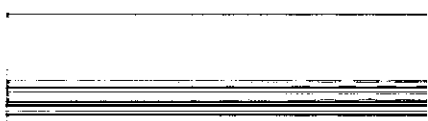
Perspectives on Classifier Constructions in Sign Languages

Edited by

KAREN EMMOREY
The Salk Institute for Biological Studies



LAWRENCE ERLBAUM ASSOCIATES, PUBLISHERS
2003 Mahwah, New Jersey London

Lawrence Erlbaum Associates, Inc., Publishers
10 Industrial Avenue
Mahwah, New Jersey 07430

Cover design by Kathryn Houghtaling Lacey

Library of Congress Cataloging-in-Publication Data

Workshop on Classifier Constructions (2000: La Jolla, San Diego, Calif.)
Perspectives on classifier constructions in sign languages / edited by Karen Emmorey.
p. cm.
"This volume is the culmination of work discussed and presented at the Workshop on Classifier Constructions held in La Jolla, California, in April 2000"—Pref.
Includes bibliographical references and indexes.
ISBN 0-8058-4269-1 (cloth : alk. paper)
1. Sign language—Congresses. 2. Sign language—Classifiers—Congresses.
3. Categorization (Linguistics)—Congresses. I. Emmorey, Karen. II. Title.

HV2474.W66 2003
419—dc21

2002067167

Books published by Lawrence Erlbaum Associates are printed on acid-free paper, and their bindings are chosen for strength and durability.

Printed in the United States of America
10 9 8 7 6 5 4 3 2 1

12

Gesture in Language: Issues for Sign Language Research

Susan Duncan
National Ying Ming University
University of Chicago

Hearing people gesticulate when they speak (Kendon, 1972, 1980, 2000; McNeill, 1985, 1992, 2000). This is universally true. The culture has not been found whose hearing members do not spontaneously produce meaningful manual, bodily, and facial movements when speaking with one another.[1] Since the 1960s and 1970s, results of close analyses of co-occurring verbal and nonverbal behaviors in audio-videotaped natural spoken language have suggested that these behaviors are "two aspects of the process of utterance" (Kendon, 1980, p. 207). Research on sign language during the same interval of decades (Baker & Cokely, 1980; Klima & Bellugi, 1979; Liddell, 1980; Newport & Meier, 1986; Padden & Perlmutter, 1987; Stokoe, 1960; Stokoe, Casterline, & Cronenberg, 1965) has succeeded in demonstrating that language in the manual–visual modality shares with spoken language all of the dimensions of patterning necessary to qualify as, "a humanly possible language, [having] universal design features in common with all human languages" (Supalla, 1982, p. 9). Because it appears that gesturing is a natural and ubiquitous part of language production for hearing speakers, it is reasonable to ask whether deaf signers—somehow analogously—also gesture while signing. Here we consider some ways one may ask this question.

Aspects of classifier constructions, for instance, have been identified as potentially "mimetic" in character (Klima & Bellugi, 1979). A signer may deploy a VEHICLE classifier handshape in such a way that the signed utterance iconically depicts aspects of the motion of the vehicle in some witnessed event. The classifier handshape may "trace" the path of motion of the vehicle. This can involve changes in speed and direction in ways not circumscribed by the grammar of sign language. The hand moves in such a way as to get across the gist of the motion. The aspects of the production that are grammaticized are the classifier handshape and the fact that the motion is traced by the hand.[2] The rest may be pure analog depiction, in that exactly how the motion

is depicted is variable. Its features can flow directly from the signer's visuospatial conception of the event, likely influenced as well by the requirements of the immediate sign discourse context. Schick (1990) and Engberg-Pedersen (1993) proposed a category of movement within classifier constructions that is in line with the above description.[3] Engberg-Pedersen (1993 notes that some verbs, "include movements that are best described as analogues of specific motions" (p. 261). Such use of a sign classifier together with a grammatically unconstrained expression of motion suggests a possible locus of one sort of gestural patterning in sign language. It is important to note, however, that many (if not most) sign language linguists hold that movement within classifier predicates is discrete and morphemic in character (Supalla, chap. 11, this volume).

We consider how a sign language utterance may simultaneously incorporate both morphemic and gestural characteristics and consider whether sign language may also manifest other types of gestural patterning as well. How we carry out such an inquiry depends on how we define *gesture*, even *language* itself. Defining gesture with respect to sign language can be especially problematic.[4] A place to begin is by identifying properties of gesture in spoken language. These can serve as heuristics in an attempt to identify a gestural dimension of sign language.

GESTURE IN SPOKEN LANGUAGE

The intent is to focus on gestures that share a semantic and discourse-structural relationship to the utterances with which they co-occur.[5] McNeill (1985, 1992) claimed that many such gestures are manifestations of a mode of meaning-creation fundamentally different from one that draws on the systems of conventionalized categorial oppositions that define, for instance, a language's phonemes and morphemes. An example of such gesturing is the bodily movements of a speaker who, in synchrony with saying, "The cat squeezes into the drainpipe," presses her arms tight to her sides, causing her body to occupy a smaller space. In an identical speech context, another speaker moves his right hand, fingers and thumb extended with their tips bunched together, through a semicircular shape created by the curved thumb and fingers of the left hand. Close analysis of the relationships between hearing speakers' gestures and speech reveals a tight temporal synchrony between this sort of gesture and the spoken phrases with which they share meaning. There is another variety of speech-associated gesturing as well, that shows somewhat less of a tendency to be strictly speech-synchronous. Speakers frequently produce gestures to time with spoken deictic indexicals or with brief pauses in the flow of speech, in a way that suggests the intention is to draw the listener's attention to the gestural display. An example is when a speaker says, "The guy went like this," followed by a demonstration of some action performed by the person under discussion. Intervals of gesturing may thus also be interspersed with intervals of speaking in this way.

The frequency, size, representational qualities, and complexity of speech-associated gestures can vary tremendously across individuals and within an individual across contexts of speaking; however, gesturing of some sort generally does occur more or less continuously in contexts of unrehearsed speaking, unless the behavior is suppressed for some reason. The ubiquity of speech-associated gesturing across cultures and languages leads researchers who focus on this dimension of human linguistic behavior to two conclusions: (1) Gesturing is somehow an integral part of the natural language production process, and (2) it is a linguistic universal. Gesture is part of human language.

The domain of gestural phenomena is heterogenous. This is true even when we consider only gesturing in spoken language. We have already touched on several properties that may be con-

sidered definitional of a significant portion of speech-associated gesturing. McNeill (1992, 2000) listed the properties that differentiate spontaneously generated gestures as a mode of meaning creation from the conventionalized signs of speech and sign language. He describes gestural meaning creation as "global and synthetic" to contrast it with "combinatoric, linear-segmented" speech and sign language. He notes further that spontaneous gesture is "context-sensitive. Individuals create their own gesture symbols for the same event, each incorporating a core meaning but adding details that seem salient, and these are different from speaker to speaker" (McNeill, 1992, pp. 41–42). Those aspects of gesture that are spontaneously generated at the moment of speaking lack standards of form and lack a community of users such as those possessed by context-independent and listable forms of speech and sign language.

Kendon's work of recent years on gestures of Neapolitan Italian speakers highlights another dimension of bodily gesture. This is gesture with the properties of being socially constituted, conventionalized, and produced in accord with category-specific standards of form (Kendon 1992, 1994, 1995, 2000). Kendon (1992) referred to these as "quotable" gestures, some types of which are alternatively referred to as "emblems" (Ekman & Friesen, 1969; McNeill, 1985, 1992). Such gestures are in certain essential respects like the signs of speech or sign language. It is reasonable to think of them as morphemic. Despite the fact that, for many people, some of the more obvious exemplars of this emblem category, such as the *OK-sign* and the *thumbs-up*, are prototypic members of the category *gesture*, here we think of them instead as being more like signs. This type or dimension of gesture is not a focus here.[6] However, it is important to keep in mind that morphemic or context-independent forms of gesture are routinely co-produced with other, spontaneously generated, dimensions of gestural performance. This possibility of sign/gesture co-production *is* a focus here. The differing dimensions of integrated gesture performances are distinguishable semiotically and may be considered separately from one another.

A particularly significant defining property of the target gestural dimension, one not given special emphasis in McNeill (1992), is that gesturing is not modality-specific. In the opening paragraph, above, gesture was identified with movements of the hands, face, and body; however, we are specifically concerned with a particular framework for the creation of meaning, rather than with a production modality. During spoken language production, a pattern of behavior is considered gestural, regardless of whether it is produced by mouth or hands, to the extent that its form derives from semiotic principles other than those that structure the categorially contrastive, socially constituted, conventionalized signs of language. The fundamental sense of gesture intended here links to linguist Dwight Bolinger's (1975) claim that "language is embedded in gesture" (p. 18). Bolinger's (1946, 1986) work dealt largely with speech and was concerned with elucidating what he considered to be spoken language's pervasive gestural aspects. The gestural aspect of spoken language with which he was primarily concerned was speech prosody, or intonation. His way of thinking about prosodic gesture was that it constitutes a source of meaning in spoken language. In his work, he catalogued many instances in which a particular intonational contour contributes as much to the interpretation of the meaning of an utterance as do the sequentially arranged morphemes and syntactic units.[7]

Bolinger (1983) also reported observations of the facial and bodily gestures that occur with speech. He noted systematic temporal alignments between them, as have subsequent researchers. Kendon (1980), Schegloff (1984), and Nobe (1996) noted that the most dynamic phase of bodily gesture tends strongly to synchronize with the element(s) of co-occurring speech that are prosodically emphasized. A

ties share gestural production characteristics. They share gestural semiotic characteristics as well; for example, prosodic emphasis is gradient in character. Further, speech prosodic contouring possesses iconic representational capabilities (Okrent, in press). To see how this is so, consider a phrase such as, "It took sooo looong," in which the forms of the categorially contrastive vowel phonemes are perturbed, lengthened, in the process of generating an utterance that manifests a distinct gestural semiotic as well. Spontaneously generated onomatopoeia are another sort of vocal gesture. Certain uses of reduplication provide further examples; for instance, the number of repetitions of the verb in a phrase such as, "He climbed, climbed, climbed, climbed," would be, by hypothesis, partially under the control of a gestural impulse. We see that there are shared production (timing) and semiotic (gradience, iconicity) characteristics of gesture across the vocal–auditory and manual–visual modalities in spoken language, suggestive of a functionally unified system that underlies gestural patterning in both modalities.

Consider a final illustrative example from spoken language, involving the two semiotic modes and their interaction when they are constrained to occupy the same modality. This example involves the interaction between intonation and phonemic tone in spoken Mandarin Chinese. In Mandarin, four distinct pitch contours phonemically distinguish morphemes that are made up of identical segmental phonemes. The syllable *ma*, for instance, uttered separately with each of the pitch contours, takes on four distinct meanings in turn. These are in categorial opposition to one another. Mandarin also, like any other language, has utterance-level intonational contouring. Prosodic-gestural pitch variation performs the same functions in Mandarin as it does in other languages. Intonational contours convey affect and emphasis, for example. Okrent (in press) also found that pitch in Mandarin may be exploited to create discourse-contextualized iconic representations of, for instance, relative height—high versus low. This can be accomplished in a way that does not obliterate the phonemic tonal contrasts necessary to support comprehension. Of significance for this illustration is that prosodic pitch can work to perturb syllable-level, phonemic pitch while leaving enough of the latter intact across a section of discourse such that, with contextual support, meaning is not lost (Yang 1995). These small-scale examples involving prosodic gesture are representative of the kind of linguistic patterning that is significant in investigating possible gestural dimensions of sign language. The examples illustrate joint occupancy of a single modality by gestures and the signs of language of the kind that led Bolinger to think of gesture as everpresent and inseparable from the linguistic "code," yet semiotically distinct from it.

Highlighting the modality independent nature of the target gestural dimension puts this discussion of gesture somewhat at odds with many others. Such discussions are generally limited to gesture in the manual–visual modality. One encounters statements suggestive of the idea that everything in speech is analytic, built of categorially opposed, arbitrary, and conventionalized forms, whereas all bodily gesture is synthetic, analog-gradient, and bears a nonarbitrary relationship to contextualized meaning; however, it is important not too make to much of this generalization. Separation of the two semiotic frameworks into the two modalities—speech *versus* bodily gesture—is often merely an issue of explanatory convenience, an aid to the exposition of certain ideas. It is clear that, in spoken language, both semiotic frameworks are operative in both modalities. Bodily gesture has its signlike, socially constituted emblems along with its *de novo* iconic representational gestures. Speech has its conventionalized phonemes and morphemes, along with gestural prosody and other gradient and iconic phenomena.[8] It is equally clear that what serves as an expository convenience in discussions of the gestural dimension of spoken language loses its usefulness when the goal is to elucidate a possible gestural dimension in sign

language. In sign language, manifestations of the alternative semiotic frameworks unavoidably share a single modality.

LOOKING FOR GESTURAL PATTERNING IN SIGN LANGUAGE

The accumulated research on gestures in spoken language predicts a gestural dimension in sign language. The preceding discussion yields several possibilities for what, of a gestural nature, we might look for in sign language:

1. Signs and gestures may be co-produced in sign language utterances, such that these utterances simultaneously manifest properties of both semiotic frameworks.
2. Gesture production may be interspersed with intervals of sign production.
3. Gestures may be produced by articulators other than those engaged at the moment in the articulation of sign forms.

In the second paragraph of this chapter, we examined a sign utterance involving a VEHICLE classifier that seems a likely example illustrating the first possibility. In that utterance, the classifier handshape is a morpheme of the language. By hypothesis, the motion is under the control of a gestural impulse. Support for this hypothesis would consist of evidence of a fair amount of variability across signers in the patterning of the motion component of such a classifier construction when it occurs in discourse; also, sensitivity of the patterning of motion not only to the analog characteristics of the referent, but also to the immediate discourse context. Further claims of sign–gesture co-production are presented in Liddell (1996, 2000, chap. 9, this volume), Liddell and Metzger (1998), and Emmorey and Herzig (chap. 10, this volume). These authors describe gradiently patterned uses of signing space to reference entities and locations. Such usages occur in the context of sign utterances that simultaneously manifest linguistic-categorial standards of form and execution in their nonspatialized dimensions of patterning.

The claim that aspects of prosody or intonation in spoken language are gestural in nature opens further avenues of investigation in sign language relating to the first possibility in the list. Among the dimensions of linguistic patterning manifested in spoken language that have also been identified in sign language, prosody may be relatively underinvestigated; nevertheless, existing studies of prosody in ASL suggest similarities to spoken language. We are not directly concerned with what Nespor and Sandler (1999) referred to as the "syntax-phonology interface" (p. 145) in their study of prosody in Israeli Sign Language. Findings such as Grosjean's (1979) of phrase-final lengthening are likely pertinent to that interface. However, Nespor and Sandler (1999) alluded to other aspects of prosody, including prosodic prominence that cues discourse focus; also, intonational contouring that signals the illocutionary force of an utterance, or "paralinguistic nuances of meaning" (p. 145). Prosodic phenomena such as these lend themselves to a gestural analysis. Phonetic correlates of emphatic stress have been identified in ASL (Coulter, 1990), as have phrasal contours that peak at the location of a stressed sign (Coulter, 1992). Reilly, McIntire, and Seago (1992) describe affective prosodic patterning in ASL. All of these relate to Bolinger's (1983) notions, outlined above, concerning the gestural aspects of intonation in spoken language. The ASL research findings demonstrate, similarly to Bolinger's demonstrations, co-production of semiotically distinct gestural prosody and categorial-linguis-

follow up on Nespor and Sandler's pointers to the varieties of gestural prosodic patterning in sign language.

Linking to research on sign language prosody, the findings on gesture in spoken language provide a further useful heuristic for investigations into the possibility of simultaneous co-production of signs and gestural patterning within the manual–visual modality. In spoken language, the close temporal relationship between the peak prosodic emphasis and the occurrence of meaningful gestural movements is well documented (Kendon, 1980; Nobe, 1996; Schegloff, 1984). Representational gestures have a high probability of co-occurrence with those words or phrases to which speakers give intonational emphasis, for example, in the service of establishing contrastive discourse focus. Assuming that it is possible to identify patterning in sign language discourse that is indicative of peak prosodic emphasis, such loci are likely places for the emergence of gesturing. Okrent's (in press) work suggests that the constraint of sign-gesture co-occurrence within a single modality is no barrier to the occurrence of even iconic representational gestural patterning. Recall that the Okrent (in press) findings concerned joint gestural and (speech) sign patterning in relation to a single feature—pitch. These lines of research—on ASL prosodic emphasis, on the temporal relationship between prosodic emphasis and meaningful gesture in spoken language, and on the simultaneous occurrence of (speech) signs and iconic gesture within modality—taken together can guide a search for gesture homologs in sign language discourse. In other words, if there is such representational gesturing in sign language, the data from spoken language suggest it is likely to occur in association with prosodically emphasized sign forms; further, it may involve some subtle, gradient, deformation of certain features of those sign forms, that deformation not being significant enough to disrupt comprehension.

The second possibility listed at the beginning of this section is that signers may engage in gesturally patterned displays interspersed with intervals of signing. Emmorey (1999) provided several examples of this. Such gesturing would include mimetic demonstrations. To a gesture researcher, some of the data from Nicaraguan Sign Language (Kegl et al., 2000) are suggestive of a pattern of usage in which intervals of gesturing and signing may alternate. Kegl et al. point out that, across signers, one can observe great variety in descriptions of particular features in line drawings. For instance, Kegl et al.'s deaf informants, in the context of signing a description of a line drawing depicting a towel hanging from a clothesline, describe the feature of a small, ragged hole in the towel in a great variety of ways. The author analyzes these descriptions within the system of conventionalized linguistic contrasts of that language, characterizing the variation as being a reflection of each signer's particular focus on some aspect or other of the feature in the line drawing. Note that such a series of responses to that one feature of the line drawing, in which each informant uses a different means of description, is also suggestive of spontaneous generation of gesture forms in response to an unfamiliar or unusual stimulus. To the extent that each of the descriptions is idiosyncratic to the individual signer, and iconically depictive of features of the stimulus display, one may hypothesize that gestural patterning is involved, in accord with the properties listed earlier from McNeill (1992). A gestural interpretation would be further supported to the extent that a featural analysis yields forms lacking stable discrete existence outside the immediate eliciting situation—both across signers and within signers, across discourse situations. The intent here is not to present a counter claim; rather, to highlight some principles that would structure an alternative, gesture-oriented, hypothesis concerning the variability data Kegl et al., (2000) reports.

The third possibility listed at the beginning of this section concerns the relative ease, in re-

categorial-linguistic patterning. This is when it is the case that gestures occur in the manual–visual modality while patterning of the other variety occurs in speech. This relative ease of analysis makes it desirable to search for instances in sign language production when the manifestations of the different semiotic frameworks are similarly separated in some way. Gesturing and signing may emerge simultaneously, perhaps, but in different bodily articulators. We may expect to see instances in which the manual articulators are signing at the same time that the nonmanual ones are engaged in a gesturally patterned display. Facial expressions of affect, varying in degree, are attested to co-occur with manual signing. We would claim that these are gestural. It also seems possible that gestures of the mimetic depiction variety, executed by parts of the body other than the hands, could occur during intervals of manual signing. Emmorey (1999) cited an example of this: a signer whose body sways while the hands are producing the sign for DANCE. Wendy Sandler (personal communication, July 2000) suggests that gestures may occur in a signer's nondominant hand, while signs are being performed by the dominant hand.

CONCLUSIONS

Research on spoken languages leads to the conclusion that gesture is an integral part of human language. Hearing speakers gesture iconically, metaphorically, and rhythmically in accord with the prosodic structure of their languages, and use gesture space cohesively to "map" the relations among the referents that figure in their discourses. Such gesturing is abundant, ubiquitous, and universal across cultures and languages. A gestural dimension of patterning is therefore predicted to exist in signed languages as well. The history of sign language research of the last several decades is one of successful demonstrations of how many of the phenomena of sign language line up point for point with like phenomena in spoken language. Existing sign language research is suggestive of gradient-gestural patterning in regard to signers' use of signing space. It also appears that there are dimensions of sign language prosody that pattern gradiently, in a gestural fashion, as is true of spoken language prosody. Further research will likely expand as well our sense of the possibilities for iconic representational gesture in sign language. We expect it will be found that iconic gestural patterning can share the stage—that is, the hands, even the moment of occurrence—with conventionalized, categorially patterned sign forms, in a variety of ways that may only be determined by further, close, analysis of naturalistic sign discourse. From the perspective of research on the gestural dimension of spoken language we can say that, should it emerge that sign language is in fact devoid of a gestural dimension of patterning, this would constitute evidence of a fundamental and significant difference between languages in the two modalities.

ENDNOTES

[1]The collected papers in McNeill (2000) provide a point of entry into the literature on cross-language comparative research on gesture in spoken language.

[2]I owe this description to Carol Neidle (personal communication, October 1997).

[3]I thank Karen Emmorey for calling my attention to these authors' analyses concerning this issue.

[4]There is the further problem of the accumulated weight—over the history of thinking and research on signed languages, the deaf, and Deaf culture—of pejorative connotations of the word *gesture*. We set this issue aside, except to note that there is a world of difference between the view of a behavior trivialized as

ing—and the view of the behavior as a mode of cognition and of semiosis that is a core property of that linguistic functioning, as much in need of an account as, for instance, phonological or syntactic patterning.

[5]This discussion is therefore not concerned, for instance, with gestures that a police officer would use to direct traffic, the pantomimes performed in a game of charades, nor the facial expressions and hand signals a worker would use to pass information to another worker in a noisy factory. Among hearing speakers, such gestures function to take the place of speech when circumstances prohibit the ordinary use of spoken language.

[6]Neither will we be directly concerned with the sense of "speech [and sign] as gesture" as advanced by Haskins Laboratories researchers Studdert-Kennedy (1987) and Browman & Goldstein (1985); what Studdert-Kennedy described as, "subtly interweaved patterns of movements, coordinated across the articulators" (cited in Armstrong, Stokoe, & Wilcox, 1995, p. 8). The sense of gesture these authors are concerned to articulate is orthogonal to, though not incompatible with, the sense of gesture relevant to this discussion. One way to think of the distinction is that here we are concerned with a more macrolevel of gestural patterning, where a bundle of features taken together achieves a certain meaning within a connected discourse context.

[7] Note that the instances Bolinger catalogued include many where speech is embedded in "melodic lines" that have the properties of social constitution, conventionalized meanings, and of being produced in accord with category specific standards of form. For example, the contrast in American English prosody that distinguishes declaratives from interrogatives is a conventionalized one. Such contrasts have been identified as lying within the domain of "syntactic prosody," in contrast to, for instance, affective–emotional prosody (Luks, Nussbaum, & Levy, 1998). Bolinger may not have made much of a theoretical distinction between the sort of speech prosodic contours that participate in a framework of conventionalized, categorial oppositions and those that do not; here, of course, we do. Given Bolinger's careful descriptions of the prosodic phenomena he studied, it seems straightforward to distinguish those instances from his work that are germane to the argument we are building here from those that are not.

[8]Of more significance in this regard is the probability that the manual–visual modality promotes more elaborated gestural representation than does the vocal–auditory modality, by virtue of the greater potential the former offers for iconic representation, spatial metaphor, and deixis. However, this is an issue of the degree of representational capability available to be exploited by gestural semiosis in each modality, not a distinction between the two in terms of which modality supports gestural semiosis and which does not.

REFERENCES

Armstrong, D. F., Stokoe, W. C., & Wilcox, S. E. (1995). *Gesture and the nature of language.* Cambridge, UK: Cambridge University Press.

Baker, C. & Cokely, D. (1980). *American Sign Language: A teacher's resource text on grammar and culture.* Silver Spring, MD: T.J. Publishers.

Bolinger, D. L. (1946) Thoughts on 'yep' and 'nope'. *American Speech, 21*, 90–95.

Bolinger, D. L. (1983). Intonation and gesture. *American Speech, 58*, 156–174.

Bolinger, D. L. (1986). *Intonation and its parts: Melody in spoken English.* Stanford, CA: Stanford University Press.

Bolinger, D. L., & Sears, D. A. (1975). *Aspects of language* (2nd ed.). New York: Harcourt, Brace and Jovanovich.

Browman, C. P., & Goldstein, L. (1985). Dynamic modeling of phonetic structure. In V. Fromkin (Ed.), *Phonetic linguistics*. New York: Academic Press.

Coulter, G. R. (1992). Phrase-level prosody in ASL: Final lengthening and phrasal contours. In R. Coulter (Ed.), *Current issues in ASL phonology, Vol.3: Phonetics and phonology.* San Diego, CA: Academic Press.

Coulter, G. R. (1990). Emphatic stress in ASL. In S. Fischer & P. Siple (Eds.), *Theoretical issues in sign language research, Vol I: Linguistics* (pp. 109–125). Chicago, IL: University of Chicago Press.

Ekman, P., & Friesen, W. V. (1969). The repertoire of nonverbal behavioral categories: Origins, usage, and coding. *Semiotica 1*, 49–98

Emmorey, K. (1999). Do signers gesture? In L. Messing & R. Campbell (Eds.), *Gesture, speech, and sign* (pp. 133–159). New York: Oxford University Press.

Engberg-Pedersen, E. (1993). Space in Danish Sign language: The semantics and morphosyntax of the use of space in a visual language. In *International studies on sign language research and communication of the deaf (Vol. 19)*. Hamburg, Germany: Signum-Verlag.

Grosjean, F. (1979). A study of timing in a manual and spoken language: American Sign Language and English. *Journal of Psycholinguistic Research, 8*(4), 379–405.

Kegl, J., Morgan, G., Spitz, R., Challis-Gore, J., Chastel, M., & Chastel, G. (2000, April). *A cross-linguistic study of classifier use in British Sign Language, American Sign Language, French Sign Language, and Nicaraguan Sign language*. Paper presented at the Classifier Workshop 2000, La Jolla, CA.

Kendon, A. (1972). Some relationships between body motion and speech: An analysis of an example. In A. Siegman & B. Pope (Eds.), *Studies in dyadic communication* (pp.177–210). New York: Pergamon Press.

Kendon, A. (1980). Gesticulation and speech: Two aspects of the process of utterance. In M.R. Key (Ed.), *The relationship between verbal and nonverbal communication* (pp. 207–228). The Hague: Mouton.

Kendon, A. (1992). Some recent work from Italy on quotable gestures ('emblems'). *Journal of Linguistic Anthropology, 2*(1), 72–93.

Kendon, A. (1994). Gestures as illocutionary and discourse structure markers in southern Italian conversation. *Journal of Pragmatics, 23*, 247–279.

Kendon, A. (1995). Andrea De Jorio—The first ethnographer of gesture? *Visual Anthropology, 7*, 371–390.

Kendon, A. (2000). Gesture and speech: Unity or duality? In D. McNeill (Ed.), *Language and gesture* (pp. 47–63). Cambridge, UK: Cambridge University Press.

Klima, E., & Bellugi, U. (1979). *The signs of language.* Cambridge, MA: Harvard University Press.

Liddell, S. K. (1980). *American Sign Language syntax.* The Hague: Mouton.

Liddell, S. K. (1996). Spatial representations in discourse: Comparing spoken and signed language. *Lingua, 98*, 145–167.

Liddell, S. K. (2000). Blended spaces and deixis in sign language discourse. In D. McNeill (Ed.), *Language and gesture* (pp. 331–357). Cambridge, UK: Cambridge University Press.

Liddell, S. K., & Metzger, M. A. (1998). Gesture in sign language discourse. *Journal of Pragmatics, 30*, 657–697.

Luks, T. L., Nusbaum, H. C., & Levy, J. (1998). Hemispheric involvement in the perception of prosody is dynamically dependent upon task demands. *Brain and Language, 65*, 313–332.

McNeill, D. (1985). So you think gestures are non-verbal? *Psychological Review, 92*, 350–371.

McNeill, D. (1992). *Hand and mind: What gestures reveal about thought.* Chicago: University of Chicago Press.

McNeill, D. (2000). Introduction. In D. McNeill (Ed.), *Language and gesture* (pp. 1–10). Cambridge, UK: Cambridge University Press.

Nespor, M., & Sandler, W. (1999). Prosody in Israeli Sign Language. *Language and Speech, 42*(2–3), 143–176.

Nobe, S. (1996). *Representational gestures, cognitive rhythms, and acoustic aspects of speech: A network/threshold model of gesture production.* Unpublished doctoral dissertation, University of Chicago.

Newport, E. L., & Meier, R.P. (1986). The acquisition of American Sign Language. In D. I. Slobin (Ed.), *The crosslinguistic study of language acquisition, Vol. 1: Theoretical issues* (pp. 881–938). Hillsdale, NJ: Lawrence Erlbaum Associates.

Okrent, A. (in press). A modality-free notion of gesture and how it can help us with the morpheme vs. gesture question in sign language linguistics. In R. Meier, K. Cormier, & D. Quinto (Eds.), *Modality and structure in signed and spoken language,* Cambridge, MA: Cambridg University Press.

Padden, C., & Perlmutter, D. (1987). American Sign Language and the architecture of phonological theory. *Natural Language and Linguistic Theory, 5*, 335–375.

Reilly, J. S., McIntire, M. L., & Seago, H. (1992). Affective prosody in American Sign Language. *Sign Language Studies, 75*(21), 113–128.

Schegloff, E. A. (1984). On some gesture's relation to talk. In J. M. Atkinson & J. Heritage (Eds.), *Structures of social action* (pp. 266–295). Cambridge, UK: Cambridge University Press.

Schick, B. (1990). Classifier predicates in American Sign Language. *International Journal of Sign Linguistics, 1*(1), 15–40.

Stokoe, W. (1960). Sign language structure: An outline of the visual communication systems of the American Deaf. *Studies in linguistics* [occasional papers]. Department of Anthropology and Linguistics, University of Buffalo.

Stokoe, W. C., Casterline, D. C., & Cronenberg, C. (1965). *A dictionary of American Sign Language on linguistic principles.* Silver Spring, MD: Linstok Press.

Studdert-Kennedy, M. (1987). The phoneme as a perceptuomotor structure. In D. A. Allport (Ed.), *Language perception and production: Relationships between listening, speaking, reading and writing.* London: Academic Press.

Supalla, T. (1982). *Structure and acquisition of verbs of motion and location in American Sign language.* Unpublished doctoral dissertation, University of California, San Diego.

Yang, L-C. (1995). *Intonational structures of Mandarin discourse.* Unpublished doctoral dissertation, Georgetown University, Washington, DC.