

A STUDY OF
INTERACTIONAL
PATTERNS,
PATHOLOGIES,
AND PARADOXES

PRAGMATICS
OF HUMAN
COMMUNICATION

PAUL WATZLAWICK
JANET BEAVIN BAVELAS
DON D. JACKSON

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**A Study of Interactional Patterns,
Pathologies, and Paradoxes**

Paul Watzlawick
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Foreword to the paperback edition by Bill O'Hanlon



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To Gregory Bateson,
Friend and Mentor

Contents

Foreword to the paperback edition by Bill O'Hanlon

Introduction

Chapter 1. The The Frame of Reference

Chapter 2. Some Tentative Axioms of Communication

Chapter 3. Pathological Communication

Chapter 4. The Organization of Human Interaction

Chapter 5. A Communicational Approach to the Play WHO'S AFRAID OF VIRGINIA WOOLF?

Chapter 6. Paradoxical Communication

Chapter 7. Paradox in Psychotherapy

Epilogue Existentialism and the Theory of Human Communication: an Outlook

References

Glossary

Index

Foreword to the Paperback Edition by Bill O'Hanlon

Paul Watzlawick was born in Villach, Austria in 1921, the son of a bank director. He traveled far and spoke several languages fluently, and changed the field of psychotherapy. He passed away in March of 2007.

I first encountered the ideas and the work of Dr. Watzlawick while taking a family therapy course as an undergraduate student at Arizona State University. The instructor, Lorna Molinaire, used the structure of *The Pragmatics of Human Communication* as her outline for the first semester of a yearlong course. It was my first introduction to a different way of seeing the problems people bring to therapy. And it helped warp me for life.

Although Paul Watzlawick, a psychologist, was schooled in an individual approach to psychotherapy (he was trained as a Jungian), he found his way to a new view. And he was an integral part of bringing this then-radical view into the mainstream of psychotherapy practice.

Taken by his unique point of view and curious for more information, I stumbled on a hidden gem in the audiotope section of my university's library and spent hours listening to a tape by Watzlawick on human communication (*An Anthology of Human Communication: Text and Tape*). In it, he told a charming story about a time when he showed up at a psychiatrist's office. He wanted to discuss the role communication played in the development of schizophrenia with this particular psychiatrist, who specialized in treating the disorder. But due to Watzlawick's Austrian accent and the fact the his name was not on the psychiatrist's appointment book, a simple misunderstanding occurred that showed a lot about communication and its role in problem development.

When Paul announced himself in a rather formal way to the secretary, he said simply, "I am Watzlawick." She suspected he was a new psychiatric patient showing up for an appointment at the wrong time, and she interpreted his introduction as, "I am not Slavic." To which she replied, "I never said you were." At which point, slightly puzzled and a little irritated, he insisted, "but I am." Several subsequent exchanges compounded the misunderstanding until they began to yell at each other. At that point, the psychiatrist, hearing the angry exchanges from within his office, poked his head out and said, "What the devil is going on out here? Paul, why are you yelling at my secretary, and why are you yelling at Dr. Watzlawick?" he asked his secretary. The misunderstanding was quickly cleared up at that point, but Watzlawick used the story to illustrate the importance of context, interaction, and human communication in problem development.

Dr. Watzlawick and I had our differences: he once scolded me when we were on a panel together for suggesting that clients had solutions to their problems that can be evoked for rapid change. "If patients had solutions, they wouldn't come to therapy. It's because their solutions aren't working or are the very cause of their problems that they seek our help," he thundered at me. I respectfully disagreed and today the solution-based approach to change is well established and accepted. Most clinicians would accept that clients often have their own solutions to problems that can help resolve them.

But Watzlawick's view reflected the hard-won knowledge that "attempted solutions" often made a problem worse or keep it in place. This is a view that I have found profoundly useful over the years with many clients, so I can appreciate his loyalty to it.

Hopefully the new edition of the book will find new readers and bring back previous ones to revisit this revolutionary tome.

The Pragmatics of Human Communication fired the first shot to signal a revolution in the field of psychotherapy. Previously, most therapeutic approaches were focused on the individual (monadic, and

this book terms it). The approach introduced here, very radical for its time but not so now, since its message has been absorbed into the mainstream, was that behavior and symptoms in the area of mental health cannot be understood properly without considering context, interaction, and communication.

The ideas in this volume derived in large part from the discussions that took place in Gregory Bateson's research group analyzing communication patterns. This group included (at times) Jay Haley, John Weakland, Paul Watzlawick, psychiatrist Don Jackson, and communication analyst Jane Beavin (Jackson and Beavin went on to become the coauthors of this book). The idea that problems were not always the result of deep underlying psychological issues, but instead arose from interactional and communication patterns, emerged from those fertile discussions and found its way here.

This book, along with Haley's *Strategic Psychotherapy*, also published in the 1960s, signaled the shift from an individual to an interpersonal lens for viewing therapy problems and solutions (notice the language shifts from symptoms to problems, indicating a move away from the pathological and psychodynamic framework). The ecology movement was just beginning at the time *Pragmatics* first came out, but that sense that we are all embedded in contexts was not at all intuitive for many people.

The structure of this book reflects Watzlawick's rather formal bent—it is divided into numbered sections. It is also a bit heady and a bit philosophical, but for those who stuck with it, the underlying message was powerful and transformative. It still is. While Watzlawick went on to write more books on his own and with others, *Pragmatics* firmly established him as a seminal thinker, theorist, and force in the field of psychotherapy.

Read it over; digest it carefully. There is a powerful message here that can shift the way all clinicians think about people and problems.

Introduction

This book deals with the pragmatic (behavioral) effects of human communication, with special attention to behavior disorders. At a time when not even the grammatical and syntactic codes of verbal communication have been formalized and there is increasing skepticism about the possibility of casting the semantics of human communication into a comprehensive framework, any attempt at systematizing its pragmatics must seem to be evidence of ignorance or of presumption. If, at the present state of knowledge, there does not even exist an adequate explanation for the acquisition of natural language, how much more remote is the hope of abstracting the formal relations between communication and behavior?

On the other hand, it is obvious that communication is a *conditio sine qua non* of human life and of social order. It is equally obvious that from the beginning of his existence a human being is involved in the complex process of acquiring the rules of communication, with only minimal awareness of what this body of rules, this calculus of human communication, consists of.

This book will not go much beyond that minimal awareness. It does not claim to be more than an attempt at model building and a presentation of some facts that appear to support such a model. The pragmatics of human communication is a science in its infancy, barely able to read and write its own name, and is far from having evolved a consistent language of its own. Particularly, its integration with many other fields of scientific endeavor is a thing of the future. However, with hope of such future integration, this book addresses itself to workers in all those fields where problems of systematic interaction in the widest sense are encountered.

It may be argued that this book ignores important studies that are directly related to its subject matter. The paucity of explicit references to nonverbal communication may be one such criticism, the lack of reference to general semantics another. But this book cannot be more than an introduction to the pragmatics of human communication (an area that so far has received conspicuously little attention) and cannot, therefore, point to all the existing affinities to other fields of research without becoming encyclopedic in the bad sense of the term. For the same reason a limitation had to be imposed on references to numerous other works on the theory of human communication, especially when such works limit themselves to the study of communication as a one-way phenomenon (from speaker to listener) and stop short of looking at communication as an interaction process.

The interdisciplinary implications of the subject matter are reflected in the manner of its presentation. Examples and analogies were chosen from as wide a range of subjects as seemed applicable, although predominance remained in the field of psychopathology. Especially when mathematics was invoked for analogy, it should be clearly understood that it was used only as a language which is eminently suited for the expression of intricate relationships, and that its use was not meant to imply that we felt our data are ready for quantification. Conversely, the rather liberal use of examples taken from literature may seem scientifically objectionable to many readers, for to prove something by reference to the figments of artistic imagination may seem poor proof indeed. However, not proof but illustration and elucidation of a theoretical point by presentation in a more readily understandable language is intended by these quotations from literature; it is not implied that they prove anything in and by themselves. In short, these examples and analogies, then, are definitive models and not predictive (assertive) models.

At various points in this book basic concepts from a variety of other fields require definitions which to any expert in that particular field will be unnecessary. To forewarn him, but also for the

convenience of the general reader, a brief outline of the chapters and their sections is given.

Chapter 1 attempts to draw the frame of reference. It introduces basic notions such as function (s. 1.2¹), information and feedback (s. 1.3), and redundancy (s. 1.4), and postulates the existence of an as yet unformalized code, a calculus (s. 1.5) of human communication whose rules are observed in successful communication but which are broken when communication is disturbed.

Chapter 2 defines some of the axioms of this hypothetical calculus, while the potential pathologies implied by these axioms are examined in **Chapter 3**.

Chapter 4 extends this theory of communication to the organizational or structural level, based on a model of human relationships as systems; thus most of the chapter is devoted to discussion and application of General Systems principles.

Chapter 5 is pure exemplification of the systems material, intended to give some life and specificity to this theory, which is, after all, concerned with the immediate effects of human beings on each other.

Chapter 6 deals with the behavioral effects of paradox. This requires a definition of the concept (s. 6.1, 6.2, and 6.3), which can be omitted by the reader acquainted with the literature on antinomies and especially the Russellian paradox. Section 6.4 introduces the less well known concept of pragmatic paradoxes, especially the Double Bind theory and its contribution to the understanding of schizophrenic communication.

Chapter 7 is devoted to the therapeutic effects of paradox. Except for the theoretical considerations in s. 7.1 and 7.2, this chapter was written especially with a view toward the clinical application of paradoxical patterns of communication. The chapter concludes with a brief excursion into the role of paradox in play, humor, and creativity (s. 7.6).

An Epilogue dealing with man's communication with reality in the wider sense does not claim to be more than an outlook. It postulates that an order, analogous to the level structure of Logical Type theory, pervades human awareness of existence and determines the ultimate knowability of his universe.

As the manuscript was being critically evaluated by a variety of experts from psychiatrists and biologists to electrical engineers, it became apparent that any given section might be considered too primitive by one and too specialized by another. Similarly, the inclusion of definitions—either in the text or as footnotes—might be considered offensively patronizing to someone for whom the term is part of his everyday professional language, while to a general reader the lack of definitions often seemed to have the annoying implication that “If you don't know what that means, we cannot be bothered to tell you.” It was therefore decided to include, at the end of the book, a glossary that contains only those terms not available in ordinary dictionaries and not defined in the text.

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1. The decimal subdivision of chapters was introduced not to confuse or impress the reader, but to indicate clearly the organization structure of a chapter and to facilitate cross references within the book.

The Frame of Reference

1.1

Consider the following diverse situations:

The fox population of a certain area of northern Canada shows a remarkable periodicity in the increase and decrease of its numbers. In a cycle of four years it reaches a peak, declines to near extinction, and finally starts rising again. If the attention of the biologist were limited to the foxes, these cycles would remain unexplainable, for there is nothing in the nature of the fox or of the whole species that would account for these changes. However, once it is realized that the foxes prey almost exclusively on wild rabbits, and that these rabbits have almost no other natural enemy, this *relation between* the two species provides a satisfactory explanation for an otherwise mysterious phenomenon. For it can then be seen that the rabbits exhibit an identical cycle, but with increase and decrease reversed: the more foxes there are, the more rabbits are killed by them, so that eventually food becomes very scarce for the foxes. Their number decreases, giving the surviving rabbits a chance to multiply and thrive again in the virtual absence of their enemies, the foxes. The fresh abundance of rabbits favors the survival and increase of foxes, etc.

A man collapses and is rushed to hospital. The examining physician observes unconsciousness, extremely low blood pressure, and, generally, the clinical picture of acute alcoholic or drug intoxication. However, tests reveal no trace of such substances. The patient's condition remains unexplainable until he regains consciousness and reveals that he is a mining engineer who has just returned from two years' work at a copper mine located at an altitude of 15,000 feet in the Andes. It is now clear that the patient's condition is not an illness in the customary sense of an organ or tissue deficiency, but the problem of adaptation of a clinically healthy organism to a drastically changed environment. If medical attention remained focused on the patient only, and if only the ecology of the physician's customary environment was taken into account, his state would remain mysterious.

In the garden of a country house, in plain view of passers-by on the sidewalk outside, a bearded man can be observed dragging himself, crouching, round the meadow, in figures of eight, glancing constantly over his shoulder and quacking without interruption. This is how the ethologist Konrad Lorenz describes his necessary behavior during one of his imprinting experiments with ducklings after he had substituted himself for their mother. "I was congratulating myself," he writes, "on the obedience and exactitude with which my ducklings came waddling after me, when I suddenly looked up and saw the garden fence framed by a row of dead-white faces: a group of tourists was standing at the fence and staring horrified in my direction." The ducklings were hidden in the tall grass, and all the tourists saw was totally unexplainable, indeed insane, behavior. (96, p. 43)

These seemingly unrelated examples have one common denominator: a phenomenon remains unexplainable as long as the range of observation is not wide enough to include the context in which the phenomenon occurs. Failure to realize the intricacies of the relationships between an event and the matrix in which it takes place, between an organism and its environment, either confronts the observ

with something “mysterious” or induces him to attribute to his object of study certain properties the object may not possess. Compared with the wide acceptance of this fact in biology, the behavior sciences seem still to base themselves to a large extent on a monadic view of the individual and on the time-honored method of isolating variables. This becomes particularly obvious when the object of study is disturbed behavior. If a person exhibiting disturbed behavior (psychopathology) is studied in isolation, then the inquiry must be concerned with the *nature* of the condition and, in a wider sense with the *nature* of the human mind. If the limits of the inquiry are extended to include the effects of this behavior on others, their reactions to it, and the context in which all of this takes place, the focus shifts from the artificially isolated monad to the *relationship* between the parts of a wider system. The observer of human behavior then turns from an inferential study of the mind to the study of the observable manifestations of relationship.

The vehicle of these manifestations is communication.

We want to suggest that the study of human communication can be subdivided into the same three areas of syntactics, semantics, and pragmatics established by Morris (106), and followed by Carnap (33, p. 9) for the study of semiotic (the general theory of signs and languages). Applied to the framework of human communication, then, the first of these three areas can be said to cover the problems of transmitting information and is, therefore, the primary domain of the information theorist. His concern lies with the problems of coding, channels, capacity, noise, redundancy, and other statistical properties of language. These problems are primarily *syntactical* ones, and he is not interested in the meaning of message symbols. Meaning is the main concern of *semantics*. While it is perfectly possible to transmit strings of symbols with syntactical accuracy, they would remain meaningless unless sender and receiver had agreed beforehand on their significance. In this sense, a shared information presupposes semantic convention. Finally, communication affects behavior, and this is its *pragmatic* aspect. While a clear conceptual separation is thus possible of the three areas, they are nevertheless interdependent. As George (55, p. 41) points out, “in many ways it is true to say that syntax is mathematical logic, semantics is philosophy or philosophy of science, and pragmatics is psychology, but these fields are not really all distinct.”

This book will touch upon all three areas, but will deal mainly with the pragmatics, that is, the behavioral effects, of communication. In this connection it should be made clear from the outset that the two terms communication and behavior are used virtually synonymously. For the data of pragmatics are not only words, their configurations, and meanings, which are the data of syntactics and semantics, but their nonverbal concomitants and body language as well. Even more, we would add to personal behavioral actions the communicational clues inherent in the *context* in which communication occurs. Thus, from this perspective of pragmatics, all behavior, not only speech, is communication, and all communication—even the communicational clues in an impersonal context—affects behavior.

Further, we are not only concerned, as pragmatics generally is, with the effect of a piece of communication on the receiver but, inseparably linked with this, also with the effect the receiver's reaction has upon the sender. Thus we would prefer to focus less on the sender-sign or receiver-sign relations and more on *the sender-receiver relation, as mediated by communication.*

Since this communicational approach to the phenomena of human behavior, both normal and abnormal, is based on the observable manifestations of *relationship* in the widest sense, it is therefore, conceptually closer to mathematics than to traditional psychology, for mathematics is the discipline most immediately concerned with the relations between, not the nature of, entities. Psychology, on the other hand, has traditionally shown a strong trend toward a monadic view of man.

and, consequently, toward a reification of what now reveal themselves more and more as complex patterns of relationship and interaction.

The affinity of our hypotheses with mathematics will be noted whenever possible. This should not deter the reader who has no special knowledge in the field, for he will not be confronted with formulas or other specific symbolism. While human behavior may one day find its adequate expression in mathematical symbolism, it definitely is not our intention to attempt such a quantification. Rather, we will refer to the enormous body of work done in certain branches of mathematics whenever the results promise to provide a useful language for the description of the phenomena of human communication.

1.2 The Notion of Function and Relationship

The main reason why mathematics should be invoked for analogy or explanatory principle lies in the usefulness of the mathematical concept of *function*. To explain this, a brief excursion into number theory is required.

The philosophers of science seem to agree that the most significant step in the development of modern mathematical thinking was the gradual emergence of a new number concept from Descartes to the present day. For the Greek mathematicians, numbers were concrete, real, perceivable magnitudes understood as the properties of equally real objects. Thus geometry was concerned with measuring and arithmetic with counting. Oswald Spengler, in his lucid chapter "On the Meaning of Numbers" (1946) shows not only how the notion of zero as a number was unthinkable, but also that negative magnitudes had no place in the reality of the classical world: "Negative magnitudes have no existence. The expression $(-2) \times (-3) = +6$ is neither something perceivable nor a representation of magnitude" (p. 66). The idea that numbers were the expression of magnitudes remained dominant for two thousand years and, as Spengler elaborates:

In all history, so far, there is no second example of one Culture paying to another Culture long and extinguished such reverence and such submission in matters of science as ours has paid to the Classical. It was very long before we found courage to think our proper thought. But though the wish to emulate the Classic was constantly present, every step of the attempt took us in reality further away from the imagined ideal. The history of Western knowledge is thus one of *progressive emancipation* from Classical thought, an emancipation never willed but enforced in the depths of the unconscious. *And so the development of the new mathematics consists of a long, secret, and finally victorious battle against the notion of magnitude.* (p. 76)

There is no need to go into the details of how this victory was won. Suffice it to say that the decisive event occurred in 1591, when Vieta introduced letter-notations instead of numbers. With this, the idea of numbers as discrete magnitudes was relegated to a secondary place, and the powerful concept of *variable* was born, a concept which to the classical Greek mathematician would have been as unreal as a hallucination. For, in contrast to a number signifying a perceivable magnitude, variables do not have a meaning of their own; they are meaningful only in relation to one another. A new dimension of information was realized with the introduction of variables, and thus was the new mathematics formed. The relation between variables (usually, but not necessarily, expressed as an equation) constitutes the concept of *function*. Functions, to quote Spengler once more,

are not numbers at all in the plastic sense but signs representing a connection that is destitute of the

hallmarks of magnitude, shape and unique meaning, an infinity of possible positions of like character, ~~an ensemble unified and so attaining existence as a *number*~~. The whole equation, though written in our unfortunate notation as a plurality of terms, is actually *one single* number, x , y , z being no more numbers than $+$ and $=$ are. (p. 77)

Thus, for instance, the equation $y^2 = 4ax$, in establishing a specific relation between x and y , comprises all the properties of a curve.*

There exists a suggestive parallelism between the emergence of the mathematical concept of function and the awakening of psychology to the concept of relationship. For a long time—in a certain sense since Aristotle—the mind was conceived of as an array of properties or characteristics with which an individual was endowed to a greater or lesser degree, very much as he might have a slender or heavy body, red or fair hair, etc. The end of the last century saw the beginning of the experimental era in psychology and with it the introduction of a far more sophisticated vocabulary that, however, was not essentially different in one sense: it was still made up of single and more or less unrelated concepts. These concepts were referred to as psychic functions—unfortunately, because they bear no relation to the mathematical concept of function, and no such relation was, indeed, intended. As we now know, sensations, perceptions, apperceptions, attention, memory, and several other concepts were defined as such functions, and an enormous amount of work was and still is being done to study them in artificial isolation. But, for instance, Ashby has shown how the assumption of *memory* is directly related to the observability of a given system. He points out that for an observer who is in possession of all the necessary information any reference to the past (and, therefore, to the existence of a memory in the system) is unnecessary. He can account for the system's behavior by its state *now*. He gives the following practical example:

... suppose I am in a friend's house and, as a car goes past outside, his dog rushes to a corner of the room and cringes. To me the behaviour is causeless and inexplicable. Then my friend says, "He was run over by a car six months ago." The behaviour is now accounted for by reference to an event of six months ago. If we say that the dog shows "memory" we refer to much the same fact—that his behaviour can be explained, not by reference to his state now but to what his state was six months ago. If one is not careful one says that the dog "has" memory, and then thinks of the dog as *having something*, as he might have a patch of black hair. One may then be tempted to start looking for the thing; and one may discover that this "thing" has some very curious properties.

Clearly, "memory" is not an objective something that a system either does or does not possess; it is a concept that the *observer* invokes to fill in the gap caused when part of the system is unobservable. The fewer the observable variables, the more will the observer be forced to regard events of the past as playing a part in the system's behaviour. Thus "memory" in the brain is only partly objective. No wonder its properties have sometimes been found to be unusual or even paradoxical. Clearly the subject requires thorough re-examination from first principles. (5, p. 117)

As we interpret it, this statement in no way denies the impressive advances of neurophysiological research on information storage in the brain. Obviously, the state of the animal is different since the accident; there must be some molecular change, some newly established circuit, in short, "something" which the dog "has" now. But Ashby clearly takes issue with the construct and its reification. Another analogy, supplied by Bateson (17), is that of a chess game in progress. At any given point, the state of the game can be understood solely from the present configuration of pieces on the board (chess being a game with complete information), without any record or "memory" of the past moves. Even if the

configuration is construed to be the memory of the game, it is a purely present, observable interpretation of the term.

When eventually the vocabulary of experimental psychology was extended to interpersonal contexts, the language of psychology still remained a monadic one. Concepts such as leadership, dependence, extroversion and introversion, nurturance, and many others became the object of detailed study. The danger, of course, is that all these terms, if only thought and repeated long enough, assume a pseudoreality of their own, and eventually “leadership,” the construct, becomes Leadership, a measurable quantity in the human mind which is itself conceived as a phenomenon in isolation. Once this reification has taken place, it is no longer recognized that the term is but a shorthand expression for a particular form of ongoing relationship.

Every child learns at school that movement is something relative, which can only be perceived in relation to a point of reference. What is not realized by everyone is that this same principle holds for virtually every perception and, therefore, for man’s experience of reality. Sensory and brain research have proved conclusively that only relationships and patterns of relationships can be perceived, and these are the essence of experience. Thus when, by an ingenious device, eye movement is made impossible so that the same image continues to be perceived by the same areas of the retina, clear visual perception is no longer possible. Likewise, a steady, unchanging sound is difficult to perceive and may even become unnoticeable. And if one wants to explore the hardness and texture of a surface, he will not only place his finger on the surface but move it back and forth, for if the finger remains motionless, no useful information could be gained, except perhaps a sensation of temperature, which again would be due to the relative difference between the temperatures of object and finger. These examples could easily be multiplied and would all point to the fact that in one way or another a process of change, motion, or scanning is involved in all perception (132, p. 173). In other words, a relationship is established, tested over as wide a range as a given contingency allows, and an abstraction is eventually gained that, we hold, is identical with the mathematical concept of function. Thus, not “things” but functions are the essence of our perceptions; and functions, as we have seen, are not isolated magnitudes, but “signs representing a connection ... an infinity of possible positions of like character....” But if this be so, then it should no longer be found surprising that even man’s awareness of himself is essentially an awareness of functions, of relationships in which he is involved, no matter how much he may subsequently reify this awareness. All these facts, incidentally, from the disturbances of the sensorium to the problems of self-awareness, are borne out by the now extensive literature on sensory deprivation.

1.3 Information and Feedback

Freud broke with many of the reifications of traditional psychology when he introduced his psychodynamic theory of human behavior. His achievements require no emphasis here. One aspect, however, is of particular relevance to our topic.

Psychoanalytic theory is based on a conceptual model in keeping with the epistemology that was prevalent at the time of its formulation. It postulates that behavior is primarily the outcome of a hypothesized interplay of intrapsychic forces considered to follow closely the laws of conservation and transformation of energy in physics, where, to quote Norbert Wiener speaking of that era, “Materialism had apparently put its own grammar in order, and this grammar was dominated by the concept of energy” (166, p. 199). On the whole, classical psychoanalysis remained primarily a theory of intrapsychic processes, so even where interaction with outside forces was evident, it was considered

secondary, as for instance in the concept of "secondary gain."¹ On the whole, the interdependence between the individual and his environment remained a neglected field of psychoanalytic pursuit, and it is precisely here that the concept of *information exchange*, i.e., of communication, becomes indispensable. There is a crucial difference between the psychodynamic (psychoanalytic) model on the one hand and any conceptualization of organism-environment interaction on the other, and this difference may become clearer in the light of the following analogy (12). If the foot of a walking man hits a pebble, energy is transferred from the foot to the stone; the latter will be displaced and will eventually come to rest again in a position which is fully determined by such factors as the amount of energy transferred, the shape and weight of the pebble, and the nature of the surface on which it rolls. If, on the other hand, the man kicks a dog instead of the pebble, the dog may jump up and bite him. In this case the relation between the kick and the bite is of a very different order. It is obvious that the dog takes the energy for his reaction from his own metabolism and not from the kick. What is transferred, therefore, is no longer energy, but rather information. In other words, the kick is a piece of behavior that communicates something to the dog, and to this communication the dog reacts with another piece of communication-behavior. This is essentially the difference between Freudian psychodynamics and the theory of communication as explanatory principles of human behavior. As can be seen, they belong to different orders of complexity; the former cannot be expanded into the latter nor can the latter be derived from the former: they stand in a relation of conceptual discontinuity.

This conceptual shift from energy to information is essential to an almost vertiginous development in the philosophy of science since the end of World War II, and it has had a particular impact on our knowledge of man. The realization that information about an effect, if properly fed back to the effector, will ensure the latter's stability and its adaptation to environmental change, not only opened the door for the construction of higher-order (i.e., error-controlled, goal-directed) machines and led to the postulation of cybernetics as a new epistemology, but also provided completely new insights into the functioning of the very complex interacting systems found in biology, psychology, sociology, economics, and other fields. While, at least for the time being, the significance of cybernetics cannot be even tentatively assessed, the fundamental principles involved are surprisingly simple and shall be reviewed here briefly.

As long as science was concerned with the study of linear, unidirectional, and progressive cause-effect relations, a number of highly important phenomena remained outside the immense territory conquered by science during the last four centuries. It may be a useful oversimplification to state that these phenomena have their common denominator in the related concepts of *growth* and *change*. To include these phenomena in a unified view of the world, science since the days of the ancient Greeks has had to resort to variously defined but always nebulous and uneasy concepts resting on the notion that there is purpose in the course of events and that the eventual outcome "somehow" determines the steps which lead up to it; or, these phenomena were characterized by some form of "vitalism" and so excluded from science. Thus some 2,500 years ago the stage was set for one of the greatest epistemological controversies, which has continued to rage until our time: the quarrel between determinism and teleology. To return once again to the study of man, psychoanalysis clearly belongs to the deterministic school while, for instance, Jung's analytical psychology relies to a considerable extent on the assumption of an "entelechy" immanent in man.

The advent of cybernetics changed all this by showing that the two principles could be brought together in a more comprehensive framework. This view became possible through the discovery of *feedback*. A chain in which event *a* effects event *b*, and *b* then effects *c*, *c* in turn brings about *d*, etc.

would have the properties of a deterministic linear system. If, however, d leads back to a , the system is circular and functions in an entirely different way. It exhibits behavior that is essentially analogous to that of those phenomena which had defied analysis in terms of strict linear determinism.

Feedback is known to be either positive or negative; the latter will be mentioned more frequently in this book since it characterizes homeostasis (steady state) and therefore plays an important role in achieving and maintaining the stability of relationships. Positive feedback, on the other hand, leads to change, i.e., the loss of stability or equilibrium. In both cases, part of a system's output is reintroduced into the system as information about the output. The difference is that in the case of negative feedback this information is used to decrease the output deviation from a set norm or bias—hence the adjective “negative”—while in the case of positive feedback the same information acts as a measure of amplification of the output deviation, and is thus positive in relation to the already existing trend toward a standstill or disruption.

While the concept of homeostasis in human relations will be taken up in greater detail in s. 4.4, it must be made clear now that it would be premature and inaccurate to conclude simply that negative feedback is desirable and positive feedback disruptive. Our main point is that interpersonal systems—stranger groups, marital couples, families, psychotherapeutic, or even international relationships, etc.—may be viewed as feedback loops, since the behavior of each person affects and is affected by the behavior of each other person. Input into such a system may be amplified into change or may be counteracted to maintain stability, depending on whether the feedback mechanisms are positive or negative. From studies of families containing a schizophrenic member there can be little doubt that the existence of the patient is essential for the stability of the family system and that the system will react quickly and effectively to any internal or external attempts to change its organization. Clearly this is an undesirable type of stability. Since the manifestations of life are evidently distinguished by both stability and change, negative and positive feedback mechanisms must occur in them in specific forms of interdependence or complementarity. Pribram (117) has recently shown that the achievement of stability makes for new sensitivities and that new mechanisms differentiate to cope with these. Thus stability is not a sterile end-point even in a relatively constant environment but rather, in the familiar words of Claude Bernard, “the stability of the internal medium is the condition for the existence of free life.”

Feedback has been accurately referred to as the secret of natural activity. Systems with feedback distinguish themselves not only by a quantitatively higher degree of complexity; they are also qualitatively different from anything that falls into the domain of classical mechanics. Their study requires new conceptual frames; their logic and epistemology are discontinuous from some traditional tenets of scientific analysis, such as the “isolate one variable” approach or the Laplacean belief that the complete knowledge of all facts at a given point in time will enable one to predict all future states. Self-regulating systems—systems with feedback—require a philosophy of their own in which the concepts of *pattern* and *information* are as essential as those of matter and energy were at the beginning of this century. Research with these systems is, at least for the time being, greatly hampered by the fact that there exists no scientific language sophisticated enough to be the vehicle for their explanation, and it has been suggested, for instance by Wieser (167, p. 33), that the systems themselves are their own simplest explanation.

1.4 Redundancy

Our emphasis on the discontinuity of systems theory and traditional monadic or linear theories is not

to be construed as a statement of despair. If the conceptual difficulties are stressed here, it is to point out that *new* avenues of approach have to be found, simply because the traditional frames of reference are clearly inadequate. In this search we are finding that advances have been made in other fields which are of immediate relevance to the study of human communication, and these isomorphies are the main focus of examination in this chapter. Ashby's homeostat (4, pp. 93 ff) is an excellent case in point and will, therefore, be mentioned here at least briefly. This device consists of four identical self-regulating subsystems that are fully interconnected so that a disturbance caused in any one of them affects, and is in turn reacted to, by the others. This means that no subsystem can attain its own equilibrium in isolation from the others, and Ashby has been able to prove a number of most remarkable "behavioral" characteristics of this machine. Although the circuitry of the homeostat is very simple when compared with the human brain or even with other manmade devices, it is capable of 390,625 combinations of parameter values, or, to make the same statement in more anthropomorphic terms, it has that number of possible adaptive attitudes to any changes in its internal or external medium. The homeostat achieves its stability by going through a random search of internal configurations, continuing until the appropriate internal configuration is reached. This is identical with the trial-and-error behavior of many organisms under stress. In the case of the homeostat the time required for this search may range from seconds to hours. It is easy to see that for living organisms this time lag would almost invariably be excessive and would be a serious handicap for survival. Ashby carries this thought to its logical extreme when he writes:

If we were like homeostats, waiting till one field gave us, at a stroke, all our adult adaptation, we would wait forever. But the infant does not wait forever; on the contrary, the probability that he will develop a full adult adaptation within twenty years is near to unity. (4, p. 136)

He then goes on to show that in natural systems some conservation of adaptation is achieved. This means that old adaptations are not destroyed when new ones are found, and that the search need not be initiated all over again as if a solution has never been achieved before.

What all this has to do with the pragmatics of human communication will become clearer after the following consideration. In the homeostat, any one of the 390,625 internal configurations has at any time an equal probability of being brought about by the interplay of the four subsystems. Thus the occurrence of a given configuration has absolutely no effect on the occurrence of the next configuration or sequence of configurations. A chain of events in which every element has at all times an equal chance of occurrence is said to show randomness. No conclusions can be drawn from it and no predictions can be made about its future sequence. This is another way of saying that it carries no information. However, if a system like the homeostat is provided with the ability to store previous adaptations for future use, the probability inherent in the sequences of internal configurations will undergo drastic change in the sense that certain groupings of configurations will become repetitive and, therefore, more probable than others. It should be noted at this juncture that there is no need to attribute any meaning to these groupings; their existence is their own best explanation. A chain of the type just described is one of the most basic concepts in information theory and is called a *stochastic process*. Thus, stochastic process refers to the lawfulness inherent in a sequence of symbols or events, whether the sequence is as simple as the results of drawing white and black marbles from an urn, or as complex as the specific patterns of tonal and orchestral elements employed by a certain composer, the idiosyncratic use of language elements in the style of a given author, or the diagnostically highly important patterning contained in the tracings of an electroencephalogram. According to information theory, stochastic processes show *redundancy* or *constraint*, two terms which can be used

interchangeably with the concept of pattern which has been used freely in the foregoing. At the risk of excessive redundancy, we shall stress again that these patterns do not, and need not, have an explanatory or symbolic meaning. This does not exclude, of course, the possibility that they may be correlated with other occurrences, as, for instance, is the case with the electroencephalogram and some medical conditions.

Redundancy has been extensively studied in two of the three areas of human communication: syntactics and semantics; the pioneering work of Shannon, Carnap, and Bar-Hillel should be mentioned in this connection. One of the conclusions that can be drawn from these studies is that each of us possesses an enormous amount of knowledge about the lawfulness and the statistical probabilities inherent in both the syntactics and the semantics of human communications. Psychologically this knowledge is of a very interesting kind, for it is almost totally outside of human awareness. Nobody, except perhaps an information expert, can state the sequential probabilities or the ranking orders of letters and words in a given language, yet all of us can spot and correct a misprint, replace a missing word, and exasperate a stammerer by finishing his sentences for him. But to know a language and to know something *about* a language are two very different orders of knowledge. Thus, a person may be able to use his mother tongue correctly and fluently and yet not possess a knowledge of grammar and syntax, i.e., of the *rules* he observes in speaking it. If this man were to learn another language—except by the same empirical acquisition as his mother tongue—he would also have to learn explicitly *about* languages.²

Turning now to the problems of redundancy or constraint in the pragmatics of human communication, a review of the literature shows that very little has been published so far on this subject, especially as far as pragmatics as *interactional* phenomena is concerned. By this we mean that most of the existing studies appear to limit themselves mainly to the effects of person A on person B without taking equally into account that whatever B does influences A's next move, and that they are both largely influenced by, and in turn influence, the context in which their interaction takes place.

It is not too difficult to see that pragmatic redundancy is essentially similar to syntactic and semantic redundancy. Here, too, we possess an immense amount of knowledge that enables us to evaluate, to influence, and to predict behavior. In fact, in this area we are particularly susceptible to inconsistencies: behavior that is out of context, or that shows certain other kinds of randomness or lack of constraint, immediately strikes us as much more inappropriate than merely syntactical or semantic errors in communication. And yet it is in this area that we are particularly unaware of the rules being followed in successful, and broken in disturbed, communication. We are constantly being affected by communication; as suggested earlier, even our self-awareness depends on communication. This has been cogently stated by Hora: "To understand himself man needs to be understood by another. To be understood by another he needs to understand the other" (65, p. 237). But if linguistic understanding is based on the rules of grammar, syntax, semantics, etc., what then are the rules for this kind of understanding meant by Hora? Again it appears that we know them without knowing that we know them. We are in constant communication, and yet we are almost completely unable to *communicate about communication*. This problem will be a major theme of this book.

The search for pattern is the basis of all scientific investigation. Where there is pattern there is significance—this epistemological maxim also holds for the study of human interaction. This study would be relatively easy if it consisted merely in interrogating those engaged in the interaction and thus learning from them what patterns they habitually follow, or, in other words, what rules of behavior they have established between themselves. A customary application of this idea is the questionnaire technique. However, once it is realized that statements cannot always be taken at face

value, least of all in the presence of psychopathology—that people can very well *say* something and *mean* something else—and, as we have just seen, that there are questions the answers to which may be totally outside their awareness, then the need for different approaches becomes obvious. Roughly speaking, one's rules of behavior and interaction may show the same degrees of consciousness that Freud postulated for slips and errors: (1) they may be clearly within a person's awareness, in which case questionnaire and other simple question-answer techniques can be used; (2) a person may be unaware of them, but able to recognize them when they are pointed out to him; or (3) they may be so far from a person's awareness that even if they were defined correctly and brought to his attention, he would still be unable to see them. Bateson has sharpened this analogy with levels of consciousness and stated the problem in terms of our present conceptual framework:

... as we go up the scale of orders of learning, we come into regions of more and more abstract patterning, which are less and less subject to conscious inspection. The more abstract—the more general and formal the premises upon which we put our patterns together—the more deeply sunk these are in the neurological or psychological levels and the less accessible they are to conscious control.

The *habit* of dependency is much less perceptible to the individual than the fact that on a given occasion he obtained help. This he may be able to recognize, but to recognize the next more complex pattern, that having looked for help, he commonly bites the hand that feeds him, this may be excessively difficult for him to scan in consciousness. (16)

Fortunately for our understanding of human interaction, the picture is a different one to an outside observer. He is like someone who understands neither the rules nor the objective of chess watching a game being played. Let the unawareness of the “players” in real life be represented in this conceptual model by the simplified assumption that the observer does not speak or understand the players' language and is, therefore, unable to ask for explanations. It will soon become clear to the observer that the behavior of the players shows varying degrees of repetitiveness, of redundancy, from which tentative conclusions can be drawn. He will, for example, notice that almost invariably a move of one player is followed by a move of the other. It will thus be easy to deduce from this behavior that the players are following a rule of alternation of moves. The rules governing the moves of the individual pieces cannot be so easily inferred, partly on account of the complexity of the moves and partly on account of the greatly different frequencies with which the single pieces are moved. It will, for instance, be easier to infer the rule underlying the moves of the bishops than that of such an unusual and infrequent move as castling, which may not occur at all in the course of one particular game. Notice also that castling involves two consecutive moves by the same player and thereby seems to invalidate the rule of alternation of moves. Yet, the much greater redundancy of alternation of moves will prevail in the observer's theory-building over the lesser redundancy of castling, and even if the apparent contradiction remains unresolved, the hypotheses formulated so far need not necessarily be abandoned by the observer. From the foregoing it can be seen that after watching a series of games the observer would in all probability be able to formulate with a high degree of accuracy the rules of chess, including the end point of the game, the checkmate. It must be stressed that he could arrive at this result without the possibility of asking for information.

Does all this mean that the observer has “explained” the behavior of the players? We would prefer to say that he has identified a complex pattern of redundancies.³ Of course, if he were so inclined, he could attribute a *meaning* to every single piece and to every rule of the game. In fact, he could create an elaborate mythology about the game and its “deeper” or “real” meaning, including fanciful tal-

about the origin of the game, as has in fact been done. But all this is unnecessary for the study of the game itself, and such an explanation or mythology would have the same relation to chess as astrology has to astronomy.⁴

One final illustration may unify our discussion of redundancy in the pragmatics of human communication. As the reader may know, computer programming consists of setting a relatively small number of specific rules in order (the program); these rules then guide the computer into a large number of quite flexible, patterned operations. Precisely the opposite happens if, as suggested above, one watches human interaction for redundancy. From observing the particular system in operation one then tries to postulate rules underlying its functioning, its “program,” in our computer analogy.

1.5 Metacommunication and the Concept of Calculus

The body of knowledge gained by our hypothetical observer studying the pragmatic redundancy of the behavioral phenomenon “chess playing” reveals a suggestive analogy with the mathematical concept of *calculus*. A calculus, according to Boole (31, p. 4), is “a method resting upon the employment of symbols, whose laws of combination are known and general, and whose results admit of a consistent interpretation.” We have already implied that such a formal representation is conceivable in human communication, but some of the difficulties of discourse *about* this calculus have also been made apparent. When mathematicians no longer use mathematics as a tool to compute, but make this tool itself the object of their study—as they do, for instance, when they question the consistency of arithmetic as a system—they use a language that is not part of but about mathematics. Following David Hilbert (64), this language is called metamathematics. The formal structure of mathematics is a calculus; metamathematics is this calculus expressed. Nagel and Newman have defined the difference between the two concepts with admirable clarity:

The importance to our subject of recognizing the distinction between mathematics and metamathematics cannot be over-emphasized. *Failure to respect it has produced paradoxes and confusion.* Recognition of its significance has made it possible to exhibit in a clear light the logical structure of mathematical reasoning. The merit of the distinction is that it entails a careful codification of the various signs that go into the making of a formal calculus, free of concealed assumptions and *irrelevant associations of meaning*. Furthermore, it requires exact definitions of the operations and logical rules of mathematical construction and deduction, many of which mathematicians *had applied without being explicitly aware of what they were using.* (108, p. 32, italics ours)

When we no longer use communication to communicate but to communicate *about* communication, we inevitably must in communication research, then we use conceptualizations that are not part of but *about* communication. In analogy to metamathematics this is called metacommunication. Compared with metamathematics, research in metacommunication is at two significant disadvantages. The first is that in the field of human communication there exists as yet nothing comparable to the formal system of a calculus. As shall be shown presently, this difficulty does not rule out the usefulness of the concept. The second difficulty is closely related to the first: while mathematicians possess two languages (numbers and algebraic symbols to express mathematics, and natural language for the expressions of metamathematics), we are mainly restricted to natural language as a vehicle for both communications and metacommunications. This problem will arise again and again in the course of our considerations.

What, then, is the usefulness of the notion of a calculus of human communication, if the specifics such a calculus are admittedly a thing of the distant future? In our opinion its immediate usefulness lies in the fact that the notion itself supplies a powerful model of the nature and the degree of abstraction of the phenomena we want to identify. Let us recapitulate: we are looking for pragmatic redundancies; we know that they will not be simple, static magnitudes or qualities, but patterns of interaction analogous to the mathematical concept of function; and, finally, we anticipate that these patterns will have the characteristics generally found in error-controlled, goal-directed systems. Thus if with these premises in mind we scrutinize chains of communications between two or more communicants, we shall arrive at certain results which certainly cannot yet claim to be a formal system, but which are in the nature of axioms and theorems of a calculus.

In their above-quoted work, Nagel and Newman describe the analogy between a game like chess and a formalized mathematical calculus. They explain how

The pieces and the squares of the board correspond to the elementary signs of the calculus; the legal positions of pieces on the board, to the formulas of the calculus; the initial positions of pieces on the board, to the axioms or initial formulas of the calculus; the subsequent positions of pieces on the board, to formulas derived from the axioms (i.e., to the theorems); and the rules of the game, to the rules of inference (or derivation) for the calculus. (108, p. 35)

They go on to show how the configurations of the pieces on the board are “meaningless” as such while statements *about* these configurations are quite meaningful. Statements of this order of abstraction are described by the above-mentioned authors:

... general “meta-chess” theorems can be established whose proof involves only a finite number of permissible configurations on the board. The “meta-chess” theorem about the number of possible opening moves for White can be established in this way; and so can the “meta-chess” theorem that if White has only two Knights and the King, and Black only his King, it is impossible for White to force a mate against Black. (108, p. 35)

We have quoted this analogy at length because it illustrates the concept of calculus not only in metamathematics but also in metacommunication. For if we expand the analogy to include the two players we are no longer studying an abstract game but, rather, sequences of human interaction that are strictly governed by a complex body of rules. The only difference is that we would prefer to use the term “formally undecidable” rather than “meaningless” when referring to a single piece of behavior (a “move” in the game analogy). Such a piece of behavior, *a*, may be due to a pay raise, the Oedipus conflict, alcohol, or a hail storm, and any arguments as to which reason “really” applies will tend to have the qualities of a scholastic disputation on the sex of the angels. Unless and until the human mind is open for outside inspection, inferences and self-reports are all we have, and both are notoriously unreliable. However, if we notice that behavior *a*—whatever its “reasons”—by one communicant elicits behavior *b*, *c*, *d*, or *e* in the other, while it evidently excludes behaviors *x*, *y*, and *z*, then a metacommunicational theorem can be postulated. What is suggested here, then, is that an interaction may be definable in terms of the game analogy, that is, as sequences of “moves” strictly governed by rules of which it is immaterial whether they are within or outside the awareness of the communicants, but about which meaningful *metacommunicational* statements can be made. This would mean that, as suggested in s. 1.4, there exists an as yet uninterpreted calculus of the pragmatics of human communication whose rules are observed in successful, and broken in disturbed, communication. The existence of such a calculus can, in the present state of our knowledge, be

compared to that of a star whose existence and position is postulated by theoretical astronomy but has not yet been discovered by the observatories.

1.6 Conclusions

If one approaches human communication with the above criteria in mind, several conceptual changes impose themselves. These will now be reviewed briefly within the context of psychopathology. The reference to psychopathology does not mean that these points are only valid there, but simply that we consider them particularly relevant and evident in this area.

1.61 The Black Box Concept While the existence of the human mind is only denied by particularly radical thinkers, research into the phenomena of the mind, as is painfully known to all workers in the field, is tremendously difficult because of the absence of an Archimedean point outside the mind. Much more than any other disciplines, psychology and psychiatry are ultimately self-reflexive: subject and object are identical, the mind studies itself, and any assumptions have an inevitable tendency toward self-validation. The impossibility of seeing the mind "at work" has in recent years led to the adoption of the Black Box concept from the field of telecommunication. Applied originally to certain types of captured enemy electronic equipment that could not be opened for study because of the possibility of destruction charges inside, the concept is more generally applied to the fact that electronic hardware is by now so complex that it is sometimes more expedient to disregard the internal structure of a device and concentrate on the study of its specific input-output relations. While it is true that these relations may permit inferences into what "really" goes on inside the box, this knowledge is not essential for the study of *the function of the device in the greater system of which it is a part*. This concept, if applied to psychological and psychiatric problems, has the heuristic advantage that no ultimately unverifiable intrapsychic hypotheses need to be invoked, and that one can limit oneself to observable input-output relations, that is, to *communication*. Such an approach, we believe, characterizes an important recent trend in psychiatry toward viewing symptoms as one kind of input into the family system rather than as an expression of intrapsychic conflict.

1.62 Consciousness and Unconsciousness If one is interested in observing human behavior in terms of the Black Box assumption, he sees the output of one Black Box as the input of another. The question of whether such an exchange of information is conscious or unconscious loses the paramount importance it has in the psychodynamic framework. This is not to be construed as meaning that, as far as the reactions to a specific piece of behavior are concerned, it makes no difference whether this behavior is taken to be conscious or unconscious, voluntary, involuntary, or symptomatic. If someone has his toe stepped on by another, it makes a great deal of difference to him whether the other's behavior was deliberate or unintentional. This view, however, is based on *his* evaluation of the other person's motives and, therefore, on assumptions about what goes on inside the other's head. And, of course, if he were to ask the other about his motives, he could still not be certain, for the other individual might claim his behavior was unconscious when he had meant it to be deliberate, or even claim it was deliberate when in fact it was accidental. All this brings us back to the attribution of "meaning," a notion that is essential for the subjective experience of communicating with others, but which we have found to be objectively undecidable for the purposes of research in human communication.

1.63 Present versus Past While there can be no doubt that behavior is at least partly determined by previous

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