

“CHAINING” AND OTHER LINKS

MAKING CONNECTIONS BETWEEN AMERICAN SIGN LANGUAGE AND ENGLISH IN TWO TYPES OF SCHOOL SETTINGS

TOM HUMPHRIES AND
FRANCINE MACDOUGALL

Can skill in a language in a visual modality such as American Sign Language (ASL) contribute to the development of literacy in a spoken language such as English? Are there ways that signing can be used to interact with printed text that helps deaf children make connections to print and consequently, learn to read? What specific practices might users of signed languages engage in to promote an environment for reading development in young deaf children? These are questions very much in the minds of educators, parents, and deaf people themselves. The development of English literacy has been a source of great concern to those with an interest in the education of deaf children. The importance of deaf children learning to at least read and write English in order to participate in the social and economic life of the United States is undisputed. But it is also well accepted that, for whatever reason, a large number of deaf children do not achieve a very high level of reading fluency.

The historical focus of ideas about how best to foster the learning of English by deaf children has led to several predominant approaches in classrooms.

One focus has been on learning English through speech input via the child's residual hearing or lipreading ability exclusively. Another has been on learning English via visible representations of English in sign, or in other words, creating sign equivalents of English words and, in theory, "signing English". A third theory has been that deaf children can learn English best by reading and writing it. With the primary focus on English input in whatever form above all else, the classrooms of deaf children have been places largely uninformed by knowledge about ASL and the cultural practices of its users. In recent years, there has been

much public discussion of how ASL can be "used" to teach English and these ideas have found their way into some classrooms. Although there are a growing number of teachers who are themselves deaf and native users of ASL and teachers who hear but are fluent in ASL, little is known about the specific contexts and types of interactions of their use of ASL in their classrooms.

Since a primary goal of schooling for deaf children is the learning of English and the development of reading and writing ability, the juncture between ASL and English in signing deaf children is of particular interest to educators. One reason for the interest in how ASL and English interact is the evidence of good English reading and writing skills among deaf children of ASL signing deaf parents (Chamberlain & Mayberry, 2000; Geers & Schick, 1988; Mayberry, 1989; Padden, 2000).

The frequency of the success that deaf children of deaf families have in learning to read and write English suggests the probability that deaf families where ASL is the primary language must be doing something that provides productive access or experience with English text that enables their deaf children to learn to read and write English well. Regardless of whether this thesis is accepted, there is widespread experimentation with creating specific kinds of interaction between English and forms of sign behavior in classrooms for deaf children. In the past, examples of such experimentation include the use of the "Rochester method" (the exclusive use of fingerspelling without signing) and the heavy use of initialized signing (as in SEE I and SEE II, which impose signs on English syntax and invent "new" signs by using a handshape from the manual

TEACHER*	DEAF/ HEARING STATUS	SCHOOL SETTING	GRADE	NATIVE LANGUAGE
Elementary School:				
Barbara	Hearing	Public	3	English
Connie	Deaf	Residential	3	ASL
Lewis	Deaf	Residential	5	ASL
Ann	Hearing	Residential	4-5	ASL/English
Middle School:				
Sara	Hearing	Residential	7	English
Victoria	Hearing	Public	7-8	English
Tammy	Deaf	Public	7-8	English

Table 1. Characteristics of teachers included in the study.

alphabet when equivalents between English and ASL are not found). Teachers have sought to instruct deaf children in ways that not only carry content but model English language use and foster literacy in English (Gustason, 1988). It should be noted that these examples of past attempts, by design, exclude or disrupt the normal phonological, morphological, and syntactic structures of ASL in order to achieve the intended goal of linking fingerspelling or signing to English.

Beyond these two obvious candidates for the means by which ASL and English connect (fingerspelling and initialized signs) are there other ways that teachers make links between English and ASL in classrooms for deaf children? The trend towards bilingual education for deaf children has encouraged more recent examples of innovation in the classroom, including revisiting how fingerspelling and initialized signs can be usefully deployed for purposes of teaching about English. The following study seeks to identify and understand how teachers, deaf and hearing, in different types of classroom environments, engage in an interplay of ASL and English texts during instruction of deaf children. This

study is part of a larger study to identify how reading and writing instruction is provided to deaf children in two types of schools settings, a residential school setting and a public "mainstream" school setting (Padden 2000; Padden & Ramsey 1998). Included in the larger study is an attempt to identify associations between language, reading and writing abilities and mode of communication used by teachers and students in the classroom. The present study focuses specifically on the types of linguistic structures and the forms of language used by teachers during instruction of deaf children.

METHODOLOGY

DATA COLLECTION

In order to observe teachers during instruction of lessons in classrooms, 90 hours of videotaping was done in several classrooms in two types of school settings. Videotaping of classrooms of deaf children to create a visual record which can be revisited and

Tom Humphries is Associate Director of the Teacher Education Program and also teaches in the Department of Communication at the University of California, San Diego. He co-authored (with Carol Padden) *Deaf in America: Voices from a Culture*. He is an associate in the Research Program in Language and Literacy at UCSD.

Francine K. MacDougall, formerly with the Research Program in Language and Literacy, is currently Coordinator of SCPI Evaluation, Assessment & Training at South Carolina School for the Deaf and Blind. She co-developed an educational videotape and workbook called "Number Signs for Everyone".

analyzed is an interesting task in itself. Unlike taping of English language classrooms where audio and video both are desirable forms of data and sometimes the visual acuity can be sacrificed if audio acuity is good, taping of signing deaf teachers and children requires sufficient visual clarity and positioning to be able to understand what is being said on the hands. Coupled with the constraints of videotaping in a classroom in a non-intrusive manner, this often means less options than one would like. If just one camera is used, it becomes more complicated. Clearly, our decision to focus the camera on the teacher only was related to our particular research interest and needs. We needed frontal images of teachers from the waist up in order to make sure we captured signing space. (For other parts of our research, we needed group shots of children during instruction. Maintaining visual acuity for understanding taped sign conversation while achieving a wide enough angle to include more than a few students and working with just one camera gives a good sense of the complexity of this type of data recording.)

One of the school settings selected for this study is a state residential school for deaf children which was selected because of its long existence and location near a major urban area (although it attracts students from nearby rural areas as well). This school explains to parents who seek to enroll their children that the school only accepts "profoundly deaf children". However, it should be noted that while a "profound" hearing loss in educational definitions usually refers to a loss of 90db or greater, the hearing ability of the children does seem to vary, to include children with "severe" (70-89 db) loss. A large number of students board at the school during the week and go home on weekends, but many go home every day. The school personnel and school documents identify the school as a "bi-bi" school—a school which they say uses a bilingual, bicultural approach to educating deaf children. The two languages they refer to are ASL and English. Selected classrooms in the elementary and middle school programs of this school were videotaped.

The second school setting selected for this study is in one of the largest urban public school districts in the country. Classrooms in an elementary and a middle school within this district were selected to be videotaped. The elementary school serves approximately 150 children with varying degrees of hearing and the middle school serves approximately 90. These two

schools within the district are designated as the primary schools for deaf and hard of hearing children living in this district. These schools are public schools and the majority of children at these school are hearing children. In these schools, some of the children are in classrooms for deaf children only and some are "mainstreamed", or integrated into classes of children who hear and do not sign. The schools in this district admit children with mild to profound hearing disability. All of the children are "day" students; they live at home and come to school each day.

The self-stated philosophy of the classrooms selected from this district for this study is "total communication" and sign language is used. "Total communication" is a philosophy that arose in the 60's and, in theory, it advocates using various methods of communication with deaf children, including sign language. In practice, it may often involve forms of signing that are not ASL. That is the case in these schools. Most teachers in the school district are not fluent in ASL, although a few are. The school encourages signing that is strongly English influenced, and, as a result, many teachers do not use ASL. It should be noted that parents who wish to have their children in classes where spoken English is used without sign language may request this option. Some of the students in this district are "fully mainstreamed", that is they attend regular classes with hearing children with or without a sign language interpreter.

Videotaping was done during several visits to selected classrooms at each school setting. Over the course of one year, three visits were made to each school setting. Each visit lasted one week during which time videotaping was done of students and teachers engaged in various lessons including reading, science, spelling and others. In addition, some earlier videotaping of classrooms at one of the schools done for another study was included in this study to augment our study of specific techniques used by teachers in the classroom.

SAMPLING OF LANGUAGE PRACTICES IN THE CLASSROOM

Because of the very close and time-consuming transcription of teachers' signing behavior during instruction necessary for this study, sample segments of classroom instruction were selected from the large number of hours of videotape from their classrooms. In all, seven teachers were selected for this study. Six 15

minute segments were identified for each teacher making a total of 42 segments analyzed. Of the seven teachers selected for the study, three were from the public school, four from the residential school. Three of the teachers (one from the public school district and two from the residential school) are native signers—having learned ASL from their deaf parents. Four of the teachers (two from the public school district and two from the residential school) are non-native signers—having learned ASL later in life outside of the family. Three of the teachers are deaf (one from the public school district and two from the residential school), and four are hearing (two from the public school district and two from the residential school) (See Table 1.).

In videotaping classroom instruction, there are often long periods of time when the teacher is not engaged in instruction. To avoid analyzing dead time, segments were selected that had a clear beginning and continuous instruction—explaining, discussing, interacting, questioning and answering, etc.—for exactly 15 minutes. The content of the sample segments varied. For example, there was a segment on a science experiment and another discussing a book that students had read, but all segments clearly involved instructional activity.

ANALYSIS

For each teacher, the sample segments were closely coded and analyzed with the goal of identifying the ways that ASL and English interact with each other in various forms. Specifically:

- how teachers make connections between signing and print
- how teacher introduce/talk about English words
- how teachers use fingerspelling and initialized signs
- how teacher introduce new words/concepts
- how teachers introduce new signs
- how teachers use different media to make connections between languages and with print
- other types of language interplay that teachers use

Analysis of videotapes of signing behavior is not a straightforward task. How do you transcribe ASL data (record it on paper so that it can be more easily manipulated) when there is no written form of the language? Unlike working with spoken languages with

no written form where you might use a phonemic transcription system, signed languages have no visual representation system that is widely considered reliable (although there are some who claim to have invented such a system). Many researcher rely on a system of 'glossing', using an English word to represent a sign. So, a sign that translates into 'ingest food' may be given the English gloss EAT (caps are often used to denote a gloss). Unfortunately, there are not always such easily achieved equivalencies as 'ingest food' and EAT. Using a gloss such as RUN leaves open the question of whether it represents the ASL 'running', 'run for office', 'run in your pantyhose', etc..

Transcription is a slow and tedious process, turning the tape on and off phrase by phrase and recording the glosses. What is created is a quite lengthy transcription of the signed data. Analysis of the transcriptions then may require frequent checking back to the original because sometimes you just can't tell or remember what the sign looks like from looking at the gloss. Clearly movement, handshape, and location, all vital structural elements of a sign, are not represented in a gloss that is just an English word after all. These transcriptions and the videotaped signed instruction they represent became the starting point for our analysis.

During analysis, records were kept of the number of occurrences of specific examples of these types of language formations or associations. For example, all instances of the use of representations of English words (fingerspelling, initialized signs, etc) were entered in a database. In addition, during the data analysis, we noticed a technique that we called "chaining" which involved a series of associations, i.e., a fingerspelled word + pointing to the same printed word on the blackboard+ fingerspelling it again. We paid careful attention to recording these types of associations

To get a clearer picture of who does what in which type of setting, the data was broken down into different configurations according to residential or public school district setting and by deaf or hearing teacher. Our intention is not to compare relative effectiveness in terms of reading development, but to describe and explain differences or similarities across configurations of classroom teaching. We expect that these differences may play an important role in reading instruction, and we hope to address the question of whether they do in a future work.



Illustration. 1. Example of an initialized sign.

RESULTS

Use of print

The teachers in this study all use print in the classroom in similar ways. That is, they all write on the blackboard and on transparencies, use print on flip charts and use books both as sources and props. There was not a notable difference in the way print was presented except as noted in the section on "chaining" below.

Initialized signs are signs that include a handshape which corresponds to a fingerspelled letter of the alphabet. For example, the sign that translates into English as 'family' includes a handshape that corresponds with the fingerspelled letter representing F (see illustration 1.). A link is thus established between English and ASL via handshapes that look like fingerspelled representations of the alphabet used in English.

In our data, there is little difference in the frequency of use of initialized signs by deaf and hearing teachers (see Table 2). Deaf teachers used initialized signs an average of 94 times in the samples and hearing teachers used initialized signs an average of 95.5 times. When comparing teachers by school setting, residential school teachers used initialized signs an average of 89 times, and public school district teachers used initialized signs an average of 102 times. Given the number of samples we have, this difference is not likely to be one that distinguishes among settings.

Of the group of teachers, one who we will call Ann (hearing, public school, native signer) used initialized signs for not only nouns and verbs, but for function words (such 'the', 'at', etc.) and pronouns as well ('it', 'her', etc.). Nineteen out of 67 of her initialized signs were function words. All of the other teachers used initialized signs more for content words ('family', 'volcano', 'computer', etc.) in varying frequency. Sometimes the topic of the lesson seemed to result in repeated use of an initialized sign. For example, a discussion about Native Americans by one teacher resulted in the frequent use of an initialized sign for 'tribe'.

Some initialized signs are so "assimilated" into usage that signers hardly think of them as initialized. An example is the sign for "family", a two-handed sign which has handshapes derived from the manual alphabet handshape for "f". Other initialized signs have gained widespread use, such as the sign for "room" which has a non-initialized form, but the initialized sign using the manual handshape for "r" is commonly used. There are other initialized signs, however, which seem to be more marked and less accepted in usage among ASL signers. These signs are often referred to by ASL signers as "new" signs because they are associated with efforts at inventing signs to create equivalents with English words. An example of this might be the

Deaf teachers	94
Hearing teachers	95.5
Residential school	89
Public school	102
(Average frequency of occurrence in 6 x 15 min. samples of instruction)	

Table 2. Frequency of use of initialized signs.

initialized sign for 'river' which is an articulation of the two-handed ASL sign for 'river' with handshapes taken from the manual alphabet for "r". It is possible that some ASL signers will use or judge the use of this 'r' form of 'river' as acceptable, but it is more likely that many will recognize it as unusual, or, at least a sign likely to be used only for pedagogical purposes.

An analysis of the initialized signs used by the teachers in this study to establish whether there are patterns of use of more or less assimilated initialized signs would require asking for judgments of many native signers over a large local area or, at least, controlled testing. This was not attempted in this study. It can be noted, however, that the judgment of the native signers conducting this study suggested that this line of investigation might yield some differences between use in public and residential school teachers, and between deaf and hearing teachers. It would be interesting, if it were possible, to ascertain the frequency of use of these "new" signs in teacher talk and whether students may be affected by the frequency of occurrence of "new" signs.

FINGERSPELLING

There are several significant differences to be noted with regard to fingerspelling (Table 3). First, deaf teachers fingerspelled more than twice as often as hearing teachers. Deaf teachers used fingerspelling an average of 176 times in our samples compared to an average of 75 times by hearing teachers. Comparing by school setting, residential school teachers fingerspelled an average of 152 times while public school district teachers an average of 74 times. Table 4 shows individual teachers' use of fingerspelling. Within the public school district group of teachers, the deaf teacher

accounted for more instances of fingerspelling than the two hearing teachers combined. Within the residential school group of teachers, although one deaf teacher had a very large number of instances of fingerspelling, there is little difference between the other deaf teacher and the two hearing teachers.

It should be noted that the hearing teachers at the residential school fingerspell significantly more often than the hearing teachers in the public school district. At the same time, the average frequency of fingerspelling of the deaf teacher at the public school district (146) more closely resembles the average frequency of the residential school group (152). The two hearing teachers at the public school district average only 37.5 instances of fingerspelling.

Teachers use of fingerspelling was found to be for specific types of items following conventions of fingerspelling among fluent adult signers. For example, many shorter words are often fingerspelled. Some examples of these are 'ok', 'so', 'well', 'if', 'due', 'fee', 'it', 'she', 'he'. Also, proper nouns are fingerspelled: 'Iroquis', 'Jr. NAD', and 'John' (names). Fingerspelling was also used to keep English phrases or idiomatic usage intact. For example: 'so be it'. When teachers wanted to express a particular English word or faced a translation difficulty, they fingerspelled, i.e., 'ham', 'feather', 'uncompromisingly', 'shore', 'skirmish'. Verbs are rarely, if ever, fingerspelled, although there was an example of a verb ('fix) appearing as a "fingerspelled loan sign", a sign which began as a fingerspelled word and through usage and alteration in

RESIDENTIAL SCHOOL SETTING	
Barbara	123
Connie	268
Lewis	115
Sara	102
PUBLIC SCHOOL SETTING	
Ann	44
Tammy	146
Victoria	31
(Frequency of occurrence in 6 x 15 min. samples of instruction)	

Table 3. Individual teacher's use of fingerspelling by school setting.

Deaf teachers	176
Hearing teachers	75
Hearing teachers in public school setting	37.5
Hearing teachers in residential school setting	112.5
Deaf in public school setting	146
Deaf in residential school setting	152
(Average frequency of occurrence in 6 X 15 min. samples of instruction.)	

Table 4. Deaf and hearing teachers' use of fingerspelling by school setting.

form over time has taken on characteristics of a sign and become lexicalized.

The teachers who fingerspelled often also tended to repeat the same fingerspelled word several times throughout a segment. This often happened during chaining which we explain in further detail below.

CHAINING

One of the most interesting findings in this study is the difference in the use of chaining by teachers. As was mentioned earlier, chaining is a technique for connecting texts such as a sign, a printed or written word, or a fingerspelled word (Illustration 2). In this technique, a teacher might, for example, fingerspell a word, immediately point to the word printed on the blackboard next to her, and fingerspell the word again; or, sign a word and immediately fingerspell it as well. Often the chains have two or three parts and sometimes four or more parts. Others have described a similar technique as a "sandwich," (Kelly 1995; Fischer & Janis 1990) in which signs and fingerspelled words are alternated. This technique seems to be a process for emphasizing, highlighting, objectifying and generally calling attention to equivalencies between languages. There are several possible combinations of links in chains of this type. The following are some examples of chaining:

"(THEORY) (T-H-E-O-R-Y) (THEORY)"
 initialized sign + fingerspelling + initialized sign

"(H-O-N-O-R) (HONOR) (H-O-N-O-R)"
 fingerspelling + initialized sign + fingerspelling

"('duty') (point) (DUTY) (D-U-T-Y) (DUTY)"
 printed word + pointing to word + initialized sign
 + fingerspelling + initialized sign

"('grubs') (G-R-U-B-S) (point)"
 printed word + fingerspelling + pointing to word

"(IMAGINATION) ('imagination') (point)
 (IMAGINATION)"
 initialized sign + printed word + pointing to word
 + initialized sign

"(VOLCANO) (V-O-L-C-A-N-O) ('volcano')
 (point) (V-O-L-C-A-N-O)"
 initialized sign + fingerspelling + printed word +
 pointing to word + fingerspelling

There were significant differences among teachers in our samples in the use of chaining. Some teachers used a great deal of chaining during instruction, while others used it very little or not at all (Table 5). Deaf teachers used an average of 30 instances of chaining while hearing teachers used chaining an average of 5.5 times. By school setting, residential school teachers used chaining an average of 21.5 times and public school district teachers an average of 8.7 times.

An analysis of certain types of chaining shows the propensities of the individual teachers. The two hearing teachers at the public school district, Ann (native signer) and Victoria (non-native), used chaining 7 and 0 times respectively. This is not to say that they did not use fingerspelling or initialized signs. Ann fingerspelled 45 times and used initialized signs 110 times, and Victoria fingerspelled 31 times and used initialized signs 50 times. But these instances of fingerspelling and initialized signs were not used in chaining combinations. Of the hearing teachers at the residential school, Sara (non-native) used chaining 14 times and Barbara (non-native) used chaining only once. The deaf teacher (non-native) at the public school district used chaining 19 times, which is comparable to the 15 times one of the deaf teachers at the residential school, Lewis (native), used chaining. But the other deaf teacher at the residential school, Connie (native), used chaining a



'THEORY + T-H-E-O-R-Y + THEORY'
initialized sign + fingerspelling + initialized sign

Illustration 2: Example of chaining.

Deaf teachers	30
Hearing teachers	5.5
Residential school teachers	21.5
Public school teachers	8.7
(Average frequency of occurrence in 6 X 15 min. samples of instruction)	

Table 5. Teachers' use of chaining.

relatively enormous 56 times.

INTRODUCING NEW VOCABULARY

Chaining is often done when new vocabulary is introduced. Teachers who use it seem to do so naturally, assuming that children need to be given the various forms of the new vocabulary, in print, fingerpelled, and signed forms. In looking at ways that teachers introduce "new" vocabulary (words, signs, or phrases of which the teacher thinks the students have no prior knowledge), there are several notable approaches that vary in usage among the teachers. Some teachers use compounding to introduce "new" vocabulary, a procedure in which signs are used in combinations, often with abbreviated transition between signs. Examples of these are:

"SLEEP-THROUGH-WINTER" = 'hibernate'
 "FROZE-HOUSE" = 'igloo'

Some teachers use ASL size and shape specifiers to introduce "new" vocabulary. To introduce 'armadillo', one teacher used a descriptive classifier for 'multiple curved bands across the back and down the sides'. For 'enlarge', another teacher used a descriptive classifier for 'to enlarge a picture'.

An aspect of teacher signing behavior during instruction that could bear further scrutiny and analysis is the strong facial markings used by some teachers to call attention to or set the stage for "new" vocabulary. For example, one teacher used a very furrowed brow and a strong question marker to set up the fingerspelling of the word 'funnel'. These facial markings seem to alert the student to several things: that something inter-

esting is coming, that one has to ask oneself what this new word means and that it is okay to do so, and finally, suggests that an explanation is coming if one pays attention.

The use of chaining and these other strategies for introducing new vocabulary are a way of singling out words in a process of objectification that sets it apart from others and makes it the thing to discuss/study for the moment. Teachers thus signal the distance between the two languages, ASL and English, as well as to bridge the gap between them (Ramsey & Padden, 1998).

DISCUSSION

Teachers, both deaf and hearing, who work in residential schools or public school districts have active ideologies from which they produce ways of teaching and, in particular, of talking during instruction. The structure of this "teacher talk" for signing teachers has not been closely examined to any great extent. This study suggests that there are not only "habits" of language use that teachers bring into play in classroom instruction that differ among teachers according to the individual language and cultural knowledge of the teachers, but that differ also according to the type of school setting.

In this study, close analysis of teacher signing behavior during classroom instruction reveals some of the ways that teachers call up resources from their personal repertoires of language and cultural knowledge to present, to explain, and to make connections between languages (and print) for their students. These differences in repertoires are seen in the differing ways that deaf and hearing teachers bring English to the forefront or make connections between ASL and English in their use of fingerspelling and a process of chaining together different language forms and media. There is also a difference in how teachers use language in different school settings. These differences between deaf and hearing teachers and between teachers in different school settings may be accounted for in several ways.

It may be that teachers have sets of beliefs about schooling for deaf children that lead them to make choices about in which type of school setting they will teach. Thus they bring with them language and cultural repertoires that differ to begin with and join in shaping

the way talk during instruction is structured at that school setting. For example, a teacher may have a belief or a doctrine gained during teacher training that one should try to use initialized words as much as possible in order to teach deaf children English vocabulary rather than rely on fingerspelling or other techniques. They may then be attracted to the type of school that reflects this belief, which is likely to be the public school setting according to our findings.

To illustrate, Sara (hearing, non-native) teaches in a residential school environment and uses fingerspelling and chaining with greater frequency than hearing, non-native teacher in the public school. In her interview she says, "I graduated from CSUN and I came out with that [bi-bi] philosophy. I've always used that in my teaching. I've always used 'this is how you do it in ASL, this is how you do it in English'. If they're confident in just ASL, then I'll transfer it to how to use it in English. I use that a lot". Her commitment to the bi-bi philosophy and the way she talks about the relationship between ASL and English most likely led her to select a residential school for a teaching job. It is in residential schools across the country that pedagogies more inclusive of ASL are usually found.

Teachers' language and cultural repertoires may go hand in hand with their beliefs about how children learn. Deaf native signers who grow up in deaf families may fingerspell often and to very young deaf children because they themselves have had the experience of learning to understand the meaning of fingerspelled words before they could recognize printed words (Padden, 1996; Padden & LeMaster, 1985). In an interview with Lewis, one of the deaf natives in this study who fingerspells and uses chaining often, he said, "...I tell the class that they already have a sign for each of the words on the list. A deaf child in 5th grade has an extensive sign vocabulary, but their written vocabulary is much smaller. My job is to tie ASL vocabulary to each of the written English vocabulary words." Chaining may be both a spontaneous "habit" of native signing deaf teachers as well as a reflection of a belief in the need to make the connections between ASL and English.

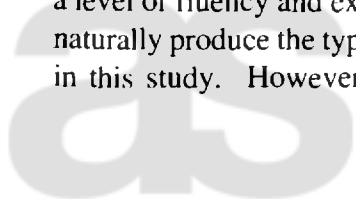
Fluency in ASL may also account for some of the differences between deaf and hearing teachers. It takes a level of fluency and experience with the language to naturally produce the type of chaining that is discussed in this study. However, it should be noted that the

hearing, native signer teaching in the public school district in this study made very little use of chaining. Having native ASL ability may not mean one will use chaining. Personal beliefs about the nature of teaching will affect signing behavior during instruction.

Deaf teachers may have a shared knowledge with deaf students that leads them to produce particular constructions during instruction. This shared knowledge may be a process of selection from beliefs about "what works" for deaf children based on the life experience of being deaf that deaf teachers have. It may also be the product of communication patterns from within the deaf communities. Many of the deaf teachers' ways of talking struck a chord with the deaf analysts in this study. These ways of talking are common usage among deaf signers. Communication strategies that are indigenous in deaf families and in deaf communities find their way into teacher talk.

How can we account for the differences in hearing teachers' use of fingerspelling and chaining according to the school setting in which they teach? It may be that when hearing teachers teach in school settings that have large numbers of deaf teachers, there is an effect of increasing hearing teachers' awareness of the use of fingerspelling and chaining through daily interaction both in class and socially with deaf students and deaf teachers. This effect is likely a product of the kinds of language and cultural knowledge that hearing people gain by association in the residential school environment. It may also be, as mentioned earlier, a product of teachers who possess these repertoires selecting the type of school setting where they are encouraged to make use of them.

There are some implications of this study for educators. The greater use of fingerspelling by deaf teachers in this study suggests that these teachers are engaged in a practice that provides access to English that is indigenous to deaf communities. The use of fingerspelling, signs, print, pointing, and facial markings during chaining strongly suggests that there is an achievable juxtaposition of ASL and English in classrooms in natural ways. Artificial modifications of ASL are not needed to achieve this linkage. There may be other indigenous practices that can be identified that will inform the way we teach and how we train new teachers. It falls to educators, therefore, to see the potential of this and other indigenous practices to provide access to English for deaf students.



The difference between deaf and hearing teachers found in our analysis suggests that their life experiences shape their talk, help them determine what the children they teach know and don't know, and lead them to provide a rich and recursive corpus of language use in their classrooms. The cultural in a "bilingual, bicultural" approach to educating deaf children rests in the details of language interaction of teacher and student, not just in the enrichment of curriculum with deaf history, deaf literature, and ASL storytelling.

And finally, the differences between teacher signing behavior in a residential school where ASL and English are used alongside each other but each remain intact, and a public school district where signing is strongly influenced by English in various ways, reminds us how much schools are the product of ideologies about teaching, about how deaf children learn, and about the relationship of ASL and English.

REFERENCES

Chamberlain, C., and R. Mayberry

2000 Theorizing about the relationship between ASL and reading. *In Language Acquisition by Eye*. C. Chamberlain, J. Morford, and R. Mayberry, eds. Pp. 221-259. Mahwah, NJ: Lawrence Erlbaum Associates.

Fischer, S., and W. Janis

1990 Verb Sandwiches in American Sign Language. *In Current Trends in European Sign Language Research*. P. Siegmund and T. Vollhaber, eds. Hamburg, Germany: Signum Verlag.

Geers, A., and B. Schick

1988 Acquisition of spoken and signed English by hearing-impaired children of hearing-impaired or hearing parents. *Journal of Speech & Hearing Disorders* 53(2):136-143.

Gustason, G.

1988 Why Signing Exact English was developed. *In Signing Exact English: English or Not?* G. Gustason, ed. Los Alamitos, CA: Modern Signs Press.

Kelly, A.

1995 Fingerspelling interaction: A set of deaf parents and their deaf daughter. *In Sociolinguistics in deaf communities*. C. Lucas, ed. Pp. 62-73. Washington, DC: Gallaudet University Press.

Mayberry, Rachel

1989, April Deaf children's reading comprehension in relation to sign language structure and input. Paper presented to the Society for Research in Child Development, Kansas City, Kansas, 1989, April.

Padden, C.

1996 Early bilingual lives of deaf children. *In Cultural and Language Diversity: Reflections on the Deaf Experience*. I. Parasnis, ed. Pp. 99-116. Cambridge, MA: Cambridge University Press.

Padden, C., and B. LeMaster

1985 An alphabet on hand: The acquisition of fingerspelling in deaf children. *Sign Language Studies* 47:161-172.

Padden, C., and C. Ramsey

1998 Reading ability in signing deaf children. *Topics in Language Disorders* 18:30-46.

Padden, C., and C. Ramsey

2000 American Sign Language and reading ability in deaf children. *In Language acquisition by eye*. C. Chamberlain, J. Morford, and R. Mayberry, eds. Pp. 165-189. Mahwah, NJ: Lawrence Erlbaum & Associates.

Ramsey, C., and C. Padden

1998 Natives & newcomers: Literacy education for deaf children. *Anthropology and Education Quarterly* 29(1):5-24.