International Journal of Bilingual Education and Bilingualism

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rbeb20

On the relation between the signing and reading skills of deaf bilinguals

Daan Hermans a, Ellen Ormel b & Harry Knoors a b

a Royal Dutch Kentalis, Sint Michielsgestel, the Netherlands
b Behavioural Science Institute, Radboud University Nijmegen, Nijmegen, the Netherlands

Available online: 17 Feb 2010

To cite this article: Daan Hermans, Ellen Ormel & Harry Knoors (2010): On the relation between the signing and reading skills of deaf bilinguals, International Journal of Bilingual Education and Bilingualism, 13:2, 187-199

To link to this article: http://dx.doi.org/10.1080/13670050903474093

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: http://www.tandfonline.com/page/terms-and-conditions

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.
On the relation between the signing and reading skills of deaf bilinguals

Daan Hermans\textsuperscript{a*}, Ellen Ormel\textsuperscript{b} and Harry Knoors\textsuperscript{a,b}

\textsuperscript{a}Royal Dutch Kentalis, Sint Michiels gestel, The Netherlands; \textsuperscript{b}Behavioural Science Institute, Radboud University Nijmegen, Nijmegen, The Netherlands

(Received 1 March 2009; final version received 9 November 2009)

In this paper, we will describe the theoretical underpinning of many bilingual education programs for deaf children: Cummins' Linguistic Interdependence theory. Then, we will review some of the studies that have been conducted on the relation between reading and signing skills, and discuss how difficult it is to interpret their findings within Cummins' framework. We will present new data on the relation between deaf children's vocabulary knowledge and morpho-syntactic skills in Sign Language of the Netherlands and spoken Dutch that imply that Cummins' theory may be too narrow as an educational model of bilingual programs for deaf children.

Keywords: bilingualism; deafness; linguistic interdependence

1. Bilingualism and deafness

In the first decades of the twentieth century, bilingualism was often considered to have negative consequences on cognitive development (Carrow 1957; Saer 1923; Stoddard and Wellman 1934). Stoddard and Wellman (1934), for instance, argued that proficiency in two languages retarded cognitive growth and only led to mental retardation. A change in this negative stance toward bilingualism came in the 1960s, landmarked by the study of Peal and Lambert (1962). Peal and Lambert found that bilinguals outperform monolinguals on various measures of verbal and nonverbal intelligence, especially on tests requiring mental manipulation, concept formation, and symbolic flexibility. Since the Peal and Lambert study, the positive impact of bilingualism on cognitive abilities has been demonstrated in numerous studies (for a review see Bialystok 2001).\textsuperscript{1} Nowadays, bilingualism is no longer associated with having a negative impact on cognitive development, and this positive stance toward bilingualism has been the foundation of many bilingual education programs that have been initiated in the last century.

Despite this change in the stance toward bilingualism, meeting the educational needs of all bilinguals is not unproblematic. For example, many children from diverse linguistic and cultural backgrounds (from now on referred to as minority language children) arrive at school with limited proficiency in the majority language (Krashen 1996). Educators in this field still struggle to provide these children with the appropriate educational curricula to meet their educational needs in order to achieve academic success. Nevertheless, programs in which language minority children
succeed in acquiring age-appropriate skills in all school subjects have been reported (Thomas and Collier 2002).

Many deaf children also acquire a minority language (a sign language) and a majority language (the written and spoken form of the majority language) in childhood. The realization that these deaf children and adults are bimodal bilinguals came shortly after the groundbreaking work by Stokoe and colleagues (Stokoe 1960; Stokoe, Casterline, and Croneberg 1976) and Tervoort (1973). Bilingual education programs for deaf children were initiated formally in the late 1970s. But despite the introduction of bilingual education programs for deaf children, the academic achievements of deaf children fall behind in comparison to hearing peers, most tellingly, but not only, in reading (Allen 1986; Karchmer and Mitchell 2003; Wauters, van Bon, and Tellings 2006). Thus, after the introduction of bilingual education programs, the field of deaf education is still struggling with the question of how to create circumstances under which the educational needs of deaf children can be fulfilled.

2. Theoretical underpinnings of bilingual education programs

In the last decade, our understanding of the unique characteristics of bimodal bilinguals has increased dramatically. Nevertheless, many bilingual education programs for deaf and hearing bilinguals still draw upon Cummins’ influential work as a theoretical underpinning of their literacy program, focusing mainly on his Linguistic Interdependence hypothesis (Cummins 1981, 29). This hypothesis states that: ‘To the extent to which instruction in Lx is effective in promoting proficiency in Lx, transfer of this proficiency to Ly will occur provided that there is adequate exposure to Ly (either in school or environment) and adequate motivation to learn Ly.’ This hypothesis has been supported by a vast amount of empirical research, for similar and dissimilar languages (Cummins et al. 1984; Geneese 1987; Krashen and Biber 1988; Verhoeven 1994).

In order to explain how proficiency in one language can transfer to another language in the case of dissimilar languages, like Japanese and English, Cummins posited the ‘Common Underlying Proficiency model’ (CUP) of bilingual language proficiency. Whereas surface aspects of dissimilar languages (phonology, grammar, and lexicon) are clearly separated, the underlying proficiency can be shared between languages. CUP refers to the cognitive/academic knowledge and abilities that underlie academic performance in both languages. The Linguistic Interdependence hypothesis assumes that there is no spontaneous transfer of knowledge of the surface aspects of the L1 (phonology, vocabulary, and grammar) to the L2, but underlying CUP skills will automatically transfer. Cummins (2006) argued that there are several types of transfer possible for bimodal bilinguals: (1) transfer of conceptual knowledge; (2) transfer of knowledge of language use (pragmatic knowledge); and (3) a variety of meta-cognitive and meta-linguistic strategies such as vocabulary acquisition strategies.

Furthermore, Cummins proposed that the transfer of CUP skills will only occur once bilinguals have acquired a sufficient level of grammatical and lexical skills in the L2. This hypothesis, the ‘Threshold hypothesis’, has also received considerable empirical support (Brisbois 1995; Carrell 1991; Cziko 1978; Lee and Schallert 1997; Schoonen, Hulstijn, and Bossers 1998). ² Lee and Schallert (1997), for instance, found for L1 Korean – L2 English bilinguals that bilinguals needed to establish some
knowledge of the grammar and vocabulary of English before they could successfully
draw on their Korean reading ability to facilitate reading in English.

Advocates of bilingual education programs often use Cummins’ Linguistic
Interdependence hypothesis as a theoretical underpinning (Israelite, Ewoldt, and
Hoffmeister 1992). Some proponents of so-called Bi–Bi programs have furthermore
argued that deaf children can acquire good reading skills without the involvement of
the spoken language. Mayer and Akamatsu (1996) and Mayer and Wells (1996) have
questioned to what extent Cummins’ model can be applied to the linguistic context in
which the languages in question are a native sign language and the written form of an
oral language (see also Knoors 1993). The question really is whether one of
Cummins’s conditions, ‘adequate exposure to Ly (either in school or environment)
and adequate motivation to learn Ly,’ can be fulfilled in bilingual education
programs, with and without exposure to the spoken form of the language. To us,
one of their key arguments is that hearing children initially rely heavily upon their
knowledge of the vocabulary and the grammar of the spoken language when they
learn to read. Deaf children, who cannot draw upon knowledge of the grammar and
vocabulary of the spoken form of a language, will therefore encounter more
difficulties in acquiring its written form. They will have to break the code of a new
language which, unlike any L1, is not used in a rich functional context, while they
have to acquire its grammar and vocabulary at the same time (Hermans et al. 2008a).
That does not imply that it is impossible to acquire a written language without
exposure to its spoken form, but it makes it much more difficult.

3. Studies on the relationship between signing and reading skills
In the last decade or so, researchers have started to explore the relationship between
deaf children’s reading and signing skills (Chamberlain and Mayberry 2000, 2008;
Duboisson, Parisot, and Vercaigne-Menard 2008; Fish, Hoffmeister, and Thrasher
2005; Hermans et al. 2008b; Hoffmeister 2000; Mann 2007; Niederberger 2008;
the application of Cummins’ linguistic interdependence at a theoretical level may be
not without problems, empirical studies of the relation between reading and signing
skills have consistently reported a positive relationship between deaf children’s skills
in sign language and in reading. Although these studies have enriched our
understanding of the relationship between language and linguistic proficiency of
bilingual deaf children and adults, the nature of the relationship between their skills
nevertheless remains very unclear (Hermans et al. 2008a, 2008b).

One of the earliest and most impressive studies on the relation between linguistic
proficiency in sign language and written language was conducted by Strong and Prinz
(1997). Strong and Prinz assessed the proficiency in American Sign Language (ASL)
and written English of a group of 160 deaf children between 8 and 15 years old. They
reported a strong correlation between the composite scores of the linguistic
comprehension and language tests in ASL and English, after age and nonverbal
intelligence was partialled out. Strong and Prinz concluded that bilingual deaf
children can benefit from having (even a moderate) fluency in ASL. Strong and
Prinz’s study was really the first one to establish a positive relationship between
linguistic proficiency in sign language and written language. Unfortunately, Strong
and Prinz did not analyze the relationship between knowledge of the surface aspects
(e.g. grammar, vocabulary) of ASL and written English in comparison to the
relationship between sign comprehension (e.g. surface aspects of ALS and CUP skills combined) and reading comprehension (e.g. surface aspects of English and CUP skills combined). As a consequence, it remains unclear where the relationship was localized.

Most of the early studies were interpreted as evidence for linguistic interdependence between children’s proficiency in sign language and in written language. Note that, according to Cummins’ Linguistic Interdependence theory, transfer of these surface aspects is not possible for dissimilar languages: children’s knowledge of the vocabulary and grammar of sign language cannot facilitate the acquisition of the vocabulary and grammar of the spoken language. In other words, in Cummins’ framework, automatic transfer between a sign language and a spoken/written language is necessarily restricted to conceptual knowledge and meta-linguistic and meta-cognitive strategies.

However, it is unclear to what extent Cummins’ theory is too narrow to serve as an educational model for bilingual programs: there may be interactions between the children’s lexical and grammatical knowledge in sign language and in written language that emerge from language and literacy practices in education (Hermans et al. 2008a; Mayer and Akamatsu 1999). Some evidence in support of this assumption was found in a study by Chamberlain and Mayberry (2008). They tested the linguistic comprehension skills of a group of 31 deaf adults in ASL, manual coded English (MCE) and written English, assessed their syntactic skills in ASL, and collected various ratings of print exposure and speech use and comprehension. They found that print exposure, MCE narrative skills and knowledge of ASL grammar were related to the reading comprehension scores. Chamberlain and Mayberry concluded that ASL syntactic proficiency plays a crucial role in the development of skilled reading of deaf bilinguals. Assuming that this assumption is warranted, the important question then is how syntactic skills in sign language can possibly affect the acquisition of good reading skills. No answer was provided to this question.

Mann (2007) conducted a study on the relationship between referential distinction in German Sign Language (GSL) and in written German with 117 deaf bilinguals, aged 6–18 years. Mann found a strong correlation between the bilinguals’ performances on the test assessing referential distinction in GSL and written German, and concluded that these findings are in agreement with the idea that knowledge of a first language is vital in learning a second language, regardless of modality (Chamberlain and Mayberry 2008). Niederberger (2008) investigated the relation between the narrative and morpho-syntactic skills in written French, spoken French, and French Sign Language (LSF) of a group of 39 deaf bilinguals, aged 8–17. Niederberger found that the morpho-syntactic (and narrative) skills of the bilinguals were correlated in written French, spoken French, and LSF, and concluded that there are interactions between deaf children’s knowledge of the grammar of LSF and their knowledge of the grammar of written and spoken French.

Other studies have started to investigate the relationship between vocabulary knowledge in sign language and in spoken/written language (Fish, Hoffmeister, and Thrasher 2005; Hermans et al. 2008b; Ormel 2008). Hermans et al. (2008b) investigated the relationship between the sign and reading vocabularies of a group of 87 deaf children in bilingual education programs, aged 8–12 years. A vocabulary task was administered in Sign Language of the Netherlands (SLN) and written Dutch. Hermans et al. found a significant correlation between the scores children
obtained in the sign vocabulary task and the reading vocabulary task when age, short-term memory, and nonverbal intelligence were controlled for.

In a longitudinal study, Ormel (2008) investigated how language skills (sign vocabulary, speech vocabulary, and fingerspelling), meta-linguistic skills (sign phonological awareness and speech rhyme), and cognitive skills (short-term memory) of 62 deaf children from bilingual programs, aged 8–12 years, were related to their reading skills one or two years later. The children’s knowledge of the grammar in SLN and spoken/written Dutch was not assessed. Most importantly for the present study, Ormel found a correlation between deaf children’s receptive vocabulary knowledge in spoken Dutch and in SLN after age was partialled out.

4. The present study

As pointed out earlier, Cummins’ Linguistic Interdependence hypothesis does not allow for transfer between the surface aspects of languages. Nevertheless, the empirical studies by Hermans et al. (2008b), Mann (2007), Niederberger (2008), and Ormel (2008) suggest that there is a relation between the vocabulary knowledge and morpho-syntactic skills of deaf children in sign language and in written/spoken language. These studies seem to confirm the notion that the Linguistic Interdependence theory may be too narrow as an educational model for bilingual programs for deaf learners.

However, neither in the Mann (2007) nor Niederberger (2008) studies, was the age of children taken into account in the analyses on the relation between their skills in both languages. Therefore, it’s difficult to determine to what extent the data actually support this conclusion. An alternative and very likely explanation is that bilinguals acquired more morpho-syntactic skills in GSL/LSF and in written German/written French as they got older. In the next study, we will present new data that may clarify this issue. In this study, we collected data on the expressive vocabulary and morpho-syntactic skills in SLN and spoken Dutch of a group of 75 deaf children, aged 4–8, from bilingual education programs. On the basis of the median age of the group, the whole group of children was divided into two groups: the younger children (age 4.1–5.6) and the older children (ages 5.7–8.10). This manipulation was conducted to investigate how the relation between children’s expressive vocabulary and morpho-syntactic skills in SLN and spoken Dutch may change as they get older.

4.1. Participants

Seventy-five deaf children (37 boys and 38 girls) from bilingual education programs participated in the study (see Table 1). Their age varied between 4.1 and 8.10 (average 5.10). All children had a hearing loss of more than 80 dB in the best ear (unaided), had normal nonverbal intelligence, and did not have additional known handicaps. Forty-six children wore a cochlear implant. The children and their parents were all born in the Netherlands. Seventy children had two hearing parents, whereas five children had one or two parents with a hearing loss.

For 75 deaf children, data on tests regarding their expressive vocabularies in SLN (T-NGT; Hermans, Knoors, and Verhoeven 2007) and in spoken Dutch (Schlichting-WO; Schlichting et al. 1998) were available. For 74 deaf children, data on their expressive syntactic skills in SLN (T-NGT; Hermans, Knoors, and Verhoeven 2007) and in spoken Dutch (Schlichting-ZO; Schlichting et al. 1998) were available.
4.2. Tests

4.2.1. Sign language skills

Two sign language tests were administered: an expressive SLN vocabulary test and an expressive morpho-syntactic test. The tests were developed and administered as part of the development of an assessment instrument for SLN (Hermans, Knoors, and Verhoeven 2007). In the vocabulary test, children saw a picture on a computer screen, and were instructed to name the picture in SLN. The vocabulary task consisted of 54 items. In the morpho-syntactic test, a picture (for instance, a picture of a boy giving a book to a girl) was presented on the computer. Next, an SLN video was presented on the screen in which the picture was described in SLN (BOY INDEX1/GIRL INDEX2, BOOK 1GIVE2). Next, a second picture was presented on the screen (for instance, a picture of a girl giving a flower to a boy). Children were instructed to describe the second picture in SLN. The purpose of presenting the first picture and its description in SLN was to elicit an appropriate response to the second picture. In a three-year longitudinal norming study, the sign vocabulary and morpho-syntactic tasks were administered to a group of 330 deaf children between 4 and 12 years old from bilingual education programs. To assess the reliability of the sign language tests, Cronbach’s alpha coefficients were computed for each age group. The alpha coefficient for the different age groups varied between 0.86 and 0.90 (average 0.88) for the expressive sign vocabulary task and between 0.78 and 0.90 (average 0.86) for the expressive morpho-syntactic task.

4.2.2. Spoken language skills

The Schlichting test for language production measures children’s language production skills in spoken Dutch. The test was developed by Schlichting et al. (1998), and consists of four subtests. Two subtests, the Schlichting-WO (test for expressive vocabulary knowledge) and the Schlichting-ZO (test for expressive morpho-syntactic skills) are frequently administered to (deaf and hearing) children in primary education. The Schlichting-WO consists of 62 items (concrete objects and pictures) that have to be named in spoken Dutch. The Schlichting-ZO consists of 40 items, in which children’s knowledge of various morphological and syntactic aspects of spoken Dutch is assessed. The test has been normed for ‘normally’ developing children between 1.3 and 6.3 years, but can be (and frequently is) administered to hearing and deaf children who are delayed in the acquisition of vocabulary knowledge and

Table 1. Number of participants (N), mean age (age), gender (gender), parental hearing, CI, and ethnicity of the parents for the children who participated in the present study.

<table>
<thead>
<tr>
<th>Participants</th>
<th>All</th>
<th>Younger</th>
<th>Older</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>75</td>
<td>37</td>
<td>38</td>
</tr>
<tr>
<td>Age</td>
<td>5.10 (4.1−8.10)</td>
<td>4.8 (4.1−5.4)</td>
<td>7.0 (5.7−8.10)</td>
</tr>
<tr>
<td>Gender</td>
<td>37 boys, 38 girls</td>
<td>18 boys, 19 girls</td>
<td>19 boys, 19 girls</td>
</tr>
<tr>
<td>Parental hearing status</td>
<td>70 hearing, five deaf/hard-of-hearing</td>
<td>34 hearing, three deaf/hard-of-hearing</td>
<td>36 hearing, two deaf/hard-of-hearing</td>
</tr>
<tr>
<td>CI</td>
<td>46</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>Ethnicity parents</td>
<td>All Dutch</td>
<td>All Dutch</td>
<td>All Dutch</td>
</tr>
</tbody>
</table>
morpho-syntactic skills in spoken Dutch. To assess the reliability of the spoken language tests, Cronbach’s alpha coefficients have been computed for each age group. The alpha coefficient for the different age groups varied between 0.78 and 0.94 (average 0.87) for the expressive vocabulary task and between 0.77 and 0.92 (average 0.85) for the expressive morpho-syntactic task.

4.3. Procedure

Children were tested individually. The SLN tests were administered by third and fourth-year students who were trained to become sign language interpreters or sign language teachers. Children were instructed in SLN. The children were tested in sessions that lasted between 20 and 40 min. The spoken Dutch tests were administered to the children by their speech therapist.

4.4. Results

Table 2 shows the average scores of the children on the four subtests as a function of the age group they were assigned to. Partial correlations were computed between the scores on the expressive vocabulary and morpho-syntactic tests in SLN and spoken Dutch. As shown in Table 2, the overall correlations between SLN and spoken Dutch were significant for the vocabulary tasks ($r = 0.367$, $p < 0.01$), but not for the morpho-syntactic tasks ($r = 0.219$, $p > 0.1$).

Furthermore, scores on the expressive vocabulary test in SLN and spoken Dutch were correlated for the group of older children ($r = 0.490$, $p < 0.01$), but not for the younger children ($r = 0.084$, $p > 0.1$). Similarly, scores on the expressive morpho-syntactic skills test in SLN and spoken Dutch were correlated for the group of older children ($r = 0.346$, $p < 0.05$), but not for the younger children ($r = -0.179$, $p > 0.1$).

5. Discussion and conclusion

The present study revealed a relationship between deaf children’s expressive vocabulary knowledge and morpho-syntactic skills in SLN and in spoken Dutch, but this relationship was not observed for deaf children who had just entered primary education (age 4.1–5.6). For the older children (age 5.7–8.10), morpho-syntactic skills and vocabulary knowledge in ASL and in spoken Dutch were significantly correlated, replicating the findings by Hermans et al. (2008b), Mann (2007), Niederberger (2008), and Ormel (2008). The present results pose two questions: (1)

<table>
<thead>
<tr>
<th>Expressive vocabulary</th>
<th>Expressive morpho-syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SLN</td>
</tr>
<tr>
<td>Young</td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>22.2 (11.5)</td>
</tr>
<tr>
<td>Older</td>
<td>39.3 (19.1)</td>
</tr>
<tr>
<td>All</td>
<td>31.0 (18.0)</td>
</tr>
</tbody>
</table>

*p < 0.05, **p < 0.01.
'Why is there a correlation between vocabulary knowledge and morpho-syntactic skills in SLN and spoken Dutch?' and (2) 'Why does this correlation only manifest itself in older children?'

To start with the first question: Cummins’ theory very rightly assumes that language proficiency will not automatically transfer from the L1 to a dissimilar L2. Obviously, this does not mean that language proficiency in the L1 cannot be exploited in educational practices to acquire the L2. To illustrate, teachers within bilingual education programs for deaf children have been found to cultivate associations between signs and words to teach deaf children new reading vocabulary (Evans 2004; Humphries and MacDougall 2000; Padden and Ramsey 2000). Padden and Ramsey found that teachers in reading instructional practices explicitly linked written words, fingerspelling, and signs together. Intervention studies have indeed shown that it seems effective to exploit deaf and hard-of-hearing children’s knowledge of signs for the acquisition of written words (Wauters et al. 2001) and spoken words (Mollink, Hermans, and Knoors 2008), although representational and processing consequences have not been addressed in these studies (Hermans et al. 2008a). Similarly, deaf children’s knowledge of the grammar of sign language may be exploited during the acquisition of the grammar of the spoken/written language, both by their teacher and speech therapists (Figure 1; Mayer and Akamatsu 1999; Paul 1998).

We will refer to the positive impact of such practices as ‘cultivated transfer.’ In other words, automatic transfer between a sign language and a written language will indeed limit itself to cognitive skills and conceptual knowledge (Cummins 2006), but the acquisition of language skills in the written language may be facilitated by exploiting children’s knowledge of sign language. In this way, Figure 1 may perhaps illustrate a more adequate or useful educational model of language proficiency in deaf children in bilingual education programs. The relation we found in the present

![Figure 1](image-url)
study for the older children regarding their vocabulary knowledge and morpho-
syntactic skills in SLN and in spoken Dutch is consistent with this notion of
‘cultivated transfer.’ Speech therapists and teachers in bilingual education programs
often exploit children’s knowledge in SLN to teach them new vocabulary and
syntactic rules in written and spoken Dutch. The more proficient deaf children are in
SLN, the more efficient such techniques will be. As a consequence, deaf children with
good signing skills (vocabulary knowledge and morpho-syntactic skills) will profit
more from cultivation techniques in comparison to deaf children with moderate or
poor signing skills. Perhaps that is also the explanation as to why the correlation
between the children’s vocabulary knowledge and morpho-syntactic skills in SLN
and spoken Dutch was not observed for children who had just entered primary
education; their signing skills may not yet have been developed to a level where
cultivation actually can occur. As the present study implies that the language
systems of deaf bilinguals can interact, for instance through cultivation of children’s
knowledge of the grammar of sign language to teach them the grammar of the
spoken or written language, the next logical and more important step is that we need
to describe and evaluate the language and literacy practices of teachers and speech
therapists.

Figure 1 also demonstrates the need for empirical studies to assess the children’s
proficiency in the spoken language in empirical studies on the relation between the
children’s skills in both languages (Hermans et al. 2008b). To our knowledge, the
Niederberger (2008) study is the first study in which, in addition to children’s
morpho-syntactic skills in sign language and in written language, children’s skills in
the spoken language were assessed as well. Interestingly, the correlation between
children’s morpho-syntactic skills in written and spoken French seems to be much
higher (0.544 for production and 0.715 for comprehension) than the correlation
between children’s morpho-syntactic skills in LSF and written French (0.343 for
production and comprehension combined). This may indicate that having good
morpho-syntactic skills in spoken language will facilitate the acquisition of reading
to a larger extent than having good morpho-syntactic skills in sign language.
Alternatively, children may have acquired better morpho-syntactic skills in the
spoken French as a result of acquiring these skills in written French.

In order to optimize bilingual education programs for deaf children, we need a
detailed understanding of deaf children’s cognitive skills and conceptual knowledge
required for sign comprehension, listening comprehension, and reading comprehen-
sion, their knowledge of the vocabulary and grammar of sign language and the
written and spoken language, and the interplay between these language cognitive
systems as a result of automatic and cultivated transfer. This implies that we need to
measure deaf children’s language proficiency (grammar and vocabulary) and
linguistic proficiency (language comprehension) in sign language and in the written
and spoken form of the language in longitudinal designs and relate these studies to
the language and literacy practices in their schools. That is presumably a huge
challenge, but it will be necessary to improve our understanding of deaf children’s
acquisition of language and literacy skills.

Notes
1. Emmorey et al. (2008) have recently found evidence which suggests that the positive
impact of bilingualism may not (always) manifest itself in bimodal bilinguals. They tested
15 unimodal bilinguals, 15 bimodal bilinguals, and 15 monolinguals in a flanker task, and
found that only unimodal bilinguals were equally fast on congruent and incongruent trials. They argued that for the enhancement of executive control in bilinguals, it is necessary that a bilingual's languages compete for selection (see Hermans 2000; Hermans et al. 1998), and argued that lexical competition is absent for bimodal bilinguals.

2. The validity of an absolute threshold has been questioned (Macswan 2000; Martin-Jones and Romaine 1986; Takakuwa 2003). Takakuwa (2003), for instance, has argued the concept of absolute thresholds has never received any empirical support. Most importantly for the present paper, the degree to which L2 learners can exploit CUP skills acquired through learning a first language during second learning is dependent upon their knowledge of the grammar and vocabulary of the L2.

3. Their conclusion must be interpreted with caution as: (1) knowledge of the grammar of English was not measured, (2) ASL narrative skills were not entered into the regression analyses, and (3) correlation is not causation.

4. The number of deaf children who enroll in mainstream education programs in the Netherlands is still growing. Most of these children who enroll in mainstream education wear cochlear implants. They have acquired reasonably good production and comprehension skills in spoken Dutch, and acquire higher levels of literacy in comparison to deaf children without cochlear implants (Vermeulen et al. 2007). The deaf children in bilingual education programs who wear cochlear implants are not at all a representative sample of all the deaf children with cochlear implants in the Netherlands. As a consequence, it is not really informative to investigate the language skills of deaf children with and without a cochlear implant in the present study.

5. Although it may be effective to teach deaf children new vocabulary in the written and spoken form of the majority language, this does not necessarily imply that deaf children develop precise (in terms of their syntactic and morphological specifications), and redundant (necessary for fast and automatized access) representations that can be effectively assessed in reading (Hermans et al. 2008a). We will not explore this issue further in the present paper.

6. This observation was actually the motivation for the intervention study conducted by Mollink, Hermans, and Knoors (2008). The first author works at one of the special schools for the deaf in the Netherlands. Like many other colleagues, she tries to exploit deaf children's knowledge of sign language in their speech therapy sessions.

7. Although sign language is clearly the most accessible language for most deaf children, it is their mother tongue for only approximately 5–10% of the deaf children. Most deaf children learn a sign language from hearing parents who often start to learn sign language themselves when the deafness of their child has been detected. These hearing parents are limited in their ability to respond intuitively to deaf children due to their limited signing skills (Spencer and Lederberg 1997). Deaf children differ considerably in their skills in SLN when they enter primary education. The differences between the signing skills of deaf children of deaf parents and deaf children of hearing parents are large and many deaf children of hearing parents are delayed in the acquisition of their signing skills (Hermans, Knoors and Verhoeven, in press).

8. Note that whereas knowledge between the surface aspects of a sign language and a spoken/written language must be cultivated, the transfer of knowledge between the spoken and written forms of a language is automatic, especially in the case of morpho-syntactic skills. For deaf children (with cochlear implants) who have reasonably good skills in the spoken language (or have the potential to acquire skills in spoken language), acquisition of spoken language skills will automatically contribute to their reading skills (Hermans et al. 2008a). For those children, focusing on the development of language skills in the spoken language may be the most efficient way to acquire literacy.

References


