Sign Bilingualism in the Age of the Cochlear Implant

Deaf Education: Changed by Hearing Technology
Ear Foundation and Phonak
June 2013

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An educational response to address the poor language and literacy outcomes of deaf and hard of hearing (DHH) learners

- In step with the zeitgeist of the late 20th century
- Bilingual programming more broadly
- Recognition of natural signed languages
- Deaf President Now
- Reframing notions of disability
Promise of Sign Bilingual Education

Informed by the linguistic interdependence hypothesis (Cummins, 1981)

- A natural signed language (e.g., ASL, BSL) would be acquired and function as L1 for communication & cognition
- L1 proficiency would underpin L2 (e.g., English) language and literacy development
- Conceptual and linguistic knowledge would transfer across languages (40 years of evidence from hearing contexts)
- Age-appropriate development in reading and writing (Wilbur, 2000)
Although two languages may seem separate on the surface they are interrelated at the deeper level of cognitive functions.

Students who learn to read and write in their L1 are able to readily transfer those abilities to an L2 (Garcia, 2009).

Assumption that proficiency in a natural signed language as L1 would support development of literacy in L2.
Common Underlying Proficiency Makes Possible the Transfer of Cognitive Academic or Literacy Related Skills Across Languages
Research Evidence

Studies often cited as support (e.g., Hoffmeister et al., 2000; Padden & Ramsey, 2000; Prinz & Strong, 2000; Singleton et al., 2001, Svartholm, 2010) – for a review see Mayer & Akamatsu, 2010

- Few studies, no longitudinal data
- Findings correlational not causal
- No outcome data reported re: reading and writing levels
- Tend to be descriptive accounts of programs and strategies (Mashie, 1995; Livingston, 1997; Svartholm, 2007)
- Focus on the early years before a gap is evident
- Need to account for spoken language as well as sign language skills (Hermans et al., 2008)
- Deaf students still performing well below hearing age peers
<table>
<thead>
<tr>
<th>Deaf, Low ASL</th>
<th>Deaf, High ASL</th>
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<tbody>
<tr>
<td>I rabbit</td>
<td>Turtle and Rabbit Race Try</td>
</tr>
<tr>
<td>I turle</td>
<td>Who win turtle</td>
</tr>
<tr>
<td>I can fast rabbit</td>
<td>Rabbit sleep tiptoe Turtle and Wake Rabbit</td>
</tr>
<tr>
<td>I can fast win turle</td>
<td>Miss Race Laugh</td>
</tr>
<tr>
<td>I can win chase</td>
<td>Turtle walk slow</td>
</tr>
<tr>
<td>I can win chase rabbit</td>
<td>Rabbit Sleep</td>
</tr>
<tr>
<td>I can win chase turle</td>
<td>Turtle Puzzle</td>
</tr>
<tr>
<td>I am can win bed</td>
<td>Worry</td>
</tr>
<tr>
<td>I am can win rabbit bed</td>
<td>Ignore</td>
</tr>
<tr>
<td>I am can win turle bed</td>
<td>elft turtle</td>
</tr>
<tr>
<td>I am can win under rabbit bed</td>
<td>Not Fair Win</td>
</tr>
<tr>
<td>I am can win rabbit and turle</td>
<td>Told Wirn</td>
</tr>
<tr>
<td>bed yes</td>
<td>Smat Learn</td>
</tr>
<tr>
<td>I am can win fight</td>
<td></td>
</tr>
<tr>
<td>I am can will win rabbit turle</td>
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</tbody>
</table>
The Center for ASL/English Bilingual Education and Research (CAEBER) envisions high academic achievement for deaf and hard-of-hearing students by facilitating proficiency in both American Sign Language and English.
Impact Question #1:
What is the impact of the ASL/English bilingual project on SAT9 English scores (for students 8-18 years)?

http://caeber.gallaudet.edu/assets/PDFs/resources/year5.pdf
“For the older group (13-18 years of age) of deaf students, the Stanford-9 scores for deaf students nationwide were significantly higher than those of the ASL/English bilingual students on the English vocabulary subtest only. Mean score differences between the national norms and ASL/English bilingual students did not reach statistical significance for the reading comprehension and the English language subtests” (p. 64)
teach me eagle
said fine right ok
fly How must have
egg older can fly
barn horse run
hit barn and end the
“Controversies surrounding bilingual education for Deaf children – specifically the extent to which American Sign Language should be used as a medium of instruction - and the degree to which linguistic and conceptual transfer will occur from ASL to written English continues to be a high stakes issue” (Cummins, 2000).
How have cochlear implantation and other advances in amplification technologies impacted the context for sign bilingualism? (Mayer & Leigh, 2010)

What is the future for sign bilingualism in the “age of the cochlea”? (Humphries, 2011)
Linguistic Interdependence

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Linguistic Interdependence

Complex set of interactions between bilingualism and development - sometimes benefits, sometimes deficits and sometimes no consequences (Bialystok, 2001)

Issues related to:

- What transfers across languages?
- What is constrained? Enhanced?
- What is the nature of transfer between ASL/BSL and English?
- How this is impacted by the sociocultural context (e.g., family, community, education)?
Nature of the Transfer

Stronger evidence for transfer between written L1 & L2

Metalinguistic skills often transfer from L1 to L2

Only a limited number of vocabulary and syntactic structures transfer (Marinova-Todd & Uchikoshi, 2011)

No matter how much transfer of high order (metalinguistic) reading & writing ability crosses over the 2 languages, language specific skills in the L2 are still necessary (Bialystok, 2004)
Nature of the Transfer

Negative, positive or no transfer from L1 to L2 language and literacy proficiencies (Bialystok, 2011)

Not unconditional (Baker, 2006)

- Home/School environment
- Individual aptitudes
- Relationships between the L1 & L2 (English-Spanish vs. English-Chinese)
- L1 proficiency
How does language underpin the development of literacy?

Comment le langage est-il à la base de la littératie?

语言如何为读写能力打下基础？

Wie untermauert Sprache die Entwicklung der Lese- und Schreibfähigkeit?
Metalinguistic Transfer
Sufficient exposure to L2 input (Cummins, 1998, 2000)

- “In order to read [and write] in a second language, a level of second language ability must be achieved” (Bernhardt & Kamil, 1995)
- “L1 reading performance can only begin to correlate substantially with L2 reading after knowledge of L2 has attained a threshold” (Hulstijn, 1981)
- “L1 proficiency alone is not sufficient for development of literacy in L2” (Mayer & Leigh, 2010)
Inner Greek → Spoken Greek → Written Greek

Spoken English

Inner English ——————————> Written English

Transfer from written Greek to written English
Proficiency in spoken English supports development of written English
Little/no transfer from spoken Greek to written English
Linking Signed L1 & Literacy in L2

Inner ASL → Signed ASL → Written ASL?

Spoken English

Inner English ← Written English

No transfer possible between written forms of L1 & L2

Proficiency in spoken English to support development of written English?

Little/no transfer between signed ASL and written English
Weak language base in L2

- Face to face form of English not well developed in most deaf learners
- No easy access to spoken form of L2
- Argued it can be bypassed

No written form of L1 to support transfer between texts

No evidence of positive change in reading/writing outcomes
“Policy makers need to realize that conceptual and linguistic growth are dependent upon opportunities for interaction in both the target language and the L1” (Cummins, 1991)

“It is not the presence of ASL (or BSL) but the absence of some form of face-to-face English that is at issue, and the challenge for educators in bilingual programs is to sort out the balance between the two languages that allows for sufficient opportunities for the development of both.” (Mayer, 2007)
Changes in Medical Technologies

Universal Newborn Hearing Screening (UNHS)

Average age of identification has decreased from 2.5 years to 6 months or less
Changes in Amplification Technologies

Cochlear implants
- Increasing numbers
- Bilaterals implants
- Implantation at earlier ages

Digital hearing aids

BAHAs

Middle ear implants

Wireless/FM
Developing a First Language
(adapted from Mayer & Wells, 1996; Mayer, 2007)

<table>
<thead>
<tr>
<th>Goal</th>
<th>Spoken language as L1</th>
<th>Natural signed language as L1</th>
</tr>
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<tbody>
<tr>
<td>Acquiring the First Language (L1) (from/before birth)</td>
<td>Spoken L1</td>
<td>Signed L1</td>
</tr>
</tbody>
</table>

To acquire language a learner must have:

- ✓ Exposure in quality and quantity
- ✓ To an accessible language
- ✓ While engaged in meaningful activity
- ✓ With capable users of the language
Challenge for Deaf Learners

- Exposure in quality and quantity
- To an accessible language
- While engaged in meaningful activity
- With capable users of the language
Many deaf children evidenced delayed development in a first language (L1)

- Limited language for communication and interaction
- Negatively impacted cognitive development
- Weak basis for schooling and academic pursuits
- Poor foundation for learning and literacy development

Could be characterized as having an L.5
Signed languages (i.e., ASL, BSL) fully accessible

- Viewed as natural L1 for deaf learners
- All languages, whether spoken or signed, have the capacity to function as tools for communication and cognition (Mayer & Wells, 1996)
- No reason to expect that ASL or BSL would not function in this way for deaf learners
- Having a language far superior than having no language
- Provide basis for learning and literacy development
To acquire language a learner must have:
✓ Exposure in quality and quantity
✓ To an accessible language
✓ While engaged in meaningful activity
✓ With capable users of the language

95% of deaf children born to hearing parents

Environment not populated with capable users of a natural signed language

To what extent could ASL or BSL develop as L1?
Accessibility through Signed Language

- Exposure in quality and quantity
- To an accessible language
- While engaged in meaningful activity

X With capable users of the language

(Mayer, 2010)
Lack of evidence that L1 in a signed language has developed for most deaf learners

- Indications that proficiency in Auslan as L1 not well developed (Leigh & Johnston, 2004)
- Few assessment tools to measure competencies in a natural signed language
- Some available in BSL & Auslan

Have we moved beyond an L.5?
BICS (Basic Interpersonal Communication Skills) = language use in the dynamic mode, high frequency vocabulary, simpler structures, conversational proficiency

CALP (Cognitive Academic Language Proficiency) = language use in the synoptic mode, lower frequency vocabulary, more complex grammar & syntax, academic proficiency

An L.5 -> weak control of all aspects of language but especially CALP
To acquire language a learner must have:
✓ Exposure in quality and quantity
✓ To an accessible language
✓ While engaged in meaningful activity
✓ With capable users of the language

Cochlear implants and other amplification technologies provide access to auditory-oral input for most DHH children. Allows for development of the spoken form of a language. Can/should English (or another spoken language) be the L1 for most DHH learners?
Improved access to a spoken L1 (English) via amplification technologies for many deaf children

- Fewer parents choosing sign language as the first option – seems incompatible with a cochlear implant
- Fewer deaf children will acquire ASL or BSL as L1 - if they ever did
- Visual channels for representing English can provide additional or primary support for L1 development (speechreading, cued speech, fingerspelling, contact sign)
- ASL or BSL not the natural L1?
Model 1 (see Stredler-Brown, 2010)

A__________________________________________________V
English

Model 2 (Mayer, 2012)

A__________________________________________________V
Spoken English

V__________________________________________________V
BSL, ASL

V__________________________________________________V
Speechreading
Cueing
Signing

V__________________________________________________V
BSL, ASL
A role for Total Communication in 2012?
Connie Mayer seeks to explain the benefits of this comprehensive communication approach

Total Communication (TC) is arguably one of the most misunderstood terms in the field of deaf education. These misunderstandings relate both to the definition of the term and to the ways in which it has traditionally been realised in practice. Questions have been raised as to whether TC is still relevant following moves to models of sign bilingual education, and more recently in the context of earlier intervention as a consequence of neonatal screening and improvements in amplification technologies, including cochlear implants (CIs).

Nature of Total Communication
Total Communication was introduced to the field in the 1970s at a time when providing access to spoken language for learners with profound hearing loss via the auditory channel alone was extremely challenging. The thinking was that educators could exploit a range of modalities (speech, sign, print) alone – or in combination – for communication and language development. In this sense it should be viewed not as a methodology but rather as a philosophical approach in which access to language by whatever means possible is paramount. Because spoken language was an aspect of this approach, it also included the use of both personal and group amplification.

Although it is often described as 'speaking and signing at the same time' or 'simultaneous communication' (SC), it must be emphasised that this is not an accurate description of TC, and the two terms are not synonymous. TC is much more flexible than SC in that it allows for speaking only, signing only, or speaking and signing at the same time depending on the communication needs of the learner.

Total Communication in practice
One of the most appealing aspects of a Total Communication approach lies in its flexibility. In allowing for the use of a range of modes for developing communication and language, it can be implemented in practice in ways that best meet the needs of individual deaf learners. For example, the teacher may sign and speak when working with the group and use only spoken language when interacting with a single child who has more auditory potential. Or there might be more emphasis placed on using elements of signed English (for example, markers for verb endings) in a reading/writing lesson.

One of the ongoing challenges to implementing a TC philosophy has been the lack of teachers who are skilled at implementing it – especially in knowing how to combine the modes effectively. Even though it has been an aspect of deaf education for more than 40 years, it is often a focus in teacher education programmes.

There are also misperceptions on the part of some individuals as to the extent that learners can understand signed forms of English; the relative roles played by signed and spoken language; and the extent to which amplification is used. These misunderstandings are reinforced as TC does tend to 'look different' in practice, depending on the context. While this could be viewed as a product of the flexible nature of the approach, it is often seen as a weakness rather than as strength.

Arguments have even been made that because there is so much misunderstanding of the term TC, the concept should be re-named. Suggestions have been made to call it a multi-modal or a comprehensive approach as these are seen as more suitably capturing the essence of the philosophy.

Moving forward
In contrast to the era when TC was first introduced, the majority of deaf children in 2012 are now able meaningfully to access spoken language through the use of CIs and improved hearing aids. That said, there continue to be learners for whom the auditory channel must be supported by visual input (for example, speechreading or signed language) for language to be acquired. Or it may be the case that they need this visual support at certain stages of their development (for example, before implantation) or in certain communication situations (for example, in a poor listening environment such as a mainstream classroom).

It could be argued that TC is a perfect fit to meet the needs of this population of deaf learners. Its flexible approach allows teachers to support spoken language input with sign to the extent that is needed for that learner. The key point here is that the signed input can be accompanied
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What is the “natural” L1 for DHH children?

- ASL? BSL?
- English?
- Another spoken language?

Possibilities for bilingualism in two spoken languages? In a spoken and a signed language?

- Simultaneous Bilingualism?
- Sequential Bilingualism?
“The challenge (and opportunity) to respond flexibly to an emerging new era in the education of deaf children is one that must be accepted if the diverse needs of all deaf learners are to be accommodated and the relative benefits of all possible language and communication options are to be demonstrated.”

(Mayer & Leigh, 2010)


