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The Importance of Variation Research for Deaf Communities

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1 Introduction

We examine the importance of variation and other linguistic research for Deaf communities.² Sociolinguistic variation in American Sign Language (ASL) was initially addressed by Carl Croneberg in the *Dictionary of American Sign Language* (DASL), the first dictionary of a sign language based on linguistic principles (Stokoe, Casterline, & Croneberg 1965). This work was followed by studies of lexical, phonological, and grammatical variation. The treatment of variation in the DASL will be reviewed and research on variation described, with emphasis on the findings from a large-scale study of phonological variation. We will show that research on linguistic variation and other aspects of sign languages impacts Deaf communities in three ways. First, the recognition that ASL exhibits sociolinguistic variation like other systems that we recognize as languages reinforces the hard-won status of ASL and other sign languages as real languages. Second, the study of variation in sign languages reinforces the position that systematic variation, or "orderly heterogeneity," is integral to the structure of all languages (Weinreich, Labov, & Herzog 1968). Understanding the nature of a language requires an understanding of variation. This in turn relates to the increasing awareness of modality differences between spoken and sign languages. Third, the findings from research on sign language structure and variation have had a direct impact on the educational and employment opportunities available to Deaf people.

2 Perspectives on ASL

Users and observers of ASL have long been aware of variation in the language. Evidence can be seen in writings about deaf people's language use

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² 'Deaf' refers to individuals and groups who regard themselves as culturally Deaf; 'deaf' refers to audiological status. Glosses of ASL signs are written in small capitals.

dating from the mid-19th century. For example, at the fourth Convention of American Instructors of the Deaf in Staunton, Virginia, J. R. Keep (1857:133) described variation in the signs used by students at the school:

... there is a language of signs; a language having its own peculiar laws, and, like other languages, natural and native to those who know no other.... There may be different signs or motions for the same objects, yet all are intelligible and legitimate.... As a matter of fact, however, although the Deaf and Dumb, when they come to our public Institutions, use signs differing in many respects from those in use in the Institutions, yet they soon drop their peculiarities, and we have the spectacle of an entire community recalling objects by the same motions.

In response to Keep's remarks, Harvey Peet referred to Deaf signers as "those to whom the language is vernacular," and added, "there is room for difference of dialects. One Deaf Mute may fall upon one sign and another upon another sign, for the same object, both natural" (144—146).

Despite the early awareness of variation indicated by comments such as those quoted above, formal research on variation in sign languages did not begin until the 1960s with Croneberg's two appendices to the DASL (Stokoe et al. 1965). Appendix C, "The Linguistic Community," describes the cultural and social aspects of the Deaf community, and discusses economic status, patterns of social contact, and the factors that contribute to group cohesion, including the extensive personal and organizational networks that ensure frequent contact even among people who live on opposite sides of the country: "The deaf as a group have social ties with each other that extend farther across the nation than similar ties of perhaps any other American minority group" (Stokoe et al. 1965:310). Croneberg noted that these personal ties are reinforced by membership in organizations such as the National Association of the Deaf and the National Congress of the Jewish Deaf. These personal and organizational patterns of interaction are central to understanding language use and variation in ASL. While ASL is variable at a number of different linguistic levels, nevertheless Deaf people recognize a cohesive community of ASL users extending across the United States.

In "Sign Language Dialects" (Appendix D), Croneberg dealt with sociolinguistic variation, specifically as pertains to the preparation of a dictionary: "One of the problems that early confronts the lexicographers of a language is dialect, and this problem is particularly acute when the language has never before been written. They must try to determine whether an item in the language is *standard*, that is, used by the majority of a given population, or

dialect, that is, used by a particular section of the population" (Stokoe et al. 1965:313). He outlined the difference between what he termed *horizontal* variation (regional variation) and *vertical* variation (variation that occurs in the language of groups separated by social stratification) and stated that ASL exhibits both. He then described the results of a study of lexical variation undertaken in the southeast and New England. He found that for ASL, the state boundaries between North Carolina and Virginia also constituted dialect boundaries. North Carolina signs were not found in Virginia and vice-versa. Maine, New Hampshire, and Vermont, however, exhibited less internal standardization, and state boundaries in New England tended to be much less important than in the south, with considerable overlap in lexical choice among the three states. He pointed out the key role of the residential schools in the dissemination of dialects: "At such a school, the young deaf learn ASL in the particular variety characteristic of the local region. The school is also a source of local innovations, for each school generation comes up with some new signs or modifications of old ones" (314).

In his discussion of vertical variation, Croneberg mentioned the influence of age, ethnicity, gender, religion, and status. His definition of status encompassed economic level, occupation, relative leadership within the deaf community, and educational background. He also noted that professionally-employed and financially prosperous graduates of Gallaudet College

...tend to seek each other out and form a group. Frequently they use certain signs that are considered superior to the signs used locally.... Examples of such signs are Gallaudet signs, transmitted by one or more graduates of Gallaudet who are now teaching at a school for the deaf, and who are members of the local elite. The sign may or may not later be incorporated in the sign language of the local or regional community (318).

Finally, Croneberg commented on what a *standard* sign language might be and stated that "few have paid any attention to the term *standard* in the sense of 'statistically most frequent.' The tendency has been to divide sign language into good and bad" (318), with older signers and educators of the deaf maintaining the superiority of their respective signs for various reasons. Croneberg neatly captured the essence of the difference between prescriptive and descriptive perspectives on language when he wrote, "What signs the deaf population actually uses and what certain individuals consider good signs are thus very often two completely different things" (319).

It is also useful to consider Croneberg's appendices within the context of other variation research being undertaken at the same time. The 1960s and

the 1970s were very busy for spoken languages and sign languages alike. Labov's study of vowel centralization on Martha's Vineyard was published in 1963 and his pivotal study of New York City speech followed in 1966. Both studies explored a new area, the correlation of linguistic variables with social factors. Shuy, Wolfram, and Riley completed their urban language study of Detroit in 1968 and Wolfram's dissertation on what is now known as African American Vernacular English appeared in 1969. Georgetown University established a doctoral program in Sociolinguistics in 1971 and James Woodward, whose 1973 dissertation explored variation in a sign language, was among the first students. In short, the years immediately preceding and following the publication of the DASL in which Croneberg's appendices appeared were ones of growing awareness about sociolinguistics in general and variation in particular.

The years following the publication of the DASL witnessed a number of studies of variation in ASL. In addition to Woodward (1973), phonological variation in the form of thumb extension (e.g. FUNNY, BLACK) was explored by Battison, Markowicz, and Woodward (1975). Woodward, Erting, and Oliver (1976) looked at signs that are produced variably on the face or the hands (e.g. MOVIE, PEACH), and Woodward and DeSantis (1977) examined signs that are variably one-handed or two-handed. In a historical study, Frishberg (1975) looked at processes such as centralization still witnessed in ASL today. Morphological and syntactic variation have also been explored, as well as lexical variation. (For a full review of variation research in ASL, see Lucas, Bayley, and Valli, forthcoming).

3 The Importance of Variation Research

3.1 Sign Languages as Real Languages

At the 1989 Deaf Way conference in Washington, DC, Stokoe addressed the issue of why the publication of a new dictionary makes headline news. He wrote that a serious dictionary is much more than a word book. Using the example of the Oxford English Dictionary, he stated that "by defining hundreds of thousands of English words in phrases and sentences in English, it describes this language more completely than any other single book can do ... Between the covers of a serious dictionary we find, all ready for us, the tools of thought" (1994:331). He dealt with the significance of the publication of sign language dictionaries, saying that beyond describing and arranging the tools of thought that sign language users need, a dictionary "can show the world that deaf signers can think in their sign languages, with logic and precision and even elegance. It can wipe out, as nothing else can so well,

the false ideas that ignorant people have about deaf people and deaf society and sign languages" (332).

In discussing what guided him in the preparation of the DASL as early as 1957, Stokoe mentioned the thinking of George Trager and Henry Lee Smith: "They insisted that language could not be studied by itself ... but must be looked at in direct connection to the people who used it, the things they used it to talk about, and the view of the world that using it imposed on them." (333) This perspective guided the inclusion of Croneberg's appendices in the DASL, appendices that showed "how language and culture as well as deafness formed a special community" (334). The recognition that ASL exhibits variation like other linguistic systems reinforces the status of ASL as a real language. And since it is known that variation is often the precursor to change, the study of variation in ASL, as in other languages, leads us to an understanding of how ASL changes.

The inclusion of information about variation in the DASL—that is, in a volume that by definition aims to represent the structure of a language and is accepted by the community as a reliable representation—also reinforces the position that rather than being just a curiosity or an anomaly, variation is an integral part of the structure of language and that in order to truly understand the nature of a language, variation must be considered. In this regard, in their pioneering work on variation, Weinreich et al. (1968) introduced the idea of structured heterogeneity as the most useful metaphor for understanding the nature of language: "The key to a rational conception of language change—indeed, of language itself—is the possibility of describing orderly differentiation in a language serving a community..." (99-100). The inclusion of information about variation in the DASL thus provides a much wider perspective on the fundamental nature of ASL structure, one that has led to an increasing awareness of modality differences between spoken languages and sign languages. These differences are evident in how variation is structured.

3.2 Systematic Variation in ASL

Our evidence for the structured nature of variation in ASL comes from a project that focused on phonological, syntactic, and lexical variation. The details of the project are described at length in Lucas et al. (forthcoming). For the purposes of this paper, we will focus on the results of the analysis of phonological variation. We looked at the patterns of variation exhibited by three phonological variables: signs produced with a 1-handshape, the sign DEAF, and the location of a class of signs represented by KNOW. The citation form (the form that appears in dictionaries and that is taught in sign language classes) for 1-handshape signs is index extended with all other fingers and

the thumb closed. However, variation in 1-handshape signs may range from an extended thumb (the 'L'-handshape) to all fingers open (the 'open hand' variant). In citation form, the sign DEAF is produced from a location near the ear to a location near the chin, but also appears chin-to-ear and simply as a single contact of the finger on the cheek. Signs like KNOW are produced at the level of the forehead in citation form, but frequently move down to the cheek or even to the space in front of the signer. Multivariate analysis of more than 10,000 tokens showed that the variation exhibited by all three variables correlates with both linguistic and social factors. That all three variables exhibit significant correlations with both linguistic and social factors is not at all surprising. These kinds of correlations are characteristic of all human languages. What is unexpected, however, is the consistently strong role of grammatical factors in conditioning the patterning of the three variables.

Sociolinguistic research on spoken languages has shown that linguistic variables may be systematically conditioned by factors operating at different levels of the linguistic system. For example, numerous studies have shown that -t,d deletion in English is conditioned by the preceding and following phonological environments, stress, and the grammatical category of the word containing the cluster (e.g. Guy 1980). Although the fact that many sociolinguistic variables are constrained by factors operating at different linguistic levels may be a commonplace for students of spoken languages, phonological variation in ASL and other sign languages has heretofore been accounted for by positing phonological constraints alone, particularly the features of the preceding and/or following segments, without reference to structures other than the sequence of phonological segments. The program of research on ASL until very recently has been to demonstrate that ASL, and by analogy other sign languages, are true languages. This work has proceeded by demonstrating that the structure of ASL parallels that of spoken languages, and that its phonology and syntax are subject to the same kinds of processes that operate in spoken languages. In the process, this work has not considered the possibility that factors at different linguistic levels may constrain phonological variation. For example, Liddell and Johnson (1989) explain variation in all three of the variables discussed here—1-handshape, DEAF, the location of signs such as KNOW—exclusively by reference to features of the preceding and/or following segments.

The results of our analysis do not support Liddell and Johnson's claims. The core of our analysis of each variable involved identifying the linguistic factors that govern the observed variation. We hypothesized that features of the immediately preceding and following phonological environment would play key roles. For example, we assumed that the location of preceding and

following signs would be important for understanding the variation in DEAF and in the location of signs such as KNOW; we assumed that the handshape of the preceding and following sign would play a role in the variation of 1-handshape signs. We therefore included factor groups consisting of the features of the preceding and following segments. However, Lucas's earlier analysis of DEAF (1995) had alerted us to the possible role played by grammatical function in explaining variation. That analysis, based on 486 tokens, found the syntactic category of the sign DEAF to be the only significant linguistic factor, with adjectives favoring non-citation forms, predicate adjectives slightly disfavoring them, and nouns strongly disfavoring them. Based on the results of Lucas (1995), in the larger study we included a factor group for the relevant grammatical categories of each variable along with the phonological and social factor groups. For DEAF, the grammatical categories included predicate adjective, noun, adjective, and adjective in a compound. For the location of signs such as KNOW, they included prepositions and interrogatives, nouns, verbs, and adjectives, and for 1-handshape signs, they included pronouns and lexical signs, the latter divided into nouns, adjectives, verbs, adverbs, and grammatical words. Table 1 summarizes the ranking of the factors for all three variables and shows that grammatical function is the most powerful factor in all three cases. This is a very surprising finding, with substantial implications. We will first discuss its importance in terms of each variable and then offer a more global explanation that unifies all three variables.

The results for variation in 1-handshape signs show grammatical function to be the first order linguistic constraint on two of the three main variants, +cf and 'open hand', and a significant constraint on the third, 'L' handshape. The 1-handshape findings suggest that conditioning at the level of discourse structure and information packaging may be more important for phonological variation in sign languages than previously thought. We can view the three variants as points on a continuum of distance from the citation form: the citation form itself, a form in which only the thumb is extended, and a class of forms in which other fingers are also selected and extended. This continuum corresponds inversely to a continuum of grammatical distance from the signing subject in the discourse setting: that is, the most salient referent in the discourse, the signer, is more likely to be referred to with a pronoun whose form may vary maximally from the citation form. The addressee, also salient in the discourse setting, is more likely to be referred to with a pronominal form that diverges from the citation form only in features of the thumb. Third person referents, those not present in the setting, are the most likely among the pronouns to be in citation form. In ASL pronouns, the indexical function is carried by the tips of the fingers, regardless of the hand-

shape used. In non-indexical lexical signs, however, the whole handshape carries part of the semantic load. The handshape in this class is the most likely to be the citation form. Lexical signs may be produced as the 'L' handshape variant, in which the thumb is also extended, but they are less likely to take a handshape that is farther away from the citation form than are pronouns, as this could convey a different meaning, or no meaning at all.

Variable	Analysis	Constraint ranking
I-hand-shape	+cf vs. -cf	grammatical function > features of preceding and following handshapes (assimilation)
	'L' handshape vs. all others	features of preceding and following handshapes (assimilation) > grammatical function
	'open hand' vs. all others	grammatical function > features of preceding and following handshapes (assimilation)
DEAF	+cf vs. -cf	grammatical function > discourse genre
	chin-to-ear vs. contact-cheek	grammatical function > location of following segment (assimilation)
Location	+cf vs. -cf	grammatical function > contact with body of following sign > location of preceding sign

Table 1. Linguistic Constraints on Phonological Variation

In the case of DEAF, the role of grammatical constraints in the choice between a citation and non-citation form may represent a synchronic reflex of a change in progress in which compounds are the most favorable environment for innovative forms, followed by nouns and adjectives, and finally predicates. We also see both the chin-to-ear and contact-cheek forms occurring with predicates, nouns, and adjectives. VARBRUL analysis shows that when the citation (ear-to-chin) and non-citation forms (chin-to-ear and contact-cheek) of DEAF are compared, grammatical category is the main linguistic constraint on variation. These findings do not mean, however, that phonological factors never play a role. When we compare the non-citation forms to each other, grammatical function is still the most important factor, but the location of the following sign also plays a role, and we have evidence of assimilation: following locations higher or lower than the usual location for the contact cheek form slightly favor this form, while a following location at the contact cheek location (as in the sign YESTERDAY or GIRL) and a

following pause both disfavor the contact cheek form and favor the chin-to-ear form.

In the case of the lowering of signs such as KNOW, as with DEAF, grammatical function is the most important factor. Specifically, prepositions and interrogatives are most likely to be produced at a location lower than the temple. Nouns and verbs represent the neutral reference point. Adjectives favor citation form. And the phonological factors of the location of the preceding sign and body contact in a following sign proved to be significant. So, the features of the preceding and following signs do play a role in variation, but their role is not as strong as grammatical category.

The analyses summarized here highlight several points. First, we cannot assume that only features of the preceding and/or following signs constrain phonological variation in sign languages. Indeed, the results of multivariate analyses show that is not the case (Lucas et al., forthcoming). Second, just as with spoken languages, studies of variation in sign languages must be based on large amounts of data collected from representative samples of the language community. With all three phonological variables that we examined, we saw that while it might seem reasonable to assume that most important factors governing variation have to do with features of the preceding and following segments, this assumption is not always reliable. When examined in light of the actual language produced by real people, the claims and assumptions about all three variables could not be supported. Third, the consistent pattern observed across all three phonological variables examined here may help us sort out the types of constraints that may be unique to signed languages, e.g. indexicality, and those that are common to all languages, whether spoken or signed.

We have strong evidence, then, that grammatical constraints play a more important role than the features of the preceding and following signs in conditioning phonological variation in ASL. The challenge is to understand why this is so. The first answer is that, as in spoken languages, phonological variation in ASL is not constrained only by phonological factors. The focus heretofore may have been on features of the preceding and following signs, but large data-based quantitative studies such as ours show that grammatical factors must also be considered. A second answer leads to consideration of fundamental differences between spoken and sign languages. That sign languages are "real" languages, viable linguistic systems independent from the spoken languages with which they may co-exist, has been amply demonstrated. However, having established that sign languages are languages, research on all aspects of sign language structure has begun to reveal some very fundamental and most likely modality-related differences between spoken and sign languages. Of most relevance here are the fundamental differ-

ences in how morphology functions and how these differences manifest themselves in variation. In many of the spoken languages in which phonological variation has been explored, morphology is a "boundary phenomenon." That is, meaningful units are added to the beginning or to the end of other units in the language in the form of plural markers, person and tense markers, derivational affixes and so forth. These units are added to an existing phonological environment. It stands to reason that when variation occurs, the immediate environment to which the units have been added is a good place to look for the basis of the variation. And in fact, many studies of spoken language variation have demonstrated the key role of the immediate phonological environment in governing variation.

However, morphology in sign languages is by and large not a boundary phenomenon. Very few affixes exist. Morphological distinctions are accomplished by altering one or more features in the articulatory bundle that makes up a hold or a movement segment or by altering the movement path of the sign. That is, segments are not usually added to other segments to provide information about, for example, person or aspect. Rather, the location feature of a segment (e.g. near the signer or away from the signer) indicates person, and movement between locations indicates subject and object of the verb; similarly, a particular movement path indicates continuative aspect or inceptive aspect (Emmorey 1999).

Based on the results of our analyses, it would seem that these fundamental differences manifest themselves in the variable components of the language. That is, the immediate phonological environment turns out not to have the major role in governing phonological variables, in part because the variables are not affixes. The grammatical category to which a variable belongs is consistently the first-order linguistic constraint. We suggest that, as the modality differences between spoken and signed languages manifest themselves in the basic phonological, morphological, and syntactic components of the language, so do they manifest themselves in the variation found in the language. As phonological and morphological processes go, so apparently goes variation.³

We suggest, then, that the difference in modality may result in differences in the relative importance of the constraints. In the phonological variation observed thus far in sign languages, grammatical constraints are consis-

³ The question of parallels between ASL and spoken languages (such as Chinese) that do not use affixes to any great extent arises, and is difficult to answer. Although numerous studies of Chinese dialects exist, relatively few employ variationist methods, and only Bourgerie's (1990) dissertation on sociolinguistic variation in Hong Kong Cantonese considers the effect of grammatical class on phonological variation.

tently more important than phonological ones. Ironically, it may be the visual nature of sign languages that reinforces the impressions and hypotheses that phonological variation in sign languages is governed only by constraints having to do with the features of the preceding and/or following segments. That is, we can actually *see* the lower and higher locations that precede and follow the sign DEAF and signs such as KNOW; we can *see* the handshapes that precede and follow 1-handshape signs. Being able to see the phonological environment surrounding the variation easily leads to hypotheses about this environment accounting fully for the variation. But these hypotheses are not supported by our data.

Finally, as suggested by the finding that the grammatical category to which a sign belongs is consistently the strongest constraint on variation, the study of variation in sign languages has important contributions to make to sociolinguistics in general. Having established that sign languages are fully-functional languages, sign language researchers are now in a position to ask how studies of sign languages can help to expand our understanding of human language, an area in which Deaf scholars have an important role to play.

4 The Importance of Variation Research for Deaf Lives

In 1989, Stokoe stated that public attitudes toward deafness and deaf people and their sign language had changed, in part because of the publication of the DASL. Speaking of the changed attitudes demonstrated by the student-led campaign for a Deaf president of Gallaudet University, the nation's only university devoted primarily to the education of Deaf students, he commented: "I would like to think anyway—when the student leaders stood in front of TV cameras in March of 1988 and said that the University needed a deaf president now because the language and culture of deaf people must be respected—that the germ of that idea was presented in the dictionary twenty three years earlier.... Owing in part, at least, to ... *A Dictionary of American Sign Language*, there are now deaf men and women engaged in studying sign language and the culture of deaf communities" (1994:334). Others have made similar observations. George Detmold stated that he thought that the significance of the DASL "was that their [deaf people's] language was treated here like any other language..." (cited in Maher 1996:90). Mervin Garretson, former president of the National Association of the Deaf, stated in a volume of essays dedicated to Stokoe that "to know, once and for all, that our 'primitive' and 'ideographic gestures' are really a formal language on a par with all other languages of the world is a step towards pride and liberation" (Baker and Battison 1980:vi). The significance here comes not only from research on variation, but from research on sign languages of which

variation is a part. This research has directly influenced the opportunities available to Deaf people in three areas: education, employment, and services.

Research on sign languages has led to the legitimization of sign languages and allowed for the discussion of what the medium of instruction should be in deaf education. Deaf people and educators now ask why it should not simply be sign language, a question that has to be understood within the historical context of deaf education. The history of deaf education is by now well documented, starting with the founding by Thomas Hopkins Gallaudet of the American School for the Deaf (formerly the American Asylum for the Deaf and Dumb) in 1817 in Hartford, Connecticut. Gallaudet was aided by Laurent Clerc, a French Deaf man who brought with him from France his knowledge of French Sign Language. Sign language was the medium of instruction at the American School and, by 1826, there were 26 residential schools for the deaf in the United States, many founded by graduates of the American School and all using ASL as the medium of instruction. However, the tide of oralism began to rise in the 1870s, and by the 1880 conference of educators of the deaf held in Milan, Italy, sign language was seen as harmful to the development of deaf children. One of the slogans of the conference was "*il gesto uccide la parola*" ("gesture kills the word"). In the following decades, oralism rapidly gained the upper-hand and by 1907 there were 139 schools for the deaf and none used ASL (Lane, Hoffmeister, and Bahan 1996). This decline in ASL as the medium of instruction had direct consequences for deaf people employed as teachers. Prior to 1880, about 42% of teachers in residential schools were deaf, by the turn of the century, only 17% were deaf, and by 1996, only 7% were deaf.

The suppression of sign language, then, had a devastating impact on the lives of Deaf people in the late 19th and early 20th centuries, both in terms of the language used for their education and their employment as teachers. The recognition of sign languages as real languages and linguistic research on sign languages since the 1960s has slowly begun to reverse the situation. Not only has the research helped to empower Deaf people all over the world, but it has allowed for the discussion of sign language as the medium of instruction in deaf education. Some schools in the United States and other countries such as Sweden, Venezuela, and Italy have implemented bilingual programs with instruction in the native sign language of the community and literacy in the majority written language. For some deaf students, these developments have led to the "unlocking of the curriculum" (Johnson, Liddell, and Erting 1989), that is, the provision of access to the academic content through a language that deaf students can understand, i.e. sign language. It has made for a slow increase in the number of deaf teachers. For example, the Gallaudet University graduate education program was established in 1891, but the first

deaf student was not admitted until 1951. In fact, in 1890, Edward Miner Gallaudet, son of Thomas Hopkins and president of what was then Gallaudet College, commented on a conversation with Alexander Graham Bell, a leading proponent of oralism: "I told him plainly that he was entirely mistaken in this idea, that no deaf persons would be admitted to our normal [teacher training] and that all its members would be thoroughly trained in the oral method for teaching the deaf" (cited in Jones & Achtzehn 1992:4). As of this writing, the graduate education program averages about 100 students, 15-25 of whom are Deaf.

Research on sign languages has also had a powerful impact on the teaching of sign language, an area in which Deaf people have fared reasonably well. Sign language courses began to be offered soon after the publication of the DASL in 1965, and both the number of Deaf teachers and their educational levels have increased over the years. In 1982, Battison and Carter reported that 24% of sign language teachers were deaf. The percentage had increased to approximately half by the mid-1990s (Cooper 1997; Blumenthal Kelly 2000). With regard to educational attainment, Battison and Carter reported in 1982 that 84% of teachers had a BA, while Newell in 1995 reported that 50% of sign language teachers had an MA and 5.8% a Ph.D. Cooper (1997) reported 40.3% as having an MA and 6% as having a Ph.D. In addition, as Wilcox (1992) reports, many high schools, colleges, and universities now allow ASL to satisfy foreign language requirements, a development that has sharply increased the need for trained teachers with graduate degrees.

The research that served to legitimize sign languages has helped increase and improve services for Deaf people, such as interpreting. The Registry of Interpreters for the Deaf was established in 1964 and has had a major impact on establishing standards for interpreting between ASL and English, an achievement that would have been impossible without the recognition of ASL as a language. In addition, there is great interest within the interpreting community in research on all aspects of sign language structure, including variation. Interpreters express consistent enthusiasm for workshops and conferences at which research findings are shared, as these findings directly affect the interpreting process. Currently, 175 interpreter training programs operate in the United States, including AA and BA programs, and one MA program at Gallaudet University.

Finally, research on sign languages has had an effect on the graduate training of both Deaf and hearing people. The *Linguistics and Language Behavior Abstracts* reports that prior to 1985, Woodward (1973) was the only sign language dissertation. By the 1997-2000 survey period, 27 dissertations had been written at 22 universities, including Arizona, Boston, Gallaudet,

New Mexico, and Rochester.

Thus, the research on sign language structure that William Stokoe initiated and to which Carl Croneberg contributed has ultimately led to a growing understanding of the nature of human language and to the continuing empowerment of Deaf people.

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