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Contrived Sign Language

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PROBLEMS OF DEFINITION

Questions of definition face the student of human signing behavior from the very beginning, but on the whole they have been given little systematic discussion. In the present paper, for example, we immediately encounter two widely used terms, **contrived** and **language**, yet we have been unable to discover any adequate discussion of the implication of either in the context of deafness. But it is surely particularly important to operate with an explicit and well-explored concept of language, so that on the one hand we do not subsume too much manual activity under the heading of **sign language**, whether contrived or not, and on the other hand do not exclude too much either. Without theoretical and methodological clarification, it would seem impossible to develop any typology, or even to discuss points consistently.

It is generally taken for granted that the meaning of the term "sign language" is sufficiently evident for it to form part of the postulates of any discussion. This partly reflects a reaction against traditional pejorative attitudes to signing as an essentially "inferior" or "debased" form of communication: it was only natural—though equally unsupported—to assert that signing was "just as much" a language as speech. But it presumably also reflects the state of the art: Until a reasonably detailed classification of manual communicative systems is developed, it is not surprising that similarities should be noticed at the expense of differences;

and there are evidently enough broad similarities between speech/writing and signing to motivate the extension of the term "language" from the former to the latter. However, when we come to classify signing behaviors, as required for the present paper, then these postulates need more formal support. Classification presupposes criteria of differentiation, and questions of definition are no longer able to be avoided. Are all possible signing behaviors "languages"? Are some? How should we decide, when faced with a range of phenomena to be accounted for that includes popular gesture, musical conducting, secret society signing, the American Sign Language, and the Paget Gorman Sign System? If they are all grouped together under the same heading, at what point does the application of the term "language" cease to be literal (in the sense of "spoken language") and become metaphorical (as in "the language of music")? They are presumably not all language in the same sense, but what does "language in the same sense" mean? (Cf. Bellugi & Klima, 1974, p. 6.) Some answer must be given to these questions in order to justify the selection of material made later in this paper. And there is little agreement in the literature on signing, even when the discussion is restricted to deaf signing systems. On the one hand, there are Anthony, Vetter, Fant, and others, claiming that "sign language is as much a real language as any other [Vetter, 1969, p. 233]"; on the other hand, we have such statements as that of Cohen, Namir, and Schlesinger (1977, p. 3): "Sign language differs in many respects from spoken language to a far greater extent than do spoken languages from one another"; and in between, we find such statements as Stokoe's (1972a, p. 90): "The sight, shape, and sense systems of sign language seem to be just similar enough, yet enough different, to cause maximum difficulty, maximum negative interference for the [deaf] person learning English as a second language."

There are many possible positions that can be taken up as regards the linguistic status of signing behavior, ranging from the use of unrealistically narrow formal criteria to very general consideration of functional equivalence. The former position is nowadays usually avoided, with the advent of more sophisticated typologies of language, but may be illustrated by such arguments as those which deny any linguistic status to signing on the grounds that it omits such grammatical features as inflections and function words, and operates with indistinct parts of speech. General linguistics has clearly shown how far from being universal such features of language are, and the point is probably no longer controversial. At the other extreme, we are faced with the broadly functionalist positions of such writers as Stokoe, who argues (e.g., 1960, p. 14) that "a symbol system by means of which persons carry on all the activities of their ordinary lives is, and ought to be treated as, a language." Here one might ask how essential

is the emphasis of "all"? To what extent would it be arbitrary to exclude signing behaviors which have a restricted function, as in the case of racing bookmakers' tic-tac signs? Also, does this definition allow for varying degrees of signing success in "carrying on the activity of one's ordinary life"? In a more recent paper (1974), Stokoe is rightly cautious about definition. He points to the nineteenth-century belief that signing is "a single semiotic system . . . pancultural . . . a species-specific human attribute . . . universally intelligible [p. 354]," agrees that there are similarities between the various systems, but adds that only a complete and systematic comparison can succeed in showing whether they are in fact all congruent. He then argues that non-language-based signs (such as the gestures of musical conducting) are not properly language: "Some have a very limited lexicon of signs, others a narrowly circumscribed range of denotata, and most a simple and direct sign-to-signified relation which is not much like that of language. . . . Semiotic systems which have a broad or unlimited semantic range are more fittingly classed as sign languages [p. 355]." On these grounds, he follows Voegelin in denying language status to American Indian signing, in that "its use was confined to situations of fairly limited and predictable contexts [p. 355]."

This emphasis, though welcome, does not take us very far. We want to know whether these are the only criteria for language status, or whether there might be others as relevant. Also, we would like to see how the various deaf signing systems would fare when measured against the same criteria. Stokoe (1974) suggests that there are differences, but it is only at the very end of his paper that he raises the question which so far everyone seems to have begged: "How much of a language can a sign language of the natively acquired class be?" Unfortunately, there is little discussion provided, and what there is raises further questions of principle. To begin with, he proceeds to paraphrase this question as: "Does American Sign Language have duality of patterning? [1974, p. 367]." His answer is yes, and this is amplified as follows:

> ASL grammar has the same general form as other grammars. There is in this language a small closed set of distinctive features, meaningless in themselves which nevertheless combine in ways peculiar to this language to form morphemes, i.e. signs which denote meaning as do the morphemes of other languages. But this language also has ways of combining these morphemes into meaningful "signs" so numerous and with so many meanings that the familiar symbol "S" represents them as well as it does the large, open, nondenumberable set of sentences in any language. Its users, like the native speakers of other languages, also reject or do not generate or produce combinations of the morphemes of the language in any but grammatical ways [p. 367].

Now there are important empirical questions here: In particular, one

wants evidence for the assertion that native speakers reject certain strings as ungrammatical (see below), and that there is qualitative as well as quantitative comparability between the set of "sentences" generable in signing and speech. But for the moment, let us raise the basic question of the legitimacy of Stokoe's paraphrase: Duality of patterning is an essential feature of language design, but on what grounds may we take it to be the only salient criterion? What other criteria could there be?

One answer would be to look at the framework within which the notion of duality of patterning was originally developed. Duality is in fact well down the list of design features for language developed by Charles Hockett and others (see Hockett, 1958; Hockett & Altmann, 1968; Thorpe, 1972), and we propose to examine the remainder of this list in detail below, to see what relevance to our topic the other criteria may be said to have. But before doing so, it may be as well to anticipate an objection to this approach, arising out of Schlesinger's discussion of the relationship between signing and linguistic theory (1971, p. 99). He argues: "I see no reason to accord sign language . . . a special status as far as the problem of universality of language is concerned. We are dealing here not with finger spelling . . . but with an independent language. . . ." He continues: "To show why sign language is to be regarded as a language **in every respect**, a short description of its **uses** will be given here. . . ." These are our emphases, and they are intended to draw attention to two stages in his formulation which we consider to be weak. At the very least, we expect clarification of the phrase "in every respect," and propose to initiate some discussion on this point below. But whatever our arguments, it is unlikely that a description of language **use** by itself would be an adequate justification. Arguments to do with the formal structure of language must also be provided, and their weight properly evaluated. It is our contention that this evaluation—focused as it is on the range of application of the term "language"—must come from linguistics, and our own criteria, presented in due course, stem from a consideration of general linguistic factors (cf. also the orientation of Bellugi & Klima, 1974). Schlesinger seems to doubt the force of this orientation (1971): "To claim that sign language has no relevance to the problem of universality because it lacks a certain characteristic of syntax, or simply because it is 'primitive' . . . is to indulge in a circular argument, according to which those languages which fail to fit into a given scheme of universals of language are simply pronounced to be 'out of the game' [p. 100]." We certainly support his criticism of those unthinking attitudes which seemed to wish to exclude signing from serious intellectual inquiry, but this reasoning cannot be applied to the study of signing as a whole, in the context of linguistic science. For what else is there with which to judge

the linguisticness of a phenomenon, other than a particular linguistic theory—which will presumably include "a scheme of universals of language"? Without such a datum, it is difficult to see how the dangers of overestimating or underestimating the structural or functional capacity of signing behavior can be avoided, and a coherent typology of such behaviors developed.

In this paper, then, we propose to approach the study of signing specifically from the viewpoint of the characteristics of speech. Our aim is to answer the question "How similar are the various signing behaviors to speech?" There are of course alternative ways of investigating signing, which do not put the question in quite such a linguistic way. We have done so because we see in speech the traditional focus for the application of the term "language," and because the study of the structure and function of speech has provided more detailed analytical models, capable of being used for comparative studies, than in the case of any other communicative behavior.

DESIGN FEATURES FOR LANGUAGE

In the absence of any clear or formalized semiotic theory to justify a definition of language within a taxonomy of communicative behaviors, we must start with those attempts at comparative study which postulate an arbitrary set of language properties, or design features, and then apply this grid to the classification of other signaling systems. Such approaches raise interesting questions at an appropriately general level. It should therefore be helpful to take up the suggestion made above that the inventory proposed by Hockett and others—which has generally been applied only to the study of animal communication—could be used as an evaluative framework for signing. Briefly, the 16 features of the revised list make the following claims about human speech (quotations here and below are all from Hockett & Altmann, 1968, pp. 63–64).

1. It uses a **vocal–auditory** channel.
2. There is **broadcast transmission** and **directional reception**.
3. There is **rapid fading**.
4. There is **interchangeability** (i.e., "Adult members of any speech community are interchangeably transmitters and receivers of linguistic signals").
5. There is **complete feedback** (i.e., "The speaker hears everything relevant to what he says").

6. There is **specialization** (i.e., "The direct-energetic consequences of linguistic signals are biologically unimportant").
7. There is **semanticity**, "associative ties between signal elements and features in the world."
8. **Arbitrariness** requires that "the relation between a meaningful element in a language and its denotation is independent of any physical or geometrical resemblance between the two."
9. There is **discreteness**, a lack of continuity between the elements of the signal.
10. There is **displacement** (i.e., "We can talk about things that are remote in time, space, or both from the site of the communicative transaction").[1]
11. There is **openness** (i.e., "New linguistic messages are coined freely and easily, and, in context, are usually understood").
12. **Tradition** requires that "the conventions . . . are passed down by teaching and learning, not through the germ plasm").
13. **Duality of patterning** (i.e., "Every language has a patterning in terms of arbitrary but stable meaningless signal-elements and also a patterning in terms of minimum meaningful arrangements of those elements").
14. There is **prevarication** (i.e., "We can say things that are false or meaningless").
15. There is **reflexiveness** (i.e., "In a language, we can communicate about the very system in which we are communicating").
16. There is **learnability** (i.e., "A speaker of a language can learn another language").

Not all of these properties are at this level of analysis methodologically relevant for the study of signing, of course. Property 1 is ruled out by definition, and there are restrictions on the extent of broadcast transmission and directional reception, as well as on the nature of the feedback, which are also due to the different kinds of channel being used. But some of the other differences are less trivial. The most noticeable difference between signing and speech is in respect of property 8, **arbitrariness**. The potential iconicity of signing, while varying in its extent and degree of stylization from behavior to behavior, is a point of major difference whose effect on the communicative status of the phenomenon as a whole it is difficult to assess. On the one hand, the physical resemblance of many signs to their referents must make meaning more transparent and universal, thereby facilitating intelligibility and interlanguage communication. On the other hand, physical and perceptual limitations must considerably restrict the range of an iconic vocabulary, and hinder the use of various processes found to be important in the analysis of speech—for example, the process of extension and restriction of sense in metaphorical expression, and the like. Tervoort, for instance, has pointed to the rarity of spontaneous metaphorical uses of sign (1961, p. 106).

[1]Note that this is a different sense from that used in the literature on signing (e.g., by Cohen, Namir, & Schlesinger, 1977), where it refers to the lack of congruence between a signing limb and the object or action it represents, e.g., signing *walk* with the fingers.

Property 10, **displacement**, is also much involved in any comparison. It would seem that many signs are dependent on the immediate context for a correct interpretation, i.e., part of the formal identity of the sign resides in the accompanying situation, and the more use that a signing behavior makes of this, the more differences from speech one must conclude there to be. Under this heading, for example, we would include what Cohen *et al.* (1977) call **covariance**—those iconic signs which vary in form depending on the nature of the accompanying object, event, etc. (for example, the sign for *carry* depends on exactly what it is that is being carried). Other examples would be the use of pointing to a specific referent for pronominal deixis, or the dependence of certain sign senses on facial expressions—for example, the contrast between positive and negative using head movement, or the use of a distinctive facial configuration as an obligatory part of a sign (e.g., *lemon* or *odor* in Israeli Sign Language).[2] Further illustrations can be found in Stokoe's commentary (1973a, pp. 14–45). The overall impression we have of signing systems for the deaf is that they are context-dependent to a degree that is unlikely in speech, and that the notion of displacement does not readily apply. The argument applies a fortiori to most of the other systems of signing referred to below, e.g., in aircraft marshaling and radio production. (We shall comment separately on the distinct notion of situational redundancy.)

[2]Whether facial expression is part of the sign or part of the context is a methodological question which most writers leave unclear. We have noted the use of the term **sign** as a formal manual notion, e.g., by Stokoe (1972a, p. 110): "A signer's hand may be performing the sign 'like' while his face and head are signalling negation." On the other hand, it is also used with reference to the semantic identity of a formal configuration which includes face, hands, etc., as in some of the examples cited below. A similar problem has been identified in prosodic studies: "Scholars have been anxious to restrict the formal definition of intonation to pitch movement alone . . .: but when the question of intonational meanings is raised, then criteria other than pitch are readily referred to as being part of the basis of a semantic effect [Crystal, 1969, p. 195]." Presumably the dilemma facing the intonation analyst faces the analyst of signing too. As Crystal goes on to say: "This is a theoretically undesirable situation, and one must make up one's mind which way to follow: either one adopts a relatively narrow definition of the phenomenon, and simplifies the formal description of intonation at the expense of the semantic, or one allows intonation a wider definition, with resultant increasing complexity in the formal stage, but an ultimately less involved semantic statement [pp. 195–196]."

Other differences between speech and signing in terms of the Hockett and Altmann list seem less significant. There would seem to be a greater use of continuous scales of signing, compared with the essential discreteness of speech (Bergman [1972, p. 21] refers to the former as an "analog language," in fact); and reflexiveness is less easy to demonstrate. But apart from these, Hockett's properties would seem to be present in a large number of human signing behaviors, and his approach accordingly makes few useful discriminations in this area. Are there, then, other differences which the limitations of this particular list of design features force us to miss? Two factors in particular seem relevant. The first of these, **dimensionality**, may be briefly mentioned; the second will be given more extensive discussion below. Dimensionality refers to the availability of two limbs, facial expression, bodily posture, etc., to allow for simultaneity of transmission of partially or wholly different messages (see the emphasis on this point in, for example, Bellugi & Fischer, 1972, p. 175). It has to be distinguished from the use of prosodic and paralinguistic features of speech, which to a limited extent have their own equivalent signing (cf. Covington, 1973). There is no possibility of simultaneous segmental or verbal use in the speech medium, and consequently the central linguistic notion of paradigmatic choice, which underlies the definition of a linguistic **system** through its implication of mutual exclusiveness of items (see below), would seem to require much modification before being applicable to signing.

ISOMORPHISM BETWEEN SPEECH AND SIGNING

The second question left unasked by the Hockett list is the extent to which there is a general correspondence between the structure of language and that of signing behavior. Presumably the more we can establish isomorphism between the two, the more plausible the ascription of the term "language" to signing will seem to be. As an initial orientation, we can take the generally used account of linguistic structure that recognises three levels, or components: phonology, grammar, and lexicon. According to Stokoe (1973b), signing displays three comparable levels: "Sign is a natural language like hundreds of others on the face of the earth. It has its own symbolic, syntactic, and semantic system [pp. 14–15]." But how comparable, quantitatively and qualitatively, are these systems to those recognized in speech? If we take the lexical level, which is where most of the discussion has centered, it is clear that there is a certain correspondence between sign (however defined) and lexical item, or lexeme, but that the differences between, say, English and the most sophisticated

signing behaviors must not be underestimated. The purely quantitative dimension cannot be simply dismissed—contrasting the three-quarters of a million items of contemporary English with the 6000 items of Seeing Essential English, the 2500 items of the Paget Gorman Sign System, or the 3000 morphemes of the American Sign Language, for example. It is not purely a pragmatic question of the number of signs increasing to comparable levels of productivity in the course of time. There is considerable doubt as to whether visual acuity can cope with any increase of such an order—of whether, for example, the signing behavior would not come to contain an intolerable amount of visual formal ambiguity, owing to limitations on the number of visually discriminable items. As Bergman says (1972, p. 22), "Owing to physiological limitations it is doubtful whether the total number of signs in ASL will ever exceed five thousand."[3] These are interesting, but generally uninvestigated questions. Moreover, there is the point that as vocabulary increases, it must surely become increasingly difficult to retain an unambiguously iconic relationship between referent and sign, or for visual memory to be able to cope with the number of arbitrary sign distinctions such as would make the signing behavior comparable to that of speech. (Similar points have been made in discussion of the merits and demerits of alphabetic systems, e.g., the learnability of phonemic as opposed to logographic writing.)

At the phonological level, apart from the writing-based codes such as finger spelling, there is no isomorphism between segmental phonology and signing behaviors, and only partial equivalence in the nonsegmental area. The absence of any equivalent for segmental phonology has of course always been recognized as a difficulty—for example, in relation to the signing of proper names, where finger spelling is regularly resorted to. Cohen *et al.* (1977) conclude: "In this respect the barrier between sign and spoken languages is much greater than that between any two spoken languages." Recent work has added a great deal to our knowledge of the nature of duality in signing (e.g., Battison, Markowicz, & Woodward,

[3]We do not see how this can be reconciled with the view that "a correctly trained signer can express himself in ASL with the utmost precision, whatever the nuances of meaning may be [Bergman, 1972, p. 22]." If this were so, it is difficult to see why there should be so much finger spelling (as indicated by Tweney & Hoemann, 1973, p. 78; Vetter, 1969, p. 238, and below). Similar claims are frequently made, e.g., Stokoe (1972a): "Because American Sign Language is the medium of communication used by a community of people . . ., anything expressible in another language can be expressed in it [p. 63]." These claims are premature, and hide massive methodological problems. Stokoe makes some progress in establishing equivalence between some of the most frequent words of written English and ASL, but it is not in the area of the most frequently occurring (largely unproductive, grammatical classes of) words that the problems of semantic precision, nuance, and the like mainly lie.

1975), but the distinctiveness of the units postulated at the "phonological" level is still in need of clarification, e.g., the level of abstractness at which the units operate (cf. Battison *et al.*, 1975 p. 293), and criteria which can place the proposed **emic** signing system into correspondence with that of speech now need to be evolved.

But it is under the heading of grammar that the comparative question is raised in its most crucial form, and here the evidence is unclear. Under this heading, we subsume both morphological and syntactic variation. To what extent do signing behaviors operate with any morphological or syntactic constraints? In view of the centrality of these notions for linguistic theory, establishing their role in any signing behavior is evidently fundamental, and the literature contains many generally phrased impressions of the situation. The absence of inflections and function words is frequently referred to, as we have already mentioned; Cohen *et al.* (1977, p. 23) talk about the "telegraphic style of sign language"; and the flexibility of sign order has also often been pointed out. But before we can investigate this question in detail, some terminological clarification seems necessary. It is widely accepted that signing is concept based. Sign language is an "idea language" (Madsen, 1972, p. 2) is a typical statement. Writers then conclude that the ordered properties evident in signing are essentially cognitive; for example, Vetter (1969, p. 235) talks about the "logical or natural" order of signs, Stokoe (1973a, p. 11) of the "larger to smaller units of reckoning" in the expression of time relationships as an utterance proceeds. Confusion enters in when one proceeds to talk about these essentially cognitive strategies using linguistic terminology, as to a great extent this begs the question. This is most readily illustrated with reference to the notion of the "syntax" of signs. An early example is in Mallery (1881):

> The reader will understand without explanation that there is in the gesture speech no organized sentence such as is integrated in the languages of civilization, and that he must not look for articles or particles or passive voice or case or grammatic gender, or even what appears in those languages as a substantive or a verb, as a subject or a predicate, or as qualifiers or inflexions. The sign radicals, without being specifically any of our parts of speech, may be all of them in turn. There is, however, *a grouping and sequence of the ideographic pictures*, an arrangement of signs in connected succession, *which may be classed under the scholastic head of syntax* [pp. 359–360]. (italics ours)

That this is a nonlinguistic conception of syntax is made clear a little later, where, in comparing Indian signing to that of the deaf, he asserts that they are similar "in figuring first the principal idea and adding the accessories successively in the order of importance, the ideographic expressions being in the ideologic order [p. 363]." Talking about sign syntax in this way, however, is highly misleading, and it is unfortunate that the metaphor has become so widespread. On the one hand, it is difficult to see what might constitute an agreed counterexample to the hypothesis that signing is "rule-governed" in a syntactic sense, as presumably any signed sequence might be said to reflect some particular process of conceptual ordering on the part of the user—this latter, however, being inaccessible to observation. On the other hand, it implies that the rules of the signing behavior are as conventional, well formed, and discrete as those of spoken syntax, and this is at best debatable, as will be discussed below.

How far are there syntactic constraints in signing comparable to those operative in speech? Our general impression is that there is little in common. Stokoe, working on American Sign Language, is the main investigator who has faced up to the importance of syntax (e.g., 1972a, p. 13) and attempted to investigate this question systematically, but even he comes up with very little, and most of his rules are capable of analysis in cognitive terms—for example, it is claimed that time adverbs are initial in an utterance, that conditional clauses precede result clauses, and that there are restrictions on subject–verb collocability. More detailed instances, in conventional syntactic terms, are: "Either/or" questions end in *which*; second person questions often end with the second person pronoun; verbs have mood, phase, and aspect variation, but not tense (see Stokoe 1973a, pp. 8–9; 1974, p. 95). Sentence boundaries are formally marked (Covington, 1973). In Israeli Sign Language, Schlesinger (1971) concludes that adjectives follow nouns, and that verbs do not occur initially, but he allows (p. 113) that cognitive saliency may have been a determinant of order in his experiment. Reduplication seems an important general process for expressing syntactic relations (Bornstein, 1973, p. 455), but it has been little studied. We are thus left with a number of isolated examples of types of potential syntactic significance, but no sense of a coherent, autonomous, formal system.[4] And even with the examples cited above, there is tentativeness over generalization. As a writer in *Signs for the Times* (11, 1972) said: "Some signers use some of the rules some of the time." For the most part, discussion of a "syntax" for signing is carried on in negative terms—there are **no** equivalents to such and such a feature in English (etc.) syntax.

A linguistic metalanguage is also used in the more detailed analyses of

[4]Autonomy refers back to the question of displacement, and is discussed below. There are a number of rules whose status is debatable because it is unclear how productive they are in displaced situations, for example, according to Stokoe (1972b, p. 87), agent/patient is distinguished by head–eye movement: "The signer's eyes, often with appropriate movement of the whole head, move *from* the agent *to* the patient."

signs. Stokoe, for example, suggests that within the structure of a sign, one component may be used in a "subordinate" way to "modify" another—for example, (1973a, p. 20), he points to the use of the eyes and face to modify the concept of *driving*, thus adding "adverbial" force, as in *driving sleepily, driving eagerly*. He emphasizes that there is considerable potential for communication here: "If close replicas of various English syntactic structures are not to be found, there is still no cause to find ASL syntax restricted: for the analogic representation in space, time and motion, over and above the separability and cooperative capability of hands and face, makes a continuum of subordination possible [1973a, p. 20]." A little earlier in the same paper (pp. 15–16), as part of his analytic commentary on a signing text, Stokoe illustrates the conceptual complexity which can be derived. He describes the use of the *light* sign used in the story to convey the visual experience of the night driver. In addition to the basic hand configurations, other positional and dynamic variables are used to produce an effect glossed in translation as "lights–tiny–glow–growing–bigger–and–bigger–glare–in–eyes." Stokoe concludes (p. 16) that "it is possible . . . to suggest that some of sign syntax must be manifested within the sign," and he draws a parallel with polysynthetic languages and the notion of the "syntax of the word."

But is this a legitimate parallel? We are of the opinion that there is no "syntax" in such signs, in the usual sense of this term; they are rather **configurations** of features (cf. Bellugi & Fischer, 1972, p. 176), interrelated primarily by the observer's awareness of cognitive probabilities—for example, a screwing up of the eyes may mean "glare" in the context of a story about night driving, but in a story about problem solving it might be glossed as "difficulty." Moreover, while kinesic and other effects are undoubtedly more important for the signer than the speaker, it is an open question whether the use of these effects in the two media is anything more than a difference of degree. The complexity and subtlety of these effects in conversation between hearing people has only recently begun to be appreciated, but it is obvious that semantic nuances of the type illustrated by the above example could equally well be carried kinesically in the context of speech. In which case, possibilities of terminological confusion abound, for if one includes kinesic variables under the heading of syntax for signing, one would in all consistency have to do likewise for speech, and one would end up with two senses of syntax for the latter. The most important argument, however, is that there is little evidence in signing of the formal sequential constraints of sign upon sign comparable to the constraints of word order in speech. What would this evidence consist of? One of the clearest supports for the view that signing is a language would come from the demonstration of unacceptable sequences.

As Gleitman, Gleitman, & Shipley (1972) say: "The one task that provides the main data base for modern grammatical theories [is] . . . whether a sentence is or is not well-formed [p. 138]." Woodward (1973), for example, asserts that "people can and do make mistakes in ASL [p. 82]," but there is no illustration (cf. also Fischer, 1973, p. 11). We have found no discussion of what would count as a mistake, but two papers (Schlesinger, 1971, and Tweney & Hoemann, 1973) have investigated experimentally aspects of signing acceptability and these do shed some light on the linguisticness of signing.

In Schlesinger's experiment, two signers tried to communicate message sequences involving subject, direct object, and indirect object; it was found that the subjects did "very poorly . . . their degree of comprehension was quite low [pp. 114–115]." He comments: "The reason is that there is apparently no rule which all users of ISL employ consistently to distinguish between the subject, the direct object and the indirect object [1971, p. 115]." He goes on: "A rule can be said to belong to the competence of users of a language only if they are able to use it consistently either in encoding or decoding. In our experiment such consistency was crucial for success in the task imposed on the subject, but no consistency was found [p. 115]." In the light of this, his conclusion reads surprisingly: "All this does not imply that the 'original' ISL has no syntax. There seem to be at least two rules adhered to steadfastly by all signers: one, concerning the sequence of the noun and its modifying adjective, the second specifying where the verb may *not* appear in the declarative sentence [p. 115]." It perhaps does not need emphasizing that the distance between a communicative system which has two, or three, or ten rules and the syntactic rules of speech is very great. Schlesinger, however, is more concerned to discuss why it is that ISL can do without the fundamental relations (subject of, etc.), when "experience shows that ISL is an adequate vehicle for everyday give and take of the deaf [p. 115]." He does not go into the question of adequacy (to deal, for example, with degrees of achievement, or what counts as "give and take"), but argues that his informants did not do well in this experiment because it posed them with problems they were not used to. Normally these grammatical rules are unnecessary in signing, "because the situation is usually such that the meaning is unambiguous," whereas "in our experiment the unusual lack of situational redundancy may have made it too hard for some of our subjects to supply enough linguistic context [p. 116]." But the implications of this reasoning for the notion of "sign language" are serious. In discussing the relevance of his experiment to the question of universals as viewed by a transformational approach, Schlesinger refers to the fundamental distinction between cognitive structures and linguistic

structures. What his experiment shows, it seems to us, is the reliance of ISL users on certain common cognitive (or possibly semantic) structures or strategies. We have seen that there is little evidence for any formal syntactic linguistic patterning. To talk about "language," then, when what is being referred to is cognitive organization, seems to us a confusion of levels. This experiment, in other words, can offer little direct support to the view that signing contains a syntax in a linguistic sense.

The second experiment was carried out by Tweney and Hoemann (1973) using back translation. Written English sentences were translated by a deaf adult into ASL, the resultant signs videotaped, and played back to a second adult deaf person who translated it back into English. The two versions were then compared. The basic results show considerable preservation of meaning, within the restrictions of the experiment (no further context was supplied, the participants were not allowed to ask further questions, etc.)—about 27% resulted in no change, and a further 63% produced semantic equivalence. They conclude (1973, p. 67): "While the frequency of structural changes in back translation supports the view that ASL is a separate language differing in important ways from English, there was no evidence that ASL is an inferior language" (though for some reason they see as exceptional to this statement "the frequent loss of plural markers"). They feel that the misconceptions about the nature of ASL as a language system have been due to the lack of appropriate tools for its study. They criticize the use of literal glosses for signing sequences (as in Tervoort, 1968): "Literal glosses of ASL tend to obscure the subtlety and sophistication of distinctions that ASL is capable of making, just as literal translations of any language lend themselves to ethnocentric judgments that the other language sounds crude and inferior compared with the native speaker's [p. 69]." These distinctions are such events as facial expression, body posture, and spatial localization: "Presumably a formal grammar of ASL would need to incorporate these features of manual communication in its treatment. The difficulty facing a formal grammar of ASL is not that ASL is 'ungrammatical,' but that it is grammatical in a different sense than spoken language [p. 69]." Earlier (p. 62), they suggest that it may be these features that might resolve Schlesinger's paradox, referred to above.

We certainly support the emphasis of this research, and look forward to its extension to other cases. But it leaves the question of linguistic status very much open. One criticism was made by Stokoe, in a comment on the paper in the same number of *Sign Language Studies* (2, 1973), who doubted the generalizability of the experiment's results, on the grounds that the investigators examined only one variety of sign language (what Stokoe calls the "high" diglossic variety: See 1969; 1972a, p. 125 ff.), and

that this was the kind which was most English influenced. The implication of this criticism, of course, is that if they had used the "low" variety, less influenced by English, and continued to use back translation as a method, there would have been less equivalence between the translations, and the difference between ASL and spoken language would have been much greater. For Stokoe, this reflects on the inadequacy of back translation as an analytic method. For ourselves, we have noted the use of back translation successfully as a regular part of foreign language teaching procedures, and feel that if it is unable to be used in relation to "low" variety ASL, this is in effect a recognition of the distance away from spoken language that ASL is.

A second point concerns the role of kinesic and proxemic features. Tweney and Hoemann are right to emphasize the need to study these factors, but it would be premature to assume that the answer to their questions will necessarily be found in this area. There is the point already made, that these features co-occur with speech too, and that therefore the grammar in this respect may not turn out to be so different as Tweney and Hoemann anticipate. But in addition, it should be emphasized that there are only so many discriminable kinesic/proxemic possibilities, and many of these are semantically nonspecific. It is therefore debatable how productive a "grammar" of these phenomena could be, or whether it could in principle provide the degree of precision to make signing comparable to speech. The basic problem is that we are dealing here with behavioral continua, not discrete segments, and with patterns that do not display any duality of structure. These basic differences between the "verbal" properties of speech and the "nonverbal" aspects of behavior have for too long been played down. It is in fact only recently that some of the distortions and simplifications of extending the notion of phoneme (originally devised to handle variability in sound segments) to the area of nonsegmental phonology (thus talking about pitch, stress, and juncture "phonemes") have come to be widely discussed, though the basic criticisms have been around since the 1940s (see Bazell, 1954, p. 133; Bolinger, 1949, 1951; Crystal, 1969, 1974). Haas (1957, p. 159) has criticized the "segmental principle," as he put it—that all things reduce to unit-segments—as being a major prejudice in the linguistic field. And the criticism that discrete techniques are dubiously applicable to gradient phenomena presumably applies all the more to those other areas of human behavior that Pike (1967) used the notion of "-eme" to help describe. It is too early to say, but there are grounds for thinking that a formal grammar of kinesic effect cannot be written—or at least, there are grounds for doubting whether these features can carry the weight of interpretation that Tweney and Hoemann suggest they have. We accept that they have

some relevance to syntax, but do not feel (*pace* Stokoe, 1960, p. 63) that they are "the key to syntactical structure." Rather we feel that (as in the case of Schlesinger) it is the factors of situation and presupposition that explain most semantic equivalence—and these are not linguistic factors. And we await the presentation of evidence which will show that kinesic features are being used differently in connection with signing than in connection with speech.

CLASSIFICATORY CRITERIA FOR SIGNING BEHAVIOR

Our argument so far may be summarized as follows. In order to investigate those behaviors generally referred to as "sign language," it was necessary to develop classificatory criteria. It seemed likely that the term "language" would provide a useful starting point for inquiry, and that some usable criteria would emerge from a consideration of communicative design features (such as Hockett's) and from the literature on signing in the deaf. We have however found that Hockett's features are not wholly applicable and are in need of extension when used with reference to types of human signing (presumably because of its original zoosemiotic orientation), and subsequently that the literature on signing is inexplicit and inconclusive regarding its use of the term "language." We have not found the criteria we were looking for, and consequently we have found it necessary to suggest our own. We have therefore selected 12 characteristics of language, which we feel are at or near the center of any definition of that phenomenon, and which seem to be sufficiently specific to permit a meaningful classification of a wide range of human signing behaviors.

A. **Productivity**. An infinite number of meaningful units (cf. "sentences") can be generated.
B. **Finiteness**. The rules governing the construction of these units are finite and learnable.
C. **Range.** The vocabulary is capable of indefinite extension.
D. **Reciprocity**. The majority of the units are conventionally understood by the whole of some community (cf. "speech community"), there being some formally definable standard of shared usage.
E. **Acceptability.** Some units will be considered unintelligible by all members of the community, and some will be considered intelligible but unacceptable in terms of their formal structure.
F. **Constituency**. Some units can be analyzed into a string of minimal meaningfully contrastive formal units (cf. "morphemes").

G. **Hierarchy**. There will be at least one level of formal organization between the level of the largest formally definable unit of meaningful sequence (cf. A) and that of the minimal meaningful unit (cf. F).
H. **Idiom**. The meaning of larger units is not necessarily analyzable as the sum of the meanings of the smaller units out of which it is constructed.
I. **Duality**. Each minimal meaningful unit is identifiable with reference to a set of minimal distinctive but meaningless elements (cf. "phonemes," "distinctive features").
J. **Systemicness**. The minimal meaningful units are organized into systems. A system has finite membership, and the units are mutually exclusive and mutually defining (cf. Quirk *et al.*, 1972, p. 46; Halliday, 1961).[5]
K. **Autonomy**. If a set of minimal units constitute a system, there will be theoretical interdependence between the units, such that every unit is capable of being defined in terms of some other unit; there is no essential dependence on events or phenomena outside the system (cf. Hockett's "displacement").
L. **Disambiguation**. There are ambiguous formal sequences, some of which are capable of having the ambiguity resolved through the use of transformational processes.

Using these 12 criteria, some of the salient differences and similarities between the various forms of signing behavior that have all on occasion been referred to as "languages" can be established. These behaviors include:

1. Various kinds of symbolic dancing or pantomimic activity, e.g., classical or Thai (see Coomaraswamy & Duggirala, 1917; Mawer, 1932; Zung, 1937)
2. Religious or quasi-religious ritual signing, such as the Masonic, Hung (see Knight, 1818; Ward & Stirling, 1925)
3. Monastic signing, e.g., of the Cistercians, the Benedictines (see Barakat, 1969; Herrgot, 1726; Hutt, 1968; Rijnberk, 1953)

[5] "Mutual exclusiveness" requires that at a given place in a sequence, only one unit from a given system may be used: "mutual definition" requires that it is possible (and usually more economical) to state the meaning of an item in terms of the other members of the system than in terms derived from outside that system. Standard examples of grammatical systems would be the personal pronouns, determiners, and auxiliary verbs. Bellugi and Klima (1974) in their work argue for the importance of the notion of systemicness "based on recurring shared elements or aspects of signs [p. 36]," emphasizing the importance of such evidence as slips of the hand.

4. Signs used in sports or entertainment, e.g., between acrobats, cricketers, in musical conducting.
5. Signs for conversation on restricted areas in certain speech communities, e.g., Indian, Aborigine, Neapolitan (see Mallery, 1881; Rosa, 1929; Roth, 1897; Seton, 1918; Tomkins, 1926)
6. Signs used in various professions: gambling casinos (to indicate the state of play, or problems that might affect the participants in a game), theaters and cinemas (signaling the number and location of seats), sales and auctions (signaling type and amount of selling or buying), aviation marshaling (signaling direction and position of aircraft, state of the engines), radio and television direction (signaling amount of time available, instructions about loudness levels, etc., information about faults and corrections; see Carlile, 1947), diving (signaling depth, direction, time, and kinds of personal difficulties; see Becker, n.d.), truck driving (signaling difficulties, courtesy, information about the state of the road), crane driving (signaling direction of movement), the fire service (signaling directions concerning the supply of water, pressures, and use of equipment), bookmaking (signaling the number of a horse or race, and its price), and those tasks where environmental noise makes auditory communication difficult (e.g., in cotton mills).

A general discussion of these areas may be found in Critchley (1939) and West (1960); some further information is given in Stokoe (1974) and Brun (1969). With very little empirical work having been done, it is accepted that any classification is arbitrary to some extent, and that generalizations about the defining characteristics of any signing behavior are tentative in the extreme. Nonetheless, we have attempted to analyze a sample of these behaviors using the 12 linguistic criteria above, and hope that despite the proliferation of question marks (which reflect our lack of knowledge) some interesting tendencies will emerge (see Table 4.1).

The genesis of this table may be seen by illustrating from radio and television signing. The signs used by a radio/TV director to people on the air may be characterized as follows:

A. They have a certain, limited productivity (signs can be used recursively for specifying the amount of time or variation in loudness required).
B. They are finite.
C. The vocabulary is extremely limited; certain semantic fields only are used.
D. The director's signals will be understood by the person on the air,

TABLE 4.1.
Classificatory Matrix for Signing Behaviors

	A	B	C	D	E	F	G	H	I	J	K	L
Cricket signs	−	+	−	+	+	−	−	−	−	?−	−	−
Aviation marshaling												
Truck/crane driving												
Orchestral conducting	−	+	−	+	+	?−	−	−	−	?+	−	−
Radio/TV signaling	?+	+	−	?+	+	?−	?−	−	?−	+	−	−
Divers' signs	+	+	−	+	+	+	?	−	?	+	?	?
Indian signs	?+	+	?−	+	+	+	?	+	?−	+	−	−
Symbolic dancing	+	+	−	+	+	+	?+	+	?−	+	?	?−
Tic-tac signing	+	+	−	+	+	+	+	−	−	+	+	−
American Sign Language	+	?+	?−	?	?+	+	?	+	?+	?+	−	?
Paget Gorman Sign System, etc.	+	+	?−	+	+	+	+	+	+	+	+	+
Speech	+	+	+	+	+	+	+	+	+	+	+	+

and he may (hence the question mark) use signals from the same set in return.

E. There are many contradictory signals (e.g., "speak up" versus "speak quietly"), and these would not be used in direct sequence.

F,G. It is unlikely, but unclear from our sample, whether there is any constituent structure.

H. No instances of idioms were found.

I. It is possible that some of the signals can be analyzed in terms of duality, but on the whole this was not so.

J. There are clear formal systems, related to the various semantic fields (e.g., time qualification, loudness level, fault specification, movement direction), each containing a finite, mutually exclusive set of elements.

K. Many of the signs are dependent on physical characteristics of the ongoing situation.

L. There is no evidence of disambiguation using the signs; writing is often used when further clarification is needed.

Comparing the various signing behaviors with each other, it is possible to detect a gradual increase in complexity in respect of their formal characterization, and we tentatively propose categories as follows:

1. Behaviors (e.g., cricket, aviation marshaling, truck and crane driving) which satisfy the criteria of finiteness, acceptability, and reciprocity, but containing little or no systemic organization of elements (i.e., the signs are more like an inventory than a system).
2. Behavior (such as orchestral conducting) where, in addition to being finite, acceptable, and reciprocal, there is evidence of more complex systemicness in operation and a wider semantic range.
3. Behaviors (such as the case of radio/TV direction) where in addition to the above some productivity must be recognized (though of a very limited kind), and where there is more structuring of the semantic fields involved (possibly suggesting the existence of some duality and constituency).
4. Behaviors (such as Indian signs) which in addition to the above have more productivity and range, and more formal structure (constituency, duality, and idiom).
5. Behaviors (such as some systems of symbolic dance) where, in addition to the above, there is a measure of autonomy. A clear example of this is tic-tac signing (Brun, 1969).
6. Artificial signing systems for the deaf, such as Signing Essential English or the Paget Gorman Sign System (see below), are clearly linguistic in respect of these criteria, though there is the doubtful question of the extent of their lexical range, referred to above. ASL, it will be seen, falls in between these systems and the others, though nearer to the former. The question marks in the line for ASL primarily identify areas for empirical research, but it is worth pointing to two areas in particular, D and E (Reciprocity and Acceptibility). **All** other signing behaviors are positive in respect of these criteria: it would therefore seem crucial for ASL's status to determine the facts here (cf. the discussion of the experimental reports above).

The point of introducing a matrix of this kind is that it helps to identify the salient contrasts between signing behaviors: As we move down the table, we encounter more conceptual organization and more formal structure in the behaviors. In other words, more can be said—there are more things to be said, and more means for unambiguously specifying them. It is premature to draw any firm conclusions, when so little empirical work has been done (on even the "high" varieties of ASL), but we do feel confident in stating that the assumption that signing behaviors in general are capable of description in linguistic terms is wrong, and that it would be preferable to talk instead in some more neutral way. We ourselves prefer to use the term **system** until such time as one can demonstrate a reasonable isomorphism between a signing behavior and the structure and function of spoken language. Perhaps in the end the choice of term is unimportant; but what cannot be shrugged aside is the fact that signing behaviors display different kinds and degrees of structural isomorphism with spoken language,[6] and this must be taken into account in the premises of any discussion.

CONTRIVED SIGNING SYSTEMS

We now feel in a position to make some typological remarks about those systems which are at the "most linguistic" end of the signing continuum—positive in respect of all or nearly all of the above criteria. These systems, the signs of which are in a one-for-one correspondence with the words or morphemes of spoken English, have not developed naturally, though most of them have incorporated as raw material some of the data of natural signing. They may therefore fairly be called **contrived**.

1. *Seeing Essential English* (1971), edited by D. A. Anthony, with a number of contributors, provides written descriptions, based on

[6]It is also likely that similar reasoning will be applicable to claims made about functional parallels; it is debatable, for example, whether the range of sociolinguistic functions for a signing system for the deaf is equivalent to that of speech.

one-handed finger spelling, of approximately 6000 signs. It is published by the Educational Services Division, Anaheim Union High School District, P.O. Box 3520, Anaheim, California 92803.

2. *Signing Exact English* (1972), edited by G. Gustason, D. Pfetzing, and E. Zawolkow, provides line drawings and written descriptions of approximately 1400 signs. It is published by Modern Signs Press, National Association of the Deaf, 814 Thayer, Silver Spring, Maryland 20910.
3. *Linguistics of Visual English* (1971), edited by D. J. Wampler, and published by Early Childhood Education Department, Aurally Handicapped Program, Santa Rosa City Schools, Santa Rosa, California 95402. (We have been able to see only a small part of this material, while preparing this paper).
4. *Signed English* (1969). *Signs for Instructional Purposes*, edited by B. Kannapell, L. B. Hamilton, and H. Bornstein, and in a number of subsequent writings, provides a series of children's books of drawings. It is published by Gallaudet College Press, Washington, D.C. 20002.
5. *Paget Gorman Sign System* (1964, revised 1970), formally known as "A Systematic Sign Language" (see Paget, 1951), edited by G. Paget and P. Gorman, provides 2500 signs. At present, this material is restricted to those who can attend a course of instruction (as is the case with item 3 above). Information is obtainable from the Association for Experiment in Deaf Education, Royal National Institute for the Deaf, 105 Gower Street, London WC1. (A discussion and analysis of this system is to be found in Craig, 1973.)
6. *Improved Techniques of Communication* (1970), edited by H. W. Hoemann, with a number of other contributors, is a training manual which provides line drawings and written descriptions of approximately 270 signs (assuming knowledge of ASL).

The aims of these systems are broadly similar. In *Seeing Essential English*, for example, the aims are said to be "the presentation of English as a visual, visible medium to complement speech . . . to introduce English to manual communication, to effect a marriage between the two, to meet a social as well as an educational need, and to give shape and form to English language processes . . . not only to give but to get from the deaf ease of communication and speed of comprehension in correct colloquial English [p. ix]."

The eight aims of the *Paget Gorman Sign System* read as follows:

> 1. To provide correct patterns of English to enable the deaf child to learn language at an age which is more commensurate with the natural optimum age for language learning in normally hearing children. 2. To increase the deaf child's comprehension by giving clearer patterns of correct language than those which are available to him by speechreading alone. 3. To enable the deaf child to build up an understanding of correct language in conjunction with speech and speechreading; to provide a sound foundation for the future use of speech and speechreading to be used by themselves where possible, or for correct fingerspelling to be used where this form of communication is considered to be the most appropriate for the individual concerned. 4. To encourage in the deaf child a desire to communicate verbally. 5. To accelerate the learning of all school subjects by providing clear unambiguous patterns of correct language. 6. To encourage the deaf child to express English which would be considered acceptable for his age and environment. 7. To increase the probability of the deaf child's reaching a reading level which would enable him to read with facility. 8. To offer a method of remedial teaching for those deaf children, or other language disordered children, whose language has not been adequately developed by other methods of teaching [pp. 18–19].

These in turn relate readily to the list of aims of *Signed English*, as given by Bornstein (in *Signed English: A Manual Supplement to Speech Intended to Further Language Development*): that it be usable at home as well as school; that it be attractive and pleasurable for child and adult; that it be informal and nonacademic in character (no grammar or metalanguage imposed upon the adult); that each aid be self-contained (usable without recourse to other materials or system logic); that it be supportive of pleasant experiences with books; that it provide the child with access to our common cultural heritage; and that it meet the immediate practical needs of the home.

All these systems are designed to supplement and not replace speech; and all are in the process of development, with additional signs being regularly added. All the systems have as a main aim some degree of isomorphism with English discussed in general terms earlier in this paper. They may therefore be classified in terms of which particular areas of English they choose to make their primary focus, and the extent to which they have developed a signing system which replicates these areas of English in all or most formal respects. In this way we recognize the following taxonomy of possibilities:

1. All the above are systems where the aim is to follow the language's syntax as closely as possible, and autonomously (i.e., there is no dependence on some other code or medium). They may thus be distinguished from signing behaviors where there is no such aim (as in many of the naturalistic, concept-based types) and those systems where the language's syntax exercises a varying influence on the signing (as with some varieties of ASL).
2. The syntactic systems may now be subclassified in terms of whether they aim to represent morphological structure in addition to syntax.

All the above have a morphological level, which is used in varying degrees. They are therefore distinct from the general use of Siglish (Fant, 1972, p. iii), which follows word order without morphological variation. *Linguistics of Visual English* (*LVE*) and *Seeing Essential English* (SEE_1) analyze morphological processes most fully; *Signed English* (*SE*) has so far introduced little at this level, and is not concerned with an internally consistent level of representation. *Signing Exact English* (SEE_2) and the *Paget Gorman Sign System* (*PGSS*) fall between these extremes, in respect of the amount of morphological structure explicitly represented.

3. In addition, we have to recognize a further distinction which crosscuts the above to some extent, namely, the fact that the *PGSS* gives formal representation to a notion of "Basic Sign," whereas the other systems do not. "Whenever possible, words with a common theme are grouped together, and each group has its own 'Basic Sign': each word in that group makes use of the Basic Sign for that group, together with an identifying gesture [p. 21]." Thirty-seven Basic Signs are recognized, and the authors claim that their use enables greater ease of learning of those words which the signs represent. It should be noted, however, that in this respect the system is going **beyond** the formal properties of spoken English, and in its degree of contrivedness would be opposed by, for example, the authors of *SE*, whose concern is to follow English order with as little additional systematization as possible.

These distinctions may be summarized as shown in Figure 4.1. The focus of interest, then, would seem to be at the center of this figure: To what extent are the systems outlined there simply notational variants of each other? A comparison of selected areas of syntactic operation would show that there are many differences among the systems, a number of which involve matters of linguistic principle and raise major educational issues. A clear example is to be found in the treatment of the various primary and modal auxiliary verbs ("have," "be," "do," "can," "may," etc.). Despite broad similarities of approach to the analysis of this area of the grammar, there are numerous differences in the morphological and syntactic analysis of these verbs. For example, whereas all systems have markers indicating past tense and past participle, SEE_1, SEE_2 and *PGSS* incorporate these in the signs for *was, were*, and *been*, while *SE* and *Improved Techniques of Communication* (*ITC*) use *be* + *n* to describe "been." The American systems other than *SE* sign "has" and "does" as *have* + *s* and *do* + *s* respectively, giving no clue to the phonological

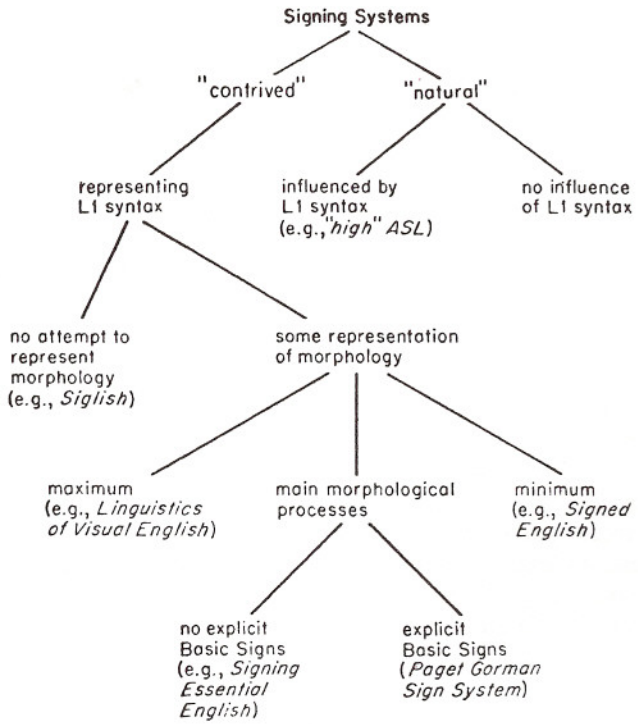

Figure 4.1. Classification of contrived signing systems.

change in the words—a point of some importance when considering the extent to which these systems can be used along with speech in the teaching situation. The *PGSS* has no official sign for the third person singular *-s*, and so there is no recognized sign for "has" or "does." None of the systems appear to differentiate among the uses of "do," with the possible exception of *ITC*. Some of the systems (SEE_1, SEE_2, *PGSS*) use the sign for the lexical item *have* (in the sense "possess") as the auxiliary verb. SEE_1 and SEE_2 treat the "paired modals" as Verb + Past Participle ("can/could," etc.); *SE* treats "can/could," "will/would" and "shall/should" in terms of Verb + Past Tense: *ITC* describes only "will/would," with "would" being treated as *will* + *d*; "should" is treated as a separate lexical item. *PGSS* treats all the modal auxiliaries discretely, and the link between the pairs is not obvious. *SE*, SEE_1 and SEE_2 all recognize the need for abbreviations *'m, 's, 've, 'll* and *n't*. *SE* treats "don't" and "can't" as separate signs since the authors believe that young children

regard these as holophrases before understanding their components. The lack of the "-n't" abbreviation in *PGSS* and *ITC* prevents the use of interrogative phrases (e.g., "can't you?"), since the full word "not" is not used in such constructions.

Other areas of grammar and lexicon bring to light similar differences, e.g., over the marking of irregular morphological forms for number, person, tense, and comparison (*SE* and *ITC* mark irregular past tense and plural, for instance, but the other systems do not). SEE_1 makes use of a large number of signs for affixes, whereas *PGSS* has no regular system for affix representation (though Craig, 1973, makes numerous suggestions for modification in this respect). It is also possible to be critical of many of the decisions made in the analysis of individual words. SEE_1, for example, has been criticized for overemphasizing criteria of formal identity (such as spelling) and not paying enough attention to meaning. Analyses of "any" as *an* + *y*, or "also" as *all* + *so*, or (to give an example from a different area of the lexicon) *mot-* being given as the common stem prefix for a set of items including *motor, motife*, and *motivate* raise fundamental questions of morphological method. All these cases raise questions of linguistic analysis, many of which do not have a single solution.

Bornstein (1973) outlines a number of other salient differences among the various systems, and it is evident from his examples and those just cited that any comparison of contrived signing systems will be a complex matter, raising questions of educational, psychological, and linguistic principle. For instance, we have not in this paper discussed the relative merits of the actual signs used by the various systems, in terms of their iconicity, clarity, fluency, or learnability, as little seems to have been done relating these notions experimentally to questions of linguistic analysis. But in the long run it is clear that many decisions in the linguistic domain are going to be affected by extralinguistic considerations of clumsiness, speed of delivery, and so on. We therefore look forward to systematic comparisons of contrived signing systems from this point of view, once their form has become more stable and their material more widely disseminated. In much the same way as no one morphological theory seems universally suitable for the description of all languages (see Matthews, 1974), so it is likely that the various systems which have been devised for English will find themselves with different and complementary futures if and when their principles are taken as models for use with languages other than English. But for such developments to be realistic, a much more thorough analysis and comparison of the linguistic principles of the available systems needs to take place. It is as part of a prolegomenon to a comparative study of this kind that we hope this paper will make a contribution.

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