

A Sketch on Reading Methodology for Deaf Children

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Abstract

A well-established reading methodology is much needed in the field of deaf education. While the concept of signed language reading is intriguing and underappreciated, it has some of the clearest implications for how to teach reading to deaf children. This paper begins by covering historical attempts to have deaf children learn to read in signed language. The distinction between signed language reading and spoken language reading is part of the paper's creation of a cohesive theoretical basis outlining best reading instruction practices. A key element of the discussion is how deaf children find text readable when it represents the language that they know, American Sign Language (ASL). This includes utilizing glossing as an intermediary system and reading methodology which enable deaf children to experience a transition to English literacy, all the while learning to read in ASL. Some indications of signed language reading (associated with glossing) are laid out through a review of published research reports. Deaf children in a charter school setting are highlighted in a variety of reading behaviors resembling hearing learners in early elementary school years. Signed language reading incorporates parallel concepts such as sounds, phonics, phonemic awareness, reading-aloud, and sounding out. The paper's emphasis on the liberal application of key concepts for reading processes produces a scenario where deafness may no longer serve as a barrier to reading.

Introduction

Teaching deaf children how to read is highly desirable, yet elusive. With this paper, the focus is on understanding reading methodology and how it can help deaf children learn to read. Over the years, educators have debated language issues that are still relevant today. However, the primary function of a school is to teach reading and writing skills. Thus, to help redirect educators towards literacy with deaf children, a formal distinction between signed language reading and spoken language reading must be made. This begins a dialogue on how deaf children can best learn to read. Not only are American Sign Language (ASL) and English two distinct languages, they represent languages in two different modalities: signed vs. spoken (Singleton, S. Supalla, Litchfield, & Schley, 1998). Deaf children are known for being native signers and thinking and processing in signed language (Lane, Hoffmeister, & Bahan, 1996). This prevalence of signed language knowledge must be seen as an asset in considerations of reading pedagogy. This includes making ASL text a part of deaf children's reading development experiences.

With English, the reading situation is understandably problematic for deaf children as they do not hear the language in question. This is where spoken language reading has serious limitations. Children born profoundly deaf or becoming deaf before the age of two would not have the ability to internalize English and utilize the spoken language knowledge for reading development purposes. Descriptions of the experience of learning to read in English as bewildering for deaf children (Hoffmeister & Caldwell-Harris, 2014) is especially troubling. A child who can hear would have spoken language knowledge in place and use it as a reference point for learning to read English. In contrast, the deaf child does not have this type of

knowledge to help with the reading process (Paul & Quigley, 1987; see Paul, 1994 for further discussion on the reading complications that arise for deaf children with English). In a typical classroom with deaf children in a school for the deaf, the print has been strictly limited to English. Yet these children know ASL, and thus written English is foreign and inaccessible.

With the provision of ASL text, deaf children integrate their knowledge with linguistic concepts, which is the most important principle for reading instruction. Reading then has the potential to become effective along a trajectory of teachable skills. Equally important is the prospect for deaf children to experience a transition to English literacy at the same time. Goldin-Meadow and Mayberry (2001) proposed that an intermediary system be developed for deaf children so that they could map ASL onto English literacy for optimal learning outcomes. While the intermediary system idea is novel and intriguing, details on what it might look like are lacking. This paper intends to detail an innovative reading instruction approach called glossing. Glossing is identified in this paper as the intermediary system that was implemented in a charter school in Arizona. ASL text is part of this framework along with other tools and procedures.

This represents an important difference from hearing children, as they normally learn to read in just one language. If they had to learn another language, they would repeat the reading process in ways similar to the first language. This reinforces the idea that “[second language or L2] proficiency is a vital prerequisite to efficient L2 reading,” a statement by the L2 reading theorist, Keiko Koda (2005, p. 23). What this suggests is that deaf children must learn spoken English in order to read it effectively. This is clearly unfair due to their disability. It is clear that the established reading theories account for one language mapping only for monolingualism and bilingualism (e.g., Adams, 1990; Grabe, 2009; Hoover & Gough, 1990; Koda, 2005; Snow, Burns, & Griffin, 1998). As discussed in S. Supalla and Cripps (2011), hearing children do not use one language to decode another language (based on current reading methodologies), but this is precisely what deaf children are required to do. Glossing, a cross-linguistic reading instruction approach, provides insights and methodological details for improving this situation.

A review of research literature on glossing will follow, emphasizing a variety of ASL reading behaviors that deaf children at the Arizona charter school modeled, and a comparison to what is known for spoken language reading. To help create a strong sense of background on signed language reading, the paper will begin with a discussion of efforts occurring in the early nineteenth century. Perhaps a surprise to many in the field of deaf education, signed language reading was actively pursued at that time. However, readers will learn that a different signed language reading model was pursued instead of glossing. Coverage of previous efforts will point to the strengths of glossing as a reading methodology for deaf children.

Early Attempts with Signed Language Reading

At the time of writing this paper, American deaf education has reached its 200-year mark, but the field has a longer history, considering that the world’s first public school for the deaf was founded in Paris, France. This school served as a model for many nations worldwide, including the United States (Van Cleve & Crouch, 1989). At the Paris school for the deaf, the concept of signed language reading was first explored. However, the French educators were largely occupied with language issues before shifting their attention to reading issues. This is understandable as reading is contingent on language. The important question raised at the time was whether signing should approximate the structure of French or best stood as a distinctive language. When the school was opened, a signed version of French was developed and used with

deaf children. Knowing French through the signed medium was thought to help deaf children with learning to read in French (see Mayer & Wells, 1996 for a similar assumption concerning signed English as used in the United States and Canada). However, through the test of time educators came to the conclusion that Natural Sign (the name they gave to the communication system that deaf children used among themselves) was the better choice (see S. Supalla & McKee, 2002 for a psycholinguistic explanation on why a sign system modeling the structure of a spoken language is ill-advised and problematic). Although Natural Sign was not French, the idea of deaf children using a language that worked for them superseded the educators' intention of confining deaf education to the French language.

French educator, Roch-Ambroise Bébien initiated the signed language reading movement. The logic was that if Natural Sign is deaf children's language, reading must then be taught in that language (see Grushkin, 2017 for a similar argument for ASL and deaf children). Bébien found himself involved in the creation of a writing system called Mimography (Lane, 1984a). The term was apparently chosen to reflect Natural Sign's 'mimetic' characterization involving hand movements. Bébien published work on Mimography in 1817 and 1820 (Lane, 1984b; alternatively 1825 as reported in Rée, 1999). Bébien can be described as belonging to a new generation of educators that were ready to pursue the concept of signed language reading. While the Paris school for the deaf was established in the 1760s, several decades passed before Bébien came into the picture and the signed language movement began.

In all of the ideas and actions that followed, Bébien did not consider how deaf children could best learn and master written French. There is no report in the literature about French educators recognizing the need for an intermediary system, for example. Although deaf children might learn to read in Natural Sign, they would still need to move towards learning and mastering written French. The idea of a conventional writing system for Natural Sign is feasible, but then deaf children would learn to read in their own language only. They could not repeat the reading process with French due to its status as a spoken language. For French educators, signed language literacy was new at the time. They wanted to focus on the basic idea that deaf children have the opportunity to read in Natural Sign. Any consideration of instructional design for cross-linguistic reading was lacking at the time.

In the United States, any form of contemporaneous signed language reading was curiously absent. There are a few reasons for this. Bébien's publications with Mimography took place after the deaf Frenchman, Laurent Clerc emigrated to the United States to work with the American collaborator, Thomas Hopkins Gallaudet to found the first permanent school for the deaf in Hartford, Connecticut in 1817. It can be said that American deaf education continued the direction that had taken place in France prior to Bébien's work (e.g., by favoring signing as a medium for instruction with deaf children). Moreover, one unfortunate situation for Bébien in France hampered the transfer of ideas from that country to the United States. Bébien was distraught over how the French school for the deaf was run, and his protests led to his dismissal (Lane, 1984b). The loss of Bébien's leadership was profound as signed language reading ceased to be a force.

The divisions among educators that began to emerge in France and elsewhere in the world did not help with the consideration and development of signed language reading. Natural Sign and signing were losing their favored position. The field of deaf education became polarized with oralism vs. manualism as reported in the literature. Educators who advocated oralism favored the use of spoken language with deaf children in the classroom and were in opposition to manualism (which favored the use of signed language; Moores, 1996). This led to

the idea that Bébien's focus on reading in Natural Sign may have unintentionally contributed to the rise of oralism. It appears educators were frustrated with the lack of attention on how deaf children could become literate in French. Bébien was fully aware of bilingualism taking place in his school (with Natural Sign and French), but he did not pursue pedagogy for deaf children becoming literate in French as they did in Natural Sign. Oralism offered these educators a sense of direction by adopting what is normally pursued with hearing children. Deaf children would have to learn to speak and hopefully reading would follow, regardless of how counterintuitive that may be.

Bébien's unique accomplishment with Mimography merits some discussion. Rée (1999) provided information about this writing system. Since Bébien was a fluent signer (in addition to the fact that he could hear), he was intuitively aware of the word structure for Natural Sign. As part of helping create Mimography, the French educator "decompose[d] [signs] into combination of elementary gestures, just as spoken words are analy[z]ed, in alphabetic writing, as sequences of elementary sounds" (p. 298). Signs or signed words organized in terms of the handshape and movement parameters were considered analogous to vowels and consonants of the alphabet. A total of 150 graphemes were created to help write signs by the thousands.

The mention of how the written sequences of elementary gestures for Mimography parallel those of elementary sounds with an alphabetic system representing a spoken language demands attention. The choice of the term 'gesture' appears unusual. By definition, gestures are part of gesticulation that speakers frequently use in addition to speaking. Pointing to something or depicting a shape of something through the use of the hands is not the same as what Bébien attempted with Mimography. Mimography used more refined components of signs in the form of handshapes and movements, for example. Sound might have been a better term (vs. gesture) as it accounts for the abstract components that make up a word either in the signed or spoken form.

It is interesting to note that contemporary Deaf culture experts, Carol Padden and Tom Humphries devoted a chapter in their seminal 1988 book, *Deaf in America: Voices from a Culture*, to the concept of sound concerning deaf people. Silence is hearing people's perception that mischaracterizes deaf people's lives. It was described as "clumsy and inadequate as a way of explaining what [d]eaf people know and do" (p. 109). Deaf people "are far from silent but very loudly click, buzz, swish, pop, roar, and whir" (p. 109). Padden and Humphries went on to explain that poetry in signed language "shows how movement, as well as sound, can express notions like harmony, dissonance, resonance" (p. 108).

Several decades have passed since Padden and Humphries' book publication, and an updated use of sound for the visual modality is necessary for this paper. Even with the enlightened association of ASL with human language, deafness seems to define reading more than it should. For example, a group of deaf education experts have claimed that sounds, phonics, phonemic awareness, reading-aloud, and sounding out are for hearing children only and should not be part of deaf education (Simms, Andrews, & Smith, 2005). Signed language reading has not been relevant to deaf education experts (or in the field of deaf education as a whole). While experts may support ASL, they seem to have created constraints on how reading should be pursued for deaf children. The exclusion of important reading development features as strictly auditory phenomenon is an unfortunate (literal) interpretation when it should be more abstract and universally generalized. Unwarranted power is being given to spoken language as the only source for reading (also see Petitto, Langdon, Stone, Andriola, Kartheiser, & Cochran, 2016 for arguments regarding reading with deaf children based on the notion that ASL is a soundless language).

Embracing sound in the visual modality for this paper promises to help educators ‘think outside the box’ and become receptive to the idea of signed language reading. All languages have abstract sound elements, some are auditory and some are visual in nature. This interpretation creates a link for young deaf readers who need signed language-based phonology as a crucial element for fully experiencing the human reading process. More discussion on this will follow in connection with glossing later in this paper. Returning to Bébien, he was, by all accounts, a remarkable educator who saw something of value in signed language reading. He was bold in creating Mimography, with the assumption that deaf children are much like hearing children. While reading takes place in an entirely different language modality (i.e., signed), the underlying principles for reading remain the same.

While the concept of Mimography has merit, the system which was developed faced some deficiencies. There are conditions to consider for the creation of writing systems, especially those belonging to the alphabetic type. An ideal alphabet would have a small number of graphemes, for example (i.e., 20 to 35; Havelock, 1976). Mimography has a very large number of graphemes, which is not a good feature (S. Supalla, McKee, & Cripps, 2014). Supporting this, one deaf education expert wrote in the 1850s that Bébien’s writing system “was so cumbersome as to be almost unusable; but at the same time it was not refined enough to distinguish between different signs” (Rée, 1999, p. 304). Such observation also suggested that the lack of knowledge associated with modern signed language linguistics during Bébien’s time may have played a role. For example, there is strong agreement among linguists that signed words are made up of three phonological parameters, handshape, location, and movement (e.g., Brentari, 1995, 2002; Zeshan, 2002). If these three parameters were included in Mimography (and not just the handshape and the movement), there may have been a more successful writing system developed.

A Comeback for Signed Language Reading

The research climate for embracing signed language reading is ripe, for several reasons. But before proceeding, it is necessary to discuss terminology. The name, Natural Sign is no longer suitable. After Natural Sign was brought to the United States from France (through the work of Clerc and Gallaudet), it became linguistically distinct over time. Consequently, the language of deaf children living in the United States has an updated name, that is, American Sign Language. While French Sign Language continues in France (see T. Supalla & Clark, 2015 for the historical emergence of ASL as a language), any discussion of signed language reading in the United States needs to refer to ASL. Until the 1970s, ASL was written off as a human language for a perceived lack of linguistic principles, which can be seen as a block for any serious consideration associated with signed language reading. However, that has changed. ASL has won recognition as a legitimate human language owing to extensive research led by linguists in recent decades (Meier, 2002; see Sandler & Lillo-Martin, 2006 for an in-depth discussion on the linguistic structure of ASL). The common terminology in linguistics such as phonology, morphology, and syntax have been successfully extended to the signed language modality.

This points out the importance of reading terminology becoming common to signed language as well. Important reading development features such as sounds, phonics, phonemic awareness, reading-aloud, and sounding out need to be fully understood in terms of deaf readers in order to help legitimize signed language reading. Likewise, research on language acquisition has produced insights that have confirmed the legitimacy of ASL. Humans are endowed with the

ability to acquire and master language. They are active learners when languages are real and meaningful to them and the language learning experience is effortless and without any formal instruction. Deaf children are no exception to that rule. They must have control over the linguistic input, a condition which is achieved with a signed language, where hearing capacity is not a prerequisite (see Newport & Meier, 1985 for an overview on ASL acquisition studies; also Schick, 2011). Denying deaf children access to ASL has been suggested by scholars to be a practice that is harmful and that must be stopped (e.g., Humphries, Kushalnagar, Mathur, Napoli, Padden, & Rathmann, 2012; see S. Supalla & Cripps, 2008 for further discussion of the linguistic accessibility concept).

For the record, many researchers and scholars outside the field of deaf education have freely discussed the idea of a writing system for ASL (e.g., Hopkins, 2008; Miller, 2001; Reagan, 2006; Turner, 2009; van der Hulst & Channon, 2010). Written language is considered a valuable asset for many spoken languages around the world. The same benefits apply to ASL (Grushkin, 2017), but the education establishment needs to rally around teaching literacy skills to deaf children based on the concept of linguistic accessibility (i.e., deaf children must learn to read in ASL, not English). Further, among the lessons learned from history is that deaf children should not be confined to learning to read in ASL only. The solution can be found in glossing, which has a specific way of handling written ASL in a way which helps deaf children decode and pursue English literacy.

Perhaps the most powerful pressure for pursuing signed language reading lies in society's push towards best reading instruction practices for all children. Deaf children are seen as part of a larger agenda for literacy. The public opinion favoring accountability is strong, which includes the understanding that deaf children cannot continue to struggle in becoming fluent readers (e.g., Marschark, Lang, & Albertini, 2002; Traxler, 2000). Of relevance for this paper is how some scholars have pointed to the importance of aligning the curriculum, instruction, and assessment to help children learn to read more successfully (Elliott, Braden, & White, 2001; Roach, Neibling, & Kurz, 2008). These scholars may not have any direct affiliation with deaf education, but the deep underlying problem with American education appears to have been identified. That is, curriculum, instruction, and assessment have been rigidly maintained, regardless of what the children need. Any pursuit of signed language reading with deaf children will require a significant amount of alignment to curriculum, instruction, and assessment.

The path for pursuing signed language reading, especially in the form of an intermediary system linking ASL and English literacy, is wide open according to Wauters and de Klerk (2014):

...[deaf] students in bilingual education settings, learning to read coincides with learning the language that they are reading in, and maybe even with learning their first language, sign language (Hermans, Knoors, Ormel, & Verhoeven, 2008; Hoffmeister, 2000; Markshark & Harris, 1996). Learning to read in a second language is a challenge in itself, but even more so when the learner has little access to the spoken form of that second language that is the basis of the writing system he must learn to tackle. We do not know how deaf readers make the connection between the languages they encounter (Easterbrooks & Beal-Alvarez, 2013). (p. 243)

This admission that deaf education experts made in regard to the lack of pedagogical reading knowledge for deaf children is noteworthy (see also Hoffmeister & Caldwell-Harris, 2014 for a similar admission for the lack of a method). However, they overlooked the fact that a charter school in Arizona had already put together what is known as the glossing approach to reading instruction. While traditional settings for deaf education include either schools for the deaf or programs in regular public schools that serve deaf children, it is easy to understand how charter schools may not be seen as credible or 'part of the system'.

Yet charter schools were expected to explore and test new ideas (Finn, Jr., Manno, & Vanourek, 2000). Signed language reading was identified as an innovation worthy of exploration at the Arizona charter school. The Arizona Board of Charter Schools reviewed the application and approved it leading to the school's founding in 1996. For financial reasons, the charter school could not continue after six years of operation. This did not stop a substantial amount of research and scholarly work from being published.

At the time of the Arizona charter school's founding, both educators and researchers at the charter school had full knowledge of ASL writing systems in existence (e.g., SignFont, see Newkirk, 1987; SignWriting, see Sutton, 1999). However, glossing was adopted at the school, which ultimately set it on a different course. It is important to understand that glossing is not new nor is it confined to the education of deaf children. To demonstrate the long history associated with glossing, Roby (1999) wrote:

...early glosses, interlinear or marginal scribblings, were learner-generated. Medieval students struggling with a foreign text (usually Latin) produced them as they worked along. Glosses as teaching aids came later, followed by their eventual codification into word lists (glossaries) and then dictionaries. (p. 94)

The reading challenge that medieval students faced with Latin is comparable to deaf children with English literacy. Latin was a 'dead language', meaning it was no longer spoken (which was historically true after the fall of the Roman Empire). The medieval students did not have an opportunity to hear Latin and use that knowledge for reading development purposes. These students found themselves scribbling down information on how to best read Latin. It is such interlinear translation that allowed the medieval students to write about how the structure and grammar of Latin compared to the language that they knew. It is easy to imagine how other students could read the gloss passages to help learn to read Latin. More discussion on this for how glossing applies to deaf children's learning will follow in the next section.

In addition, the modern use of glossaries and dictionaries which help students who can hear and know English points to the universal benefits associated with glossing. Native English speaking students who are already literate often encounter unknown 'big words' in print. They are provided with the opportunity to look up definitions and understand the individual words' meanings in a dictionary. Second language learners of English have a similar option with glossing as well. The three well-known types of glossing for this group of students are: 1) synonyms, 2) encyclopedic comments, and 3) grammatical notes (Roby, 1999). The description of glossing as "a common and acceptable aid for many foreign language textbooks" (Lomicka, 1998, p. 41) should be noted. From what has been discussed for glossing thus far, it appears that the primary function of glossing is to make text clear. Deaf children are entitled to glossing as English text is unclear and unreadable.

Making English Readable for Deaf Children

As expected for curriculum, instruction, and assessment alignment, the glossing approach adopted at the Arizona charter school had an impact on what reading materials looked like, how a teacher taught reading skills, and how deaf children's reading skills were assessed. The educators and researchers were sensitive to the fact that deaf children enrolled at the charter school were young and had not yet learned to read (e.g., kindergartners). Recall that medieval students would read gloss passages attached to Latin text. The medieval students were older and accomplished readers. They read in their own language to learn about Latin. No truly intermediary system is in use here. This is where the idea of doing more by glossing the English text itself emerged at the charter school. The English text was manipulated to the point that it resembled ASL's morpho-syntactic structure. To distinguish an ASL text from that of a regular text, the printed English words or roots are fully capitalized. The ordering of words in a given sentence may be changed (as ASL has a flexible word order as compared to English). A set of conventions were created to help fully represent ASL's grammatical structure by using an underline or a symbol attached to the beginning or end of a basic English word or root, for example.

True to the objective of glossing, the English text is made clear to deaf children through the necessary manipulation. The children at the charter school could read the text word by word when it was consistent with ASL morphologically and syntactically. It is important to note that text manipulation has been recognized as a way of improving reading performance for all children. Ralabate (2011) explained that text manipulation is critical for improving the reading outcomes of students with disabilities. For whatever reading difficulties there may be, the text itself can be problematic and manipulation can make all the difference.

Hundreds of gloss books were created at the charter school, derived from children's literature and basal readers. It is now necessary to explain what gloss text looks like exactly. The basis for creating gloss text is interlinear translation. The English sentence example below showing before and after manipulation will help clarify the technique:

Before Manipulation: The dog is chasing the cat.

After Manipulation: DOG NOW CHASE>IX=3 CAT

S. Supalla and Cripps (2011) produced the sentence examples above and provided a detailed description of how glossing took place with the original English sentence as follows:

[The gloss sentence] depicts four English words all capitalized to represent the four signs produced as an equivalent of the English sentence composed of the six words... [s]tructurally, no definite article is used in the ASL gloss sentence, which is correct for the signed language. The ASL gloss sentence also indicates a rough equivalence of the present progressive tense in English, with the insertion of NOW as a separate word (or "time sign") before the verb. In addition, the ASL verb CHASE undergoes a third person object agreement inflection (i.e., the movement of the verb is [modified] to agree with the location of the cat in the

signing space) with the attachment of the gloss convention >IX=3 to the verb representing inflection in the sentence. (p. 4)

What has been discussed so far relates to the sentence level. The educators and researchers at the charter school took into consideration the fact that the gloss text includes the use of English words. A hearing child would sound out or decode an unfamiliar word in print to help with his or her reading comprehension. Clearly, deaf children cannot do this task, but those at the charter school were provided with a way to identify English words in the gloss text. This is where a supporting component of the glossing approach comes in, called The Resource Book (RB). The RB works like a bilingual dictionary with thousands of English words paired with the ASL equivalents written in what is called the ASL-phabet.

With the gloss sentence, DOG NOW CHASE>IX=3 CAT, a young deaf child reading this sentence might be able to identify all words except for CAT. The child could then use the RB to locate the word and then read the ASL equivalent next to it. The written sign for CAT is: $\forall \circ \zeta \mathfrak{H}$. S. Supalla and Cripps explained the details associated with this written sign as follows:

In the ASL equivalent for CAT, the grapheme in the furthest left slot refers to the handshape seen in Figure [1] below, the next grapheme refers to the location of where the sign is produced (i.e., on the cheek), and the last graphemes refer to the movements made (i.e., ζ = straight path and \mathfrak{H} = repeated). (p. 7)



Figure 1: The sign for CAT

Here the deaf child could sound out the sign and learn the meaning of the English word. The child can then read and comprehend the gloss sentence (i.e., the dog is chasing a cat, not a rabbit, for example) and move on to reading other sentences. As demonstrated here, the RB makes a clear connection between English words and their ASL equivalents.

In comparison to what was discussed for Mimography, it becomes clear that the ASL-phabet is designed for the word level only, not sentences or text (as done with the French system). Moreover, the ASL-phabet accounts for three phonological parameters of handshape, location, and movement (which can be seen as an improvement). The number of graphemes for the ASL-phabet, this time, falls in line with what was discussed above for an ideal alphabet. The ASL-phabet has 32 graphemes in use (i.e., 20 graphemes for the handshape parameter, 5 for the location parameter, and 5 for the movement parameter). Aggressive grouping of handshapes

within single graphemes played a key role, which helped dramatically reduce the number of graphemes in comparison to Mimography. The same holds true for the location and movement parameters (see S. Supalla et al., 2014 for further discussion on the ASL-phabet as a system).

Teachers at the Arizona charter school found themselves teaching phonics in ASL owing to some phonological ambiguity in how signs are written based on the ASL-phabet. For example, the handshape grapheme for CAT, \forall represents two handshapes, not one. As shown in Figure 2, these two handshapes are closely related sounds with a slight difference in how the hand is shaped. Deaf children at the school were taught about sound representation in the handshape parameter. The same holds true for the location parameter. While the location grapheme for CAT is \subset (as the sign is produced on the cheek), other signs produced on the mouth or on the chin will use the same location grapheme. The grapheme \subset represents a more general location area of the cheek, mouth, and chin. Similar types of phonics lessons were taught on movement for the ASL-phabet as well. Since deaf children were expected to use the RB on a regular basis, they had to understand how the ASL-phabet worked and teaching phonics was critical for their success.

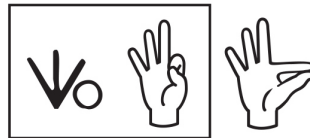


Figure 2: Two handshapes (one with rounded and one with pinched fingers) grouped for the representation of a single grapheme for the ASL-phabet

Some of the overall positive impacts of the glossing approach for reading instruction were discussed in S. Supalla, Cripps, and Byrne (2017) as follows:

Since [deaf] children can sign word for word [via gloss text], it is easy for the teacher to see if they are reading with accuracy, for example. The teacher can also monitor whether these children use [the RB] any time they encounter unfamiliar English words in print. This allows the teacher to see how the children fare with reading the ASL equivalents written in the ASL-phabet. The teacher's guidance on reading written signs will strengthen the deaf child's decoding skills. The same holds true for modeling deaf children on how to best read a gloss text with a wide range of conventions in use. One way or another, these children's reading comprehension will be boosted. Fluency will ultimately develop with practice opportunities provided along with the teacher's coaching efforts. (p. 546)

Thanks to the liberal application of key concepts for reading processes, educators and researchers at the charter school were able to foster natural skills in learning to read. While skill in making the English-based letter and sound relationships was not part of the reading instruction design at the school, deaf children were provided an opportunity to do this in an alternative fashion. They were encouraged to study ASL phonology in terms of handshapes, locations, and movements and connect them with the ASL-phabet graphemes or ASL letters. The skills

associated with the ASL-phabet were treated as comparable to how the alphabetic principle is taught to students who can hear with English (S. Supalla & Blackburn, 2003).

The reading instruction curriculum, materials and teaching at the charter school included opportunities for deaf children to develop phonemic awareness in ASL (as part of their preparation for learning to read words in ASL). Kindergartners were exposed to ASL nursery rhymes as produced by accomplished signers on videotapes readily available on the market. *The ASL Parent-child Mother Goose Program: American Sign Language Rhymes, Rhythms and Stories for Parents and their Children* produced by the Ontario Cultural Society of the Deaf (2004) serves as a good example. One of the songs was rhymed throughout the production via one particular handshape. Deaf children exposed to the handshape-based rhyme were expected to develop awareness about that particular handshape.

Turning to how deaf children at the charter school experienced transition from ASL to English literacy, it is necessary to remember they were reading gloss books and using the RB on a regular basis to access meanings of the individual English words. This is precisely the way that deaf children developed a strong English vocabulary base. The English books were more readable to these children as the words were the same as found in the gloss books (e.g., cat vs. CAT, dog vs. DOG, and chase vs. CHASE). The benefits associated with the shared spelling and orthography of the gloss and regular texts form the basis for the initial transition from ASL to English literacy (S. Supalla & Cripps, 2011).

A complete transition to English literacy is realized when deaf children participate in another supporting component called Comparative Analysis. Children initially read a gloss book (and use the RB whenever necessary) and participate in different activities around that book. The teacher then introduces the children to the gloss and regular versions for observation and analysis (e.g., the gloss version: DOG NOW CHASE CAT with the English version: The dog is chasing the cat). With the help of the transparency between the gloss and regular texts, deaf children can study what is structurally similar and different between ASL and English and focus on learning the grammatical features that are specific to English.

The learning of English for deaf children at the charter school was repeated with one book after another, along with increasing text complexity over time. Teachers at this school appreciated the fact that the less complex texts for younger readers coincided with rudimentary English structures to learn. The older readers could review what they learned and study the new and more complex structures over time. This resulted in the scaffolding of the English language skills that deaf children needed to learn and master over time (S. Supalla & Cripps, 2011).

By the fourth grade, deaf children at the charter school were expected to read to learn (rather than learn to read). They needed to demonstrate their reading performance through assessment. One example of information gathered from deaf children is how well they read aloud a gloss text with their performance measured through what is known as running records (Clay, 2000). Deaf children were asked to read the English text silently, and answer a set of comprehension questions. With a good or satisfactory level of performance with ASL and English, the glossing approach for reading instruction would cease. At that point, deaf children would be reading in English and continue using ASL for communicative purposes in the classroom (see S. Supalla & Blackburn, 2003 for the further discussion on the phasing out of the glossing approach).

Some Indications of Signed Language Reading

To begin with, adequate signed language reading research has never been presented on Mimography. Bébien did report on deaf children's performance with reading in French Sign Language when he described the writing system's success as questionable. Rée (1999) wrote that "...Bébien's own claim that the 150 characters of [M]imography could be mastered by a deaf signer within 'eight or ten days' had a quality of crazed desperation..." (p. 301). The earlier discussion of the internal problems with the French Sign Language writing system suggests that the French effort with signed language reading should not be pursued. The fact that multiple research publications have been produced in regard to signed language reading at the American charter school is most welcoming. This includes valuable data on how well deaf children perform in reading gloss text, as it is unconventional and has no precedence in the general literature on glossing. A variety of reading behaviors to follow that deaf children have demonstrated are promising.

The first known publication on signed language reading with deaf children in the United States is the S. Supalla, Wix, and McKee paper (2001). The data is descriptive in nature. Deaf kindergarteners at the charter school learning to read their name signs written in the ASL-phabet were subject to videotaping for later analysis. The description of the particular classroom activity led by the teacher is:

The teacher showed one card at a time and asked the class who the written name referred to. The students recognized their names by looking at the first two graphemes (i.e., handshape and location information). They signed their names to indicate that they recognized the written names. The students were clearly engaged in the activity. (p. 9)

The authors of the paper went on to write:

...deaf students 'read' words with only partial information (i.e., handshape-location/symbol relationships) and the context of a name-reading exercise. This is comparable to the kinds of early success that hearing kindergartners get when first identifying consonant sound/symbol relationships in the context of words they are learning. At the [Arizona charter school], such activities show the beginning development of metalinguistic awareness for ASL signs. [Teachers] start children on the handshape and location graphemes in kindergarten and first grade. Movement graphemes are mastered first through third grade levels. (pp. 9-10)

The detailed nature of how skills were taught at the charter school supported the Arizona Academic Standards' reading component, which dictates that kindergartners begin identifying words in print through consonants (whereas vowels are more difficult to learn and master). It is interesting to note that the teachers at the charter school were not sure how to teach deaf children in reading signs at first. The children's learning patterns ultimately shaped the instruction design with the ASL-phabet. The handshape-location/symbol relationships were easier to learn as compared to the movement/symbol relationships, thus the former was seen as involving consonants and the latter vowels. There is support for such a signed word structure in the ASL linguistics community. Diane Brentari, a well-known and highly reputable linguist presented an

argument in a 2002 paper about the existence of consonants and vowels in ASL words. The combined handshape and location information of a given sign falls under the consonant category while the movement information is considered the vowel category.

Recall that, with Mimography, Bébien treated the handshape information of French signs as the consonant equivalent and the movement as the vowel equivalent. While the distinction between consonants and vowels that contemporary scholars and researchers are pursuing is more refined (by accounting for the combined handshape and location information, not just the handshape information), the basic distinction between the handshape parameter and that of movement is still true for both systems, the ASL-phabet and Mimography. At the time when the ASL-phabet was developed at the Arizona charter school, educators and researchers were not aware of these details associated with Mimography. The consonants and vowels in signed words identified uniformly among the different educators and researchers during contemporary times stretching back to the early nineteenth century suggests that the credibility of such understanding for signed word structure is strong.

S. Supalla et al. (2014) provided additional insights on signed language reading at the word level. The data, this time, involves an older (9 years old) deaf child. This child was a student at the Arizona charter school and participated in a tutorial during one summer. The child was required to look at a set of four flashcards held by the tutor. On each flashcard was the written sign for 'correct', 'on', 'day' and 'long'. The written signs were unfamiliar to the child. The child was asked to read each word and tell what it was. The tutor explained to the child that he would only tell whether the response was correct or incorrect. If not correct, the child was encouraged to try to read the word again to hopefully come up with the correct sign. The choice for what sign to come up with was wide open. The task was quite challenging, but thought to be appropriate for the older child.

According to the data, this child was successful with the written sign 'long'. She read the word and responded with the correct sign. In the process of decoding what the ASL word was, the child moved her hands 'in the air' trying to come up with the correct sign. One could tell that the child took into consideration the consonant and vowel information in print. With the three other written signs, the child was less successful. She responded with incorrect signs before signing the correct word. In the deaf child's 'failed' responses, the signs were all close to the target sign phonologically. The child was trying her best to come up with the correct sign based on what she read on the card.

While the deaf child discussed thus far was not fluent with reading written signs, she did read all of the words written on the cards when given another chance:

The flashcard activity included one more stop, which was reviewing the four words with the child. When the tutor mixed the order of the four words and showed them to the child again, she responded correctly to all words. Regardless of the fact that the child had most trouble with ['correct']. She read it perfectly during the review of the four words. (p. 15)

The assessment method in the paper by Cripps and S. Supalla (2004) is somewhat different. This time, a well-known vocabulary test was given to deaf children participating in the study. The word items in the Peabody Picture Vocabulary Test-Revised (Dunn & Dunn, 1981; Jongsma, 1982; Kipps & Hanson, 1983) were converted from spoken to print to allow deaf children to see the words (instead of hearing them). The two deaf children participating in the

study were instructed to go through a list of English words and respond to each word by pointing to the correct picture out of four in a booklet. The children were provided with the Resource Book or RB to help with their English word identification. They were instructed to use the RB at all times regardless of whether they knew the English word or not.

It is important to keep in mind that the two deaf children who participated in the study differed in age and schooling experience. The first child was Lucy (pseudonym) who was 6:11 years old, and the second child was Barb (again a pseudonym) who was 9:11 years old. Lucy enrolled at the Arizona charter school at the age of 4 and had been taught at this school for three years. Barb was with the charter school for two years. Prior to transferring to the charter school, she was in a traditional school for the deaf (where the glossing approach of reading instruction was not implemented).

According to Cripps and S. Supalla, Lucy “began the test at the 10th vocabulary item, *reading*...[s]he reached the ceiling at the 49th vocabulary item, *coin*” (p. 105). What is important for this paper is that the majority of English words were identified successfully: “Lucy looked up a total of 38 words using [the RB]. She produced 30 correct answers out of the 38 vocabulary items (or 72%). She could not identify 8 English words after reading the ASL equivalents in [the RB]” (p. 105).

Barb began the test at the 30th vocabulary item, *whale*. She reached the ceiling at the 90th vocabulary item, *triplet*. As with Lucy, Barb identified a majority of the English words in the test successfully. This child did not use the RB consistently, however. The following discussion of her performance will clarify the differences:

Barb looked up a total of 51 words using [the RB] out of 59 vocabulary items (or 86%). With the 51 words, she produced 32 correct answers (or 62%). She could not identify 19 English words after reading the ASL equivalent[s] in [the RB]. (p. 105)

Barb’s level of English word identification performance is lower in comparison to Lucy’s (62% vs. 72%). Given that Barb is older, she should have performed better than Lucy. The fact that Barb transferred to the charter school and had a shorter time of exposure to its aligned curriculum and instruction appears to be a factor.

Cripps and S. Supalla’s study includes the finding that both Barb and Lucy outperformed what was normed for deaf children. With the deaf normative study done by Bunch and Forde (1987), the Peabody Vocabulary Test-Revised was subject to the same modification (i.e., the target words converted from spoken to print), without the RB in use. In comparison to the normed scores for the different ages of deaf children, Barb and Lucy, who had access to the RB, did far better in the identification of English words. This can be attributed to their making associations with ASL.

In S. Supalla et al. (2017), the focus is on reading at the sentence level. One 9-year-old child participated in the study, and she read aloud a gloss passage (in ASL), which was reproduced in the paper. Specifically, running records were utilized with the child reading the gloss passage matching her age. A word count formula was created for ASL to help with effective computation (being sensitive not just to counting signs in a given sentence, but for other features such as facial syntactic markers and classifier constructions). The child’s oral reading performance was found to be at the instructional level. The age-appropriate gloss text was not too difficult or too easy. The child was capable of reading, but not yet an independent or fluent

reader. She read the gloss passage with accuracy for the most part. Some predictable reading behaviors such as skipping a word and making a self-correction occurred, but they were not enough to hamper the reading process. The child used the RB once for an unfamiliar word that she encountered, which was IN-A-HURRY. The English word identification was successful, and the child signed the word and continued reading the rest of the gloss passage.

Closing Remarks

The research reports for deaf children using the glossing approach for reading instruction at the word and sentence levels have ramifications for the field of deaf education. The various reading behaviors point to the reality of signed language reading. The skills are measurable or observable, at least preliminarily. The key concepts associated with sounds, phonics, phonemic awareness, reading-aloud, and sounding out are internal to signed language reading. It is important to keep in mind that the research reports discussed in this paper cover the glossing approach to reading instruction partially. What has yet to be discussed (based on the data) is how deaf children experience a full transition to English literacy through the perusal of comparative analysis and the teaching of English language lessons on regular basis. This component is integral to the glossing approach as much as the gloss books and the RB. A future paper will need to include the comparative analysis lessons as taught in the classroom and demonstrate how deaf children participate and learn about English.

In addition, any coverage on how deaf children make progress with signed language-based reading skills over time is lacking. Publishing a doctoral dissertation work on this topic (Cripps, 2008) will be an important step, as the results can be positive and insightful. For now, while the number of deaf students whose data is included in this paper is small, it is still appropriate for understanding the feasibility of signed language reading. As a whole, the signed language reading research is in its infancy, yet primed for expansion.

The importance of signed language reading cannot be further emphasized. Easterbrooks (2010) explained that "the evidence base in deaf education tends to be woefully lacking" (p. 111) is a serious matter. Because reading has been equated with spoken language, teachers of the deaf are stymied in what they can do about reading instruction. This environment is not conducive to creating or gathering evidence for best practices when reading is tied to hearing ability. With this paper, deaf education experts can now consider the glossing approach for teaching reading to deaf children, especially with its cross-linguistic features. The notion of deaf children using ASL to decode English (as part of becoming literate in a language they do not hear) is attractive in its own right. This option exceeds what reading theories offer (as they focus on how children become literate in one language at a time). Shaping the education of deaf children based on what hearing children experience with reading is inappropriate and restrictive. Reading theories need to account for all children, including those who are deaf and have a unique way of learning and mastering English literacy.

In retrospect, the basic idea of signed language reading first attempted in nineteenth century France where deaf children learned to read in French Sign Language is something that all teachers of the deaf should know and appreciate. The resurgence of signed language reading as reported for a charter school in the United States centers on a more complex framework connecting ASL to English literacy. This is where text manipulation comes into the picture and becomes the key component of signed language reading. The curriculum, instruction, and assessment alignment is also found to be necessary to ensure that deaf children experience a

meaningful reading methodology. It is hoped that in the near future, glossing as a reading methodology and its different tools and procedures including gloss books, the RB, and comparative analysis lessons can prove themselves as a staple in the education of deaf children. No longer would these children be plagued by reading difficulties, but perhaps their exposure to signed language-based teachings can clear a path towards English literacy.

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