

Center for Systems Research ¹
Reprint 1977c

SYSTEMS OF ACTION ²

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Paper presented to the First International Conference on
Applied General Systems Research: Recent Developments and Trends,
Binghamton NY, August 1977.

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² Also appeared as:
Papers in Progress 236B-77.
Center for Advanced Study in Theoretical Psychology, Edmonton AB: University of Alberta.

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INTRODUCTION

In this paper I describe my program for the development of a General Theory of Action. The program is conceived within a wider format of a Unified Theory of Action. While in many of its parts the Unified Theory is still only a general format, I have already developed several other parts in considerable detail.⁴ To construct a Unified Theory of Conduct, I am using a method which I call Phenomenological Systems Analysis. I use phenomenology to conceptualize and systems analysis (not in the sense used by the “social systems analysts” or the “general systems analysts,” but in the sense used by computer scientists and engineers), to explain.

The Unified Theory of Conduct consists of three General Theories. Each General Theory is concerned with a different fundamental problem, employs a different method for its solution, has its own special concepts, and invokes different systems of explanation. The three General Theories are, however, unified by a common conceptual space, by a Theory of Structuring of Action, and a Theory of Aggregation of Action.

One domain of inquiry, the primary concern of psychologists, micro-economists, and theoreticians of automata, is the *conduct of individuals*, be they organisms or machines. I call the method employed for its conceptualization *Cybernetic Phenomenology*. The explanatory system invokes the logic of functional analysis (in the sense used in modern physics) and its elaborations in the calculus of variations and the various models of cybernetics. I call the proposed formalization of this domain the *General Theory of Action*.

Another domain of inquiry is the *conduct of groups* of organisms and machines. Groups are aggregate systems with all individuals and relations of interest identified. Social psychology and theories of the firm, corporations, and games are the primary sources of information about groups. The method employed for its conceptualization is *Structural Phenomenology*. I have derived the

³ Also appeared as:

Papers in Progress 236B-77.

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⁴ See “Notes” at the end of this paper.

explanatory system for this domain primarily from set theory and its various elaborations and applications, such as graph theory, lattice theory, and matrix algebra. I have named the proposed formalization of this domain the *General Theory of Interaction*.

A third domain of inquiry is the *conduct of collectives*. Collectives are aggregate systems in which all individuals and/or relations of interest cannot be meaningfully identified, either because of the number of elements and relations, or because of the heterogeneity that is of interest. I call the method employed for the formulation of collectives *Stochastic Phenomenology*. The explanatory system invoked is probability theory. Since this is a domain of inquiry largely abandoned by the present generation of sociologists, one can find the models for its formulation mainly in macro-economics, population genetics, and epidemiology.

The name for the proposed formalization of this domain is the *General Theory of Transaction*.

THE GENERAL THEORY OF ACTION

The General Theory of Action attempts to explain systems of actions, holding an individual actor constant as a point of reference and allowing situations to vary. While this statement is a highly technical abstraction, it reflects a naive curiosity about the behavior of individuals, *i.e.*, organisms - human or not - and machines.

CYBERNETIC PHENOMENOLOGY

There are two radically different, yet complementary modes of analysis of any system. The identical element - an organism or a machine - may be equally appropriately analyzed either as a *physiological system* (by applying the concepts and principles of physics, chemistry, and biology), or as a *psychological system* (by applying the concepts and principles of the behavioral sciences). Its complement, *i.e.*, environment, may be similarly analyzed either as an *ecological system*, or as a system of situations, *i.e.*, a *sociological system*. The criterial difference between the two modes of analysis is whether one conceives the phenomena under study as *systems of behavior* or as *systems of conduct*, *i.e.*, construes them as *systems of energy* or as *systems of meaning*.

To choose one of the two modes of analysis requires not an ontological belief, but an epistemological preference. Since my interest is in the meaning of conduct, and not in the thermodynamics of behavior, the above distinction and other reasons lead me to a commitment to phenomenology as the method of conceptualization. The terms actor, action, and situation will, therefore, indicate that individuals, their environments, and their activity in these environments have been conceptualized phenomenologically. The fundamental abstractions "actor," "action," and "situation" imply a commitment to a particular mode of explanation with a long, illustrious, and troubled tradition in philosophy, psychology, and social science. This mode of explanation is focused on the presence or absence of regulation in the systems under study. Within this tradition, actions are simply those exchanges

between individuals and their environments that are actually or hypothetically regulated. Actors (or situations) are those aspects of individuals (or environments) that are analyzed as sources of regulation or disturbance.

Actors, situations, and actions are terms for individuals, environments, and exchanges between them that have been conceptualized phenomenologically as systems of meanings, and explained cybernetically as systems of regulation. This conception of action is compatible with two of Parsons' definitions of action, which codify the basic terms of the classical tradition:

Action is (1) "the relation between the actor and the situation," and (2) "the distribution of energy ... subject to specific constraints."

My attempt to construct a General Theory of Action draws on the classical tradition of action analysis wherever possible. However, having made explicit the basic intent of conceptualization, *i.e.*, the abstraction of the meaning of behavior, I accept phenomenology as the only method of conceptualization appropriate in the construction of the theory. In the same vein, I adhere to the idea of constraints as the sole source of explanation. Therefore I refuse to introduce any additional, incompatible, and empirically untenable explanatory ideas, such as intentionality and goals - *viz.*, "Actor seeks goals in situations." Thus the analysis radicalizes conceptualization of action by accepting phenomenology as its sole method. It rejects pre-scientific, introspective, and romantic functionalism with its teleological fallacy for explanation of action.

Instead, it substitutes functional analysis as employed in physics. This is a step from the logical structure of Hero's explanation of the behavior of light rays as prescient and purposive, to the logical structure of modern quantum, electromagnetic, relativity, and game theories. The structure of functional explanation is very simple. A set of boundary conditions (values of a set of independent variables) constrains the behavior of a functional system (a system of intervening variables) to maintain the value of an essential (dependent) variable at an extremum. Extremum is a general term for either maximum or minimum values in a range, or for constants. While the concept "extremum" permits, on the one hand, further formal elaboration, it imposes, on the other hand, a rigorous methodological restriction. The general procedure for a meaningful functional analysis of empirical data follows. First, discover an essential variable, the value of which in fact remains constant, or at a maximum or minimum possible value. Next, identify the necessary and sufficient set of variables that maintains the essential variable at an extremum. Third, discover through naturalistic observation, or by violation through laboratory experimentation, the set of necessary and sufficient boundary conditions under which the phenomenon occurs, and without which it disappears. Functional analysis is the foundation stone of cybernetics - the rest is a combination of functional chains through loops, and the analysis of interaction between various sources of disturbance (variance).

THE FUNDAMENTAL PROBLEM AND SOLUTION

The General Theory of Action conceptualizes behavior of individuals in environments phenomenologically as *actions constrained by systems of meanings*. It constructs actors and situations as the sources of meanings, and explains action cybernetically as the *mutual disturbance and regulation by an actor and a situation*. Thus conceived, the fundamental problem of the General Theory of Action becomes: how does an actor and a situation regulate action? To solve the problem, the theory provides in essence:

- (1) a conceptualization of boundary conditions that act as sources of disturbance;
- (2) a specification of systems of intervening variables by formulating various processes into which ongoing action can be meaningfully analyzed; and
- (3) a set of essential variables and their propensities to assume extremum values that regulate — which also means, that explain — the various processes.

The General Theory of Action postulates that separate conceptualization and analysis of three special processes is necessary and sufficient for complete analysis of action. Each of the three processes expresses a different fundamental propensity of action. While embedded in the common conceptual and explanatory format of the General Theory, the analysis of each process requires also special concepts, mechanisms, and principles. Thus, the actual analysis of action is accomplished by the three Special Theories of Action.

The three Special Theories are: (1) the *Special Theory of Orientation*; (2) the *Special Theory of Motivation*; and (3) the *Special Theory of Decision*. The General Theory provides the concepts, mechanisms, and principles necessary for the description and explanation of the interplay of the three special processes. It thus becomes the theory of integration or disintegration of action.

A different schema is employed to formalize each Special Theory. The Theory of Orientation employs a schema derived from information theory, the Theory of Motivation a schema derived from the theory of elasticity, and the Theory of Decision a schema derived from the economic theory of decisions under risk. Each theory postulates a different principle regulating (*i.e.*, explaining) the relevant process. The *form* of the principle is the same in all three Special Theories and in the General Theory, but its *content* differs with each theory.

The form of the principles derives from the logic of functional explanation described above: the value of an essential variable is maintained at an extremum by a system of intervening variables only under a given set of boundary conditions. The extremum maintained in each case is of the form

reduction of the maximum possible amount of **e**,

“**e**” being the value of the relevant essential variable.

The *content* of each principle is the essential variable of the process conceptualized. It is different in each theory. The essential variables of the three processes of orientation, motivation, and decision express the fundamental propensities of action, *i.e.*, to manage *uncertainty*, *tension*, and *risk*. The special principles of action are: for the process of orientation, the reduction of the maximum possible amount of uncertainty; for the process of motivation, the reduction of the maximum possible amount of tension; and for the process of decision, the reduction of the maximum possible amount of risk.

THE GENERAL THEORY AS A THEORY OF INTEGRATION AND DISINTEGRATION OF ACTION

The General Theory of Action is composed of three Special Theories. Each describes an analytically distinguishable process of action, expresses a different fundamental propensity of action, and postulates a special principle regulating action. It is a fundamental postulate of the General Theory that all three processes are not only sufficient, but also necessary to regulate (*i.e.*, to explain) action. This represents a radical departure from prevalent monistic thinking. Furthermore, the processes are postulated to be mutually independent within systemic limits - thus, the processes are as likely to be mutually antagonistic as they are to be mutually irrelevant or solidary.

THE GENERAL PRINCIPLE OF ACTION

Having delegated most of the task of explaining regulation of action to the three Special Theories, the fundamental problem for the General Theory of Action becomes: what principle governs the interplay of the three special processes? Or, stated differently, under what conditions does action, *i.e.*, meaningfully constrained behavior, occur - and under what conditions chaotic behavior and death? Life does not generally cease because of the fulfillment of its propensities, but rather because of an inability to cope with disturbances that push the processes of action beyond systemic limits. "The vital balance," as Menninger called it, is an important characteristic of life and a partial subject of the General Theory of Action. Yet, it is the *vital imbalance* that temporarily gives rise to the phenomenon called life.

The salient features of the proposed solution are as follows. A constraint must be imposed on the independent operation of the three special processes. Their interplay is seen as a general process which manifests a propensity toward *authenticity*.⁵ Stating the constraint in the format explained earlier, the General Theory explains action as governed by a **general principle of reduction of the maximum possible amount of inauthenticity**. This principle governs the interplay of the three processes by generating experiences such as *guilt*, *shame*, and *anxiety* when inauthenticity increases increased, and by relieving these experiences or generating their opposites when it decreases. Formally speaking, experiences

⁵ The term "authenticity" is intended in its dictionary meaning, and as used in phenomenology and existential philosophy.

such as guilt are generated when special processes (or sub-processes) of action are mutually antagonistic. When the general principle operates properly, systemic limits are actually experienced.

Another way of stating the general principle of action is as a categorical imperative: above all, action must *reduce* as much as possible *any discrepancy between the state of the organism and its definition as an actor*.⁶ Obviously, there are two simple ways of reducing such a discrepancy. The state as an organism can be changed to correspond to its definition as an actor, or the definition can be changed to correspond to the state. The difference between the two ways is partly illustrated by the distinction between some mechanisms of adjustment (such as learning), and the mechanisms of defense. It is also relevant to socialization, deviance, and social control.

SUMMARY

Cybernetic Phenomenology is the method used to construct a General Theory of Action, one of three comprising a Unified Theory of Conduct. General Theory of Action pertains to conduct of individuals; General Theory of Interaction to conduct of groups (systems with all individuals and relations identified); and General Theory of Transaction to conduct of collectives (systems without meaningfully identified individuals and their relations). The three General Theories are unified by a common conceptual space, and by formal operations of structuring and aggregation. Each General Theory, however, addresses a different fundamental problem, and employs a different formalization schema and different key concepts for its solution.

The General Theory of Action draws on traditions of action analysis in psychology, sociology, economics, and philosophy. However, it radicalizes conceptualization by employing phenomenology, and explanation by employing cybernetics. Phenomenology describes action as a system of experienced meanings, while cybernetics accounts for regulatory features observed. Jointly, they permit the employment of a mode of functional analysis, commonplace in physics, but unused in sociology. Instead of a teleological conception, action is seen as governed *not* by future goals, but by past and present extremum constraints on essential variables that represent the fundamental propensities of action.

The theory postulates three such fundamental constraints, each grounding a Special Theory of Action. These are:

1. Special Theory of Orientation, governed by the principle of reduction of the maximum possible amount of *uncertainty*;
2. the Special Theory of Decision, governed by the principle of the reduction of the maximum possible amount of *risk*; and

⁶ Among the results of the process of orientation is precisely the continuing generation, evaluation, and acceptance or rejection of the two constructs: the state as an organism and the definition as an actor. For references, see "Notes" at the end of this paper.

3. the Special Theory of Motivation, governed by the principle of the reduction of the maximum possible amount of *tension*.

Processes of orientation, decision and motivation are mutually independent within systemic limits, thus accounting for the vital *imbalance* that is the distinguishing characteristic of behavior. The operation of systemic limits, and thus the integration of action, is accounted for in the General Theory of Action by the general principle of action, *i.e.*, the reduction of the maximum possible amount of *inauthenticity*.

NOTES

My general conception of human behavior is described in:

Man: Fact - construct - artifact.

Papers in Progress 248A-77.

Edmonton AB: Center for Advanced Study in Theoretical Psychology,
University of Alberta, 1977.

The compatibility of phenomenological conceptualization and nomothetic logical explanation is the subject of:

The complementarity of science and the humanities in the management of uncertainty.

In J. R. ROYCE, L. D. MOS & H. BRADBURY (EDS.). *Humanistic psychology: Concepts and criticisms.*

The Hague NL: Mouton (In press).

For a detailed outline of the overall conception of Phenomenological Systems Analysis and the Unified Theory of Conduct, *cf.*:

Outline of cybernetic phenomenology: Systems analysis of individual and aggregate conduct.

Papers in Progress 231A-77.

Edmonton AB: Center for Advanced Study in Theoretical Psychology,
University of Alberta, 1977.

The Special Theory of Orientation is described in:

Systems of orientation: A revision.

Papers in Progress 236A-77.

Edmonton AB: Center for Advanced Study in Theoretical Psychology,
University of Alberta, 1977.

Systems of discourse.

Papers in Progress 241A-77.

Edmonton AB: Center for Advanced Study in Theoretical Psychology,
University of Alberta, 1977.

The structure and function of scientific discourse.

Papers in Progress 251A-77.

Edmonton AB: Center for Advanced Study in Theoretical Psychology,
University of Alberta, 1977.

The basic conceptions of the Special Theories of Motivation and Decision are presented in:

Systems of motivation. *Papers in Progress 239A-77*.
Edmonton AB: Center for Advanced Study in Theoretical Psychology,
University of Alberta, 1977.

Systems of decision. *Papers in Progress 245A-77*.
Edmonton AB: Center for Advanced Study in Theoretical Psychology,
University of Alberta, 1977.