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The Phonemic Nature of Sign Language

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Man's existence historically has been a search for the "ultimate" in whatever pursuit he may fancy. The natural goal for the linguist has been the discovery of the definitive units of language, much like the quest of science for the fundamental particle of matter embodied until recently in the atom. Traditionally, the search began with the study of writing systems and continued with the gradual disassociation of the speech sequence into its smallest possible segment. Eventually, however, the Prague Linguistics Circle proposed a "phonological unit" as a binary representation of the ultimate constituent of language and the goal became the definition of the relationships between discrete units (Jakobson 1979:18).

It has been said that human beings are acoustically sensitive to these units, which have been called "distinctive features," because they instruct us as to which phoneme to use to distinguish words of unlike meaning. What of those who, because of nature or mishap, find acoustic or articulatory oppositions meaningless? Two options are left to those who for some reason are left with hearing at less than a functional level: first is speechreading, or lipreading, and the second, some form of manual representation of language, upon which type this discussion is based. However, I will confine my review not to those abundant codes which are based on English, but to American Sign Language.

Worth mentioning at this point is the relative immaturity of the linguistic analysis of ASL. It was not considered anything more than "bad English" (based on observations of the illiteracy of the Deaf Community when writing) until the 1960's with the publication of Sign Language Structure: An Outline of the Visual Communication Systems of the American Deaf by William Stokoe, a hearing linguist who noted that sign language was a language just like any other and as such could be considered an abstract symbol that could be

dissected into parts and analyzed.

Therefore, it has been proposed that American Sign Language (ASL) consists of four elements: signs, classifiers, facial expression, and body language or mime (Cokely and Baker 1980:33). The motions included in ASL are fundamentally different from those hand-wavings and unconscious gestures that often accompany even verbal communication. I would like to propose that ASL has a set of "ultimate constituents" much like the phonemic distinctive features of spoken language. Instead of maximal contrast in audibility, of course, the objective of this language is visibility.

The idea of finding a set of distinctive features in Sign Language is not new, in fact Stokoe broke ASL down into three independent parts: location, or where on the body or in space is the sign being made, handshape, and movement. Then he suggested that each could be further detailed into finer and finer parts (Battison 1980:48).

His ideas have since been expanded by such researchers as Peng (1976:188-9) who set forth the signed universal syllable type, which is represented in spoken languages as the opposition between consonant and vowel, as signs involving body contact (consonants) and all others (vowels). Kegl and Wilbur (1976:376) made the proposal that C-V relationships actually were indicated manually by hands (consonants) and facial expression (vowels). Even more interesting was Chinchor's (1978, quoted by Liddell) attempt to differentiate between static and motion. Finally, Liddell (1984:396) makes a reasonable case in Chinsor's support by introducing the notion of three manners of motion (much like the three manners of the articulation of consonants: stop, fricative, and affricate) which he defines as hold, continuous, and restrained.

Cokely and Baker (1980:79) discuss Stokoe's units of ASL with one additional parameter: palm orientation:

"By combining a specific handshape, palm orientation, and movement in a particular location, one makes a sign. These four parts of a sign are called its **parameters**. Each parameter has a set of members that [Stokoe] called **primes**. For example, the handshapes 'A', '5' and 'O' (as

in GIRL, FATHER and NONE) are three primes within the handshape parameter. 'Palm up' and 'Palm down' (as in MAYBE and BALANCE) are two primes within the palm orientation parameter. 'Circular' and 'back and forth' (as in PLEASE and TRAIN) are primes within the movement parameter. 'Head' and 'waist' (as in RABBIT and RUSSIA) are primes within the location parameter. The Dictionary of American Sign Language by Stokoe, Casterline, and Croneburg lists 18-19 handshape primes, 24 movement primes and 12 location primes (the dictionary did not mention palm orientation primes, although some linguists have said there are about six such primes, and some linguists disagree that palm orientation should be analyzed as a separate parameter.) Other linguists have used different ways of counting, and the question about exactly how many primes are within each parameter is still being studied."

I would suggest that trying to count each differentiation as a separate prime is counter-productive. It could be likened to the beginnings of phonology, if linguists had said "Now, which consonants are made on the upper lip and which on the lower; which with the incisors together and which with the molars" and even "which with the tongue up, down, sideways (and which side), bent in the middle, straight . . ." rather than grouping like characteristics into sets.

"Indisputably, the grammatical pattern of the sentence, the context of the words as issue, and the situation which surrounds the given utterance prompt the hearer's apprehension of the actual sense of the words so that he doesn't need to pick up [every] constituent of the [sequence]" (Jacobson 1979:4). But there exists a wide range of choices open to the receiver and it is only through such minute distinctions as "pill" and "bill" that sense can be made from what we hear in ordinary speech.

The idea that in an analysis of structure "it is not things that matter but the relations between them" (Jacobson 1979:18) has led to the expression of the distinctions mentioned previously in terms of a binary opposition, a compound in one, most often known as "distinctive features." Roman Jakobson stated that:

"For the sake of efficiency the perception of the sense- discriminative cues naturally has recourse to the polar differentiators facing the native decoder with

a set of bare yes-or-no decisions between any two members of binary oppositions. In this way, the need for maximal simplicity, not only in the scientist's approach to the [pattern] of language, but first and foremost in the daily strategy of the language user, is fulfilled, especially since the number of oppositions in any given language is prefabricated and strictly limited for the apprehension of its speakers and perceivers (1979:25)."

Therefore, if it is the goal of the linguist to find the ultimate units, the distinctive features, it would be well to remember Ockham's principle about simplification. The question here, however, is whether or not signed languages, in particular ASL, are valuable testers of the principles discussed. Jakobson did not feel that the study of sign language was worthwhile since "the label of sign language is deceptive since it obscures the fact that 'natural language' likewise consists of signs (in this case verbal signs) and that in general, language is a topic of the science of signs, alias semiotics. . . . as William C. Stokoe noted, 'the proportion of native signers to native speakers is about one to ten thousand' and thus in the study of universal human speech this marginal system may be left aside (1979:70). Upon further consideration, how much more value could be placed on a universal if it was shown to have real universal applicability. In fact, in a seeming contradiction of his previous statement, Jakobson himself stated, "If in linguistics the properties assumed to be universal proved to be near-universal, and if among the over one thousand languages more or less familiar to the scholarly world a minute number of languages with a handful of speakers offered single deviations from the patterns used by the preponderance of languages and speakers, these rarissime exceptions would require a special investigation of the intrinsic and extrinsic conditions which engender such an 'anomaly' and, in addition, they would ask us to seek the reasons for the near-universality of the property in question (1979:58)." Does ASL provide any exceptions to current universal theories or does the analysis of American Sign Language provide yet another example verifying their truth? A careful examination of the language will demonstrate that actually, there are what could be termed distinctive features in ASL, and in no way should it be necessary to proliferate them merely to

accommodate variations in the data.

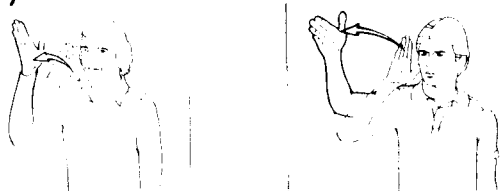
Beginning again with Stokoe's list of "primes", I would like to propose that they be viewed this time with an eye toward the inherent opposition displayed in the function of the parameter. Stokoe began with location, by which he meant the sign in relation to the body. This parameter could be assigned a dual designation either in reference to the high-low distinction or the features of "nearness and farness." Two minimal pairs shown below will illustrate these features.



First, handshape remains constant as does movement and palm orientation. The distinction is made between "FATHER" and "MOTHER" only in the height of the sign in relation to the body.

A quick explanation would be in order of the normal limitations of a signer's "space." Generally, a person's sign space will start at the middle of the forehead (high) and drop to the naval area (low). Signs at either extreme are more marked, while the closer to center one gets, the less marked the signs are. The same would hold true for the near/far distinction. Normally, one would sign in an area approximately six inches from the chest area and any signs made where a person had to reach forward or stretch back over the shoulder are going to carry more information.

A minimal pair illustrating the feature of nearness and farness is "FUTURE" and "WAY-IN-THE-FUTURE." Notice how the 'size' and speed of the sign also change (as an additional element [body language] of the language along with facial expression.)



Second, Stokoe discussed handshape. One would think that there would be a wide range of available handshapes, like one would correctly assume a variety of possible speech sounds, but like the baby who babbles using any combination of sounds and eventually eliminates those sounds that

are not useful in its language, so also there are lingual and cultural limitations to the handshapes that can legally be used in ASL. While certain handshapes are highly marked in some languages (the extended middle finger, for example, does not appear in any standard ASL vocabulary although to the best of my knowledge, socio-cultural applications were not a factor when this sign was developed), these handshapes do appear in other signed languages. The extended middle finger in the signs used in Taiwan means man, since it is the tallest of the five fingers. On the other hand, handshapes that are common in ASL are considered vulgar in some countries. One example is the "t" handshape, illustrated in the the diagram below:



As many as 19 handshape primes were proposed by Stokoe and his associates, but it is my submission that actually there is only one opposition--to borrow Jakobson's term--that of tense/lax. In the diagrams below demonstrating the unmarked and marked handshapes most common to ASL users, you will notice that the unmarked hands are assuming fairly natural hand positions while the more marked ones require quite a bit more effort to form and maintain them. Battison (1974) based their unmarked/marked data on first, distribution and frequency of occurrence and second, the fact that native Deaf children learn them first, but I would like to propose that it is because the necessary tenseness of the hand makes the marked handshapes distinctly more uncomfortable, while the unmarked handshapes tend to come very naturally.



Same except
using crooked
forefinger.

Some sign pairs illustrating the principle of the tense / lax opposition are given in these illustrations. "CANDY" is a generic term for anything candied, whether it is hard or not, while "APPLE" is quite specifically that fruit.

Another pair, that of "WAVE" (hello, goodbye, attention-getter, or conversation opener) and "EMERGENCY" shows the same type of example. I don't feel that it is necessary to classify every single different handshake as a distinct entity, since this aspect of either being tight or relaxed is a characteristic held in common by all of them.



same except
with clenched "e"
handshape

Much the same as location could be likened to 'tonality' because of the high/low feature, movement definitely has to do with energy. While frequency of voice is not at issue here, there is a frequency of motion involved. I tend to agree with the hypothesis of Liddell when he mentions that movement features correlate with the consonant/vowel distinction. Three minimal-pair sets illustrate the differences in motion. The first sign in the series could be considered a hold, the second a continent, and the final illustration demonstrates a restrained sign. Since all of sign language consists of either motion or lack of motion, it would be appropriate to liken the + or -motion of signed languages to the + or -consonantal of spoken language.



NAME

continuous
sliding
motion

SOON

sharp
sliding
motion

BRIEF

Cokely and Baker's addition of the palm orientation provided a great insight as to the reason why some signs can be done using only one hand (although technically they require two) and others cannot be distinguished without the addition of the second hand. The palm orientation can be a factor in the features of the sign in one of two ways: either as the distinguishing feature on the dominant hand (i.e. "THUMBS-UP" and "THUMBS-DOWN"), which would then include the signs that can be distinguished without the second hand, or as the distinguisher on the base hand:



HELP

Same except
base hand turned
palm down.

ESTABLISH

The best name I can think of to call this opposition is exactly what it has been called in the past, for lack of a more fitting description: palm-up and palm-down.

In summary, the conclusions that I have reached contradict the findings that linguists have thus far proposed for the description of distinctive features in ASL. Rather than lists of different primes, each describing a minute variation, it is much more beneficial to examine the parameters of signs for commonality. Therefore, I suggest that the distinctive features of location are high/low and near/far. The features of handshape include only the tense/lax distinction. Movement, as compared with consonant/vowel relationships in verbal exchange, can be distinguished by either motion or non-motion. The final parameter of palm orientation, whether base hand or dominant hand, can be only distinguished as up or down.

What have we accomplished by our analysis of ASL? First, we have narrowed the range of possible distinctive features to a manageable level, one that could be agreed upon by linguists of any persuasion, rather than the proliferation of primes. Second, we have established the fact that the universals mentioned previously, specifically the existence of distinctive features and their phonemic reality, are a factor in the contrast and therefore the understanding of sign languages, and finally we have added a new dimension to the flourishing study of this language that illustrates, by linguistic means, that ASL can take its place with the spoken languages of the world as a legitimate field of endeavor.

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