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2008

A Bilingual Approach To Reading

D. DeLuca

Donna Jo Napoli
Swarthmore College, dnapoli1@swarthmore.edu

Recommended Citation

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Doreen DeLuca and Donna Jo Napoli

Learning to read your native language can range from being a simple task to being enormously difficult. A lot depends on the writing system employed by your country, language, or culture.

Alphabets, excluding manual alphabets, are systems built on a correspondence between single written symbols and single sound segments. The prototype of an alphabet is a system in which every written symbol corresponds to one and only one sound segment and every sound segment corresponds to one and only one symbol. Spanish comes quite close to having such an ideal system. So when a child learns the alphabet and learns what sound segment each symbol corresponds to, the child can then sound out words accurately. As soon as the concept of reading sinks in, the child can fly ahead quickly. The Spanish-speaking child who is reading Spanish does not often stare at a written word and wonder what on earth it sounds like. And spelling bees don't make sense after early elementary school—everyone would win. Of course, there are different varieties of Spanish, and this description, if it took that into account, would be somewhat more complex. But on the whole, this is a representative picture of the situation.

Not all alphabet systems are anywhere near as close to the ideal as that described for Spanish. English, for example, has symbols that are not pronounced (e.g., the letter "1" in *walk*) as well as sound segments that are not represented by any symbol in the word (e.g., the sound [p] that many people insert after the sound [m] in *something*). English allows single symbols to correspond to a range of different sounds (e.g., the letter "s" corresponds to a different sound segment in each of the words *soon*, *sugar*, *present*). English allows single sound segments to be represented by a range of different written letters, including, sometimes, a sequence of written letters (e.g., the initial sound segments of these words: *silent, celery, psychiatrist*). The English-speaking child who is reading English does, on occasion, stare at a new word and wonder what on earth its pronunciation might be (think of *cough*). English-speaking countries have spelling bees, and it's hard to be the winner.

Regardless of how close a language's alphabet system comes to a one-to-one correspondence between written symbol and sound segment, reading tends to be mastered in alphabet systems relatively quickly. By the time a child is in fourth grade, chances are reading is no longer a daunting task. Alphabets are amazingly efficient and accessible that way. With just the twenty-six symbols of the Roman alphabet, for example, we can write all the words of the English language—tens of thousands of words.

Another kind of writing system is the character system, such as that used in China. In the prototype of a character system, each written symbol corresponds to an entire word. The character is not analyzable with respect to sounds. So one character that has the [p] sound segment in it may have absolutely nothing in common with another character that has the [p] sound segment in it. The written character corresponds not to the sound of a word, but to its meaning. So when a child faces a new character, that child cannot figure out what it means (there is no chance of sounding out here). Instead, the child must be taught each character. To learn to read 4,000 words, the child must memorize 4,000 characters.

To be sure, character systems, like alphabet systems, differ to varying degrees from the prototype. For example, some have words that are made by superimposing one (part of a) character onto another, particularly when the sense of the result is related to the senses of the two component characters. So if a child knows both of the component characters, he or she might have a chance at guessing somewhat accurately the sense of the new, composite character. Still, learning to read in a character system is a much more difficult task than in an alphabet system. Children continue to learn new characters through high school, and if they go on to the university, that learning continues. It is difficult to give a general statement about when it is likely that a child will have mastered enough characters to read a novel, for example, since countries with character systems vary quite a lot in their educational systems and in their societal attitudes toward those systems—both of which affect the rate of student learning. But you can be sure that reaching this level of competence takes many years longer than in a country with an alphabet system.

There are other kinds of writing systems, such as those in which each symbol stands for an entire syllable—called syllabaries. But it isn't necessary for us to go into them here. Alphabets represent one end of the spectrum and character systems represent the other in terms of ease of learning to read. And our initial look at just these two kinds of systems is enough to help us in our discussion of reading skills with respect to the deaf or hard of hearing person.

If you cannot hear the language, you cannot use sounding out as a method for learning to read in the same way a hearing person can. Therefore, even if the language you are trying to read uses an alphabet, the task for you is largely the same as if that language were written in characters. That is, you are likely to learn each word in the list—*pat, mat, bat, cat,* and so on—separately, as an unanalyzable whole.

Of course there is a meaning breakdown available. For example, once you have learned the word *kind* and the negative prefix "un-" and the adverb ending "-ly," you can look at the new word *unkindly* and figure out its meaning. Roots like *kind,* prefixes like "un-," and suffixes like "-ly" are called morphemes. They

are meaning-bearing units. So some figuring out of new words is possible for the child who does not have access to the sounds; in particular, the child can recognize morphemes, break the word down into its composite morphemes, and take a stab at the meaning of the whole word.

Still, the task of learning to read an alphabet system is vastly more difficult for the deaf child than for the hearing child (although there is evidence that some profoundly deaf children develop phonological awareness that helps them in reading, but exactly how they develop this awareness and how they use it is unknown; see Goldin-Meadow and Mayberry 2001). Add to this the fact that for many children who have hearing loss, their native language is not the language they are learning to read, but, instead a sign language. So the child who uses ASL, for example, has the extra burden when learning to read of facing an entirely new language—with an unfamiliar lexicon and an unfamiliar syntax. It would be as though we put a hearing child who spoke English into a Chinese classroom and plopped a book in Chinese, written in Chinese characters, on the desk and said, "Read." Let's make it even more uncomfortable by having this be the child's first experience with reading.

The job of learning to read English is a heavy one for the deaf or hard of hearing child. We have been working on trying to lighten that burden by writing a book of five stories that employs a new method of developing reading skills.

The Concept of Reading

While writing has served humans well through several millennia, the very concept of reading and writing is sophisticated. A set of written symbols stands for a language. When you think of all the things that language comprises, that idea seems impracticable. Spoken languages, for example, have intonation that can be miraculously nuanced. Sign languages have modulations of movement in signs that can, likewise, be subtle and delicate in their significance. Whoever would have guessed that writing could do such a good job?

Actually, writing doesn't do all that. The reader does. The reader interprets the writing. That's why we can admire one director's production of a drama and perhaps be less enthralled by another's of that same drama. Reading is an activity. It requires energy on the part of the participant. It is an interpretive art.

But that art cannot begin until the reader masters the initial (and surprising) idea that written symbols on a page can convey language. That is task number one.

Differences in the Lexicon

Clearly, the lexicon of one language is different from the lexicon of another. Since the child whose native language is a sign language is learning to read in a foreign language, she or he must master a new lexicon.

We tend to think that learning a new lexicon is a relatively simple task of memorization. If you want to learn how to say "eat" in Japanese, for example, you look it up in a dictionary or ask a Japanese friend. In fact, however, languages break down information in different ways. While we say "garden" in English for both a flower garden and a vegetable garden, we say "giardino" for the first, but

"orto" for the second, in Italian. On the other hand, Italian has the word *bibita*, which covers refreshing beverages, like soda or juices, but not hot drinks or *drink* as in "one needs food and drink to live." There is no single word of English that covers exactly what the word *bibita* covers in Italian.

These same mismatches of the lexicon occur between sign languages and spoken languages. However, they occur in much greater number. That's because of the graphic nature of sign languages. While individual lexical items are rarely truly iconic (witness the fact that people who don't know American Sign Language [ASL] are unlikely to catch even the gist of a conversation in ASL), in the contexts of sentences, predicates can take on a distinctly pictorial nature. That is because signs that connote actions often vary according to who is doing the action or what physical object is being acted upon and even how that actor is acting upon the object.

One such kind of variation is due to the use of classifiers. This is perhaps best understood through exemplification. If a man hurries down the street, the 1 handshape may move quickly along a certain path (where 1 is a classifier for human beings; its use shows that a human is doing the action). If a cat hurries down the street, we may have the same speed and path (i.e., the same movement), but the bent 2 handshape will be used (where bent 2 is the classifier used for animals). If a car hurries down the street, the movement might remain the same but the handshape will change to 3 (the classifier for wheeled vehicles).

Why should 1 indicate humans, bent 2 indicate animals, and 3 indicate vehicles? There seems to be nothing iconic about this at all. Only the speed and path in these predicates seems graphic.

But things can get more complicated. If a woman in high heels hurries down the street, we may well use two hands quickly moving along the path, with the I handshape pointing down and tapping their way along (like the pointed heels of her shoes). If a very fat person hurries down the street, we may well use the dominant hand in a Y shape pointing down and rocking from side to side with or without the upturned palm of the nondominant hand as base as both hands move quickly along the path (showing the waddling nature of the gait). If a clumsy person makes that same action, we could use both hands in the 3 handshape moving like footsteps, but the 3s would be horizontal, that is, in a plane parallel to the ground (whereas for vehicles, the 3 would be in a plane orthogonal to the ground, unless the vehicle falls on its side).

The examples above all involve alteration of the action sign (the predicate) in accordance with the identity or other characteristics of the one doing the action (the agent argument of the predicate). But predicates can vary depending on characteristics of the other participants in the action (i.e., the other logical arguments of the predicate), as well. If a person is carrying something, the predicate CARRY will have a handshape appropriate to the object carried and even to the part of the object that is being touched while it is carried. So the action of carrying a bowl will use a different handshape from that used in carrying a bucket by holding it on the sides, which will be different from that used in carrying a bucket by the handle, and so on.

While all the above are examples of uses of classifiers, there are other ways in which predicates adapt to their logical arguments. If you look up the English word *eat* in an English-ASL dictionary, chances are you will find the sign of a flat

O handshape moving toward the mouth. But, in fact, if the proposition you want to convey in ASL is that a chicken ate, you wouldn't use the sign EAT. Instead, you'd use flat baby O tapping on the upturned palm of the nondominant hand—that is, you'd use the sign PECK. And if you wanted to convey the proposition that a cow ate, you'd have both hands in the A shape, making circles against each other (knuckles to knuckles, base of the palm to base of the palm)—that is, you'd use the sign CHEW-CUD. Different animals eat differently—so a sentence about a snake eating would use a different sign from one about a lion eating, and so on. The eating predicate will be appropriate to the manner in which the particular animal eats. This is because the predicate to a certain extent tries to "draw" (if you will) the eating action in the air.

On the other hand, English has many separate words for semantically related lexical items, whereas often ASL will simply modulate some aspect of the movement of one lexical item in generating the other. For example, English has *chair* and *sit*, two morphologically unrelated words, while ASL has a pair that use the same location, handshape, and palm orientation, but differ only by movement (CHAIR involves two quick taps, while SIT involves one slow movement to a resting contact point).

Additionally, sign languages may exploit polysemy to a greater extent than spoken languages do. So, for example, the word *run* in English can be used in many types of situations that have only a vague semantic similarity (compare: "Her stocking ran" to "His nose ran" to "The child ran" to "He ran the business," and so on). Several relatively low-information verbs have this property. But many more lexical items in sign languages have this property. So the sign WOW, for example, can correspond to the English words *awesome, amazing, struck with something* and so on.

Learning the lexicon of a second language is not just a matter of memorization; it's a matter of understanding how the other language breaks up world information.

Differences in Syntax

As we stated above, the syntax of a country's or locale's sign language is independent of the syntax of the country's or locale's spoken language. That's because sign languages arise independently of spoken languages.

Comparing ASL and English syntax, for example, we can find many disparate points. For one, ASL tends to incorporate relative spatial notions into predicates; English tends to use prepositions. So in expressing the proposition that the boy put the cat in the box, ASL might use the sentence

PAST CAT$_i$ BOX$_j$ BOY CARRY$_{i\text{-to-}j}$

This is to be understood as making the sign PAST, then making the sign CAT and indicating a spatial location (which we have designated with the locational index i), then making the sign BOX and indicating a different spatial location (designated by j), then making the sign BOY, then doing the predicate CARRY by having the hands in an appropriate shape to indicate carrying a cat-size animal and

moving them from spatial location i to spatial location j, clearly moving downward into the spot j. English might use the sentence

The boy put the cat in the box.

Likewise, ASL tends to incorporate modifiers of the action into predicates; English tends to use modifying phrases. So if we wanted to convey the information that the boy placed the cat carefully in the box, the predicate CARRY could be altered in several ways, including using the nonmanual parameter. One might move the whole torso with the hands/arms from point i to point j, while pursing the lips or forming a tight O with the lips. English would just add the word *carefully* at some appropriate niche in the sentence.

There are other differences between ASL and English syntax besides the lack or presence of prepositions and modifiers of the action, and some of them are made obvious by this same example. The ASL sentence places the predicate in final position; the English sentence places it between the subject and the object. The ASL puts the topic as the first noun phrase—the cat. The English sentence begins with the grammatical subject. While the ASL sentence employs spatial indices, the English sentence employs the definite article *the.* The ASL sentence indicates past by a sign at the start, whereas the English sentence indicates past by inflecting the verb.

Before we go any further, we should point out that these differences are not due to any strangeness of either language. Lots of languages of the world behave very much like English with respect to each one of these particular grammatical characteristics. And lots of languages of the world behave very much like ASL with respect to each one of these particular grammatical characteristics. For example, Japanese is similar to ASL in word order—placing the predicate in sentence-final position and the topic in sentence-initial position. Chinese is similar to ASL in indicating time frame via lexical items ("in the future," "recently," etc.) rather than changes in the verb string.

What do these differences mean to the deaf child learning to read English? Let's look at just one of these differences for a moment—perhaps the one that seems most trivial: the use of definite articles. If you are a native speaker of English, have you ever tried to describe to someone who speaks another language how to use *the?* Why is it inappropriate to walk into a room that has no apples in it and say, "What do you think of the apple?" but fine to say, "What do you think of apples?" Why do you say "I'm going to school" without an article, but "I'm going to the hospital" with an article (at least in American English)? Why can you say "He's the boss" as easily as "He's boss," meaning the same thing? Go ahead; try to account for these data. Simple it isn't.

Likewise, if you are a native speaker of English and you have ever tried to learn to speak Spanish or French or Italian, you have probably had to work hard to learn when it is appropriate to use articles or to leave them out in these languages. And the use of the partitive in French—wow, now that's a tough one to describe. French language teachers can talk themselves into knots trying to explain the differences to American students. Basically, the Americans get a vague idea, but really learn to use the partitive properly only if they wind up being lucky enough to live in a French-speaking area for many months.

In other words, the syntactic differences between languages, even those that seem relatively small, can present a serious puzzle to our incipient reader. And most English sentences are going to be packed with multiple syntactic differences from their ASL counterparts.

So many complex differences thrown at the child at once can be overwhelming. And it is not surprising to find the overwhelmed child defeated at the outset.

Our Approach

We start with a story that is told almost entirely in one-word utterances of English. And we choose words that translate easily into ASL. In other words, we push aside syntax and complications of mismatched lexical items. Under each English word, we give the corresponding ASL sign. In this way, the child can focus on the concept of reading itself while starting to build a lexicon in written English.

Later stories bring in mismatches in the lexicons of the two languages, allowing the child to notice those differences and enjoy them. The child can face the fact that this is part of the job of learning English. And, since both languages are given on the page, speakers of English and signers of ASL alike can develop a sense of respect for the richness of the others' language.

Even later stories introduce sentences, gradually bringing in differences between English and ASL syntax, while remaining careful not to load too many differences into any one sentence or story. The idea is to allow the child to grapple with each difference separately, increasing the child's chance of mastering them.

We also have several positive hooks to help the child learn to read: repetition, rhythm, rhyme, and semantic cohesion.

Many children learn to read by having the same story read to them over and over, so that they memorize the words. They can then figure out the written words on their own, since they know what words have to be on each page. Stories that are easy to memorize, therefore, can be wonderful ignitions for the reading motor. Some of the most effective aids to memorization are repetition and rhyme.

In our first story, both repetition and rhyme are employed in the English words. But repetition and rhyme are also employed in the ASL signs. Here is our first story:

"School Signs"

Ride
bump bump bump

School
jump jump jump

Friends
1 2 3

Trains
A B C

Cookie
yum yum yum

Music
drum drum drum

Dance
feet hands head

Colors
blue green red

Time
jump jump jump

Ride
bump bump bump

The repetition is obvious in both English and ASL, occurring in the second line of the first two couplets, the middle two couplets, and the final two couplets.

We used rhyme consistently in the English to help any hearing child memorize the story, since we are hoping that our method will help not only the deaf and hard of hearing child but also any child whose native language is not English, as they are trying to learn to read English.

The English rhyme does nothing to help the deaf child learn to read, however. The oral rhyme is lost to the child who cannot hear it. And the written rhyme seems equally lost. Indeed, in studies involving reading rhymed and unrhymed words, orthographic rhyme did nothing to enhance the memory of Deaf people when they were asked to recall the words they'd read. Recall on written rhymed words was, in fact, worse than on unrhymed words (Padden and Hanson 2000). This finding should be no surprise, really; Jacoby and Dallas (1981) found that orthographic similarity is not an aid to memory recall among hearing people. In other words, oral rhyme helps the hearing child learn to read—not orthographic rhyme. That's one of the many reasons why reading aloud to hearing children is of vital importance to their developing literacy skills.

ASL rhyme, on the other hand, can help the deaf or hard of hearing child in the task of learning to read. That is, for hearing and deaf or hard of hearing children, it's the phonology pattern that counts.

In a strong rhyme in ASL, three out of the four phonological parameters of handshape—movement, location, and palm orientation—are the same. So our first story is rich in strong rhymes: SCHOOL-JUMP, JUMP-DANCE, FRIENDS-HANDS, 1-2-3 , BLUE-GREEN, as well as RIDE (the nondominant hand)-C.

In a weak rhyme in ASL, two out of the four parameters are the same. So our first story revels in weak rhymes, as well: SCHOOL-COOKIE, JUMP-COOKIE, TRAINS-MUSIC, TRAINS-DRUM, DRUM-A, COLORS-RED, BLUE-B.

Further, as Corina and Knapp (2006) have shown, lexical entries of a sign language are most likely organized and accessed by our memory according to both their semantic and phonological properties. However, the phonological parameters of movement and location exert a stronger influence on the retrieval of signs

during language perception or production than do the phonological parameters of handshape or orientation (Corina and Hildebrandt 2002; Dye and Shih 2006). Accordingly, we have used several signs with the same movement, in terms of going in X direction, then in –X direction, then back in X direction. Up-and-down motion is found in SCHOOL, JUMP, DRUM (where each hand does this movement but inverted in time). Sideways back-and-forth motion is found in DANCE, MUSIC, TRAIN. Both up-and-down and back-and-forth movement are found in COOKIE. Likewise, several signs use the location of an upward facing nondominant B hand: SCHOOL, JUMP, COOKIE, DANCE. Several use the (ipsilateral) dominant side of neutral space: 1, 2, 3, A, B, C. Several start from the lower part of the face: COLORS, BLUE, GREEN, RED. Several use the center of neutral space: FRIENDS, TRAINS, DRUM, FEET, HANDS. Two use parts of the nondominant forearm as location: MUSIC, TIME.

Additionally, we have exploited another hook common in works aimed at helping children learn to read: rhythm. Each couplet here has identical rhythm: The first line (which is a single word) is worth one beat; the second line (which is three words) is a duple and a beat, where the duple is in double-time. In other words, this story has a one, one-two-three cadence. This particular rhythm is an old tradition in ASL performances and is used in the famous "Bison Song" (Bahan 2006). The semantics mimics the rhythm. The word of the first line of each couplet is general, introducing a topic. The three words of the second line are either specific, getting into the details of the topic (as in TRAINS, 1 2 3) or are a response to the whole topic (as in COOKIE, YUM YUM YUM). That the final word of the second line of each couplet gets a full beat helps signal to the child that that couplet is ending. The regularity of rhythm matched to the regularity of meaning will, we hope, trigger memory in the same way jump rope songs or marching songs do. ASL storytellers use rhythm as a recall tool; we're now applying it to reading.

The above point about the semantic structure of our story brings us to our final reading hook. As Jacoby and Dallas (1981) have shown, semantics is an even more salient factor in memory recall than phonology. Stories that not only rhyme, but also make sense, are easier to memorize. So, while stories about a cat in the hat who swings a bat may be fun to make up and to read aloud, they are less easily memorized than stories about a cat who found a rat under a mat and that was that. Our first story is built around a day at school. The events are familiar to the point of being almost predictable to the child. Strong semantic connections, as in COLORS-BLUE-GREEN-RED and in DANCE-FEET-HANDS-HEAD, for example, are potent aids to memorization.

Conclusion

Reading is a complex activity, and learning to read in a foreign language that you cannot hear is that much more complex. By analyzing the chore, we have been able to try to isolate each subtask and then present the child with reading material intended to help master each particular subtask. Our hope is that these materials will be useful to any child whose native language is not English as that child approaches reading in English.

Additionally, should these materials be used in a classroom in which children with hearing loss have been mainstreamed, the child who knows ASL might well have an opportunity to teach the rest of the class how to sign the ASL properly.

What a lovely position for that child to be in! What a wonderful exchange of culture might take place in those classrooms!

Our first reading book, *Handy Stories,* will be published by Gallaudet University Press in 2008 or 2009, but we hope that teachers and parents will experiment with our approach right away, making up stories for the children they love.

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