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GESTURE

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ABSTRACT

The integration of gesture with speech production is described, and the various ways in which—in conversational settings—gesture functions in relation to spoken discourse are discussed. Cultural differences in gesture use are outlined, and the possible relationship between these differences and language differences, on the one hand, and the microecology of social life, on the other, are considered. Conventionalization in speech-associated gestures and in gestures that can be used without speech is discussed. Various kinds of "gesture systems" and sign languages used in speaking communities (alternate sign languages) are described along with their relationships to spoken language. Fully autonomous sign languages, as developed among the deaf, are briefly considered in regard to how signs and signing may be related to gestures and gesturing.

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INTRODUCTION

According to the Oxford English Dictionary, in contemporary English the word "gesture" refers to "a movement of the body or of any part of it" that is "expressive of thought or feeling." A degree of voluntarism is always implied, however. If someone starts at a sudden explosion, or bursts out laughing at something said, or if, on being told bad news, tears well up, these expressions are not usually regarded as gestures. Nevertheless, it is not possible to specify where to draw the line between what is gesture and what is not. Although someone making the "thumbs up" gesture, gesticulating while speaking, or using a sign language is using gesture in the sense in which the word is commonly understood, it is sometimes difficult to be certain whether a postural adjustment, an object manipulation, or a hair pat are gestures (see Scheflen 1965). In this review only actions that are treated by coparticipants in interac-

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tion as part of what a person meant to say will be included: Conventional gestures, gesticulations, and signing are included, but posture shifts, self-touchings, and incidental object manipulations are not (for more on defining gesture, see Kendon 1981b, 1985a).

In the West, gesture has been a topic of interest since antiquity. It first received systematic treatment by Quintilian in AD 100 (Graf 1992, Lamedica 1984, Magli 1980, Quintilian 1924). Its importance was recognized in the middle ages (Schmitt 1990), and treatises devoted to it began to appear at the beginning of the seventeenth century (Angenot 1973). A philosophical interest in gesture developed in the eighteenth century, especially in France. It seemed that its study might reveal the nature of thought (Diderot 1904) or throw light on the origin of language (Wells 1987), or that it could form a basis for a universal language (Knowlson 1965). In the nineteenth century, prominent discussions of gesture included those by Tylor (1865), Mallery (1972), and Wundt (1973). These authors regarded it as providing important insights into the nature of symbolic processes and, for Mallery and Wundt especially, as providing clues to the problem of language origins. For much of this century, however, gesture has been little studied, despite the interest in nonverbal communication that developed after 1950 (Kendon 1982). Only within the past fifteen years, as gesture has come to be seen as relevant to theoretical issues in cognition, language acquisition, and conversational processes, has it once again begun to receive serious attention (see also Schmitt 1984).

In this review, I focus on adult gesture use in conversation, emphasizing communicative and semiotic aspects. Because of space, I leave aside studies of the development of gesture (Volterra & Erting 1990), neurological studies (reviewed in Feyereisen & de Lannoy 1991), and gesture in nonhuman primates (see Tanner & Byrne 1996 and references therein). Studies of gesture by archaeologists and historians of art (Barasch 1976, 1987; de Jorio 1832; Durand 1990; Sittl 1890), law (Hibbitts 1992), or everyday life (Bertellie & Centanni 1995, Bremmer & Roodenburg 1992, Schmitt 1990) receive passing mention. Sign language studies, though connected to gesture studies, are beyond the present scope (see Baker & Cokely 1980, Emmorey & Reilly 1995, Isenhath 1990, Klima & Bellugi 1979, Kyle & Woll 1985, Volterra 1987, Yau 1992), though they will be briefly referred to in the section on "Sign, Gesture, and Language." The relevance of gesture to theories of language origins is also left aside (for recent discussions, see Armstrong et al 1994, 1995).

GESTURE IN RELATION TO SPEECH

The microanalysis made possible by audiovisual recording technology of the relationship between speech and bodily movement reveals that speech and

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gesture are produced together, and that they must therefore be regarded as two aspects of a single process (Kendon 1972, 1980a; McClave 1991; McNeill 1985, 1992; Nobe 1996; Schegloff 1984). Speakers combine, as if in a single plan of action, both spoken and gestural expression. Two examples are given by way of illustration.

In a telling of the story of Little Red Riding Hood (Kendon 1990a, 1993a), at one point the speaker gestured as if swinging a hatchet. She did this in association with the sentence: "And he took his hatchet and with a mighty sweep sliced the wolf's stomach open." This arm-swing action, however, was performed precisely in association with the verb "sliced." The speaker began to lift her hands into position above her right shoulder in the brief pause that immediately preceded the entire sentence. The hands reached this position by the completion of the word "hatchet" and were held there during "and with a mighty sweep." The precise timing of the arm-swing with the pronunciation of "sliced" could not have been achieved unless the speaker had begun to organize her gestural action in advance. That she did so shows that here gestural action and speech must have been organized together. It is only by commencing the movements for the gesture in advance of the speech that the synchrony of arm swing and "sliced" could have been achieved.[1]

In this example, the arm-swing action, co-occurring as it does with the verb "sliced," serves to make the meaning of the verb more precise. Note that the character of the act of "slicing" depends on what is being sliced and the instrument used. To say "sliced the wolf's stomach open" says nothing about this, but by combining gesture and spoken verb the speaker can create a more specific expression.

This combination of gesture and speech, by which a verb or other linguistic expression is given greater specificity, has been noted by Bavelas (1992), McNeill (1987, 1992), Müller (1994), and others. Gestures also provide meanings beyond those expressed linguistically (see examples in Bavelas et al 1992, de Fornel 1992, McNeill 1992). In a dinner party conversation [recorded in 1991 near Salerno, Italy (see Kendon 1997)], the discussion had turned to pear trees and the problem of how their branches were to be held up when loaded with fruit. One speaker said: "No, ci mettono le mazze sotto (No, they put staves under there)." As he said "le mazze (staves)" he held his forearm in a

[1]The tendency for gesture phrases to begin before that part of the spoken expression with which the phase of the gesture phrase deemed to carry semantic import [the "stroke" in Kendon (1980a)] appears to be related [termed "lexical affiliate" by some, following Schegloff (1984)] has been variously interpreted. Space limitations exclude a review here, but see Beattie & Aboudan (1994), Butterworth & Beattie (1978), McNeill (1985, 1992), Morrel-Samuels & Krauss (1992), Nobe (1996), and Rimé & Schiaratura (1991).

vertical position, the hand—with fingers drawn together in a bunch—also directed upward, as if it were an extension of the forearm. The arm in this position was moved upward vertically during the first syllable of "mazze," it was then lowered slightly, and was again moved upward during "sotto." Thereafter it was lowered to rest in his lap.

In this example, too, the speaker prepared his gesture in advance: He started to move his forearm and hand into vertical position as he began saying, "No, ci mettono." Consider, however, what this gesture expresses. The vertical position renders visible the idea of the vertical position of the "mazze," and the upward movements give the idea of something acting to hold something up. In this way the speaker makes clear how the "mazze" are placed underneath the branches, and by the upward movements of his forearm he conveys an idea of their function. Neither of these aspects is to be found in his words.

As in the previous example, the gestures provide a visual representation of things that can be observed ("iconic" in McNeill's terminology). In this second example, however, in the twice-repeated upward movement of the vertical forearm, the speaker uses muscular action to refer to the function of the staves as supports for heavily laden branches. Staves, however, do not do anything to prevent laden branches from falling down. The action of twice lifting the forearm is a metaphorical expression of the idea that the staves support the branches.

With gestures, speakers use a mode of expression that renders in visible form part of what is meant by the utterance. There are different ways in which this may be done. These include enactment (first example), the use of body parts as models of things (second example), and the use of moving hands as if they are sketching diagrams or shapes in the air (for a discussion of types of representation in gesture, see Kendon 1980b, Mandel 1977, Müller 1996, and Wundt 1973). Speakers can also point to things, persons, or locations as a way of bringing these in as referents (Haviland 1993). These visible expressions can be used both to represent aspects of literal reality and to provide images for abstract ideas, and in pointing, as McNeill et al (1993) have shown, abstract ideas can be given locations in space.

McNeill (1992) has referred to the use of gestures to render abstract ideas in visible form as "metaphoric." He provides many examples that show how the conduit metaphor (Reddy 1979); metaphors for seeing as an active, penetrating process; the representation of abstract processes as dynamic patterns; and the like are commonly displayed in gestures. Calbris (1985) and Kendon (1993b) have discussed how spatial metaphors for time are shown in gesture.

Gestures have other functions besides expressing aspects of utterance content. They can provide a visible indication of different "levels" of discourse structure and can also function in relation to aspects of interaction manage-

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ment. McNeill (1992) described how simple rhythmic hand movements (which he terms "beats") mark "new" in contrast to "given" information in certain discourse contexts. He also described "cohesive" gestures, which, in narrative discourse, indicate logical connections between different parts of the discourse. Other gestures mark contrast between discourse that advances a narration and discourse that provides background information. Kendon (1995a), studying naturally occurring conversations recorded near Salerno, has described conventionalized gestures with discourse marking functions, such as distinguishing "topic" from "comment" or marking that part of a discourse that is pivotal to the speaker's argument.

Gestures can also express the type of "move" or "speech act" of a speaker. Streeck & Hartge (1992), in a study of Ilokano (Philippines) conversations, described a gesture indicating the type of talk a speaker will engage in once a turn is granted. Kendon (1995a) described gestures that mark certain kinds of questions. These can also be used on their own so that, by simply using one of these "illocutionary marker" gestures, a person can indicate that it is a plea or a critical question that is being expressed (see also Kendon 1992, Poggi 1983, Ricci-Bitti & Poggi 1991). Gestures also play a role in various aspects of conversational interchange management. Bavelas and her colleagues (Bavelas et al 1992, 1995) gave an account of "interactive gestures" which, among other functions, cross-reference the content of a current speaker's utterance to the theme of the conversation, indicate a participant's understanding of another's contribution, and serve in the management of turn distribution in a conversation.

WHEN SPEAKERS GESTURE AND WHY

Speakers do not gesture every time they speak. Furthermore, the kinds of gesturing employed and the role gesture plays in relation to what is being said or in relation to the interaction situation varies. Few studies, however, have directly considered what occasions gesture.

In some studies, gesture use has been compared in circumstances in which interlocutors can or cannot see each other. Cohen & Harrison (1973) and Cohen (1977) showed that speakers, when giving route directions, used far fewer gestures when speaker and interlocutor were not mutually visible than when they were. Rimé (1982), however, found that rates of gesture in pairs of speakers conversing with a partition between them were only slightly reduced in comparison to when there was no partition. Bavelas and colleagues (Bavelas et al 1992, Bavelas 1994) have conducted similar experiments. They showed that when speakers could not see each other they did not use "interactive" gestures,

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although they continued to use "topic" gestures [i.e. gestures which express aspects of utterance content (Bavelas 1992)].

Some experimental work suggests that the apparently nonstandardized "spontaneous" gestures that speakers produce while talking convey little or no information to recipients (Krauss et al 1991). Because of this and because speakers—even when invisible to their interlocutor—sometimes use "topic" gestures, it has been suggested that such gestures function primarily for the speaker. They are thought to aid verbal formulation, perhaps because they help the speaker to keep complex concepts in mind while seeking to talk about them (Freedman 1977), or perhaps because they play a role in lexical retrieval (Butterworth & Beattie 1978, Krauss et al 1996, Morrel-Samuels & Krauss 1992). Such "internal" functions, if there are such, would not, however, necessarily contradict any communicative functions they might have, and other experimental studies show that recipients do gain information from gestures of this type (Goldin-Meadow et al 1992, McNeill et al 1994; for a review, see Kendon 1994).

To more fully understand what is entailed in the occasioning and functioning of gesture in conversation, collections of specific instances of gesture use in different conversational situations are required. These instances must then be analyzed to determine how gestures contribute to the way participants make sense of the interactional moves of which they are a part. Work of this type already published shows how speakers deploy gestures in a wide variety of ways and accomplish a wide variety of communicative purposes in doing so. For instance, gestures can play a role in how interactants regulate each others' patterns of attention (Goodwin & Goodwin 1986, Heath 1992); participants in nonspeaker roles may use gestures to indicate their assessment or understanding of another's utterance (de Fornel 1992, Goodwin & Goodwin 1992, Heath 1992, Streeck 1994); gestures may be incorporated into discourse as objects of deictic reference (Goodwin 1986, Heath 1986, Streeck 1993), and gestures may be used in alternation with spoken elements in discourse, partnering words as syntactic elements (Jarmon 1996, Kendon 1997, Marslen-Wilson et al 1992, Sherzer 1972, Slama-Cazacu 1993). Gestures may serve to project the nature of the speaker's next turn, or the next part of the discourse (Schegloff 1984, Streeck & Hartge 1992), and they can play an important role in how conversational participants may collaborate in reaching understanding when a spoken expression is momentarily lacking (Schlegel 1997, Streeck 1993).

Consequently, no simple generalization about how gestures are used in conversation is possible. Together with speech, gestures are used as an available resource for the construction of the units of action out of which a conversation is fashioned. Analytically, our task is to show how they are so used, and to

show how the particular properties that gestures have as an expressive medium—for example, that they are silent, are a form of physical action, and can serve as a means for creating visual representations of things—make them adapted for a variety of communicative functions (Kendon 1985b). That conversation is a "multimedia" process has been sufficiently demonstrated. We now need to understand how its various "media" are articulated in relation to one another. The studies listed above provide some good beginnings.

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CULTURAL DIFFERENCES IN GESTURE

Cultural differences in gesture have long been recognized. The greater propensity for the inhabitants of southern Italy to use gesture compared with those in nothern Europe has been noted at least since the seventeenth century (Burke 1992, Roodenburg 1992). There is, however, only one systematic study of cultural differences in gesture. Efron (1972), who first published this study in 1941, described marked differences in various aspects of gesture use between Jewish Yiddish-speaking immigrants and Italian-speaking immigrants from southern Italy in New York City. He found, however, that these differences were much less marked or virtually absent in the assimilated descendants of these two groups. Efron also discussed the history of gesture use in England and France. In England, whereas, already in the mid-nineteenth century, restraint in gesture was considered a virtue, 100 years or more before, in the London of Steele and Hogarth, gesturing in public conversation, in speechmaking, or in preaching was elaborate and lively. In France, between the sixteenth and the nineteenth centuries, there were marked changes in what was considered appropriate in the use of gesture.

It appears that except for movements of the most restricted and carefully controlled sort, gesture has often been viewed as uncultivated. Since the fifteenth century, at least, and even in Classical times, restraint in gesture has been regarded as a virtue (Bremmer & Roodenburg 1992, Schmitt 1990). It is interesting to note that this view is found not only in Europe. To give but one unrelated example, Levinson (1996b) noted that the Tenejapan Tzeltal (of Mexico) are highly restrained in their gesturing in formal interactions.

Language Differences and Differences in Gesture

Some aspects of cultural differences in gesture may follow from language differences, whether in prosody, syntactic patterning, or the way a language describes things. Creider (1978, 1986) compared gesticulation in speakers of three East African languages—the Nilotic languages Luo and Kipsigis and the Bantu language Gusii—and showed that how the peak of the action of the gesture phrase [the "stroke" in Kendon (1980a)] is placed within a tone unit varies

in relation to differences between these languages in the patterning and function of linguistic stress.

Languages also differ, of course, in the way they express things, and where and how a speaker deploys gesture may differ accordingly. Talmy (1985) has compared languages according to how the semantic components of a "motion event"—i.e. something moving from one place to another, how it does so, and the path it takes through space—are packaged linguistically. For example, the motion verbs in a language may incorporate information about the path and manner of movement (so-called verb-framed languages), or these aspects may be conveyed by verb "satellites"—particles and prepositions—instead (so-called satellite-framed languages). Recently, interest has focused on the way a speaker uses gesture in describing a motion event. Does this differ according to whether the language is verb framed or satellite framed? Perhaps. Müller (1994, 1996), who compared Spanish and German, and Kita (1993), who compared English and Japanese, both suggested that what gains representation in gesture can be influenced by what, besides mere motion, a motion verb encodes. For example, Müller found that speakers of German, which incorporates motion in the verb root, tended to use manner gestures more than speakers of Spanish, which does not incorporate manner of motion in the verb. In Kita's study, all the English speakers showed the path of the motion event they were describing, also using a verb ("swing") which incorporates the path of motion. Only some of the Japanese speakers in the study showed path in their gesture when describing the same motion event, however. Kita suggested that this may be because in Japanese there is no verb of motion like "swing" that incorporates reference to the shape of the movement path. Neither of these studies suggests a very strict relationship between how a language represents a motion event and how a speaker represents it when using both language and gesture, but they may indicate some influence.

Another difference between languages that may influence gesture is in how location is specified using coordinate systems (Levinson 1996a). According to Levinson (1996a), coordinate systems may be intrinsic (coordinates established in relation to asymmetries in shape and function of the reference object), relative (coordinates established in relation to the speaker as reference point), or absolute (coordinates based on a system of cardinal directions such as compass points). It has been suggested that speakers of "absolute" languages use gesture differently from speakers of "relative" languages. Examples of languages using absolute systems are Guugu Yimithirr in Australia (Haviland 1979, Levinson 1992) or Tzeltal in Mexico (Levinson 1996b). Levinson (1996b) compared features of gesture observed in both Tzeltal speakers and Guugu Yimithirr speakers. He examined recordings in which traditional stories were told that had actual geographical locations (Tzeltal) or, in the Austra-

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lian case, a story of a personal incident that happened years before that also had actual geographical locations. Levinson found that both the Tzeltal and Gugu Yimithirr speakers show many similarities in how they use gesture. He argued that, where an "absolute" coordinate system is in use, consistency in spatial reference is essential. Gestures become tied to this, and their directionality bears important information. In this respect they may differ from gestures used by speakers of English or Dutch, which are "relative" rather than "absolute" languages. (Note that there is no systematic study by which this possibility can be checked.)

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Cultural Differences in Gesture, Cultural Values, and Communication Ecology

Much contemporary work on gesture remains focused on the individual speaker, with an emphasis on the value of studying it for what it may reveal of the cognitive styles that speakers of given languages may have. Gesturing, however, like speaking, is part of how individuals both "give" and "give off" information to one another (Goffman 1963) and is thus a part of the "expressive strategy" of participants in interaction. As such, gesturing, like speech, is influenced by cultural values and historical tradition, and its usage is adjusted according to the setting, social circumstance, and micro-organization of any given occasion of interaction. Accordingly, to understand cultural differences in gestural usage requires comparative in situ investigations of gestural practice in conversation.

It is also necessary to consider the history of communication conduct and of the behavior settings within which gesturing occurs in the regions to be compared. Historical anthropologists such as Elias (1978–1982), Burke (1987, 1992, 1993), Schmitt (1990), Hibbitts (1992), and others (see Bremmer & Roodenburg 1992) have discussed changes in conversational practice, shifts in moral attitudes to gesture and the etiquette of body management, and changes in the role of formal gesture in legal transactions, which have taken place in Europe between antiquity, the middle ages, and the modern era. Their work shows how the prominence and importance of gesture in conversation can change markedly with historical circumstances (see also Efron 1972). From such studies it is possible to develop hypotheses about how communicational style—and the role of gesture within this—and the ecology of everyday life "in public" (Goffman 1963) may be related. For example, in a city such as Naples, the particular combination of climatic conditions, built environment, social structure, and economy that have come to prevail there over more than two millennia has created communication circumstances in which gesture would be particularly valuable. It may be inferred, for example, from travelers' accounts and descriptions of popular theatre and from contemporary prints that

gesture has always been important in everyday life. It is useful both for conspicuous display and for inconspicuous communication, for communicating at a distance and when noise levels are high. It has been suggested (Kendon 1995b) that the special elaboration of gesture for which the inhabitants of Naples have long been famous can be understood partly in terms of how the systems of communication in interaction in common use have been adapted over many centuries to the communication ecology of that city, acquiring in the process the force of a cultural tradition.

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Conventionalization in Gesture

Among southern Italians many patterns of gesture have become conventionalized within the community as a sort of vocabulary. Thus Efron (1972, p. 123) noted that it was possible "to draw a more or less exhaustive inventory of the 'bundle of pictures' that a 'traditional Italian' usually carries in his hands." Many users can "quote" at least some items from this inventory out of context and offer verbal glosses for them. Efron referred to the gestures in this inventory as "emblematic." Since the work of Ekman & Friesen (1969), partly an adaptation of Efron's classification, gestures distinguishable as part of a shared inventory and that are "quotable" (Kendon 1992) have been called "emblems." Gestures of this type have often been treated as though they were a distinct species, highly conventionalized and contrasted with "illustrators," which are generally regarded as spontaneous and idiosyncratic.

Many studies of gesture have been confined to emblems. When they are compared from one culture to another, cultural differences in gesture can be readily discerned (see, for example, Morris et al 1979, Saitz & Cervenka 1972). A number of publications list gestures of this sort for different communities [Payrató (1993) has a good bibliography]. Comparative studies of existing lists, using the glosses provided (Kendon 1981a), or studies classifying gesture glosses elicited from informants into semantic and pragmatic categories (Payrató 1993), suggest that the semantic range and pragmatic functions of these gestures tend to be restricted. For example, Payrató shows for Catalan quotable gestures that they serve mainly to convey messages of interpersonal control (orders, commands, threats) as a component of an interaction ritual, or as evaluative expressions of the personal state of the self or of others.

Most studies of emblems have simply provided descriptions of the forms of the gestures, with glosses attached. Excluding Sparhawk (1978) and Payrató (1993), there is usually no information about how the descriptions were obtained or from whom they were obtained, and almost never any material providing examples of how these forms are used in context, who uses them, or in what situations (exceptions are Driessen 1992; Sherzer 1972, 1991, 1993).

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Kendon (1995a), in a study of gesture use in conversations in coastal Campania, analyzed the contexts of use of four well-known and highly conventionalized gestures. He showed that speakers draw as freely upon these forms as they do upon more spontaneous gesturings, simply as it suits their purposes. According to this study, emblems and illustrators do not behave in fundamentally different ways. Rather there are a range of forms that vary in their degree of conventionalization. Emblems are simply those gestural expressions that, for reasons that are not at all well understood in most cases, have become stable in form and tend to be more readily recalled as a result.

Many gestural patterns are intermediate in the degree to which they are conventionalized, however. Calbris's (1990) study of movement patterns and handshapes in French gesticulation strongly suggests considerable consistency in form-meaning relationships in gesture. This is also clear in later work by Webb (1996). Webb examined the uses of metaphoric gestures [in McNeill's (1992) sense of this term] in recordings of speakers in several different settings. She found that the majority of the metaphoric gestures produced had stable form-meaning relationships and that these relationships were the same from speaker to speaker. For example, the handshape in which the tip of the thumb makes contact with the tip of the index finger (or sometimes with the middle finger), forming a sort of ring, with the other fingers partially extended and spread apart, recurs in contexts in which the speaker is seeking to make a precise point or a clear distinction. Webb also showed that in some cases gestures can be analyzed into components; that is, a given gesture can be regarded as being composed of a combination of features. For example, a gesture involving the ring handshape may be performed in a location near the side of the head, and its reference to a "precise point" may be combined with a reference to mental processes. When performed close to the center of the speaker's chest it may combine with references to the "self," or possibly to emotions. In this way, a single gesture phrase may retain the meaning and form of each of its constituent components.

Webb's findings appear to confirm the idea that we can speak of a "morphology" of gesture, and they support Calbris's (1990) position. Webb suggests that, to some degree, gestural expressions are constructed from a repertory of component features that have stable, though highly abstract, meanings.

This work needs to be extended. Especially valuable will be studies that compare data from diverse cultures and languages, for they may reveal the extent to which these consistencies in gestural form-meaning relationships result from social tradition or from parallel invention. For example, the contexts of use of ring handshape gesture as a marker of "precision" in discourse in the United States, as noted by Webb, are described likewise by Kendon (1995a) for southern Italy and similarly by Jones & Morey (1932) in their comments on

gesture forms depicted in the miniatures illuminating the early medieval manuscripts of the Roman playwright Terence. We also find this meaning attributed to it by de Jorio (1832) for Neapolitan.

Morris et al (1979), who interpreted this handshape in a like manner, suggested that it derives from the "precision grip" and expresses the idea that when specifying something or making something precise it is as though one is seizing upon or picking up a very small object (for a discussion of how forms of action in gesture may be related to practical action, see also Rozik 1992, Streeck 1996). If so, this metaphor appears to be common at least to both Italians and Americans, and it appears to have been employed for many centuries. Is the metaphor shared widely in Western European culture and spread by tradition? Or is it universal and therefore used in similar contexts in unrelated cultures?

GESTURE SYSTEMS AND ALTERNATE SIGN LANGUAGES

As suggested above, certain kinds of communication economies may provide circumstances in which gesture tends to be "foregrounded" in interaction and is more frequently relied upon in communication. In these conditions, patterns of gesture may be widely shared, as they are, for example, in Naples and surrounding areas.

If circumstances that make speech difficult or impossible are routine, and gesture is used as a replacement, then it is rapidly codified and may develop into a "gesture system." This has been demonstrated experimentally. When people are asked to use only gesture to tell stories or to describe something, they can do so readily, and they can create, even within the space of one short session, a stable gesture vocabulary. Gestures that are elaborate when first invented soon became abbreviated and stylized. Consistencies in sequencing also develop, suggesting a rudimentary syntax (Goldin-Meadow et al 1996; McNeill 1992, pp. 65–71).

In settings such as broadcasting studios, auctions, racecourses, sawmills, and certain factories, where workers have to remain in communication with one another but can do so only by sight, gesture systems sometimes become established (Barakat 1969, Brun 1969). Meissner & Philpott (1975) described a system of this type in a sawmill in British Columbia. Workers in the mill were positioned in full view of one another but were too far away to talk. A system of specialized gestures had been devised to handle essential aspects of coordinating the mill's operations, and this had been elaborated into a more complex system, allowing for brief exchanges about such topics as sports, weather, women, and boss-worker relations. The gesture sequences used in these ex-

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changes tended to be fixed, however, and the system was not used outside the work setting.

Work-setting gesture systems probably all have this limited character, but further descriptions are much needed. Where speech becomes unavailable as a matter of routine in all settings, however, gesture systems may become highly productive. Thus there are certain European monastic orders in which speech is foregone for religious reasons in most everyday situations. A restricted official vocabulary of essential gestures is permitted, but within each monastery, local gesture systems—often quite complex—have commonly developed (Barakat 1975, Kendon 1990b, Rijnberk 1954, Umiker-Sebeok & Sebeok 1987).

The most complex versions of systems of this type are found in those societies where speech is foregone in all situations of everyday life, in the first place as a matter of ritual. Among the Australian Aborigines of the north central desert, such as the Warlpiri or the Warumungu, it is the practice for mature women to forego the use of speech for prolonged periods (sometimes for a year or more) when they are bereaved of their spouse or certain other male relatives. Among women in these societies, highly complex "alternate" sign languages have developed that fulfill virtually all the functions of spoken language (Kendon 1988).

Complex alternate sign languages also developed among the Native Americans from northern Mexico to the Plains. A version of one of these came into widespread use in the nineteenth century and served as a means of intertribal communication. West (1960) provided a detailed account of the linguistic structure of one version. For earlier accounts, see Mallery (1972) and Sebeok & Umiker-Sebeok (1978). Farnell (1995) has described how certain older Assiniboine speakers make extensive use of elements from one of these sign languages (called Plains Sign Talk) as an integral part of their everyday expression.

SIGN, GESTURE, AND LANGUAGE

A point of particular interest with these gesture systems is the extent and nature of their relationship to the spoken languages of their users. The simplest systems seem to show little relationship to spoken language. In the sawmill system referred to above, however, English morphology played some role in sign formation. English syntax influenced the construction of sign sentences in the Cistercian system described by Barakat (1975) for a monastery in Massachusetts. Kendon (1988) showed that for the Warlpiri and adjacent peoples, in the most sophisticated versions of the sign languages they used, signs were employed as if they were the equivalents of the morphemes of the spoken languages, including many bound morphemes, such as semantic case-endings.

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West (1960), however, found that the version of Plains Indian Sign Language he studied was structurally independent of any spoken language. He found that it used many of the grammatical devices, such as spatial inflection, later described for primary sign languages (such as American Sign Language). This structural autonomy may partly be because the system studied by West was a lingua franca, whereas the Australian sign languages studied by Kendon do not function in this way. Furthermore, Australian languages such as Warlpiri and Warumungu have a thoroughgoing "agglutinative" morphology, so that expressions can readily be assembled as sequences of signs for morphemes. The languages of the Plains Indians have "synthetic" morphologies, which could not be represented with signs as morpheme equivalents.

Gesture systems that develop into sign languages among the deaf show, not surprisingly, only an indirect relationship to spoken language, and they use modes of expression that fully exploit the potential of the spatial-visual medium in which they are elaborated. Since Stokoe (1960), studies have demonstrated that the systems established in deaf communities (such as American Sign Language) are full-fledged languages. Still not resolved, however, is the way modes of expression in such primary sign languages may be related to those found in gesture in speaker-hearers.

Some developmental studies support the view that gesturing that comprises signing is distinct from nonsigning gesture. For example, in a study of the use of deictic gestures in two very young deaf children, Pettito (1990) found that their use in person reference shows a distinct and later development, comparable to the development of the use of personal pronouns in speaking children. Reilly et al (1990) reported that deaf children learn to use those facial actions that are optional in signing but that have important syntactic functions in a manner that is distinct from the development of their use of facial actions as expressions that give emotional color to what they are saying. Of special importance here, however, is the work of Kegl et al (1997) on the emergence of a sign language in Nicaragua, where it is only within the past twenty years that a deaf community has come into being. Kegl et al show that the gesture systems developed in families of isolated deaf are variable and labile. A more stable and widely shared system emerged once home sign users came into contact with one another in schools. They found, however, that the first cohort of very young deaf children to attend school where the shared system was used transformed this system and introduced into it distinct grammatical features as though they had created a new, more complex, and consistent system. Kegl and her colleagues compared this to the process of "language creation" described by Bickerton (1981) in his studies of the development of creoles.

On the basis of studies of this sort, it has been argued that a sharp distinction should be drawn between gesture, as it is found in hearing people, and "sign"

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as it is found in sign languages. It seems incorrect, however, to characterize all the gestural activities of speaker-hearers as "nonlinguistic." As noted above, gestures used by speaker-hearers often play an important role in making what is being said more specific or providing additional features of meaning. Further, as noted in particular by Slama-Cazacu (1993), speakers may use gestures as if they are the functional equivalents of lexical units in spoken language, alternating them with spoken elements within a sentence. From a functional point of view, therefore, gestures can be regarded as "part of language."

It has been said that most of the gestures used by speakers at the same time as they speak cannot be considered "linguistic" because they appear to be improvised and cannot be decomposed into elements that can be recombined (McNeill 1992). However, Calbris (1990) and Webb (1996)—noted above—have provided grounds for believing that gestures of this sort may, after all, have a morphology and may show compositionality at least to some extent. Furthermore, as noted in the discussion of conventionalization in gesture, there are gestures used by speaker-hearers—so-called emblems—that have have structural characteristics that suggest they have been shaped by processes quite similar to those that operate to produce signs in sign language.

From the point of view of formal organization, thus there may be in gesture a spectrum of forms, more or less linguistic, rather than a sharp break. If a distinction is to be drawn between linguistic gesture and nonlinguistic gesture, it seems that this does not separate "signers" from "speaker hearers" in as clear a way as might be expected. Only with further research, however, will it be possible to clarify the domains in which we may observe linguistic gesture in speakers and the precise conditions in which it is likely to be found.

CONCLUSION

In 1832, at the beginning of his treatise on Neapolitan gesture, Andrea de Jorio asked: "Is there anything more readily observable, more common and more elementary than the gesturing of man?" He invited his readers to "consider its vast extent" and to look at it carefully in all its aspects. Then, he continued, it will be seen "how little is known of the power of gestural expression, and how much more there is to observe" (de Jorio 1832, pp. iii–iv). Despite the recent upsurge in interest in gesture, to say nothing of the long tradition this is heir to, we can still say the same today. Notwithstanding the marginal position gesture so often seems to occupy in our experience, and notwithstanding its character as something seemingly light-weight, ephemeral, even comic, its study can contribute to our understanding of issues of general importance such as symbol formation, the boundaries of language, and communication practice. Surely the agenda ahead is exciting, and there is worthwhile work to be done.

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