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## SOME FORMAL ASPECTS OF COMMUNICATION

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*The study of communication, like other fields, depends greatly on the basic premises involved. Too often this level is taken for granted, but it is explicitly examined here by Paul Watzlawick and Janet Beavin, Research Associates at the Mental Research Institute (Palo Alto, California). Their paper is based on a study of human communication supported by the Robert C. Wheeler Foundation, and presented in greater detail in Pragmatics of Human Communication: A Study of Interactional Patterns, Pathologies and Paradoxes, by Paul Watzlawick, Janet Beavin and Don D. Jackson (New York: W. W. Norton, 1967). Parts of this paper were presented by Dr. Watzlawick at a recent conference on Systematic Research on Family Interaction at the Eastern Pennsylvania Psychiatric Institute, Philadelphia.*

■ This paper will describe an approach to the study of human interaction which is based on the assumption that *communication* is synonymous with what is observable in such interaction. That is, communication is seen not as just the vehicle, not as just the manifestation, but as a better conception of what is often loosely gathered under the rubric "interaction."

We have, of course, no complete or formal theory. We will, rather, present what appear to be very simple and obvious premises which, however, followed through to their necessary conclusions, seem to yield a fundamentally new and quite productive outlook.

Before this, however, some general comments about the "obviousness" of these points should be made. First of all, it is often the intimately important, especially in our own behavior, which is overlooked or difficult to see, precisely because it is, like breathing, largely out of awareness until drawn to our attention. Second, and more important, while few would flatly exclude in theory the ubiquity and importance of the social context, actual research and application too frequently stop at lip service, so that involvement with a particular (monadic) subject of investigation results, in practice, in the neglect of the interactional perspective. That is, communication factors are often regarded as random, or potentially excludable, sources of variance. This problem arises both in the definition of *what* is to be studied and — since the behavioral sciences are ultimately self-reflexive and all research by humans on other humans is social — to the strategy and analysis of *how* the data are studied; that is, to methodology as well as to content. In either case, even when the interactional context is thus, in effect, ignored, it does not go away; there always remains a valid *communicational* interpretation of the data. The latter is, unfortunately, often in conflict, or at least difficult to integrate with the investigator's intended, more monadic interpretation (e.g. 1, 2). Third, and perhaps most important, these basic notions may be obvious, yet they still are neither systematized into an adequate theory of communication, nor consistently utilized in research.

But such considerations take us beyond the aims of this

paper. For the present, we will primarily identify the subject matter of the problem.

### PRAGMATICS AS RECIPROCAL PROCESS

Morris (3) proposed that semiotic (the general theory of signs and languages) could be divided into three main areas. We suggest that these can, analogously, describe three levels of analysis of human communication: *syntactics* as the study of the formal relations of signs to one another; *semantics* as the study of the relations of signs to the objects to which the signs refer, i.e. the study of meaning; and *pragmatics* as the study of the relation of signs to their users. The last, the pragmatics of human communication, encompasses our interest, which is the behavioral effects of human interaction. However, it is necessary to make at least one important qualification of the above framework, which may be said to be not so much about communication, as about signs, senders, and receivers and, thus, still primarily concerned with individuals in isolation. We would prefer to use the term pragmatics to refer not to any sender-sign or sign-receiver relation but rather to an *interpersonal* relation. We would not even say "sender-receiver" relation, if this could be avoided in our language, in order to be able to focus on a *reciprocal process* in which both (or all) persons act and react, "receive" and "send," in such detail and complexity that these terms lose their meaning as verbs of individual action. As Birdwhistell has put it:

An individual does not communicate; he engages in or becomes part of communication. He may move, or make noises . . . but he does not communicate. In a parallel fashion, he may see, he may hear, smell, taste, or feel — but he does not communicate. In other words, he does not originate communication; he participates in it. Communication as a system, then, is not to be understood on a simple model of action and reaction, however complexly stated. As a system, it is to be comprehended on the transactional level. (4, p. 104)

Herein our focus will be on dyadic, in-person communication, in which the cues exchanged emanate directly from the voice, the body, or the immediate context. Such communication is clearly amenable to analysis in terms of the principles to be outlined below. However, only further study will prove whether these principles might not be fruitfully applied to the study of, for instance, the mass media, international communication, the psychoanalytic concept of communication with one's introjects, or animal communication, though we would expect that this is so.

### IN THE PRESENCE OF ANOTHER, ALL BEHAVIOR IS COMMUNICATIVE

Our case for the generality of such phenomena as will be described rests primarily on an assumption of the inevitability of communication in social situations (which certainly include more than those defined by mere physical presence — the above premise states a minimum whose upper limit is yet to be

defined). It is first of all necessary to remember that the scope of "communication" is by no means limited to verbal productions. Communications are exchanged through many channels and combinations of these channels, and certainly also through the context in which an interaction takes place. Indeed, it can be summarily stated that *all* behavior, not only the use of words, is communication (which is not the same as saying that behavior is *only* communication), and since there is no such thing as non-behavior, it is impossible *not* to communicate. Recent animal studies show, for instance, that certain monkeys will seat themselves during their rest periods in a forest clearing so that no animal looks at any other while staring straight ahead into the forest. This is not only in order to keep watch but also for the purpose of resting. They seem to find it necessary to avoid even the communication inherent in a glance, very much as a man in a waiting room may stare at the floor if he wants to be left alone by other persons present. But this behavior itself amounts to the message "Leave me alone" and is normally understood by the others as such.

All behavior is communication: this is true but not trivial. All behavior has an effect as communication, an often very powerful effect which may be one of the most proven assertions of social science — though not always deliberately proven. That is, it is quite common that experiments with a variety of independent variables, including pharmacological agents, show significant changes in human behavior which are, however, not replicable *with that variable*. However, the original effect did in fact occur, and is usually construed as a "placebo" effect. We concur with those who interpret each such case as a demonstration of powerful though as yet unspecified communicational effects.

At the present state of knowledge there is no ultimate evidence whether all behavior is really completely free of "noise" in the information-theoretical sense. However, to date, explorations of the problem of noise (randomness) versus redundancy (order, patterning) in behavior seen as communication have shown so consistently an almost unbelievable degree of order and structure behind the protean manifestations that it becomes more and more plausible that communication in the widest sense is at least as rule-governed as natural language is determined by its grammar and syntax (e.g. 5, 6). And, just as in learning a natural language, the ability to communicate is based on the acquisition of a very abstract structure or code which is never formalized and, in this sense, is never truly conscious.

The suggestion that there is virtually no sender-originated noise in human communication almost immediately raises the related issues of "conscious," "intentional," or "successful" communication. Many communicational events are routinely excluded from, or differently classified within, theory based on a simpler "information" model because they were either not *intended* to be communication or did not succeed in communicating what was intended. To take an extreme position, one which rests precariously on the edge of infinite regress, any measure of intention is, ultimately, garnered in a communicational setting. Thus, I may say that I did not (consciously) intend to ignore you, or you may yourself label my behavior in this manner. But this labelling procedure is no more and no less than further information in our ongoing communication. This, of course, has nothing to do with whether the unconscious really exists or whether people really have intentions. Seen as *labels of the participants*, such information is only communication — valid as such but not complete.

The issue of successful or unsuccessful (and, therefore, implicitly meaningless) communication obviously rests in part on the same sort of judgment of participant or observer. But, again, to take an extreme counter-example, verbal or nonverbal nonsense is communicative: information, especially at the rela-

tionship level (discussed immediately below) *is* conveyed to the receiver; this point has been especially well taken in regard to schizophrenic behavior, e.g. Haley (7), which may be seen *positively*, as occurring and meaningful, rather than as gibberish outside the pale of human communication.

**THERE ARE MANY LEVELS OF INFORMATION IN EVERY COMMUNICATION, AND ONE ALWAYS PERTAINS TO THE RELATIONSHIP IN WHICH THE COMMUNICATION OCCURS.**

A prisoner is held by two guards in a room with two doors. He knows that one door is locked, the other unlocked, but does not know which. He also knows one of the guards always tells the truth, the other always lies, but again the prisoner does not know which. Finally, he has been told that the only way to regain his freedom is to identify the unlocked door by asking *one* question of *one* of the guards. For a long time the prisoner ponders this seemingly unsolvable problem, but eventually asks the correct question: he points to one of the doors and asks one of the guards (it does not matter which door or which guard), "If I asked your comrade whether this door is open, what would he say?" If the answer is yes, then that door is locked, and, vice versa, if no, then it is open.

The charm of this unlikely story lies not only in the fact that a problem with two unknowns (the doors and the guards) is elegantly solved through the discovery of a simple decision procedure, but in that a fundamental property of communication is involved in the solution. The prisoner has been given two quite distinct orders of information to work with. One has to do with impersonal objects (the doors), the other with human beings as senders of information, and both are indispensable for the solution. If the prisoner could investigate the doors himself, he would not need to communicate with anyone about them, he would merely have to rely on the information supplied by his own senses. Since he cannot, he has to include the information he has about the guards and their habitual ways of relating to others, i.e. truthfully or mendaciously. Therefore, what the prisoner does is to deduce correctly the objective state of the doors through the medium of the specific relationship between the guards and himself, and, thus, eventually arrives at a correct understanding of the situation by using *information about objects* (the doors and their state of being locked or unlocked) together with *information about this information* (the guards and their typical ways of relating — specifically, conveying object information — to others).

Not only in the abstraction of this story, but in real life as well, these two orders of information are present in all communication. They are called the *content* and the *relationship* aspects of message material; and while the one or the other may have greater relative importance in a given piece of communication, communications composed of only the one or the other are impossible, just as a computer needs data (information) and a program (information about this information), and cannot function with only one of these inputs. The relationship as well as the content aspect is a basic, ever present property of communication.

To exemplify: if woman A points to woman B's necklace and asks, "Are those real pearls?", the content of her question is a request for information about an object. But at the same time she also gives — indeed, cannot *not* give — her definition of their relationship. How she asks (especially, in this case, the tone and stress of voice, facial expression, and context) would indicate comfortable friendliness, competitiveness, formal business relations, etc. B can accept, reject or redefine but cannot under any circumstances — even by silence — not respond to A's message. A's definition may, for instance, be a catty, condescending one; B, on the other hand, may react to it with aplomb or defensiveness. It should be noticed that this part of their interaction has nothing to do with the genuineness of

pearls, or with pearls at all, but with their respective definitions of the nature of their relationship, although they may continue to talk about pearls.

Whether or not communicational closure is reached on the content level will produce agreement or disagreement between the communicants; on the relationship level, it will result in understanding or misunderstanding between them — two phenomena that are essentially different, even though the ordinary terms we must use for labels do not reflect the distinction with complete precision. (The many levels and vicissitudes of communication in this area have recently been the subject of an excellent study by Laing *et al.* [8]). Thus, it is possible for two communicants to disagree about an objective issue but understand each other as human beings, to agree but fail to understand each other as human beings, or, to agree *and* to understand each other; by the same token, of course, two communicants may fail at both levels and, thus, both disagree with and misunderstand one another. A particularly frequent and clinically very important type of communication occurs when the two levels are confused, in the sense that the communicants attempt to resolve a relationship problem on the content level — e.g. argue about a specific issue in order to establish who is the better. Another situation of particular clinical importance arises when a person is somehow coerced into denying his own correct perceptions (on the object level) in order to maintain the *status quo* on the relationship level. Asch's experiments on independence and submission to group pressures (9) provide an excellent example and so do, of course, all double bind(10) situations.

From the above it appears that it is easiest to illustrate the relationship aspect of communication with pathological examples in which incongruency of definition occurs. But, of course, in those relationships where there is understanding, or congruency of definitions, omnipresent though often very subtle cues support and reinforce this state of affairs. Pathological examples may be helpfully clear, but they also mistakenly promote a common notion about "breakdown" of communication which misses the generality of the underlying principles. This formal aspect of communication, then, is presented here not to divide "good" and "bad" communication, but to define an inevitable property of all communication.

Thus, stated more strongly, à la Heisenberg, there are no objective facts outside the relationship context in which they are experienced. Even — perhaps, especially — the interpersonal situations in which scientific data is gathered about human behavior should be examined in this light. For example, a young medical student was assigned an exercise in epidemiology as a summer project in which he was to make a survey of the incidence of suicide in a particular area. Candid coroners informed him that this was not strictly possible, as a verdict of suicide versus natural or accidental causes of death was based on social as well as medical facts — delicacy, the testimony of involved survivors, the context in which death occurred, and other considerations routinely entered into the final verdict. Indeed, Rosenthal's studies of "experimenter bias" reported on in this issue examine what might in our language be called effects stemming from the relationship level of communication between experimenter and subject, while Turner considers this same kind of relationship context more broadly:

Human behavior is so organized that subjects can and do enter experiments with conceptions as to what behavior is appropriate to produce, what degree of compliance is desirable, and what one owes to the experimenter. I suggest that these remarks, which merely draw upon the commonplaces of the role conception of social action, would be utterly trivial if made in reference to almost any other role relationship; and yet with regard to the lab situation of subject and experimenter they are likely to seem merely nihilistic. . . . Like job interviews, courtroom proceedings, therapy sessions and card games — experiments are social situ-

ations, possessing a complex structure in their own right. One man's experiment is another man's *in situ* social situation . . . (11, pp. 2-3)

### A STREAM OF COMMUNICATIONAL EVENTS CONSISTS IN A SERIES OF OVERLAPPING STIMULUS-RESPONSE-REINFORCEMENT TRIADS

In pointing to the relationship aspect of communication and to the fact that all behavior must be considered communication, some necessary corrections of a purely verbal-information model of communication may have been achieved, but the result is still not too different from the standard sender-receiver model in its individual focus. In order to step from the emanations of participants to communicational process, a model of this process is needed.

If A and B are interacting, that is, exchanging behaviors, these behaviors can be seen as a stream of alternating communicational events, and this stream may be represented as

$$a_1 b_1 a_2 b_2 a_3 b_3 \dots b_{76} a_{77} b_{77} a_{78} \dots a_n b_n$$

Let us consider some of the ways the observer may *punctuate* this stream of events, that is, what conception of what "really" occurs is imposed on it.

One of the most common formats (indeed, nearly impossible to avoid in our language) is that of individual actions, so that the events are seen as

$$a_1 a_2 a_3 \dots a_{77} a_{78} \dots a_n$$

$$b_1 b_2 b_3 \dots b_{76} b_{77} \dots b_n$$

And, especially if one of the participants, say A, is the subject of study (for example, a psychiatric patient or an experimental subject), then only items  $a_1, a_2, a_3,$  etc. are examined. The behavioral events are divided and isolated on the basis of whether they are ascribed to A to B. Laing *et al.* have focussed sharply on these "banal and unproductive errors":

The failure to see the behavior of one person as a function of the behavior of the other has led to some extraordinary perceptual and conceptual aberrations that are still with us. For instance, in a sequence of moves in a social interaction between person A and person B,  $a_1 \rightarrow b_1 \rightarrow a_2 \rightarrow b_2 \rightarrow a_3 \rightarrow b_3$ , the sequence  $a_1 \rightarrow a_2 \rightarrow a_3$  is extrapolated. Direct links are made between  $a_1 \rightarrow a_2 \rightarrow a_3$ , and this artificially derived sequence is taken as the entity or process under study. (8, p. 8)

Often this sequence is further collapsed into an overall statement about A, the actor. That is, the static sum of these behaviors

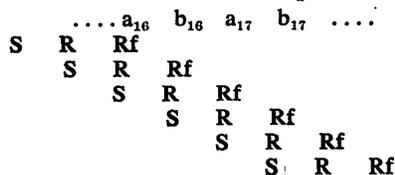
$$a_1 + a_2 + a_3 \dots + a_n = A'$$

is seen as a characteristic of A — e.g. incomplete sentences, litarality, hostility, etc., depending on the level of abstraction at which a statement is made about A. In such cases, any "explanation" of A's behavior must be *intrapersonal*, attributable to some intrapsychic structure or process which then becomes the primary object of analysis. A less extreme, quasi-interactional approach is to include the behavior of the other but in the same form as above. That is,  $b_1 + b_2 + b_3 \dots + b_n$  becomes B' which is then somehow related to A' — for example, the concept of sadomasochistic symbiosis from a sequence of behaviors between two persons.

In the above cases, either the individual is conceptually isolated from the behavior of those around him, or his behaviors are seen as time- and order-free "properties" of him as an individual, or both. The alternative has been illustrated by Schefflen:

We notice three people standing on a corner facing each other and talking. A number of abstractions is possible. Each has on a brown suit. Thus, brownness is abstractable. So is humanness, or standing-ness, or two-leggedness. But it is also possible to make another kind of abstraction. We can abstract *relatedness*; e.g. proximity, kinship, cooperation, and so on. *Once we abstract relatedness we no longer have organismic wholeness or individuality. We have a concept. There are only qualities or behavioral arrangements in a concept; there are no people.* (5, p. 58)

One scheme which includes both parties in a dyadic relation and which also takes note of the *relation between* events and the order in which they occur is the stimulus-response-reinforcement format from psychology. Thus,  $a_1$  is called the stimulus,  $b_2$  the response, and  $a_2$  the reinforcement. However, probably as old as studies of this kind is the joke about the laboratory rat who boasts to another rat, "I have trained my experimenter so that every time I press the lever he gives me a piece of cheese." What this rat does is simply to impose a different punctuation on the stream of events: what to the experimenter is the rat's response, the rat considers its stimulus to the experimenter; what he then does and calls a reinforcement, the rat sees as a response, and so forth. What we are proposing, following Bateson (e.g. 12) is essentially to extend this conception of things to encompass both the experimenter's and the rat's positions. That is, any behavioral event in a sequence is a stimulus for the event which follows it, and both response and reinforcement to the one which preceded it:



Just as all behavior in interpersonal sequences is communication, so all such behavior has this triple aspect, being "simultaneously a stimulus, a response, and a reinforcement, according to how we slide our identification of the triad up and down the series." (12, p.4) We propose this as the minimum complexity of any interchange.

Far from being spurious, however, the *punctuation of the sequence of events* is a highly significant corollary to the premise of an essentially unpunctuated stream. As philosophers of science, e.g. Popper (13), have pointed out, man is born with a propensity to look for regularities in the constant stream of events surrounding and involving him. The Berkeleyan question whether these regularities exist in actual fact or are merely introduced by the observer, will be of no concern here. (There is no reason why the day should be divided into 24 hours, but this arbitrary division is a very useful one). The fact remains that the same principle is at work in human communication: man tends to pattern the stream of communicational events into an order which to him is familiar and predictable. This, however, presupposes selection and the criteria applied to this process of selection are anything but simple and obvious. In particular, these criteria need not be obvious to, or shared by, the other communicants. Discrepancies in the punctuation of jointly experienced events are in fact at the root of many conflicts in most areas of human interaction, and the ever present blindness for the other's punctuation, coupled with the naive conviction that reality is the way *I* see (punctuate) these events, almost inevitably leads to the mutual charges of badness or madness.

Thus, for instance, nation A may arm to protect itself against a real or imaginary threat by nation B. Nation B considers *this* a threat and increases its armaments, justifying this step as a purely defensive measure, made necessary by nation A's threatening attitude; nation A now has further "proof" of nation B's aggressive designs, etc. etc., a mechanism extensively studied by Richardson (14). A paranoid patient suspects the motives of others; this prompts the others to prove to him the honesty and sincerity of their intentions, which not only confirms but increases his suspicions, for, he argues, if they were not out to hurt him, they would not be trying so hard to make him believe that they meant well. A depressed patient withdraws; his withdrawal worries those close to him; they try to help him by increasing their attention; on perceiving their

concern and anxiety he feels doubly guilty for causing them emotional pain; on seeing his depression thus increase they try harder and at the same time feel more desperate for being unable to help him; which in turn compounds his depression to the point of considering suicide for being so "bad" to those who love him.

These examples of vicious circles can be multiplied almost indefinitely. The point is that when the model of overlapping stimulus-response-reinforcement triads is adopted, no one participant's behavior can be said to *cause* the other's: each is both cause and effect of the behavior of the other. In most ongoing relationships, it becomes obvious on examination that the behavior of each participant is predicated on that of the other. The exact nature of these relationship links and the more abstract rules which govern them emerge as a new, virtually unexplored area of human behavior.

One final, very general point derives from such considerations. In the communicational perspective, the question whether there is such a thing as an objective reality of which some people are more clearly aware than others is of relatively little importance compared to the significance of different *views* of reality due to different punctuations. However, awareness of how one punctuates is extremely difficult owing to another basic property of communication. Like all other complex conceptual systems which attempt to make assertions about themselves (e.g. language, logic, mathematics) communication typically encounters the paradoxes of self-reflexivity when trying to apply itself to itself. What this amounts to is that the patterns of communication existing between oneself and others cannot be fully understood, for it is simply impossible to be both involved *in* a relationship (which is indispensable in order to be related) *and* at the same time stand *outside* it as a detached, uninvolved observer (which would be necessary in order to encompass and to be aware of the relationship in its entirety). This is essentially similar to the impossibility of obtaining full visual awareness of one's own body, since the eyes, as the perceiving organs, are themselves part of the body to be perceived.

As Russell, Gödel and Tarski have shown once and for all, no system complex enough to include arithmetic can achieve its own fully consistent formalization within its own framework and in its own language. Whether or not human communication is a comparable system and, therefore, beset by the same problem of ultimate undecidability, is not yet clear at all. There is much that speaks in support of this assumption, mainly the above mentioned problem of subjective awareness, or the fact that to communicate (or even to think) about communication itself is itself communication. In this sense both one's subjective experience of communicative processes with others as well as the study of communication as such has to employ concepts whose range includes themselves and, thus, lead into Russellian paradoxes of self-reflexiveness, into an infinite regress of assertions about assertions, and into the problem of undecidability in Gödel's sense (15). Bronowski, in a lucid study of this vexing problem (16), has shown precisely that on the one hand "any description in our present formalisms must be incomplete, not because of the obduracy of nature, but because of the limitation of language as we use it," (p. 5) but that on the other hand it is obvious that the mind somehow solves these problems in a highly typical way for which mathematics or logic offer no analogies.

It seems to us that in the field of human communication the main evidence for the correctness of this assumption is supplied by the phenomenon of growth and change in relationships which are the equivalent of Baron Munchhausen's feat of pulling himself from the quagmire by his own pigtail. The paradox of change has occupied the human mind since the days of the Presocratics, and it will not be solved here. But it remains

a question of the greatest importance, especially in the light of communicational patterns and the question of their changeability which, after all, is the main factor in psychotherapy, in conflict resolution on a personal as well as on an international scale, and ultimately in man's awareness of reality.

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# ON THE STRUCTURING OF HUMAN COMMUNICATION

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*Human communication is not a summation of bits of information but is highly structured in significant ways deriving from several sources. Dr. Scheflen, a psychiatrist, is ordinarily Senior Scientist at Eastern Pennsylvania Psychiatric Institute and Professor of Research Psychiatry at Temple University Medical Center; currently, he is a Fellow at the Center for Advanced Study in the Behavioral Sciences, Stanford, California.*

■ In human communication *people in social organization* perform and interpret repertoires of *coded behavior*. The people are not like simple machines capable only of transmitting bits of information in a single channel. People have learned multi-channeled, highly patterned communicative behavior for multiple social roles and multiple occasions. The social organization for an interaction is not a simple alternation of speaker and listener, but involves kinship and other affiliational systems, dominance hierarchies, territorial arrangements and other abstractable dimensions. Finally, the behavioral patterns are coded for the call for standard behavioral morphs organized in predictable sequences. Since these patterns are general in a cultural tradition behavior has common meaning.

A number of researchers have been building a theory of human communication that takes cognizance of such complexity, for example Pike (1)(2), McQuown *et al.* (3), Bateson (4)(5), Birdwhistell (6)(7)(8), the Pittsburgh group (9)(10)(11)(12)(13), and the author (14)(15)(16). A methodology has evolved that analyzes motion pictures of interactions to discover the behavioral forms that are common in a tradition and their relations to the social and behavioral contexts of the interaction (2)(3)(14)(17).

Such comprehensive theory requires models of organismic, social and behavioral organization and a way of bringing these together. This means that some up-to-date theory must be

borrowed from a number of disciplines. I cannot review all this theory and data in a short overview, so I will acknowledge it in a footnote and move on to abstracting some premises.<sup>1</sup>

#### BEHAVIORIAL STRUCTURE AND COMMONALITY IN A CULTURE

Behavior appears in standard units in any culture for the members must learn to shape their voice sounds and bodily

<sup>1</sup>Models depicting the human organism in communication will have to cover several levels: the *integration* of information about 1. metabolic and physiological states, 2. inputs, and 3. cognitive representations is an organismic matter depending on neural subsystems at the organ systems level, and hormonal regulation, memory and other subsystems are at yet lower levels. Miller, Galanter and Pribram (18) and Pribram and his associates (19)(20)(21)(22) have put much of this complexity together for us. For social organization we can borrow models from sociologists like Parsons (23), from network theorists (24)(25) and from ethologists (26)(27)(28). The structure of linguistic codes has been studied in structural linguistics (29)(30)(31) and broadened by McQuown *et al.* (3) and Pike (1)(2). Birdwhistell (6)(7)(8)(32) Schlegel (14)(15)(16)(33), Charney (10), Bateson (34), Ekman (35)(36), Frank (37) and others have contributed a knowledge of coding in other modalities of communication.

In turn, of course, each of these sections of theory can be traced to antecedents like the idea of contexts in psychoanalysis (38), to field theory (39) to gestalt theory (40) to the idea of program in computer science and so on.

And the synthesis of these blocks of theory depends on theoretical developments in science as a whole. Ideas of feedback (4) and multiple simultaneous causation (42) will be useful in relating temporal events and the principle of organization from general systems theory (43)(44) will clarify the spatial aspects of the systems involved. The idea of levels (43)(45) will be necessary to relate the organism and the group and, as well, to relate the structure of the behavioral morphs in the coding.