A STUDY OF INTERACTIONAL PATTERNS, PATHOLOGIES, AND PARADOXES

PRAGMATICS OF HUMAN COMMUNICATION

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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

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

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

Although Paul Watzlawick, a psychologist, was schooled in an individual approach to psychotherap
(he was trained as a Jungian), he found his way to a new view. And he was an integral part of bringin
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
the audiotape section of my university's library and spent hours listening to a tape by Watzlawick o
human communication (*An Anthology of Human Communication: Text and Tape*). In it, he told
charming story about a time when he showed up at a psychiatrist's office. He wanted to discuss th
role communication played in the development of schizophrenia with this particular psychiatrist, wh
specialized in treating the disorder. But due to Watzlawick's Austrian accent and the fact the his nam
was not on the psychiatrist's appointment book, a simple misunderstanding occurred that showed a l
about communication and its role in problem development.

When Paul announced himself in a rather formal way to the secretary, he said simply, "I a
Watzlawick." She suspected he was a new psychiatric patient showing up for an appointment at th
wrong time, and she interpreted his introduction as, "I am not Slavic." To which she replied, "I nev
said you were." At which point, slightly puzzled and a little irritated, he insisted, "but I am." Sever
subsequent exchanges compounded the misunderstanding until they began to yell at each other. At th
point, the psychiatrist, hearing the angry exchanges from within his office, poked his head out an
said, "What the devil is going on out here? Paul, why are you yelling at my secretary, and why are yo
yelling at Dr. Watzlawick?" he asked his secretary. The misunderstanding was quickly cleared up a
that point, but Watzlawick used the story to illustrate the importance of context, interaction, an
human communication in problem development.

Dr. Watzlawick and I had our differences: he once scolded me when we were on a panel together fo
suggesting that clients had solutions to their problems that can be evoked for rapid change. "If patien
had solutions, they wouldn't come to therapy. It's because their solutions aren't working or are th
very cause of their problems that they seek our help," he thundered at me. I respectfully disagreed an
today the solution-based approach to change is well established and accepted. Most clinicians wou
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
problem worse or keep it in place. This is a view that I have found profoundly useful over the yea
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 revis
this revolutionary tome.

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

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

The ideas in this volume derived in large part from the discussions that took place in Grego Bateson's research group analyzing communication patterns. This group included (at times) Ja 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 problem were not always the result of deep underlying psychological issues, but instead arose fro interactional and communication patterns, emerged from those fertile discussions and found its wa here.

This book, along with Haley's *Strategic Psychotherapy*, also published in the 1960s, signaled th shift from an individual to an interpersonal lens for viewing therapy problems and solutions (noti the language shifts from symptoms to problems, indicating a move away from the pathological ar psychodynamic framework). The ecology movement was just beginning at the time *Pragmatics* fir 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 numbere sections. It is also a bit heady and a bit philosophical, but for those who stuck with it, the underlyin message was powerful and transformative. It still is. While Watzlawick went on to write more book on his own and with others, *Pragmatics* firmly established him as a seminal thinker, theorist, ar force in the field of psychotherapy.

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

Introduction

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

On the other hand, it is obvious that communication is a conditio sine qua non of human life a social order. It is equally obvious that from the beginning of his existence a human being is involve in the complex process of acquiring the rules of communication, with only minimal awareness of wh 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 a attempt at model building and a presentation of some facts that appear to support such a model. T pragmatics of human communication is a science in its infancy, barely able to read and write its ow name, and is far from having evolved a consistent language of its own. Particularly, its integrati with many other fields of scientific endeavor is a thing of the future. However, with hope of suc future integration, this book addresses itself to workers in all those fields where problems of system interaction in the widest sense are encountered.

It may be argued that this book ignores important studies that are directly related to its subje matter. The paucity of explicit references to nonverbal communication may be one such criticism, t lack of reference to general semantics another. But this book cannot be more than an introduction the pragmatics of human communication (an area that so far has received conspicuously litt attention) and cannot, therefore, point to all the existing affinities to other fields of research witho becoming encyclopedic in the bad sense of the term. For the same reason a limitation had to b imposed on references to numerous other works on the theory of human communication, especial when such works limit themselves to the study of communication as a one-way phenomenon (fro 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 i presentation. Examples and analogies were chosen from as wide a range of subjects as seeme applicable, although predominance remained in the field of psychopathology. Especially whe mathematics was invoked for analogy, it should be clearly understood that it was used only as language which is eminently suited for the expression of intricate relationships, and that its use w not meant to imply that we felt our data are ready for quantification. Conversely, the rather liberal us of examples taken from literature may seem scientifically objectionable to many readers, for to prov something by reference to the figments of artistic imagination may seem poor proof indeed. Howeve not proof but illustration and elucidation of a theoretical point by presentation in a more readi understandable language is intended by these quotations from literature; it is not implied that the prove anything in and by themselves. In short, these examples and analogies, then, are definitio models and not predictive (assertive) models.

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

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 (1.2[1]), information and feedback (s. 1.3), and redundancy (s. 1.4), and postulates the existence of an yet unformalized code, a calculus (s. 1.5) of human communication whose rules are observed successful communication but which are broken when communication is disturbed.

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

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

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

Chapter 6 deals with the behavioral effects of paradox. This requires a definition of the concept (6.1, 6.2, and 6.3), which can be omitted by the reader acquainted with the literature on antinomies ar especially the Russellian paradox. Section 6.4 introduces the less well known concept of pragmat paradoxes, especially the Double Bind theory and its contribution to the understanding 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 paradoxical patterns of communication. The chapter concludes with a brief excursion into the role 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 b more than an outlook. It postulates that an order, analogous to the level structure of Logical Type 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 ar biologists to electrical engineers, it became apparent that any given section might be considere primitive by one and too specialized by another. Similarly, the inclusion of definitions—either in th text or as footnotes—might be considered offensively patronizing to someone for whom the term part of his everyday professional language, while to a general reader the lack of definitions ofte seemed to have the annoying implication that "If you don't know what that means, we cannot b bothered to tell you." It was therefore decided to include, at the end of the book, a glossary th contains only those terms not available in ordinary dictionaries and not defined in the text.

The authors want to express their thanks to the many persons who read all or parts of the manuscri and provided help, encouragement, and advice, especially to Paul S. Achilles, Ph.D., John H Weakland, M.A., Carlos E. Sluzki, M.D., A. Russell Lee, M.D., Richard Fisch, M.D., and Arthu Bodin, Ph.D., all colleagues of ours at the Mental Research Institute; Albert E. Scheflen, M.D Eastern Pennsylvania Psychiatric Institute and Temple University School of Medicine; Karl H Pribram, M.D., Ralph I. Jacobs, M.D., and William C. Dement, M.D., of the Stanford Universi School of Medicine; Henry Longley, B.S.E.E., Project Engineer, Western Development Laboratorie (Philco); Noël P. Thompson, M.D., M.S.E.E., Chief of the Division of Medical Electronics, Palo Alt Medical Research Foundation; and John P. Spiegel, M.D., Center for Research in Personality, Harvar University. Responsibility for positions taken and errors which may have been made rests, of cours exclusively with the authors.

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Mental Health, whose aid is gratefully acknowledged.

Palo Alto, March 196

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 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 th 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 th time-honored method of isolating variables. This becomes particularly obvious when the object study is disturbed behavior. If a person exhibiting disturbed behavior (psychopathology) is studied isolation, then the inquiry must be concerned with the *nature* of the condition and, in a wider sens with the *nature* of the human mind. If the limits of the inquiry are extended to include the effects this behavior on others, their reactions to it, and the context in which all of this takes place, the focu shifts from the artificially isolated monad to the *relationship* between the parts of a wider system. Th observer of human behavior then turns from an inferential study of the mind to the study of th 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 thre areas of syntactics, semantics, and pragmatics established by Morris (*106*), and followed by Carna (*33*, p. 9) for the study of semiotic (the general theory of signs and languages). Applied to th framework of human communication, then, the first of these three areas can be said to cover th problems of transmitting information and is, therefore, the primary domain of the informatio theorist. His concern lies with the problems of coding, channels, capacity, noise, redundancy, an other statistical properties of language. These problems are primarily *syntactical* ones, and he is n interested in the meaning of message symbols. Meaning is the main concern of *semantics*. While it perfectly possible to transmit strings of symbols with syntactical accuracy, they would rema meaningless unless sender and receiver had agreed beforehand on their significance. In this sense, a shared information presupposes semantic convention. Finally, communication affects behavior, an this is its *pragmatic* aspect. While a clear conceptual separation is thus possible of the three area they are nevertheless interdependent. As George (*55*, p. 41) points out, "in many ways it is true to sa that syntax is mathematical logic, semantics is philosophy or philosophy of science, and pragmatics 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, th behavioral effects, of communication. In this connection it should be made clear from the outset th the two terms communication and behavior are used virtually synonymously. For the data o pragmatics are not only words, their configurations, and meanings, which are the data of syntacti and semantics, but their nonverbal concomitants and body language as well. Even more, we would ad to personal behavioral actions the communicational clues inherent in the *context* in whic communication occurs. Thus, from this perspective of pragmatics, all behavior, not only speech, 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 o communication on the receiver but, inseparably linked with this, also with the effect the receiver reaction has upon the sender. Thus we would prefer to focus less on the sender-sign or receiver-sig relations and more on *the sender-receiver relation, as mediated by communication*.

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

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

The affinity of our hypotheses with mathematics will be noted whenever possible. This should n deter the reader who has no special knowledge in the field, for he will not be confronted with formul or other specific symbolism. While human behavior may one day find its adequate expression mathematical symbolism, it definitely is not our intention to attempt such a quantification. Rather, v 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 huma communication.

1.2 The Notion of Function and Relationship

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

The philosophers of science seem to agree that the most significant step in the development modern mathematical thinking was the gradual emergence of a new number concept from Descartes the present day. For the Greek mathematicians, numbers were concrete, real, perceivable magnitud understood as the properties of equally real objects. Thus geometry was concerned with measuring ar arithmetic with counting. Oswald Spengler, in his lucid chapter "On the Meaning of Numbers" (*146* shows not only how the notion of zero as a number was unthinkable, but also that negative magnitud had no place in the reality of the classical world: "Negative magnitudes have no existence. Th expression (–2) × (–3) = +6 is neither something perceivable nor a representation of magnitude" (66). The idea that numbers were the expression of magnitudes remained dominant for two thousan years and, as Spengler elaborates:

> In all history, so far, there is no second example of one Culture paying to another Culture long 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 decisiv event occurred in 1591, when Vieta introduced letter-notations instead of numbers. With this, the ide of numbers as discrete magnitudes was relegated to a secondary place, and the powerful concept *variable* was born, a concept which to the classical Greek mathematician would have been as unreal a hallucination. For, in contrast to a number signifying a perceivable magnitude, variables do not hav a meaning of their own; they are meaningful only in relation to one another. A new dimension o information was realized with the introduction of variables, and thus was the new mathemati 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 y2 = 4ax, in establishing a specific relation between x and comprises all the properties of a curve.*

There exists a suggestive parallelism between the emergence of the mathematical concept function and the awakening of psychology to the concept of relationship. For a long time—in a certa sense since Aristotle-the mind was conceived of as an array of properties or characteristics with whic an individual was endowed to a greater or lesser degree, very much as he might have a slender heavy body, red or fair hair, etc. The end of the last century saw the beginning of the experimental e in psychology and with it the introduction of a far more sophisticated vocabulary that, however, w not essentially different in one sense: it was still made up of single and more or less unrelate concepts. These concepts were referred to as psychic functions—unfortunately, because they bear n relation to the mathematical concept of function, and no such relation was, indeed, intended. As w know, sensations, perceptions, apperceptions, attention, memory, and several other concepts wer defined as such functions, and an enormous amount of work was and still is being done to study the in artificial isolation. But, for instance, Ashby has shown how the assumption of *memory* is direct related to the observability of a given system. He points out that for an observer who is in possessio of all the necessary information any reference to the past (and, therefore, to the existence of a memo in the system) is unnecessary. He can account for the system's behavior by its state *now*. He gives th 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 neurophysiologic research on information storage in the brain. Obviously, the state of the animal is different since th 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. Anothe analogy, supplied by Bateson (*17*), is that of a chess game in progress. At any given point, the state the game can be understood solely from the present configuration of pieces on the board (chess bein a game with complete information), without any record or "memory" of the past moves. Even if th

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

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

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

1.3 Information and Feedback

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

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

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

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

As long as science was concerned with the study of linear, unidirectional, and progressive caus effect relations, a number of highly important phenomena remained outside the immense territo conquered by science during the last four centuries. It may be a useful oversimplification to state th these phenomena have their common denominator in the related concepts of *growth* and *change*. T include these phenomena in a unified view of the world, science since the days of the ancient Gree has had to resort to variously defined but always nebulous and uneasy concepts resting on the notio that there is purpose in the course of events and that the eventual outcome "somehow" determines t steps which lead up to it; or, these phenomena were characterized by some form of "vitalism" and s excluded from science. Thus some 2,500 years ago the stage was set for one of the gre epistemological controversies, which has continued to rage until our time: the quarrel betwe determinism and teleology. To return once again to the study of man, psychoanalysis clearly belong to the deterministic school while, for instance, Jung's analytical psychology relies to a considerab 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 broug together in a more comprehensive framework. This view became possible through the discovery *feedback*. A chain in which event *a* effects event *b*, and *b* then effects *c*, *c* in turn brings about *d*, et

would have the properties of a deterministic linear system. If, however, *d* leads back to *a*, the syste is circular and functions in an entirely different way. It exhibits behavior that is essentially analogou 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 this book since it characterizes homeostasis (steady state) and therefore plays an important role achieving and maintaining the stability of relationships. Positive feedback, on the other hand, leads change, i.e., the loss of stability or equilibrium. In both cases, part of a system's output is reintroduc into the system as information about the output. The difference is that in the case of negative feedba this information is used to decrease the output deviation from a set norm or bias—hence the adjecti "negative"—while in the case of positive feedback the same information acts as a measure f amplification of the output deviation, and is thus positive in relation to the already existing tre toward a standstill or disruption.

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

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

1.4 Redundancy

Our emphasis on the discontinuity of systems theory and traditional monadic or linear theories is n

to be construed as a statement of despair. If the conceptual difficulties are stressed here, it is to poi
out that *new* avenues of approach have to be found, simply because the traditional frames of referen
are clearly inadequate. In this search we are finding that advances have been made in other fiel
which are of immediate relevance to the study of human communication, and these isomorphies a
the main focus of examination in this chapter. Ashby's homeostat (*4*, pp. 93 ff) is an excellent case
point and will, therefore, be mentioned here at least briefly. This device consists of four identical sel
regulating subsystems that are fully interconnected so that a disturbance caused in any one of the
affects, and is in turn reacted to, by the others. This means that no subsystem can attain its ov
equilibrium in isolation from the others, and Ashby has been able to prove a number of mo
remarkable "behavioral" characteristics of this machine. Although the circuitry of the homeostat
very simple when compared with the human brain or even with other manmade devices, it is capab
of 390,625 combinations of parameter values, or, to make the same statement in mo
anthropomorphic terms, it has that number of possible adaptive attitudes to any changes in its intern
or external medium. The homeostat achieves its stability by going through a random search of i
combinations, continuing until the appropriate internal configuration is reached. This is identical wi
the trial-and-error behavior of many organisms under stress. In the case of the homeostat the tim
required for this search may range from seconds to hours. It is easy to see that for living organism
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. Th
means that old adaptations are not destroyed when new ones are found, and that the search need not b
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 th
following consideration. In the homeostat, any one of the 390,625 internal configurations has at an
time an equal probability of being brought about by the interplay of the four subsystems. Thus th
occurrence of a given configuration has absolutely no effect on the occurrence of the ne
configuration or sequence of configurations. A chain of events in which every element has at all time
an equal chance of occurrence is said to show randomness. No conclusions can be drawn from it an
no predictions can be made about its future sequence. This is another way of saying that it carries n
information. However, if a system like the homeostat is provided with the ability to store previou
adaptations for future use, the probability inherent in the sequences of internal configurations wi
undergo drastic change in the sense that certain groupings of configurations will become repetitiv
and, therefore, more probable than others. It should be noted at this juncture that there is no need
attribute any meaning to these groupings; their existence is their own best explanation. A chain of th
type just described is one of the most basic concepts in information theory and is called a *stochast
process*. Thus, stochastic process refers to the lawfulness inherent in a sequence of symbols or event
whether the sequence is as simple as the results of drawing white and black marbles from an urn, or
complex as the specific patterns of tonal and orchestral elements employed by a certain composer, th
idiosyncratic use of language elements in the style of a given author, or the diagnostically high
important patterning contained in the tracings of an electroencephalogram. According to informatio
theory, stochastic processes show *redundancy* or *constraint*, two terms which can be use

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

Redundancy has been extensively studied in two of the three areas of human communicatio
syntactics and semantics; the pioneering work of Shannon, Carnap, and Bar-Hillel should
mentioned in this connection. One of the conclusions that can be drawn from these studies is that ea
of us possesses an enormous amount of knowledge about the lawfulness and the statistical probabili
inherent in both the syntactics and the semantics of human communications. Psychologically th
knowledge is of a very interesting kind, for it is almost totally outside of human awareness. Nobod
except perhaps an information expert, can state the sequential probabilities or the ranking orders
letters and words in a given language, yet all of us can spot and correct a misprint, replace a missi
word, and exasperate a stammerer by finishing his sentences for him. But to know a language and
know something *about* a language are two very different orders of knowledge. Thus, a person may
able to use his mother tongue correctly and fluently and yet not possess a knowledge of grammar a
syntax, i.e., of the *rules* he observes in speaking it. If this man were to learn another language—exce
by the same empirical acquisition as his mother tongue—he would also have to learn explicitly *abo*
languages.[2]

Turning now to the problems of redundancy or constraint in the pragmatics of huma
communication, a review of the literature shows that very little has been published so far on th
subject, especially as far as pragmatics as *interactional* phenomena is concerned. By this we mean th
most of the existing studies appear to limit themselves mainly to the effects of person *A* on person
without taking equally into account that whatever B does influences *A*'s next move, and that they a
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 a
semantic redundancy. Here, too, we possess an immense amount of knowledge that enables us
evaluate, to influence, and to predict behavior. In fact, in this area we are particularly susceptible
inconsistencies: behavior that is out of context, or that shows certain other kinds of randomness
lack of constraint, immediately strikes us as much more inappropriate than merely syntactical
semantic errors in communication. And yet it is in this area that we are particularly unaware of th
rules being followed in successful, and broken in disturbed, communication. We are constantly bei
affected by communication; as suggested earlier, even our self-awareness depends on communicatio
This has been cogently stated by Hora: "To understand himself man needs to be understood b
another. To be understood by another he needs to understand the other" (*65*, p. 237). But if linguist
understanding is based on the rules of grammar, syntax, semantics, etc., what then are the rules for th
kind of understanding meant by Hora? Again it appears that we know them without knowing that w
know them. We are in constant communication, and yet we are almost completely unable
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
significance—this epistemological maxim also holds for the study of human interaction. This stu
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
behavior they have established between themselves. A customary application of this idea is th
questionnaire technique. However, once it is realized that statements cannot always be taken at fa

value, least of all in the presence of psychopathology—that people can very well *say* something ar *mean* something else—and, as we have just seen, that there are questions the answers to which may l totally outside their awareness, then the need for different approaches becomes obvious. Rough speaking, one's rules of behavior and interaction may show the same degrees of consciousness th Freud postulated for slips and errors: (1) they may be clearly within a person's awareness, in whic case questionnaire and other simple question-answer techniques can be used; (2) a person may l unaware of them, but able to recognize them when they are pointed out to him; or (3) they may be s far from a person's awareness that even if they were defined correctly and brought to his attention, h would still be unable to see them. Bateson has sharpened this analogy with levels of consciousness ar 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 outsi observer. He is like someone who understands neither the rules nor the objective of chess watching game being played. Let the unawareness of the "players" in real life be represented in this conceptu model by the simplified assumption that the observer does not speak or understand the player language and is, therefore, unable to ask for explanations. It will soon become clear to the observ that the behavior of the players shows varying degrees of repetitiveness, of redundancy, from whic tentative conclusions can be drawn. He will, for example, notice that almost invariably a move of on player is followed by a move of the other. It will thus be easy to deduce from this behavior that th players are following a rule of alternation of moves. The rules governing the moves of the individu pieces cannot be so easily inferred, partly on account of the complexity of the moves and partly o account of the greatly different frequencies with which the single pieces are moved. It will, f instance, be easier to infer the rule underlying the moves of the bishops than that of such an unusu and infrequent move as castling, which may not occur at all in the course of one particular gam Notice also that castling involves two consecutive moves by the same player and thereby seems invalidate the rule of alternation of moves. Yet, the much greater redundancy of alternation of move will prevail in the observer's theory-building over the lesser redundancy of castling, and even if th apparent contradiction remains unresolved, the hypotheses formulated so far need not necessarily b abandoned by the observer. From the foregoing it can be seen that after watching a series of game the observer would in all probability be able to formulate with a high degree of accuracy the rules chess, including the end point of the game, the checkmate. It must be stressed that he could arrive 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 t say that he has identified a complex pattern of redundancies.[3] Of course, if he were so inclined, h could attribute a *meaning* to every single piece and to every rule of the game. In fact, he could crea 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 th game itself, and such an explanation or mythology would have the same relation to chess as astrolog has to astronomy.[4]

One final illustration may unify our discussion of redundancy in the pragmatics of huma communication. As the reader may know, computer programming consists of setting a relatively sma number of specific rules in order (the program); these rules then guide the computer into a larg number of quite flexible, patterned operations. Precisely the opposite happens if, as suggested abov one watches human interaction for redundancy. From observing the particular system in operation on 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 th behavioral phenomenon "chess playing" reveals a suggestive analogy with the mathematical conce of *calculus*. A calculus, according to Boole (*31*, p. 4), is "a method resting upon the employment symbols, whose laws of combination are known and general, and whose results admit of a consiste interpretation." We have already implied that such a formal representation is conceivable in huma communication, but some of the difficulties of discourse *about* this calculus have also been mad apparent. When mathematicians no longer use mathematics as a tool to compute, but make this to itself the object of their study—as they do, for instance, when they question the consistency arithmetic as a system—they use a language that is not part of but about mathematics. Followin David Hilbert (*64*), this language is called metamathematics. The formal structure of mathematics is calculus; metamathematics is this calculus expressed. Nagel and Newman have defined the differen between the two concepts with admirable clarity:

> The importance to our subject of recognizing the distinction between mathematics and meta-mathematics 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 b *about* communication. In analogy to metamathematics this is called metacommunication. Compare with metamathematics, research in metacommunication is at two significant disadvantages. The fir is that in the field of human communication there exists as yet nothing comparable to the form system of a calculus. As shall be shown presently, this difficulty does not rule out the usefulness o the concept. The second difficulty is closely related to the first: while mathematicians possess tw languages (numbers and algebraic symbols to express mathematics, and natural language for th expressions of metamathematics), we are mainly restricted to natural language as a vehicle for bo communications and metacommunications. This problem will arise again and again in the course 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 usefulne lies in the fact that the notion itself supplies a powerful model of the nature and the degree abstraction of the phenomena we want to identify. Let us recapitulate: we are looking for pragmat redundancies; we know that they will not be simple, static magnitudes or qualities, but patterns interaction analogous to the mathematical concept of function; and, finally, we anticipate that thes patterns will have the characteristics generally found in error-controlled, goal-directed systems. Thu if with these premises in mind we scrutinize chains of communications between two or mo communicants, we shall arrive at certain results which certainly cannot yet claim to be a form 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 ar 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 suc while statements *about* these configurations are quite meaningful. Statements of this order 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 i metamathematics but also in metacommunication. For if we expand the analogy to include the tw players we are no longer studying an abstract game but, rather, sequences of human interaction th are strictly governed by a complex body of rules. The only difference is that we would prefer to u the term "formally undecidable" rather than "meaningless" when referring to a single piece behavior (a "move" in the game analogy). Such a piece of behavior, *a*, may be due to a pay raise, th Oedipus conflict, alcohol, or a hail storm, and any arguments as to which reason "really" applies wi tend to have the qualities of a scholastic disputation on the sex of the angels. Unless and until th human mind is open for outside inspection, inferences and self-reports are all we have, and both a notoriously unreliable. However, if we notice that behavior *a*—whatever its "reasons"—by on communicant elicits behavior *b, c, d,* or *e* in the other, while it evidently excludes behaviors *x, y,* an *z*, then a metacommunicational theorem can be postulated. What is suggested here, then, is that a interaction may be definable in terms of the game analogy, that is, as sequences of "moves" strict governed by rules of which it is immaterial whether they are within or outside the awareness of th communicants, but about which meaningful *metacommunicational* statements can be made. Th would mean that, as suggested in s. 1.4, there exists an as yet uninterpreted calculus of the pragmati of human communication whose rules are observed in successful, and broken in disturbe communication. The existence of such a calculus can, in the present state of our knowledge, l

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

1.6 Conclusions

If one approaches human communication with the above criteria in mind, several conceptual chang
impose themselves. These will now be reviewed briefly within the context of psychopathology. Th
reference to psychopathology does not mean that these points are only valid there, but simply that v
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 particular
radical thinkers, research into the phenomena of the mind, as is painfully known to all workers in th
field, is tremendously difficult because of the absence of an Archimedean point outside the min
Much more than any other disciplines, psychology and psychiatry are ultimately self-reflexiv
subject and object are identical, the mind studies itself, and any assumptions have an inevitab
tendency toward self-validation. The impossibility of seeing the mind "at work" has in recent yea
led to the adoption of the Black Box concept from the field of telecommunication. Applied original
to certain types of captured enemy electronic equipment that could not be opened for study because
the possibility of destruction charges inside, the concept is more generally applied to the fact th
electronic hardware is by now so complex that it is sometimes more expedient to disregard th
internal structure of a device and concentrate on the study of its specific input-output relations. Whi
it is true that these relations may permit inferences into what "really" goes on inside the box, th
knowledge is not essential for the study of *the function of the device in the greater system of which
is a part*. This concept, if applied to psychological and psychiatric problems, has the heurist
advantage that no ultimately unverifiable intrapsychic hypotheses need to be invoked, and that one ca
limit oneself to observable input-output relations, that is, to *communication*. Such an approach, v
believe, characterizes an important recent trend in psychiatry toward viewing symptoms as one kin
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 th
Black Box assumption, he sees the output of one Black Box as the input of another. The questio
whether such an exchange of information is conscious or unconscious loses the paramount importan
it has in the psychodynamic framework. This is not to be construed as meaning that, as far as th
reactions to a specific piece of behavior are concerned, it makes no difference whether this behavior
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 wa
deliberate or unintentional. This view, however, is based on *his* evaluation of the other person
motives and, therefore, on assumptions about what goes on inside the other's head. And, of course,
he were to ask the other about his motives, he could still not be certain, for the other individual mig
claim his behavior was unconscious when he had meant it to be deliberate, or even claim it wa
deliberate when in fact it was accidental. All this brings us back to the attribution of "meaning,"
notion that is essential for the subjective experience of communicating with others, but which we hav
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 previou