

Gesture and the Dynamic Dimension of Language

Essays in honor of David McNeill


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John Benjamins Publishing Company
Amsterdam / Philadelphia

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Paper for Printed Library Materials, ANSI Z39.48-1984.

Library of Congress Cataloging-in-Publication Data

Gesture and the dynamic dimension of language : essays in honor of David McNeill /
edited by Susan D. Duncan, Justine Cassell, Elena Levy.

p. cm. -- (Gesture studies, ISSN 1874-6829 ; v. 1)

Includes bibliographical references and index.

1. Gesture. I. McNeill, David. II. Duncan, Susan D. III. Cassell, Justine, 1960- IV. Levy,
Elena Terry, 1952-

P117.G4685 2007

808.5--dc22

2007011245

ISBN 978 90 272 2841 3 (Hb; alk. paper)

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John Benjamins Publishing Co. · P.O. Box 36224 · 1020 ME Amsterdam · The Netherlands
John Benjamins North America · P.O. Box 27519 · Philadelphia PA 19118-0519 · USA

Face-to-face Dialogue as a Micro-social Context The Example of Motor Mimicry*

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Face-to-face dialogue proceeds moment by moment, as the participants constantly and precisely respond to each other. Their reciprocal actions are the micro-social context of language use and social interaction. The old puzzle of motor mimicry (e.g., wincing at someone else's injury) illustrates the benefit of moving outside the boundary of the individual and examining actions in their micro-social context. Motor mimicry is not simply imitative or emotional; the evidence demonstrates that it is a micro-social communicative act with a significant role in face-to-face dialogue. Unfortunately, experimental evidence demonstrating this role has usually been re-interpreted as evidence for traditional individual theories, ignoring the micro-social level.

1. Introduction

What does it mean to say that language is social? Often, 'social' means either society writ large or social stimuli for the mental processes of individuals. Although the societal and the individual approaches contribute to a complete perspective, both are abstracted from direct observation. They lie on either side of—and omit entirely—an immediate, observable focus on language use as social. Language happens in the moment-by-moment *micro-social* context consisting of the observable acts of interlocutors as they actually use language in face-to-face dialogue. That is, what individuals say and do in face-to-face dialogue is intimately affected by what the other person is saying and doing at that moment and by the immediate effect that their own actions will have on the other person. This chapter will offer a case for the importance of the micro-social context and also some ideas about why it is so consistently neglected.

1.1 The importance of face-to-face dialogue

A diverse group of scholars has proposed that face-to-face dialogue is the basic or fundamental site of language use (e.g., Bavelas, 1990; Bavelas,

* I am pleased to acknowledge both the many collaborators cited herein and research grants from the Social Sciences and Humanities Research Grant of Canada.

Hutchinson, Kenwood, & Matheson, 1997; Clark, 1996; Fillmore, 1981; Garrod & Pickering, 2004; Goodwin, 1981; Levinson, 1983; Linell, 1982, 2005). Face-to-face dialogue must have been the first language of the earliest humans; it is the infant's first language developmentally; and it remains the language of everyday interactions. A corollary assumption, which I share with most of the above authors, is that, unlike written forms of language use, face-to-face dialogue includes both audible acts (words and their prosody) and visible ones (such as co-occurring hand and other bodily gestures, facial displays, and gaze) that are complementary to or even momentarily replace words (Bavelas & Chovil, 2006).

One important feature of face-to-face dialogue is its affordance of *micro-social interaction*, that is, a high level of reciprocity and mutual influence. It represents one end of a continuum of the probability and speed of a response from the other person. In published text, for example, there is a low probability and high latency of response; if the readers respond to the writer at all, it is long after the act of writing. Letters or especially email are faster, and both are more likely (but not certain) to receive a reply. In a telephone dialogue, exchanges can occur rapidly, and even a momentary failure to respond is noticeable. In face-to-face dialogue, responses are highly probable and extremely fast; frame-by-frame microanalysis reveals that addressees often provide *simultaneous* feedback to the speaker (e.g., Bavelas, Coates, & Johnson, 2000). They nod or say "Mhm" and constantly convey information to the speaker by their ever-changing facial displays of attentiveness, confusion, alarm, or amusement, among many others. These responses often overlap the speaker's turn (Goodwin, 1986), but they are not considered interruptions. Indeed, such reciprocal responses are demonstratively essential to the speaker, whose narrative falters when they are absent (Bavelas et al., 2000). Thus, because of its reciprocity and precision, language use in face-to-face dialogue is not simply abstractly social. A participant's contribution does not originate autonomously in his or her mind (or from "language" as an abstraction) and does not evaporate into a social vacuum. Rather, each contribution is part of a social interaction at the micro-level; fortunately, with video technology, these essential details are also directly observable at that level.

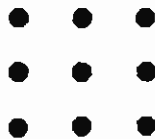
There is accumulating experimental evidence for micro-social effects on both verbal and nonverbal behaviours. For example, Clark and Wilkes-Gibbs (1986) showed that speakers often used verbal references that the addressee had helped to shape. Schober and Clark (1989) then demonstrated that these terms were not as clear to overhearers who did not participate in their moment-by-moment creation. Other experiments have shown that when speakers became aware that they did or did not have common ground with their addressee, they immediately adjusted their verbal descriptions (Isaacs & Clark, 1987) or hand gestures (Gerwing & Bavelas, 2004). Evidence from McNeill's lab has revealed other micro-social effects on hand gestures, which were formed in relation to the other person's spatial perspective (Özyürek, 2000; 2002) or previous gesture (Furuyama, 2000). In Clark and Krych's (2004) experiment, addressees often

began to gesture relevant actions *during* the speaker's verbal instructions; speakers interrupted or changed their instructions, even in mid-sentence, in order to confirm (or correct) the addressee's proposed action. Some gestures have interactive rather than referential functions (Bavelas, Chovil, Lawrie, & Wade, 1992) and are specialized for the coordination of face-to-face dialogue, where they have predictable micro-effects on the addressee's next act (Bavelas, Chovil, Coates, & Roe, 1995). Facial displays can also have micro-social functions. For example, Brunner's (1979) microanalysis confirmed that addressees often precisely timed their smiles to speakers' utterances so that these smiles served as back-channel responses, just as words and nods do.

In this chapter, I will illustrate the utility and importance of a micro-social perspective with a program of research on the historical phenomenon of 'motor mimicry', which is Allport's (1968) term for a reaction by an observer that is appropriate to the situation of the person being observed but not appropriate to the observer's own immediate situation (e.g., wincing at someone else's injury). Allport had pointed out that "the little understood tendency to elementary motor mimicry" (p.29) was still a "riddle in social psychology" (p.30). Previous theories had cast motor mimicry as "basically a perceptual motor reaction" (p.32), that is, within an individual framework. It turned out that a solution to Allport's riddle was to place motor mimicry in its micro-social context. Before describing this research, though, I will introduce the secondary theme of this chapter, which is the apparent difficulty that many researchers have in noticing the micro-social context of language use or in remembering it even after it has been demonstrated as a solution. The next section illustrates this sub-theme by analogy.

1.2 Self-imposed Limits on Observation

The micro-social perspective seems elusive in the study of language use, even and perhaps especially in social psychology (Clark, 1985; Bavelas, 2005). I propose that its fate is analogous to the classic 'nine-dot problem' in perceptual psychology, which starts with a 3-by-3 matrix of points:



The problem is to draw a line through the middle of each of the dots only once, using four straight lines that are all connected. In other words, use four lines to connect all of the dots without lifting the pen or pencil from the paper and without retracing through any of the dots. (The solution can be found on the web or in a review article such as Kershaw & Ohlsson, 2004.)

To connect the nine dots as required, one must think and act outside the apparent square or box that their configuration suggests. The outer dots are not a border or limit, but most of us initially impose one ourselves and try to solve the puzzle within a self-limited space, rather than using the space outside it. Similarly, even when ostensibly studying language use, many researchers still operate within the borders of the individual, with a self-imposed limit that excludes the micro-social context of which the individual is part at any given moment. The rest of this chapter will be devoted to the possibility of looking outside the conceptual limit of the isolated individual.

There is an additional reason to use the nine-dot problem as an analogy here, namely, its remarkable resistance to insightful solution. Chronicle, Omerod, and MacGregor (2001) have shown that verbal and visual hints raise the success rate only slightly. Moreover, even when individuals have once seen or drawn the solution themselves, they may not be able to solve the problem later. (The reader who had previously known the solution may have had the same experience here.) I propose that the micro-social perspective on human behaviour faces a similar recalcitrance. Even when evidence reveals it as a solution, it seems to be quickly forgotten, and the focus on the individual takes over again. In brief, the nine-dot problem is really two problems: At first, it's hard to see the solution. Then, even once you've seen the solution, it doesn't stick. We will see how this analogy works for the micro-social aspects of an illustrative case.

2. Motor Mimicry as a Micro-social Act

2.1 Background and definition

Allport (1968) credited Adam Smith, in *The Theory of Moral Sentiments* (1759/1966) with the first recorded description of motor (i.e., overt, behavioural) mimicry, in which the observer visibly reacts as the observed other person might react, even though this reaction is not appropriate to the observer's own situation. In 18th century England, it was apparently common to see another person beaten in public: "When we see a stroke aimed, and just ready to fall upon the leg or arm of another person, we naturally shrink and draw back on our leg or our own arm" (Smith, 1759/1966:4). As reviewed in Bavelas, Black, Lemery, and Mullett (1987), scholars in the 19th and 20th centuries, including Darwin (1872/1998), continued to notice motor mimicry. Allport (1968:29-32) summarized the few existing explanations for motor mimicry and concluded that, even after 200 years, the phenomenon was "at present not fully understood." All of the proposed explanations focused entirely on individual processes (e.g., vicarious emotion or an imitative reflex).

When our research group approached Allport's riddle in the early 1980's, we had the considerable advantages of experimental methods and video technology (Bavelas, Black, Lemery, MacInnis, & Mullett, 1986a) so that we were not limited to descriptions or still photographs of motor mimicry. Because of the capacity to

observe closely and repeatedly, we began to recognize that the individual's reaction depended on the micro-social context, in that *it was more likely to occur when another person would see it*. We then hypothesized that motor mimicry was a communicative act, skilfully and efficiently conveying understanding of the other's situation.

2.2 First experiments

Our first full experiment (Bavelas, Black, Lemery, & Mullett, 1986b) tested the communicative hypothesis by varying whether or not another person would see the participants' motor mimicry, that is, whether there was a receiver for any mimetic display the participant might make. The experiment was explicitly designed to challenge the existing individual explanations:

If motor mimicry is communicative, then ... the probability of its being seen by a receiver should affect the sender's display of facial mimicry... . If, on the other hand, such mimesis reflects essentially a private experience that happens to result in overt nonverbal behavior, then ... the presence or absence of a receiver should have no effect. (1986b:323).

In a highly controlled 4-second interval (described in detail below), the experimenter (E1) apparently injured his finger and then either did or did not make eye contact with the observing participant. This independent variable required a carefully rehearsed sequence that began with the participant waiting while E1 and his assistant (E2) carried a heavy TV monitor into the room to a table near the participant, where it slipped and dropped on E1's finger. Over the next few seconds, the two experimental conditions began to diverge: either the probability of eye contact between E1 and the participant increased until it finally occurred or the probability decreased and it did not occur at all.

We took great care that the only difference between conditions in this brief period was eye contact (or not). Because the experimenter's face would ultimately be visible only in the eye-contact condition, it was essential that his expression was not the cue to which the participant was responding (which would be a fatal confound in the design; p.325). Therefore, E1's face initially began to show visible pain in both conditions, and he also indicated his injury by a sharp intake of breath and body-acting. Then, at the point in the sequence when the participant in the no-eye-contact condition would not see E1's face, his expression was blank in the eye-contact condition. At the maximum point of eye contact, E1 displayed no pain facially. Thus, the only difference between conditions was whether E1 and the participant made eye contact, that is, whether motor mimicry by the participant would be seen by a receiver (E1). Here is the procedural description from the published article (1986b:324):

Eye contact condition

Injury and intake of breath; face begins to show pain.

Brings head up and glances at observer with defocused eyes as head rolls back.

Two seconds after the start of the injury:

E2 lifts TV off E1's hand.

E1 pivots fully toward observer, in semi-crouch, holding his hand. Looks at hand, then directly at observer for 1 second with "blank" face.

No eye contact condition

Injury and intake of breath; face begins to show pain.

Hunches down over TV, with face visible to observer in profile.

E2 lifts TV off E1's hand.

E1 pivots fully toward E2, in semi-crouch, holding his hand. Looks at hand, then directly at E2 for 1 second.

Our dependent measure was any expression of pain by the observer (the experimental participant); it did not need to be literally what E1 had done, as long as it was appropriate to his situation. Microanalysis of the videotapes revealed a clear result: If the participants had eye contact with E1, they typically winced and also made a kaleidoscopic sequence of other pain displays in response to his injury (e.g., knitted eyebrows, sharp intake of breath, vocalization such as "ouch"). At the point of maximum eye contact, when E1 looked fully at them, they made a very distinct display. The participants who saw the same injury (and the same initial facial display of pain) typically either displayed no motor mimicry at all or started to respond and quickly ceased. At their minimally social point, when E1 turned to interact with E2, few displayed any motor mimicry. The statistically significant difference between experimental conditions in participants' motor mimicry was a micro-social effect of eye contact.

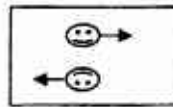
These results eliminated other, individualistic explanations for motor mimicry such as imitation and vicarious emotion, because neither of these can account for the difference between conditions, that is, when motor mimicry did *not* occur. It is important to emphasize that we did not deny that emotion may have occurred, only that it did not produce the motor mimicry. In our *parallel-process* theory (Bavelas et al, 1986b:328), the internal and communicative processes are independent, and it is the micro-social, communicative process that determines the overt behaviour. That is, observers may or may not have experienced vicarious pain in reaction to the injury they saw, but this hypothesized internal state did not automatically result in overt mimesis, because observers who witnessed the same injury without eye contact were virtually impassive. The evidence was clear: The display of motor mimicry depended on the presence of a recipient; it was meant to be seen. Only when we included the micro-social dimension—in this case, the possibility of immediate communication to another person—did the motor mimicry become intelligible.

In the second part of the experiment, another group of participants rated the videotaped reactions of the previous participants. These raters received a

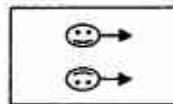
description of E1's injury, but his image on the split-screen video was covered so that they would be unaware of the eye-contact variable. Their instructions were to rate each person they saw on video for "the extent to which the face expressed that the person *knew* how the experimenter felt . . . [and] *cared* about what had happened to the experimenter" (Bavelas et al., 1986b:327; emphasis original). The faces of participants in the no-eye-contact condition were rated as significantly less aware of and less caring about E1's injury than those in the eye contact condition. (Note that these were outsiders' ratings of the facial expressions; we have no information on how the participants actually felt.) Taken together, these two studies suggested that motor mimicry was both encoded and decoded as a brief but important interpersonal message.

The next set of experiments focused specifically on encoding and decoding, in order to demonstrate that micro-social factors determined not only the occurrence but the very form of motor mimicry. Bavelas, Black, Chovil, Lemery, and Mullett (1988) examined closely the motor mimicry that was most often described by the classical authors cited above, namely, an observer watching someone else who is leaning or ducking to one side. If the observer also leans or ducks, this would be considered motor mimicry regardless of whether it is to the right or the left. However, our micro-social analysis proposed that the *direction* in which the observer leans is theoretically informative.

To explain, I'm going to use arbitrary pronouns for the two people: The first person, who initiates the sequence by leaning or ducking to one side (e.g., to avoid or reach for something), will be female while the person who mimics her action will be male. If the first person leaned to her left and the observer, who is facing her, leaned to his left as well, he would be doing exactly what she had done, which fits individualistic theories of motor mimicry such as literal imitation, taking the role of the other, or vicarious action. From a social or dyadic perspective, however, this looks odd because its effect is that the two of them are moving in opposite compass directions:



To appear to be moving *with* the first person, the one facing her must lean or duck in the opposite direction. If she leaned left, and then he would lean right, which is in the same compass direction:



We proposed that it is easier to see this direction as mimetic because it looks more "together"—a perceptual relationship that Heider (1958:200-201) called a "unit relation."

In our first experiment, each participant was facing the experimenter, who told a story in which she illustrated ducking away to avoid someone's elbow. As predicted, virtually all of the participants who ducked mimetically did so in the same compass direction, rather than in the opposite compass direction. The participants encoded their motor mimicry in the most intelligible form by ducking 'with' the storyteller.

Next, in order to test the effects of the two forms of mimetic leaning on viewers, we created several descriptions or photographs of situations in which one person was leaning or ducking (e.g., to avoid a squash racquet in the face or to reach a coffee mug on a side table) and the person facing was also leaning. There were always two versions of the same scene: the second person was either leaning in the same or the opposite compass directions. Large samples of participants were significantly more likely to choose the version in which the observer was leaning in the same compass direction as the one in which the observer appeared to be more "involved" and to be acting "together with" the other person. Altogether, the results in this article (Bavelas et al., 1988) led to the conclusion that the *form* of this kind of motor mimicry was shaped by its micro-social context, that is, the mimicry took the form that was most readily intelligible to the other person. Even the transitory actions of ducking or leaning were sensitive to their appearance in relation to the other person. This was another step outside the boundary of the individual, but our experiments still had little to do with face-to-face dialogue.

2.3 Motor mimicry in dialogue

As shown in our first experiment (Bavelas et al., 1986b), many expressions of motor mimicry are facial, for example, the observer may wince or look startled when the other person is suddenly injured. Kraut and Johnston (1979) had pointed out that, in over 100 years of studies of facial expression since Darwin (1872/1998), almost none had examined its social functions. Indeed, most experiments studied individuals alone or with a non-reactive interviewer, in order that social factors would not obscure their 'true' emotional expressions. As with the nine-dot problem, there had been a self-imposed limit to studying the faces of isolated individuals—yet without social data, an alternative theory could hardly arise. Kraut and Johnston also introduced a useful theoretical distinction between studying a facial configuration (e.g., smiling) as an emotional 'expression' of some presumed internal state (which may be independent of social context) versus studying it as a social 'display' directed at others (which may be independent of internal state). In our lab, Chovil (1989; 1991; 1991-92) began to gather systematic social data on facial displays in dialogue.

One of Chovil's studies (1989; 1991) tested whether the addressee's motor mimicry in face-to-face dialogue is communicative (versus a purely individual reaction) by manipulating whether it would be seen. There were four experimental conditions in which an addressee listened to a narrator's real close-call story: (1) the narrator and addressee were face-to-face; (2) the narrator and addressee were interacting through a partition; (3) narrator and addressee were on the telephone; or (4) the addressees were alone, listening to a dramatic close-call story on an answering-machine. In the face-to-face condition, there was a great deal of facial motor mimicry (e.g., displays of fear, pain, or alarm), and these were significantly less frequent in the other three conditions. These results replicated in dialogue the finding of Bavelas et al. (1986b) that motor mimicry required a visually available receiver. (There is still very little experimental research on non-emotional functions of facial displays in dialogue; cf. Bavelas & Chovil, 2006; Bavelas & Gerwing, in press.)

Later, we borrowed Chovil's (1989, 1991) close-call task in order to learn more about what 'mere listeners' do in face-to-face dialogue (Bavelas, et al., 2000). They made two different kinds of responses: As one would expect, addressees made the familiar *generic* responses, such as nodding, "yeah," and "mhm." But they also made responses that were *specific* to the speaker's topic at that moment: supplying words or phrases and displaying precisely fitted facial or bodily gestures such as looking alarmed, recoiling, or crouching slightly—in other words, motor mimicry. Listeners made these specific responses at surprisingly high average rates (2 to 4 per minute), skewed toward the dramatic ending of the story.

We therefore proposed that the true home of motor mimicry is in face-to-face dialogue, where it constitutes important feedback to the narrator. Two experiments tested this hypothesis by using an unrelated cognitive task to distract addressees in one condition from the narrative (Bavelas et al., 2000). The results showed that distracting the addressees from the content of the story virtually eliminated specific responses such as motor mimicry, which strongly suggests that these responses require cognitive processing and are not automatic or reflexive. Moreover, the distracted addressees had a strong effect on the narrator's storytelling, particularly at the dramatic ending, where specific responses were more likely to occur in the normal listening condition. When the addressee was distracted and made only generic responses or none at all, the narrator's story-ending fell flat and was significantly more poorly told than when the narrator was talking to a responsive addressee. A good narrator requires a good addressee, and a good addressee is not diffusely socially present but specifically active at the micro-social level.

The final evidence (so far) for the micro-social nature of motor mimicry was an analysis of precisely how and when addressees time their responses to the narrator (Bavelas, Coates, & Johnson, 2002). We examined interactions in which narrators told their close-call stories to undistracted addressees (the control group in Bavelas, et al., 2000, exp. 2) and found a consistent and highly collaborative

pattern between narrator and addressee: The narrator would occasionally glance at the addressee, initiating eye contact. This is when addressees made their generic or specific responses, during mutual gaze. Then the speaker looked away again, which ended the eye contact. So the speaker started the sequence by making eye contact and the addressee responded, which terminated the speaker's gaze. This pattern was statistically different from chance not only for the sample as a whole but for each dyad. Their reciprocal coordination was the same for both generic and specific responses, that is, for motor mimicry too. Speakers and addressees in face-to-face dialogue produced these responses together, as part of a micro-social sequence. Note that this result replicates the original Bavelas et al. (1986b) eye-contact effect, this time with a dyad in spontaneous dialogue.

The five articles reviewed here contained 11 studies all strongly suggesting that one answer to Allport's (1968:30) "riddle" of motor mimicry is to see it as a micro-social process and not as an individual process. Motor mimicry is not an individual phenomenon. It depends on, is shaped by, and in turn influences a particular moment in dialogue, illustrating the fine-tuned reciprocity that is the essence of the micro-social context. However, as we will see next, this is not the direction in which the literature has gone.

2.4 Re-imposing the Limits

Recall that the second difficulty of the nine-dot problem is that giving hints or directions for a solution does not help much; the self-imposed limits seem to return on their own. The same has been true for the above research on the micro-social nature of motor mimicry. From the first experiment (Bavelas et al., 1986b) to the latest dialogue studies (Bavelas et al., 2000; 2002), the results have clearly demonstrated that motor mimicry is part of a communicative social interaction at the micro-level rather than an imitative or emotional response by an individual. Yet, as I will illustrate with a sample of citations to the first experiment, one finds quite a different version in the subsequent literature.

Because of the surprising outcome of this survey and because a literature review cannot, by definition, be anonymous, it is important to emphasize its very narrow scope. The sole purpose here was to ascertain how the findings of one experiment were represented in subsequent research or theory, that is, to look for an overall pattern in the literature. For this reason, the focus was solely on each citing article's description of the Bavelas et al. (1986b) eye-contact experiment (described in detail in section 2.2), which has been available long enough to have accumulated a number of citations. In each article reviewed, this experiment was typically only one citation among numerous others and was usually described in a few lines; it was never the main point of an article. Therefore, my comments cannot and do not apply to other parts of any article, much less to an entire article or its authors. Finally, before judging those who mis-cited the experiment, each of us should ask ourselves whether we have ever read something through our own

preconceptions. It is this all-too-familiar tendency—staying within one's self-imposed framework—that is my point here.

The sample came from PsycInfo and Google Scholar, which in late 2006 listed 37 and 50 citations, respectively, of Bavelas et al. (1986b). I selected the 39 unique citations that were in refereed journals or book chapters available in English and that cited this experiment in the context of a discussion of mimicry (excluding abstracts, conference proceedings, articles and full books on unrelated topics, and, obviously, self-citations). There were two clear patterns in these 39 citations. First, there were no criticisms of the our actual experimental design. Although a handful questioned the generalizability of our conclusions, most of the citations were positive references to the experiment in support of the citing article's theoretical position.

Second, only five of the 39 citations were wholly accurate in their descriptions of the results (and the procedure if they included it): Bertenthal, Longo, & Kosobud (2006:223), Fridlund (1991:230 & 237), Fridlund, Kenworthy, & Jaffey (1992:191-192), Gibbs & Van Orden (2003:5) and Parkinson (2005:282 & 297-298). Twelve other citations reported accurately that we had proposed a communicative or signalling function of motor mimicry (Bush, Barr, McHugo, & Lanzetta, 1989: 49; Chartrand & Bargh, 1999:901; Chartrand, Maddux, & Lakin, 2005:338 & 350; DePaulo, 1992:221, 229, & 230; Dijksterhuis & Bargh, 2001:13; Hess, 2001:398; Hess & Blairy, 2001:129 & 139; Hess, Philippot, & Blairy, 1998:509-510; Krauss & Fussell, 1996:664 & 690; Lakin & Chartrand, 2005:283 & 285; Manusov & Rodriguez, 1989:16; Wilson & Knoblich; 2005:463) but included inaccurate or inconsistent descriptions of the variables or procedure; see details below.

The remainder were inaccurate descriptions of the variables, results, and/or procedure of cited experiment. Moreover, the pattern was not random: The vast majority described the experiment as supporting one of three *individual* theories of motor mimicry: automatic or nonconscious imitation, emotional contagion, or expression of an internal, mental state. In effect, these theories recast the experimenter as a mere stimulus for imitation rather than a conscious being who was capable of perceiving the participant's response in their micro-social interaction. In the following, I will first explicate how these theories cannot explain our results and then describe in more detail how this incongruence came about.

A theory of motor mimicry as *automatically activated imitation* of the other person's facial display does not explain the significantly lower frequency of mimicry in the no-eye-contact condition. First, the procedural description reproduced in Section 2.2 shows that, in the initial two seconds, the experimenter's facial display of pain was identical and equally visible in both conditions, so both conditions should have automatically triggered a response. Second, at the peak point of motor mimicry (during full eye contact), his facial expression was gone. There was none to imitate, yet this was the point of maximum difference between the two conditions. Third, behaviours that we

included as motor mimicry were much more varied than a literally imitative facial display. In keeping with the historical definition of motor mimicry, we counted any behaviours "indicative of pain" (1986b:324), including vocalizations and certain head movements. Fourth, the mean response time was 1.27 seconds, during which the participants took into account both the injury and the probability of eye contact; their reaction was fast but not simple automaticity.

Nor can the results be attributed to *emotional contagion* of the experimenter's pain, again because of the no-eye-contact condition. Because the apparent pain of the injury was the same in both conditions, emotional contagion cannot explain why the participants who witnessed the same degree of pain without eye contact were unlikely to display mimicry. Also, as reported in the article (1986b:325), participants in the eye-contact condition were significantly more likely to include a *smile* mixed in with their pain displays, which is inconsistent with feeling vicarious pain. We interpreted those smiles as also communicative, that is, as reassuring or face-saving smiles to the experimenter.

For similar reasons, the interpretation of our participants' actions as *expressions of an internal state* such as rapport, liking, empathy, or an emotion (presumably pain) also has no basis in the evidence. There was no self-report or other measure of the participants' feelings. To infer the participants' internal state from their motor mimicry and then explain the mimicry by this inferred internal state would be circular. The only ratings obtained (Bavelas et al., 1986b, part 2) were from third parties on very specific scales, not global ratings of rapport, liking, empathy, or any emotional state. To interpret motor mimicry as the expression of an internal state would also require us to assume that the less reactive participants in the no-eye-contact condition did not feel anything when they witnessed an equally painful injury. We had pointed out that the data excluded explanations based on intrapsychic states such as empathy (1986b:327) and offered instead our parallel-process model, which separates feelings from overt displays (1986b:328).

In short, the evidence in the 1986b experiment is incompatible with each of the three most common re-interpretations, primarily because of the significant effect of the independent variable, which showed when motor mimicry would and would not occur. However, this incompatibility did not arise in most of the citations, mainly because the relevant elements were absent or transformed. This occurred in several different ways:

A large proportion of the inaccurate citations simply did not mention an independent variable (Aarts, Gollwitzer, & Hassin, 2004:34; Bush et al., 1989:49; Fischer, Rottevel, Evers, & Manstead, 2004:225; Garrod & Pickering, 2004:10; Hess, 2001:398 & 400; Hess & Blairy, 2001:129 & 139; Hess et al., 1998:509-510; Krauss & Fussell, 1996:664 & 690; Lundqvist, 2006:263; Marsh, Richardson, Baron, & Schmidt, 2006:13; Pasupathi, Carstensen, & Levenson, 1999:175-176; Richardson, Marsh, & Schmidt, 2005:62; Russell, 2003:155; Sebanz, Knoblich, & Prinz, 2005:1235; Sonnby-Borgström, 2002:433; Sonnby-Borgström & Jönsson, 2004:103; Sonnby-Borgström, Jönsson, & Svensson,

2003:4 & 16; Van Swol (2003:462; Vreeke & van der Mark, 2003:183; Williams, 2002:449; Wilson & Knoblich; 2005:460 & 463). Most of these citations were in support of demonstrating that mimicry could be experimentally elicited but, lacking an independent variable, they could not describe the main purpose of the experiment, which was to show when it would *not* occur.

Several articles did describe an independent variable. In one case, only the timing of the eye contact was incorrect (Depaulo, 1992:221). More often, a different independent variable was described (Jakobs, Manstead, & Fischer, 2001:52; Lakin & Chartrand, 2003:334; Tiedens & Fragale, 2003:559). In three cases, a small change transformed the manipulation from one that made the *participant's* expression visible to the experimenter into one that made the *experimenter's* facial expression more clearly visible as a stimulus to the participant (Chartrand et al., 2005:338; Dijksterhuis & Bargh, 2001:10; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005:192). Recall that the experimenter's facial expression was equally visible or not in both conditions.

There were also changes in the dependent variables analysed (Bush, et al., 1989:49; Chartrand et al., 2005: 350; Fischer et al., 2004:225; DePaulo, 1992:221 & 229; Hess, 2001:400; Hess & Blairy, 2001:129 & 139; Lakin & Chartrand, 2005:283 & 285; Marsh et al., 2006:13; Pasupathi et al., 1999:176; Russell, 2003:155; Van Swol, 2003:462; Williams, 2002:449; Wilson & Knoblich; 2005:463). The most common error was describing variables that went well beyond what we had measured, usually internal states such as rapport, empathy, affiliation, or emotional contagion, but there were also a few instances of different mimicry (e.g., yawning or sadness). In other cases, it was not possible to tell whether the error was the independent or dependent variable (Lundqvist, 2006:263; Sonnby-Borgström, 2002:433; Sonnby-Borgström & Jönsson, 2003:143; Sonnby-Borgström & Jönsson, 2004:103; Sonnby-Borgström, et al., 2003:4 & 16), or both the independent and the dependent variables were changed (Bargh & Ferguson, 2000:930; Chartrand & Bargh, 1999:896; Dijksterhuis, 2005:211; Manusov & Rodriguez, 1989:16).

Finally, there were descriptions of the experimental context or procedure that did not match ours, such as a naturally occurring interaction rather than an experiment (Bargh & Ferguson, 2000: 930; Chartrand & Bargh, 1999: 896) or as involving a speaker and listener, co-acting partners, or infants or children instead of an (adult) experimenter and observer (Hess, 2001:398; Hess et al. 1998:509; Jakobs et al., 2001:52; Krauss & Fussell, 1996:664 & 690; Manusov & Rodriguez, 1989:16; Sebanz et al., 2005:1235; Vreeke & van der Mark, 2003:183).

In summary, the vast majority of this sample of 39 articles citing the experiment did not deal with the hypothesis and variables we were testing, which was that motor mimicry is elicited by social, communicative processes rather than by individual processes. The results clearly supported a micro-social explanation, yet the consistent pattern of the majority of citations was to reconstruct the experiment into one that supported an individual interpretation. (Almost none of

the articles included the subsequent experiments that demonstrated motor mimicry in dialogue.) It is important to emphasize again that this was a narrow search that does not impugn anyone's scholarship, much less suggest that anyone deliberately distorted our experimental results. I believe that the authors simply read our experiment as fitting a familiar or expected pattern. In the metaphor of this chapter, it seems that the micro-social context in the experiment was as irrelevant as the white space outside the nine dots and was similarly ignored.

3. Why Don't We See the Micro-social?

I propose that it is primarily the tendency to see the individual as a natural unit of analysis that prevents our seeing the micro-social context that surrounds and profoundly influences each individual. Focusing on the individual creates an implicit border, as in the nine-dot problem, which seems to limit our perceptual or conceptual field to mental rather than social processes. Even when researchers briefly step outside and notice what is happening around and in interaction with the individual, the focus soon retreats to the isolated individual. Both language and social interaction have been predominantly attributed to mental processes, not just in the broader domains of linguistics and psychology, but even in those that one might expect to be especially interested in face-to-face dialogue, such as psycholinguistics and social psychology. Because this choice of the individual as the unit of analysis seems to be a relatively unexamined one, it is worth considering briefly its causes and effects, focusing on the discipline I know best, psychology.

In an insightful analysis, Danziger (1990) has shown how the person historically called "the subject" has been socially constructed in psychology. He described a

Robinson Crusoe myth [which] made it seem eminently reasonable to ignore the settings that had produced the human behavior ... and to reattribute it as a property of individuals in isolation. (1990: 186)

Danziger went on to point out that psychologists did not invent the Robinson Crusoe myth (although they continue to contribute to it); western culture is highly individualistic, placing a high value on individual actions and attributes. I would add that the circumscribed individual is appealing because he or she is an obvious biological unit (even though not a viable one if truly isolated). This physical boundary also defines each of us as a separate entity in the law and in society at large.

According to Danziger (1990), the experimental methods to which psychology aspired even in its formative years served to reinforce the Robinson Crusoe myth in ways that systematically removed what I am calling the micro-social context:

Experimental methods isolated individuals from the social context of their existence and sought to establish timeless laws of individual behavior by analogy with the laws of natural science. Shared social meanings and relations were automatically broken up into the properties of separate individuals [*versus*] features of an environment that was external to each of them. ... Anything social became a matter of external influence that did not affect the identity of the individual under study. (1990:186-87)

Notice that drawing a conceptual circle that includes only the individual inevitably means that what the other person in an interaction is doing at any moment becomes external or environmental and thus, at most, a stimulus for the actions of the individual. Because face-to-face dialogue is intimately and constantly reciprocal, treating the other person as external to the individual makes it impossible to see or study micro-social phenomena. (The use of confederates in social psychology is an attempt to control or eliminate the influence of the other person, although it is much more likely to produce an artificial interaction with significant effects on behaviour; e.g., Beattie & Aboudan, 1994).

As discussed elsewhere (Bavelas, 2005), another reinforcer of the notion of the individual as a natural unit of study has been a mistaken application of the principle of reductionism, borrowed from natural science. It is true that reductionism advocates reducing complex phenomena to separate simpler parts (Reber, 1985:623), but it does not mean always studying the smallest or most molecular part. As Luria (1987:675) emphasized, it is essential to preserve all of the "basic features" of the phenomenon of interest. Luria pointed out that chemists cannot study water by separate research into hydrogen and oxygen, because those elements are below the level of the phenomenon of interest; they do not preserve its basic features. Studying isolated individuals is equally unlikely to predict the properties of their observable micro-social interactions. The implicit assumption of reductionism is that studying individuals who have been conceptually or even physically isolated from each other will naturally lead to an understanding of their micro-social interactions, albeit at some unspecified point in the future—an outcome that has not yet, to my knowledge, been demonstrated.

What many of us have discovered is that permitting dyadic interaction does not, as feared, preclude true experiments, nor does conducting experiments necessarily destroy social interaction. As shown in the examples at the end of Section 1.1 as well as in Section 2.3, it is possible to set a task that will create the desired variable and then let the participants interact freely within it. Ancient maps are said to have warned that, in the regions outside known lands, "Here be tygers," but we have not found such methodological dangers. Instead of the expected chaos, the data become even more systematic and interpretable when two real participants interact with each other. Perhaps because face-to-face dialogue is such a central part of our social life and because interlocutors have to make sense to each other, they will therefore also make sense to us as observers. Moreover, with a careful choice of tasks and a precise focus on the outcome of interest, the analysis can be highly reliable, if time-consuming. We attribute this high inter-analyst reliability to the fact that the analysts themselves participate

constantly in face-to-face dialogue in their everyday lives, so they are natural experts in understanding its nuances. In the experiments described above and many others, a focus on the micro-social dimension has been, not just possible, but richly rewarding.

4. Epilogue

The ideas proposed here may seem far from the work of David McNeill, but there is a direct and continuing debt. His 1985 article on gesture led to an ongoing program of research on hand gestures that has helped shape the micro-social perspective. Equally important, it led me to be able to see several kinds of so-called nonverbal communication in more linguistic ways; to do meaning-based analysis instead of physical description; and to do experimental research with real dyads in real conversations. In addition, his intellectual generosity and tolerance of ideas that are often quite different from his own is an example to us all.

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