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Gestures Specialized for Dialogue

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A small group of hand gestures made during conversation (interactive gestures) seem to function solely to assist the process of dialogue rather than to convey topical information. The rate of interactive gestures was significantly higher when 27 dyads talked in dialogue than in sequential monologues, whereas the rate of other (topical) gestures did not change; this difference supports the theory that interactive gestures are uniquely affected by the requirements of dialogue. A second, microanalytic study tested hypotheses about the specific functions of interactive gestures by examining the responses of the person to whom the gesture was addressed. Predictions were correct for 78 of 88 gestures sampled randomly from a large database. These results support the conclusion that interactive gestures are an important means by which speakers can include their addressees in the conversation. Moreover, these gestures demonstrate the importance of social (dialogic) processes in language use.

Talking in dialogue differs in important ways from talking in monologue (Bavelas, 1990; Bavelas & Chovil, 1994; Clark, 1985; Duncan & Fiske, 1977, 1985; Goodwin, 1981; Grice, 1975; Linell, 1982; Rosenfeld, 1987; Sacks, Schegloff, & Jefferson, 1974). As Clark and his colleagues have pointed out, monologues can be autonomous, but dialogue in conversation is collaborative (e.g., Clark & Schaefer, 1989; Clark & Wilkes-Gibbs, 1986). That is, dialogue requires social processes, such as coordination and calibration, in addition to the individual processes of language production and comprehension. Far too little is known about how people construct and manage a dialogue together or about the means at their disposal for doing so (Clark, 1985).

We propose that there are hand gestures that have the previously unnoticed function of helping the interlocutors coordinate their dialogue; these gestures serve the special conversational demands of talking in dialogue rather than monologue. We have called these *interactive gestures* (Bavelas, Chovil, Lawrie, & Wade, 1992; Bavelas, Hagen, Lane, & Lawrie, 1989) because, we proposed, they address and maintain the interaction required by dialogue rather than conveying meaning within the dialogue as other gestures do. In broader terms, we are developing a theory that emphasizes the social, dialogic aspects of conversation (e.g., Bavelas, 1990; Clark & Schaefer, 1989; Clark & Wilkes-Gibbs, 1986; Goodwin, 1981; Watzlawick, Beavin Bavelas, & Jackson, 1967) and in which nonverbal and verbal acts may serve specialized but always integrated functions (Bavelas, 1990, 1992; Bavelas, Black, Chovil, & Mullett, 1990, chap. 7; Bavelas, Black, Lemery, & Mullett, 1986; Bavelas & Chovil, 1994).

First, we should locate this relatively small group in relation to other kinds of gestures (see also Table 1). Most scholars divide hand gestures into two broad classes (Efron, 1941/1972; Ekman & Friesen, 1969; Kendon, 1987; McNeill, 1985): The first group consists of stereotyped hand signals, such as the hitchhiking or OK sign, that people can and often do use in nonspeaking contexts. We are interested in the other group, *conversational gestures*, which occur while people are talking and which do not have stereotypic forms. Rather, speakers spontaneously improvise them along with their words and

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phrases, to which the gestures are tightly synchronized. (It is easy to distinguish these conversational gestures from adaptors—that is, from hand movements such as scratching that are self- or object-oriented rather than discourse-oriented and are therefore unrelated to the talk-in-progress; Kendon, 1987.) Cohen and Harrison (1973) and Cohen (1977) first made the case that conversational gestures are communicative by showing that their frequency decreases when another person would not see them. McNeill (1985, 1992) went further and proposed that these gestures are produced as part of language; his evidence ranged from their use in abstract metaphor (McNeill & Levy, 1982) to the selective effect of specific aphasias on gestural as well as verbal productions (Pedelty, 1987).

Within conversational gestures, there is another widely accepted distinction (e.g., Kendon, 1987): Most conversational gestures depict events, objects, actions, or ideas directly related to the topic of conversation, such as gestures portraying shape or movement or, metaphorically, location in time. There are some, however, that are not obviously related to the topic of conversation; these have been described as quick flicks or strokes of the hand that do not seem to depict anything specific. Efron (1941/1972) and Ekman and Friesen (1969) called the latter gestures *batons*; Freedman (1972) called them *speech primacy movements*; McNeill and Levy (1982) called them *beats*. The consensus has been that they have an abstract relationship to topic, such as emphasis or syntactic contrast.

We have proposed (Bavelas et al., 1992, 1989) that most of these nontopical gestures are in fact direct references to the *other person* in conversation. Using dialogue data, we found that on close examination these simple movements share two key characteristics of form and meaning: (a) At some point, however briefly, the finger(s) or open palm(s) are oriented directly at the other person, and (b) the paraphrased meaning of the gesture in the context in which it occurs includes a reference to "you," the other person in the dialogue. Some typical examples from our data are given in Figure 1.

THE NATURE AND FUNCTIONS OF INTERACTIVE GESTURES

Dialogue is more than taking turns at speaking. A person who has the speaking turn does not simply launch into monologue, shutting out the listener until it is the other person's turn to talk. Rather, the speaker constantly includes the addressee and attends to dialogic requirements in a variety of ways, many of which can be served by interactive gestures (Bavelas et al., 1992, 1989). Here we will be more specific about the many functions that interactive gestures can serve in dialogue. We propose that there are 4 broad functions, subsuming a total of 12 specialized functions, which are described below and summarized in Table 1 in the context of all hand actions.

Marking the delivery of information. To help coordinate the understanding of meaning between them, a speaker may mark for the addressee the status of the information being delivered at the moment. In the *general* case, the speaker metaphorically hands over new information related to the main topic at hand, as in Figure 1A. For example, McNeill and Levy (1982, p. 290) described one mathematician explaining to another, "You take the full linear dual," while making a gesture that "looks as if presenting an object to the other person"—that is, both hands, which are extended, move somewhat downward. (McNeill, 1987, p. 230, also provided a sketch of a similar example.)

A common variation occurs at points when the speaker delivers *shared* information. The speaker marks gesturally that the addressee is probably already aware of the information being delivered—it is part of their common ground (Clark & Brennan, 1991). For example, early in a getting-acquainted conversation, the speaker had mentioned that his major was political science; about a minute later, while talking about which year he was in, he said, "This is my last term in, ahh, political science," and, as he came to word *political*, his hand quickly came up from his lap and rotated toward the addressee; his fingers uncurled to point at the addressee; then his hand returned to his lap. Our paraphrase of this gesture is "as you know." Nothing in the gesture referred to political science; instead, the speaker indicated that the addressee undoubtedly recalled that he is majoring in political science.

Another variation occurs when the information being delivered is the beginning or end of a *digression* from the main point; this gesture is often made slightly off to the side. The speaker seems to indicate "You should know I'm going off [or coming back to] the main point."

The last kind of delivery gesture indicates that the information being delivered is *elliptical*—that is, irrelevant details are being left to the listener to fill in mentally. A verbal equivalent of the latter might be "He was busy right then, with his chem lab or, you know, whatever."

In these and the following kinds of interactive gestures, it is important to reemphasize that the differences lie more in the function the gesture serves at a particular juncture in conversation than in the particular form the gesture takes, although, of course, all these gestures have the essential physical feature of interactive form—namely, orientation of the finger(s) or palm(s) to the addressee. Speakers improvise specific forms opportunistically, by where their hands happen to be at the time

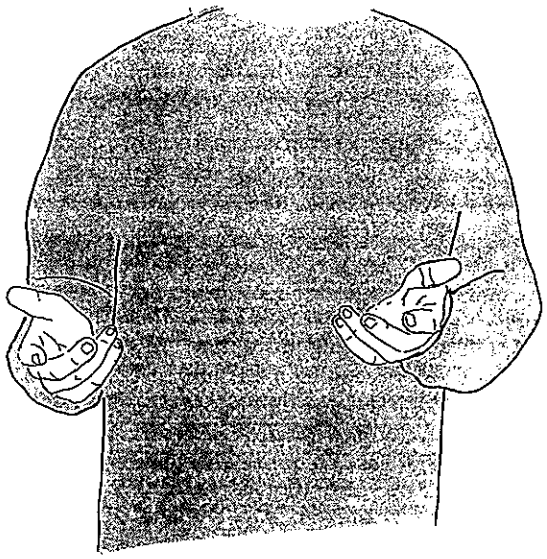

Figure 1A

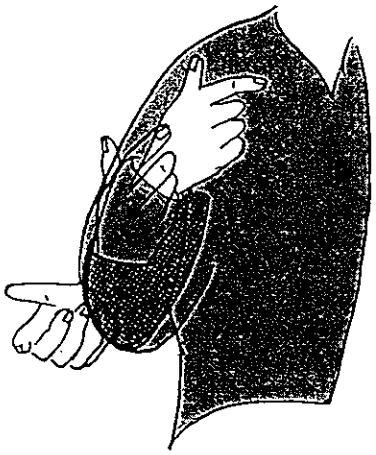

Figure 1C

Figure 1B

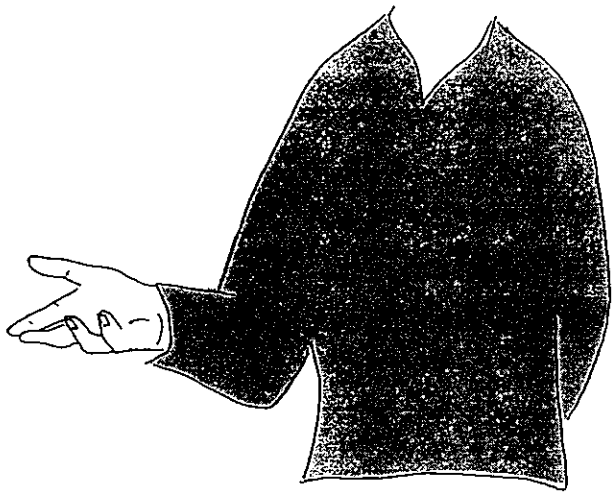

Figure 1D

Figure 1 Typical kinds of interactive gestures. Note that these are only examples because, unlike hand signals, there are no stereotypic forms. The gestures should be visualized in rapid motion and in three dimensions. A = general delivery (verbal equivalent: "Here's my point"). B = general citing (verbal equivalent: "As you said earlier"). C = seeking help (verbal equivalent: "What's the word . . . ?"). D = giving turn (verbal equivalent: "You go ahead").

and perhaps by individual differences in style. Conversational gestures, including interactive gestures, are not stereotyped hand signals; speakers and listeners use and understand them in context, just as they do words.

Citing the other's contribution. A second broad set of functions that interactive gestures serve is to cite the addressee—that is, to acknowledge an earlier contribution the addressee made. *General* citing (as in Figure 1B) occurs when the speaker mentions something that the addressee had said earlier. Notice that, if neither a verbal ("as you said") nor a nonverbal citation were made, it would appear as if the speaker had not heard the addressee's contribution or as if the speaker were claiming the contribution as his or her own. (Thus the general citing gesture might whimsically be called a conversational APA citation.)

The second context that elicits a citing gesture is when the speaker *acknowledges* the addressee's indication of

TABLE 1: Proposed Functions of Hand Movements

Self- and object-oriented actions (often called *adaptors*) accomplish noncommunicative functions, such as rubbing one's chin or a ring, or arranging one's clothes or hair.

Hand signals (often called *emblems*) are stereotypic in form and are usually used to convey meaning in nonspeaking contexts, such as divers' underwater signals or obscene gestures.

Conversational gestures accompany and illustrate talk and are improvised with and synchronized to words. They are usually made by the person speaking at the moment.

Topic gestures depict some aspect of the topical content of the conversation, such as the size of an object or (metaphorically) of a problem. (The vast majority of conversational gestures are topic gestures.)

Interactive gestures are a much smaller group that refers to the addressee and provide no information about the topic at hand. They serve several functions necessary for dialogue.

Delivery gestures, as a group, refer to the delivery of information by speaker to addressee.

General delivery gestures (e.g., Figure 1A) mark the standard relation of speaker to addressee; the speaker metaphorically hands over information relevant to his or her main point. One verbal paraphrase would be "Here's what I'm telling you."

Shared information gestures mark material that the addressee probably already knows—information that is part of their common ground. They mean, essentially, "As you know."

Digression gestures mark information that should be treated by the addressee as an aside from the main point. They are analogous to "Follow me."

Elliptical gestures mark information that the addressee should elaborate for himself or herself; the speaker will not provide further details. They are analogous to "You know the rest."

Citing gestures refer to a previous contribution by the addressee.

General citing (e.g., Figure 1B) indicates "As you said earlier"—that is, that the point the speaker is now making had been contributed by the addressee.

Acknowledgment of the addressee's response indicates that the speaker saw or heard that the addressee understood the speaker. It can be paraphrased as "I see that you understood me."

Seeking gestures aim to elicit a specific response from the addressee.

Seeking help (e.g., Figure 1C) requests a word or phrase that the speaker cannot find at the moment. One verbal paraphrase would be "Can you give me the word for———?"

Seeking agreement asks whether the addressee agrees or disagrees with the point being made. This is analogous to "Don't you agree?"

Seeking following asks whether the addressee understands what is being said. Verbal equivalents include "You know?" or "Eh?" at the end of a phrase.

Turn gestures refer to issues around the speaking turn.

Taking turn accepts the turn from the other person. One paraphrase is "OK, I'll take over."

Giving turn (e.g., Figure 1D) hands it over to the other person, as if to say, "Your turn now."

Turn open indicates that it is anyone's turn, meaning "Who's going to talk next?"

NOTE: From "Gestures as Part of Speech: Methodological Implications," by J. B. Bavelas, 1994, *Research on Language and Social Interaction, 27*, p. 213. Copyright 1994 by Lawrence Erlbaum Associates, Inc. Adapted by permission.

understanding or following. For example, a speaker was telling a childhood close-call story in which, after her horse had kicked her in the face, she went looking for her mother; the speaker was implying, with some humor, how horrifying this sight would be for her mother. The addressee simultaneously mimed what the speaker must have looked like, making a "helpless child" face and silently mouthing "Mom! Mom!" The speaker flicked her finger quickly at the addressee, as if to say, "You've got it—that's exactly what I mean." Notice that citing gestures play an important role in the "on-line monitoring" (Linell, 1982) by which interlocutors coordinate their contributions to discourse (Clark & Schaefer, 1989).

Seeking a response. Speakers may actively elicit responses from addressees in several ways. Speakers may seek *help* in finding the right word or phrase, often by what McNeill and Levy (1982) called a "conduit metaphor" in which the outstretched cupped hand forms "a metaphor for the question as an object or container into which the listener is supposed to place an answer" (McNeill, 1985, p. 358) or, as in Figure 1C, by the metaphor of the hand as a conveyer belt or water wheel to transport the desired word from addressee to speaker. Speakers also seek evidence of *agreement* with a point just made or simply seek evidence that the addressee is *following* the speaker so far (again, an on-line monitoring function). The latter is the gestural equivalent of the ubiquitous verbal "you know?" (i.e., Bernstein's, 1962, *sociocentric sequence*).

Turn coordination. Finally, although most interactive gestures permit the speaker to touch base with the addressee while continuing to speak, we have also included gestures that help coordinate an exchange of speaking turns. The speaker may gesturally *take* the turn (often by metaphorically pulling it toward himself or herself), *give* the turn (Figure 1D), or indicate that the turn is *open* to either person (often by presenting two open palms). In these ways, turn gestures assist the process of turn exchange, which is accomplished both verbally and nonverbally (e.g., Duncan & Fiske, 1977).

A theory of interactive gestures. Thus, as was shown in Table 1, we are proposing a new distinction for conversational gestures: Most function as *topic* gestures, which refer directly to the specific topic of the moment; some function as *interactive* gestures, which refer instead to the addressee. Topic gestures (along with words, faces, etc.) convey topic-specific content, whereas interactive gestures can be described as topic-independent in the sense that in none of the examples given above could we infer the topic of conversation from the interactive gesture. Instead, interactive gestures (and other acts) serve to facilitate and regulate the process of having a dialogue. In our theory (Bavelas et al., 1992, 1989), interactive gestures serve housekeeping functions that are required by dialogue but not by monologue. They enable a speaker to include the addressee, to solicit the addressee's involvement in their dialogue, and to coordinate their contributions. As implied in our paraphrases, there are also verbal equivalents that can serve these functions. However, interactive gestures have an advantage over verbal ways of coordinating and collaborating, because the speaker can insert them quickly and with minimal interruption of the topical flow.

An obvious and important conceptual question concerns the relationship of these gestures to the accompanying words. We propose that in spontaneous face-to-face dialogue, words and gestures do not act as separate channels but, rather, work together. In our *integrated message model* (Bavelas, 1992; Bavelas et al., 1990, chap. 7; Bavelas & Chovil, 1994), the rapid audible and visible communicative acts co-occurring at any given moment form a coherent whole. The relation of parts within this whole ranges from redundancy to uniqueness (just as it does for the words within a written sentence).

Interactive gestures are a good example of the nonredundant end of the continuum. They are precisely timed with words and other simultaneous conversational events, but they typically go well beyond the information conveyed by the words. To verify this, we showed that interactive gestures from two separate experiments (Bavelas et al., 1992) were significantly less redundant with the accompanying phonemic clause than topical gestures were. Indeed, the modal interactive gesture was completely nonredundant with the surrounding words, providing information that the words did not allude to at all (as in the "political science" and close-call examples above). Thus our answer to the question of their relationship is that the accompanying words are necessary but not sufficient to understanding an interactive gesture; they provide a general context but not the specific meaning. (We will present further examples of this relationship in the Analysis section.)

So far, we have sketched out a rather large theoretical superstructure with little reference to experimental data. There are two crucial empirical requirements for this theory: that we justify our claim of two distinct functions of conversational gestures and that we demonstrate the specific functions of interactive gestures. The first study was an experiment that tested whether we are empirically justified in dividing conversational gestures in this way—that is, whether interactive gestures are a new and functionally distinct kind of conversational gesture. The second study used microanalysis to test our specific hypotheses regarding their functions by predicting the responses of addressees to interactive gestures.

STUDY 1: DIALOGUE VERSUS SEQUENTIAL MONOLOGUES

As noted above, previous theorists have often called these gestures beats or batons and connected them to topical content, however abstractly. In contrast, although we do not claim that the illustrator/beat and topic/interactive distinctions are completely isomorphic, we believe that virtually all the gestures previously called beats or batons (and some others, such as conduit metaphors) have interactive functions. It therefore falls on us to show that this new distinction is necessary, by showing that interactive gestures do not act like topic gestures in situations designed to bring out their differences.

We have previously conducted two experimental tests of this distinction (Bavelas et al., 1992), which showed that (a) individuals made fewer interactive gestures than dyads recalling the same material and (b) narrators in dyads who were visually separated from their listeners by a partition made fewer interactive gestures than dyads who were interacting face to face. These findings strongly suggest that speakers make interactive gestures for a partner who will see them. However, these results did not establish whether it was the *physical* or the *functional* aspect of dialogue that elicited more interactive gestures. That is, if an addressee is present and visible (as in the experimental conditions of these two studies), the speaker might in the course of talking have occasion to point at the addressee, which is simply not possible when another person is not there or cannot be seen (as in our previous control conditions). If this were true, then what we are calling interactive gestures might indeed be pointing at the addressee (sometimes called *deitic* gestures), but this would be simply an artifact of visible physical presence and of little functional significance for dialogue.

The present experiment was a direct test of our theory of the unique effect of dialogue on interactive gestures. In both conditions, there were two persons and each could see the other. The sole difference was the degree to which they needed (and were able) to include and involve each other and to coordinate their contribu-

tions. In a within-subjects design, dyads retold one cartoon together and another in sequential monologues (i.e., one person told the first half and the other told the second half, and they could not help each other). Thus we varied the functional relationship between the two persons while controlling physical presence and topical content. We predicted (a) that the gestures we are calling interactive would be more necessary in the fully dialogic condition and therefore would occur at a higher rate than in the sequential monologue condition and (b) that this would not be true of topic gestures, which function to convey topical content rather than to serve dialogic processes.

Method

Participants. A total of 58 people from the Psychology Department volunteer subject pool participated in 29 dyads. Sound-recording problems led to the replacement of one dyad, leaving the planned *N* of 28 dyads. However, the quality of one of these videotapes subsequently precluded analysis of their dialogue condition, and so the final *N* was 27 dyads. All participants knew in advance that they would be videotaped and, after viewing their tape, gave written permission for us to keep and analyze it.

Equipment. The experiments were videotaped in our Human Interaction Lab using three remotely controlled Panasonic WD-D5000 color cameras and two special effects generators (a Panasonic WJ-5500B overlaid on a customized Panasonic four-camera system). We chose a three-way split that simulates a three-dimensional view of the gestures: Two cameras filmed the upper halves of the subjects face-on, and the third used a wide-angle lens to capture a side view of both subjects. The tape also bore a time signal in minutes, seconds, and hundredths of seconds. For analysis, we used both Betamax 1 (SLO 323) and Sharp VHS (2500S) VCRs, with a 19-in. color Sony or Electrohome monitor.

Stimuli. We selected two short episodes from Road Runner cartoons for their similarity in length (about 1 min each) and action (both portrayed a series of connected events rather than isolated incidents). Participants saw each episode twice so that memory demands would be minimal.

Procedure. The orders of condition (monologue or dialogue first) and of stimulus (Cartoon A or B first) were completely counterbalanced, yielding four experimental conditions to which dyads were randomly assigned in permutations of four. All participants understood that they were going to watch a cartoon episode twice and then describe it in detail immediately afterward. After turning back from watching the cartoon, they sat facing each other across a coffee table.

In the monologue condition, the experimenter assigned one person to each half of the cartoon, told the dyad where the halfway point was located (e.g., "You tell up to the point where the coyote skis off the cliff"), and asked them not to help each other out. In the dialogue condition, the instructions emphasized telling the cartoon together: "This time, when you describe the cartoon, you'll be describing it together. OK, so you'll alternate back and forth. So, one of you describes a bit and then the other describes a bit, and so on." In both conditions, the experimenter played the cartoon twice and then left the room until the participants had finished their retelling.

Analysis. The procedure by which we distinguish between interactive and topic gestures is described, with reliability data, in Bavelas et al. (1992, 1989); full details and a demonstration tape are available from the first author. The basic steps, which follow a formal decision tree, are as follows.

The analyst locates each gesture (i.e., excluding adaptors) and views it several times in the immediate context in which it occurred. The analyst then formulates a verbal explication of the meaning of the gesture (e.g., "shows the cannonball dropping" or "cites the other's previous statement"). The analyst then proceeds by elimination, with a bias toward finding topic gestures. That is, if the gesture is complex in form and clearly depicts something in the cartoon (such as the cannonball dropping), it is a topic gesture. If there is no apparent topical interpretation but there is an interactive interpretation (e.g., "as you just said") *and* the form is simple, with interactive characteristics (i.e., fingers or palm directed at the other person at some point), it is an interactive gesture. A useful working principle for the decision is as follows: Whereas topic gestures depict an aspect of the explicit topic (e.g., something is dropping), an interactive gesture tells you nothing about the cartoon—the people could as easily be discussing giraffes or existentialism as describing this Road Runner cartoon. Using specific rules for resolving the occasional difficult cases, we have been able to identify all conversational gestures as either interactive or topical in function.

The meaning of the interactive gesture cannot be determined from the words alone. The analysts were not simply attributing to the gesture information that was actually being conveyed in the words. Recall that we showed in data from two separate experiments (Bavelas et al., 1992) that interactive gestures were significantly less redundant with the accompanying words than topic gestures. Of particular importance here is that 80% of those interactive gestures conveyed a meaning entirely absent from the words; the words were topical, but the gesture was interactive. Two examples will illustrate the

same pattern in the present data. (The point at which the gesture occurred is indicated by broken underlining.)

(1) Gesturer: The ball was dropping, supposedly, to the bull's-eye.

> The speaker marked the delivery of key information she was stressing for the other—namely, that the cannonball was "supposedly" dropping to the bull's-eye where the road runner stood (but, of course, it would hit the coyote instead). She did so by briefly holding her hand out vertically with all fingers pointing at the other person.

(2) Partner: . . . stops and starts eating birdseed,
Gesturer: Yeah, yeah, and then, um,

In this example, the gesturer's interactive gesture combined with her words to convey that she was accepting and building on the other's contribution; it was as if she had said, "Yeah, yeah, and [after what you just said] then," but the bracketed phrase was not expressed verbally. Instead, she raised her hand from her lap and arched her index and middle fingers over to point at her partner. We systematically transcribed the words accompanying a random sample of 39 interactive gestures from this study.[1] For only six gestures, all dealing with the turn, did the meaning also appear in the accompanying words.

Pairwise reliabilities for four independent analysts were all above 90%. Because it was not possible to hide experimental condition in the tapes, we must consider the possibility of bias. There are several reasons to conclude that this was minimal. First, the system is very structured and requires that the analyst give specific reasons at each point in the decision tree. Second, in earlier work (Bavelas et al., 1992), analysts could be and were blind to condition, and similarly high agreement was obtained. Third, we established the initial reliability of the present analysts on a data set from another, unrelated study as well as by checking several times in the present set; so, again, agreement did not depend on knowledge of condition. Fourth, although the analysts could infer the condition, they varied greatly in their knowledge of hypothesis about condition, from sophisticated to naive. If decisions were biased toward the hypothesis, then the knowledgeable analysts would agree with each other more than with naive ones, and this was not even marginally true. Finally, because there was no specific directional prediction for topic gestures (as long as they responded differently to dialogue than interactive gestures did), those who knew the previous studies could have expected equally no difference or a decrease in topic gestures in the dialogue condition.

Two large excerpts from each episode (condition) for each dyad were analyzed, one from the first half of each cartoon and one from the second half. The excerpts selected were ones that virtually all participants remembered well, so that the incidents being described were constant. The average length of these excerpts was 65 s for the monologue condition and 68 s for the dialogue condition. We analyzed all the gestures in an excerpt and converted the frequencies of interactive and topic gestures to rates per minute.

Results and Discussion

There was a significant effect of monologue versus dialogue condition on interactive gestures, with no stimulus or order effects. As shown in Table 2, dyads made interactive gestures at a higher rate when narrating together than when narrating in sequential monologues. In contrast, the rate of topic gestures decreased nonsignificantly in the dialogue condition. As predicted, the two responded differently to social variables.

The size of this shift was substantial: As can be seen in Table 2, the average rate of interactive plus topic gestures was about 26 gestures per minute in both conditions. In the monologue condition, the ratio of interactive to topic gestures was about 1:9, whereas in the dialogue condition, the ratio shifted to 1:3. (A summary of which specific kinds of interactive gestures increased is given in Table 4.)

It is possible that the conditions differed in memory load in a way that affected the gestures. For example, an extrapolation from Morrel-Samuels and Krauss (1992) might predict that the greater responsibility to recall without help in the monologue condition would increase the rate of gestures, and topic gestures did differ in this direction. Finding the opposite effect for interactive gestures thus provides even stronger evidence for our main thesis, that interactive and topic gestures are functionally different. Finally, narrative content (stimulus) did not affect interactive gestures, but topic gestures occurred at a higher rate for one cartoon sequence, which was somewhat more complex than the other, $t(26) = 3.18$, $p < .05$, two-tailed. Thus narrative content rather than social condition affected the rate of topic gestures, whereas the reverse was true for interactive gestures. Altogether, the present results justify our distinction between two kinds of conversational gestures, based on topical versus interactive functions.

STUDY 2: PREDICTING THE RESPONSE OF THE ADDRESSEE

The evidence described so far establishes the existence of two kinds of conversational gestures, but it only suggests that interactive gestures have the specific functions we have hypothesized. That is, we are proposing that interactive gestures are an efficient way for speakers to touch base with their addressees—to include them in the ways required by dialogue, usually without handing over the turn. We have shown that speakers make signifi-

TABLE 2: Mean Rates per Minute of Interactive and Topic Gestures by Condition, Study 1

	Type of Gesture	
Condition	*Interactive*	*Topic*
Sequential monologues	2.45 (2.10)	22.27 (5.81)
Full dialogue	6.89 (3.72)	20.07 (6.73)
t	−4.44	1.38
df	26	26
p (two-tailed)	.00001	*ns*

NOTE: Standard deviations are in parentheses.

cantly more interactive gestures when such inclusion is permitted and required. Still, the ultimate test of the function of an interactive gesture is the behavior of the addressee. If, as we propose, interactive gestures are specialized for dialogue (i.e., specifically address the interlocutor), then they should frequently have an observable effect on the other person even, as is usually the case, without accompanying verbal statements by the gesturer.

To test this hypothesis, we predicted the response of the other person to each of our 12 kinds of interactive gestures. It is important to remember that people who are for the moment in the role of addressee, by definition, do very little except listen and provide back channels, so there are few one-to-one correspondences between gesture and predicted response. Still, the spread of predicted outcomes is sufficiently wide that our theory could be disconfirmed. For any of the gestures marking the delivery of information, it would be equally appropriate for the addressee to make either a confirming response (i.e., a back channel such as "Mhm," "Yeah," or nodding; Yngve, 1970) or to make no response (e.g., Clark & Brennan, 1991). An addressee who has been cited for a previous contribution need not respond at all but may make a minimal confirming response. Gestures that seek evidence that the addressee is following what the speaker is saying should always elicit a confirming response, whereas gestures that seek help (or agreement) from the addressee should elicit that help (or agreement). The turn predictions are equally straightforward. See Table 3 for a summary of our predictions. Because of the rapid and precise nature of dialogue, this test could be conducted only at the microanalytic level—that is, on the actual responses of the addressees within periods that were often 1 s or less.

Data sets. The data were from conditions in three experiments in which there were two participants who could see each other. In addition to both conditions of Study 1 (just described), we used two data sets from Bavelas et al. (1992): the dyad condition of Experiment 1 and the face-to-face condition of Experiment 2. Together, these data included a variety of topics (stories about real close calls, giving directions for finding and using the library, and retelling Road Runner cartoons). A first group of analysts identified specific functions for all 464 of the interactive gestures in this data set. Then a second group of analysts identified the response of the addressee to a random sample of 1/5 of these interactive gestures, a total of 88 interactive gestures. (Some of the rarer kinds did not occur in the sample.)

Identifying functions. The first group of three analysts examined each of the interactive gestures in its immediate context, using a formal decision procedure,[1] and identified its function as one of the 12 described earlier and listed in Table 1. We could assume, because the gesture had already been identified as interactive, that it was referring directly to the addressee; the question was, precisely how? This decision depended on explication of the gesture in the context of the accompanying words, intonation, and facial display and what had just been happening in the conversation, more than on the physical form of the gesture. That is, we were interested in the speaker's precise relationship to the addressee at that juncture, which we assumed the speaker was marking by an interactive gesture. (For obvious reasons, the analysts did not consider what happened after the gesture.) Independent reliability checks on dyads from the three experiments revealed agreement of 100% on the four general functions and 94% on specific functions.

The initial validity of this procedure for identifying functions is revealed descriptively in the distribution across data sets (see Table 4). For example, when the addressee did not know and therefore could not contribute to the speaker's close-call story (in Experiment 2 from Bavelas et al., 1992), there were no general citing gestures, no turn gestures, and no gestures seeking help or agreement from the addressee. Similarly, when the speaker and the addressee were instructed not to help each other out (in the present monologue condition), there were no citing gestures and few seeking gestures: Speakers did not cite addressees' previous responses and seldom tried to elicit a response from them. Thus the global distribution of the various kinds of interactive gestures was consistent with our theory of their functions. The real evidence, however, would be the response of the addressee.

Identifying responses. A different group of three analysts focused on the immediately following response of the addressee. These individuals were completely blind to not only the specific kind of interactive gesture but also the very existence or function of different kinds of interactive gestures. We took great care that they would know nothing of the specific purpose of the project on which they were working.

TABLE 3: Predicted Addressee Responses to Specific Interactive Gestures

Function of Gesture	*Predicted Addressee Response*
Delivery gestures	
General	Confirming response or no new response
Shared information	Confirming response or no new response
Digression	Confirming response or no new response
Elliptical information	Confirming response or no new response
Citing gestures	
General	No new response or minimal confirming
Acknowledgment	No new response
Seeking gestures	
Seeking help	Provide specific information or show that one is trying to provide it (e.g., a word); not a turn exchange.
Seeking agreement	Provide evidence of agreement or disagreement
Seeking following	Confirming response
Turn gestures	
Taking turn	Stop delivering content almost immediately; possible overlap or failure, but high probability of addressee ceding the turn.
Giving turn	Start delivering content almost immediately; may start with confirming response but should also begin a turn.
Turn open	Hesitation and possibility of taking up the turn or no new response

TABLE 4: Frequencies of Specific Interactive Gestures Across Tasks, Study 2

	Task			
	Bavelas, Chovil, Lawrie, & Wade (1992)		*Study 1*	
	Experiment 1[a]	*Experiment 2*[b]	*Dialogue*[c]	*Monologue*[d]
Function	f (%)	f (%)	f (%)	f (%)
Delivery				
General	32 (23)	24 (50)	29 (14)	19 (24)
Shared information	43 (30)	17 (35)	63 (31)	31 (39)
Digression	9 (6)	2 (4)	5 (2)	1 (1)
Elliptical	4 (3)	1 (2)	6 (3)	4 (5)
Citing				
General	20 (14)	0 (0)	42 (21)	0 (0)
Acknowledgment	0 (0)	1 (2)	3 (1)	0 (0)
Seeking				
Help	11 (8)	0 (0)	4 (2)	2 (3)
Agreement	2 (1)	0 (0)	3 (1)	0 (0)
Following	0 (0)	3 (6)	1 (0.5)	0 (0)
Turn				
Taking	3 (2)	0 (0)	10 (5)	9 (11)
Giving	13 (9)	0 (0)	26 (13)	4 (5)
Open	5 (4)	0 (0)	12 (6)	9 (11)
Total	142	48	204	79

NOTE: If the reader seeks to compare the rates in Table 2 with rates derived from the totals here for Study 1 (i.e., total number of interactive gestures over total of scored time), the figures will not agree precisely, for two reasons. First, for the present analysis, we expanded the segment to include the turn exchange. Second, the rate figures in Table 2 are averages across dyads, so that dyads were weighted equally rather than by the amount of scored time.

a. Dyad condition: Dyads collaboratively retold a cartoon they had just seen and also gave instructions on how to find and use the university library. The information discussed was familiar to both participants.

b. Face-to-face condition: One person from each dyad recalled a close-call story; the addressee was unfamiliar with and could not contribute to the story presented by the speaker.

c. Dialogue condition: Dyads collaboratively retold a cartoon they had just seen.

d. Monologue condition: Participants separately retold half of a cartoon they had just seen.

Each analyst was given the time (displayed on the tape) of a randomly sampled gesture. The analyst located and then identified the addressee's first response after the peak of the interactive gesture (usually within

TABLE 5: Accuracy of Predicted Responses to Each Kind of Interactive Gesture, Study 2

	Response of other[a]						Proportion Correct	Chi-Square[b]	p
Function of Gesture	No New Response	Confirming Response	Starts Delivering Content	Provides Specific Content	Stops Delivering Content	Acts Hesitant			
Delivery:									
General	{13}	{8}	1	0	0	0	21/22	3.91	<.05
Shared	{15}	{14}	1	0	0	0	29/30	6.09	<.02
Citing:									
General	{6}	{3}	0	0	1	0	9/10	.84	>.05
Seeking:									
Help	0	0	0	{2}	0	0	2/2	98.00	<.001
Following	0	{1}	0	0	0	0	1/1	1.95	>.05
Turn:									
Taking	1	2	0	0	{0}	0	0/3	.03	>.05
Giving	2	0	{11}	0	0	0	11/13	45.53	<.001
Open	{2}	2	{1}	0	0	{2}	5/7	.14	>.05
Totals	39(44%)	30(34%)	14(16%)	2(2%)	1(61%)	2(2%)	78/88	156.49	<.001

[a] Predicted response(s) are within braces: {}.
[b] df = 1 for gesture subtypes, 8 for the total.

2 s). The analysts had to follow a formal decision tree,[1] which included all the responses listed in Table 3. The three analysts worked individually on systematically overlapped data sets, so that all responses were identified by two independent analysts. Overall (pairwise) agreement was 83%.

Results and Discussion

The results of these microanalyses of the sampled gestures appear in Table 5, which shows substantial conformity with our hypotheses: Our predictions were correct for 78 of the 88 responses.

To test our point predictions statistically, we applied chi-square to the frequencies observed in the predicted versus not-predicted categories. Each expected value depended on the base rate of the response category. For example, 44% of all addressee responses were to make no new response, and 34% were confirming responses. Therefore, by chance alone, 78% of the 22 responses to general delivery gestures would have been one of these two predicted responses. This leads to an expected value of 17.16 for the predicted responses, which was then compared with the observed value of 21. Then, following McNemar (1969, pp. 257-259), we summed the chi-square values for each kind of gesture to arrive at a highly significant overall test of our predictions (see Table 5).

The results for each specific kind of interactive gesture were also as predicted for virtually all the functions (although small *n*s often precluded local significance). In the most frequent instance, when the speaker marked the delivery of information (general or shared), the addressee either passed (did not respond) or inserted a confirmation (that the information was received and comprehended). The addressees seldom began to deliver content themselves (i.e., seldom took up the turn). The same pattern was true for general citing. The one gesture in our sample that sought evidence that the addressee was following or understanding elicited such confirmation, as predicted. Remarkably, the only two cases in which addressees began to provide specific content occurred, as predicted, after interactive gestures that had been independently identified as asking for help with a word or phrase.

In contrast, the results for turn gestures were mixed. When the speaker gestured to give over the turn, the addressee was highly likely to begin speaking. Turn-open gestures mostly elicited confirmation or no new response. The one notable failure in all our predictions was for those marking that the gesturer was now taking up the turn, which should have resulted in the other person's stopping talking. Either these gestures were misidentified or taking up the turn is not as smooth in micro time as we predicted. (It is some comfort to know that this failure precludes the possibility of bias in identifying gestural functions or responses: If the analysts who identified these functions had in fact been looking at the subsequent response of the addressee, or if the response analysts had intuited or deduced from the words the meaning of the gesture, they could easily have made us correct in these cases, as all turn-taking gestures would be followed by the other person's stopping the delivery of content.)

Given the precise and rapid nature of dialogue, our predictions were surprisingly accurate. The speakers' interactive gestures produced predictable responses in listeners, providing strong evidence of their function in dialogue. It is worth noting, in particular, how frequently interactive gestures elicited confirming responses. They

seem to be a major means by which speakers elicit evidence that the addressee is following and that the speaker may now proceed. As Clark and Schaefer (1989) pointed out,

> Conversations are highly coordinated activities in which the current speaker tries to make sure he or she is being attended to, heard, and understood by the other participants and they in turn try to let the speaker know when he or she has succeeded. (p. 259)

Interactive gestures seem to be one important way in which speakers seek this assurance and to which addressees provide it.

CONCLUSIONS

We have proposed that interactive gestures are a small and previously unnoticed group of conversational gestures that speakers can efficiently insert as a means of including their addressees, usually without yielding the turn or even making explicit verbal reference to the addressee. Unlike the gestures that depict some aspect of topical content, interactive gestures assist the dialogue itself rather than serving semantic or syntactic functions. Indeed, the existence of several kinds of interactive gestures draws our attention to the many specific ways in which interlocutors must calibrate their contributions and mutual understanding. To confirm our theory, we first showed that these gestures are strongly and uniquely affected by the requirement to have a dialogue, rather than by the physical presence of another person or by narrative content, thereby justifying a new functional distinction. Then we showed that interactive gestures elicit microanalytically predictable responses from recipients.

Most previous microanalyses of conversation have been conducted with audiotaped data, whereby rising intonation and pauses have been identified as significant means of coordination and inclusion (e.g., Clark & Wilkes-Gibbs, 1986). Bernstein (1962) also identified verbal sociocentric sequences, such as "You know?" or "Eh?" Undoubtedly, these audible behaviors continue to function in face-to-face dialogue, but we suspect that interactive gestures are at least as important when the interlocutors can see each other.

These findings have several broader implications. First, they confirm the value of looking more closely at the *social* processes of conversation—that is, of examining the ways in which dialogue differs from monologue. To do so requires obtaining and studying actual dialogue spontaneously generated by two (or more) participants and then analyzing it at the level at which it occurs, which is microanalytical and in context. Moreover, such analysis must include visible as well as audible communicative acts. Both are important, whether they work together or in specialized ways.

NOTE

1. Available from the first author.

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