whether or not the role of interrogatives is the same or different in varying input situations, both for grammatical and for pragmatic reasons. A description of the functional framework of the input can give us insights in how function and form mapping takes place during the early stages of language acquisition.

During the early period of language development the Mean Length of Utterances (MLU) of the mothers' speech appears to slowly increase. It always seems to be slightly larger (2 morphemes ahead) than the child's MLU, and is said to more or less 'pull' the child along (Cross and Morris 1980). The relation between the mother's and the child's MLU's at different points in time thus needs to be explored. The acquisition of the verbal system of a language is generally seen as the basic framework on which word order acquisition and morpho-syntactic development are based. Studies like Newport, Gleitman and Gleitman (1977), Furrow, Nelson and Benedict (1979) and Gleitman, Newport and Gleitman (1984) provide contradictory

evidence for the facilitative effect of input on the language acquisition of children. The high percentage of *yes-no* questions in English input, for example, was claimed (and disclaimed) to be facilitative for the acquisition of auxiliary verbs by the children. Form (auxiliary verb fronted) and function (*yes-no* question) mapping is an important aspect in the acquisition of syntax in English, or other input languages, for that matter. Children have to learn whether or not their language is a pro-drop language, and which arguments need to be realized in which position of the sentence. Can subjects or objects be left out, and if so, under what conditions? For instance, studies of Dutch and German input have shown the use of fewer finite verbs with young children, and a different word order (SOV). In this period the children themselves produce this order and many infinitival forms (Mills 1985; Gillis and De Houwer 1998:72). Krämer (1995) and Schlichting (1996) have described the occurrence of topic drop in Dutch by adults and in the language production of hearing children. The causal relationship between the input and output is nevertheless not clearly established. As Richards (1994) stated, there is as yet little hard evidence for the relationship between qualitative aspects of input and the output.

1.4 Input in the bilingual situation

The various issues touched upon above (quantity and quality of input; exposure and access to language input, and functional and formal aspects) can also be considered in a situation where two (or more) languages are offered to a child. We do not mean here the situation where a child has already acquired a first language and subsequently learns a second one in school at a later point in life (*second language acquisition*). We are talking about *bilingual development*, of which Genesee (1988) gives the following definition.

The simultaneous acquisition of more than one language during the period of primary language development. (Genesee 1988:62)

Some researchers define this period as the first *three* years of life and others during the first *five* years. Bilingual development can occur under different circumstances, for instance when two languages are used within the home by the two parents (one person - one language) or when one language is used at home and another outside the home. Bilingualism usually entails biculturalism, which means that a person or a child has the ability "[...] to act here and now according to the requirements and rules of the cultures" (Oksaar 1983:20).

Bilingualism is more often the norm than people realize (Appel and Muysken 1987); many children are raised in a bilingual or multilingual environment. How does this affect the language acquisition process? Genesee (1988) adequately summarizes the question.

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[...] are there interactions between the two language systems that result in the pattern of language acquisition being different in comparison with monolingual development? (Genesee 1988:63)

1.4.1 *Quantity and quality of bilingual input*

In many studies the simultaneous acquisition of two spoken languages in early childhood has been described. Hoffman (1991:50ff) presents a comprehensive overview of such studies. From the literature it becomes clear that children raised bilingually from birth in general do not lag behind monolingual children. The simultaneous acquisition of two languages does not affect the eventual proficiency in either language, all this provided, of course, that the children have frequent contact with both languages. Data provided by for example Zurer Pearson, Fernández and Oller (1995) for Spanish and English bilingual input show proportions of 60-40% or 40-60% for the two languages, depending on the specific language situation of the child. The children acquired both languages with this division. If the child is exposed to one language almost to the exclusion of the second, then there is a good chance that this second language will not be fully acquired or perhaps be lost (De Houwer 1999). We briefly mention 'semilingualism' here. Skutnabb-Kangas (1984) used this term to indicate the language proficiency of children who had a low proficiency in their home language Finnish and lagged behind their monolingual peers in acquiring the school language Swedish; ultimately the children did not attain full competence in either language. However, Hoffman (1991:127-128) and Romaine (1989) criticize this concept and they warn against a linguistic interpretation of imperfect language production where cognitive and social factors may play an important role.

It is always of importance in bilingual situations to look at the actual amount of input that the children receive. In the case of deaf and hearing children of deaf parents, where a spoken and a signed language can be offered in the input, it is also important to establish what *access* the children have to the two languages. As described in section 1.3.1 the difference between language input by the parents and the intake by the children is of course influenced by the actual amount of input that can be processed (or accessed) by the children (uptake).

The quality of the various languages in the input may also vary. There are many descriptions in the literature of parents using a language with their children that is not their first language (Bickerton 1981; Grosjean 1982). In those cases the language offered may not be native-like. Does this influence the acquisition of that language by the children? As yet there is no clear answer to this question. It is clearly important to look at the bilingual input that is being offered. The quantitative, lexical, functional, and structural aspects of each of the languages that comprise the linguistic input to the children should be described and related to their output.

1.4.2 *Language input and separation of languages*

As we have seen there is very little work on the quality and quantity of the input in the bilingual situation. An additional issue in bilingual development is how children manage to acquire the two separate linguistic systems; or put differently, on the basis of what information do children decide that a word or a syntactic rule belongs to this one particular language or to the other? De Houwer (1987) suggested the following.

Obviously, the more distinct the two languages are that the pre-bilingual child is exposed to, the more chance there is for investigating early separate development. (De Houwer 1987:109)

It is well documented that when children raised bilingually start to speak they often use words from one language mixed together with words from the other. However, usually as more complex utterances occur, they seem to be able to keep the languages apart. This led many researchers to the hypothesis that in the initial stage of language acquisition children have one lexicon for the two languages (Leopold 1939-1949; Grosjean 1982; Saunders 1982). Volterra and Taeschner (1978) proposed three stages in the bilingual acquisition process. Stage one, where bilingual children have one lexical system, consisting of lexical items from both systems. Stage 2, where the child has two lexicons but one structural system; and stage 3, when the two systems are separated on all levels. Taeschner confirmed these stages empirically in her 1983 study of two children. She used lexical equivalence as indicator of one system in the child. By this is meant that if a child has a label for a concept in language A, initially there would be no label for that same concept in language B. This conformed to what Slobin (1973) called the principle of unfunctionality, that is a (monolingual) child accepts only one form for one function during the one-word stage. However, Hoffmann (1991) criticized Taeschner's work methodologically.

[...] more comprehensive lists taken from the first stage (lexical mixing) are needed to ascertain whether the absence of equivalents is observable in all children or whether it is largely determined by the linguistic input. (Hoffmann 1991: 64)

This means that if the input contains mixed utterances we cannot attribute the mixed output of the children to their having initially one lexicon. But if the child only receives certain lexical items in one language, then no lexical equivalents can be learned. The input determines the output in this aspect, and therefore needs to be studied thoroughly and compared to the output.

Bergman (1976) believes that in a situation of a one person-one language environment the child will not mix its languages, thus establishing that the single-language system does not exist. But if parents do mix words from two languages in the input, so will the child in his/her language production. She proposed an Independent Development Hypothesis:

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In case of simultaneous language acquisition, each language will develop independently of the other, reflecting the acquisition of that language by monolingual children, unless it is the case that the lines between the two languages are not clearly drawn in the linguistic environment of the child. In such a case, which may be caused by code-switching patterns in the bilingual community or by deviations [sic] in the adult language of the child's environment from the norm in the monolingual community, the child will sort out the two systems according to the input that he receives. (Bergman 1976:94 in De Houwer 1987:82)

Goodz (1989) and Quay (1995) found supporting evidence for this hypothesis in their data.

In this study the use of sign language and spoken language in the input of deaf mothers is described. Besides aspects of bilingual input, we have the added difference in modality. Sign languages are perceived and produced in the visual-gestural modality, while spoken languages use the auditive-oral modality. Unlike two spoken languages, there is the possibility of producing signs and words at the same time. This sometimes leads to a special form of cross-modal language contact (Vonen 1999) which needs to be studied in its own right (Lucas and Valli 1992; Romaine 1989). Romaine (1995) claims that mixed input can produce a 'third system'.

In situations of intense language contact it is possible for a third language system to emerge which shows properties not found in either of the input languages. Thus, through the merger or convergence of two systems, a new one can be created. (Romaine 1995:4)

If indeed the mixing of signs and words in the input leads to a third system as described by Romaine (1995), this form of input will of course influence the acquisition of the languages by the children in an important way.

1.5 Summary

In this chapter we have outlined the role of input and interaction in the language acquisition process in various theories of language acquisition. In every framework input has some role and so it is important to describe in any study. It is assumed that it has a clear role along with innate principles. We have established that a child must have access to a language to be able to acquire that language. The quantity and quality of this input may also play a role, although there is as yet no firm

quantitative evidence on lower limits or necessary features. An important distinction was made between input, uptake and intake. In the case of bilingual development, where a child is in contact with more than one language before the age of five, input can be of additional importance, amongst other things contributing to the separation of the two (or more) languages. Where mixed input is provided, a third system may develop.

In describing the language input of deaf mothers and the language development of their children in this study we hope to present a clear picture how two factors influence the acquisition process. These factors are a hearing impairment in one or both of the partners in conversation, and bilingual language input and output in two modalities. In this study we will describe the language input offered by four deaf mothers to three deaf and three hearing children, as well as the language production of the children at the ages of 1;0, 1;6, 2;0, 2;6 and 3;0. We shall give a description of the quantitative and qualitative input and output, as well as a functional and structural description. With this research we hope to contribute to greater insight into the role of input in the complex process of language acquisition in deaf and hearing children in deaf families.

In Chapter 2 we give background information on the interaction in deaf families in the Netherlands, and the literature on language input, both spoken and signed, to deaf and hearing children in deaf families, and on the language acquisition of these children.

The research questions are formulated in Chapter 3, and Chapter 4 describes the design of the study. Questions of quantity of language are discussed in Chapter 5, where we will describe the amount of language input and output produced by the deaf mothers and the children, and their language choices. Chapter 6 deals with the accessibility of the input of the deaf mothers and the output of the children. Qualitative aspects are dealt with in the following chapters. Lexical issues in input and output are described in Chapter 7, including lexical equivalents. Chapter 8 concentrates on functional and formal aspects in input and output and in Chapter 9 we will describe the grammatical structure of the input and output in the different languages used. A summary and conclusions will be presented in Chapter 10.

