

PSYCHOLOGY

A JOURNAL OF HUMAN BEHAVIOR

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PSYCHOLOGY

A Journal of Human Behavior

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SYNERGETIC PSYCHOLOGY - A NEW PERSPECTIVE

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There is a permanent correlation between physicalism and psychism without any ontological hiatus. In 1958 F. Barron had the intuition regarding the applicability to the human experience of some laws extracted from chemistry, physics and mathematics of the micro-universe. In 1980, E. H. Walker outlined a type of quantum mechanics of psychological phenomena. In 1983, H. Stapp claimed that quantum effects played an important role in the functioning of the human brain. In 1985, B. Nicolescu asserted that "The microphysical and psychological worlds are two different faces of the same dynamism."

It is true that the human is influenced by the physical world, and by the interaction with the prehuman. All that happens at a human scale is in a continuous and profound interaction with all that happens at a quantum or cosmic level. Without knowing or controlling this interaction, we cannot satisfactorily know and explain human psychology.

I. Synergetics - A Nonclassical Approach to Organization

In 1971, Herman Haken laid the foundations of a new scientific orientation called synergetics - with a wide orientation (Haken, 1980). The word comes from Greek--syn (together) and ergon (action). Synergetics is the simultaneous action by several agents working together toward

the same goal, namely to carry out the same function.

Some time ago, psychology used the term *psychosynergy* in reference to the processes that are carried out simultaneously. In medicine, synergy refers to some group of muscles that act together. The term is also used in physiology, chemistry, physics, and other fields.

Haken defines synergetics as *the science of self-organization or self-structuring of systems, independently of their nature (whether physical, chemical, biological, or social) based on the organic cooperation between components*. There is a possibility that synergetics manifest at a macroscale - as an effect of the synchronous cooperation of some spatial organizations with spectacular effects in the field of system's efficiency.

In a classical deterministic universe, everything is order and symmetry. In 1960, H. von Foerster showed that the order of the self-organized systems is based on disorder. In a similar way, H. Haken validated that in synergetic systems, order stems from disorder and self-organization makes possible the transition from equilibrium that leads to "ordered disequilibrium." Synergetics avoids the stable equilibrium that leads to degeneration, and stimulates the dynamic instability and the creative disequilibrium that give an impulse to development. Therefore, the fluctuations, perturbations, and

"noise" become sources of creation and development. The cooperation of the components can be stimulated.

II. The Object and the Method of Synergetics

Haken has demonstrated the existence of self-organization phenomenon in a laser with a gas system, in which the transition from the *lamp* condition (when the movement of the atoms excited by the electromagnetic field is disordered) to the *laser* condition (when the movement of the atoms becomes ordered) constitutes a leap in the system's efficiency. If we could "hear" the light, explains Haken, we would realize that it makes an indistinct noise, just like the sea waves, while the laser would give one single note of perfect clarity.

Thus, synergetics may be characterized by the following features:

- self-organization (through the synchronous cooperation of the components);
- the "behavior" of the systems far from any equilibrium;
- "the phase transitions" of the system (exceeding a critical threshold); order rooted in chaos.

Following is a brief description of the methods of synergetics:

(a) The most important method is *to approach separated results in the correlation of different systems* (through a psychological process of nonspecific transfer);

(b) *Analogy* allows to apply synergetics to technology, medicine, sports, etc. H. Rugg (1963) viewed the human psychism as an architectural structure in which every component had a specific role in creation. According to Rugg, the creative process includes both psychical spheres and physiological components. Hence, we could think of a synergetic psychology projection.

(c) Synergetics develops a *methodology* that includes principles transferable to other fields:

(C1) **The nonlinear causality principle.** It should be mentioned that there are also mathematical nonlinear models that have some kind of quasi-periodicity subdued to some "scaling laws."

(C2) **The interaction principle** whose effect consists in the synchronous cooperation in and between the systems. Let us note that psychology has emphasized a possible correlation between human activity psychorhythms and the cosmic rhythms.

(C3) **The efficient synergy principle.** Efficiency embodies qualitative rather than quantitative growth through the promotion of some combinatorial mechanisms.

(C4) **The slaving principle** consists in selecting a small number of features capable to correctly and completely describe the synergetic system's behavior; thereby the unstable variables dominate the stable variables.

(d) The optimal self-organization of the synergetic system generates "a determined chaos" thus amplifying the value of the creativity resources of the components. Synergetic systems admit some kind of information strategy as *feed within--superior to the feedback or the feed forward*. The optimal self-organization and optimized cooperation induce the synergetic system to become a *system of the systems*.

III. From the General Theory of Systems to the Theory of Dynamic Systems

1. **From the structural to the organizational paradigm.** The general theory of systems (GTS) has been obsessed with the promo-

motion of system structure, *leaving aside the element* (the component), while synergetics - as a continuation and overfulfillment of the GTS - deals with the explanation of the inner mechanisms of the elements' interaction. Thus, synergetics points out the function of the system and *not its structure*, as the GTS does.

2. From organization to self-organization. The GTS and cybernetics are theories of organization, whereas synergetics is the *theory of self-organization*. Morin (1977) demonstrated that GTS and cybernetics ignore this specific characteristic of the living organization, i.e. self-organization. Together with Prigogine's theory of dissipative structures Prigogine & Stengers, 1979) and R. Thom's theory of catastrophes Thom, 1972), synergetics promotes a theory of dynamic systems which explains organization in terms of a *process* and not in architectural terms.

IV. The Epistemological Valencies of Synergetics

1. The creative and integrative synthesis. Synergetics has an open and synthetical attitude because it deals with the inner self-organization problem and the interdependence between different complex systems in various fields. Synergetic opens the integrative and creative synthesis horizon in contemporary scientific thinking by demonstrating that only the comprehension of all connections between components would enable us to understand the whole universe. Thus, synergetics shows its real quality of being the *metascience* of human integration in the universe.

2. Chaos too may become a study object of science. Classical science has dealt with the description of scientific laws and concentrated on concepts such as order, neces-

sity, essence. Morin (1977) wondered why people could not understand that pure order is the most extraordinary madness of all, and that abstraction is the ugliest death among all.

Synergetics demonstrates that the order stems from chaos through *the phase transition*. The discovery of the *chaotic order or deterministic chaos* is a real conceptual revolution in science. Morin (1982) laid these ideas at the foundation of a *postmodernistic epistemology of the complexity*.

3. The creative disorder. Unlike classic science, synergetics considers that disorder is not destructive. Moreover, synergetics may also be creative, as opposed to frozen order. To use a metaphor, the flame-like order is preferred to crystal-like order. Synergetic disorder is creative because it permanently supports a flexible development and regeneration of the system.

4. The diffusion or rapid communication between components is characteristic to synergetic systems. This phenomenon favors the combinatorial proliferation of mechanisms which amplify the creative valencies of components. We could talk about a new type of coherence based on a mechanism of communication between components as a result of self-organization activity. In this respect, every component becomes able to "feel," to "see" what happens to the others.

V. Synergetic dialectics

Synergetics enriches the concept of interaction because cooperation is *an interaction aimed at a purpose*. We could speak about a synergetic interaction in the case of a dynamic system promoting synchronous cooperation (i.e., *working together and at the same time*). Synergetics too takes into account the *coopera-*

tion between interactions, and not only between components that interact. Thus, we believe that synergetics contributes to a nonstandard dialectic ascension of thinking. In synergetic dialectics, every particle is an inter-particle (i.e. every component is an intercomponent); every part inherits its fertility from its dynamic movement and from multiple relations with the other parts.

VI. Possible Transfers from Synergetics to Psychology and Conversely

A. Particularities of synergetic psychology.

(a) In a project of synergetic psychology, the following problems may be of interest:

1. Cooperation of different components of the *human psychical system* (HPS) and other pre-human systems (e.g. macro-universe and the quantum universe);
2. Synchronism of the actions and operations;
3. Coherence and concentration in the human psychical system;
4. The *phase transitions* in insight phenomena;
5. The *stimulated emission* in problem solving, learning, intrinsic motivation, etc.;
6. The slaving principle used in a projection of experimental models;
7. The development of the HPS through self-organization;
8. Improvement of psychic structures by complementarity, such as order-disorder, equilibrium-disequilibrium, etc.;
9. The ordered disequilibrium function in successful learning, thinking, memorizing, etc.

(b) The psychic system and the human personality. We consider it necessary to adapt synergetics to the specifics of organization and functioning of human psychism.

Synergetics may be an important methodological guide in pursuing research in the field of humanities, whose objects are open, complex, and dynamic systems. Among all these sciences, the study-object of human psychology is the most open, complex, and dynamic system known so far; this system is the human psychic system (HPS). Given the nature of the object, we consider that synergetics might have much to learn from the organization principles of the HPS.

Although HPS is obviously a dynamic system never in a perfect equilibrium, it sometimes has periods of relative stability (i.e. "consonance," "relaxation," etc.). In 1982, C. F. Weizsaecker demonstrated that in man's case, building up of structures starts off not only in the "far-from equilibrium" state, as P. Glansdorff and I. Prigogine asserted, but also in the "equilibrium" state (Weizsaecker, 1982).

The human personality is a *dynamic oversystem, self-organized* because of the combination of a great number of systems with retroactive capacity – the cognitive, emotional, motivation systems, etc. The multiplicity of these systems is by no means homogeneous and constant. Moreover, this multiplicity may explain the coexistence and coaction of biological and psychical elements in the personality framework, the cooperation and rivalry between conscious and unconscious. Ey considered conscience as being the organization of human psychic activity (Ey, 1963).

(c) The specifics of the cooperation in the frame of human psychism. The first cooperation we could speak about is subject-object cooperation – a complementary relationship between two opposites. The projection of the HPS refers not

only to the reflecting capacity of the object, but also to its relationships with the subject through self-reflection. In psychism, cooperation is in the same time co-participation, co-order, and co-regulation. Cooperation in the HPS may be successive or simultaneous. When cooperation is simultaneous, or "local," it may lead to global cooperation. For example, in the creativity process, cooperation may be first limited to the level of cognitive components, and gradually may extend and multiply cognitively, motivationally, emotionally, volitionally, etc. But is such synergetic cooperation between all these processes and functions possible? Human learning too may be based on intracognitive cooperation (i.e. memory, thinking, imagination). However, at the highest level, human learning is a general psychological activity that conjectures cooperation between all subsystems of the personality.

As J. Piaget demonstrated, intelligence works not only with operations but also with second-order operations. Similarly, intrapsychical cooperation may also be second-order cooperation. In the frame of the HPS, *cooperation may be generative* i.e., generate cooperation. The process of generating cooperation is a genuine process of creation.

Cooperation is developed through different types of transfer. Due to the fact that we deal with a "human general operator," as Paul Popescu-Neveanu (1978) pointed out, the transfer is a psychological action of global cooperation. No internal or internal-external interaction can be understood in the absence of transfer. As an example of second-order cooperation, we experimentally emphasized the existence of a *transfer of the transfers*, proper to the "structural synergetic learning."

In synergetics, the emphasis is on cooperation in the absence of supporting rivalry. In psychology, the presence of both cooperation and rivalry (between different components of the HPS, such as sensorial - logical, emotional - cognitive, conscious - unconscious, etc.) is possible.

Complementary cooperation and rivalry demonstrate the permanent existence of tension between HPS components. As long as the HPS is a dynamic system, cooperation cannot reach the fusion point; there will always remain dynamic tension between components. The cooperation of the HPS may exist between divergent (heterogeneous) or convergent (homogeneous) components.

While J. P. Guilford (1975) stressed the difference between convergent and divergent thinking, the Romanian psychologist M. Bejat (1971) showed that cooperation between the two kinds of thinking in creative activities is possible. The application of synergetics to *social psychology* might lead to finding new cooperation strategies within groups, a fact that may determine growth of the group's functionality and stimulation of the individuals' achievement. *Transpersonal psychology* pleads for transpersonal cooperation. A. Maslow (1970) elaborated the concept of the *synergetic society* that favors fusion of selfishness and selflessness beyond the opposition between the two of them.

(d) **The specifics of synergetic organization in psychology.** More than in physics, chemistry, or biology, in human psychology it is necessary to consider what F. Jacob (1970) called "the organization hidden behind the visible structure" or what D. Bohm (1987) called "implicated order." Within

human psychism, the synergetic organization involves the visible order (in the behavior) and the invisible order (conscious or unconscious) in a unique coherence. All that is hidden and that is more profound may be more important than what is at the surface.

In human activities (e.g. learning, sports, work), the emotional processes are more "visible" than motivational processes; the latter are more profound and more important. Intrinsic motives (e.g., epistemic curiosity, cognitive interest, attraction for the problematic and unknown) are more hidden than extrinsic motives (e.g. reward, punishment, etc.)

H. Haken speaks about synchronous and concentrated organization of components. Within human psychism, optimal concentration is relaxed. In 1963, the American psychologist H. Rugg formulated the *theorem of relaxed concentration*. Relaxed concentration refers to an optimal state that leads to a profound insight and to the occurrence of a multitude of ideas. In 1961, G.W. Allport considered personality as an open system which acts according to the principle of organization in expansion. In 1981, the Romanian philosopher C. Noica wrote: "The human being is concentration by intellect on the one side and expansion by reason on the other side." The dynamic organization of the personality is not only concentration, but also expansion.

(e) At human psychism level, self-organization is a logical trait much too complex in motivational self-organization. As A. Maslow (1970) explained, the increase and development motives of developing self-organization escape the elementary homeostasis' attention and allow

sonality to reach an optimal development up to the "self-actualization" level.

Conscious self-organization is mainly achieved through volitional processes. The self-organizing factor with the highest efficiency is self-science, which may be considered the highest form of psychism. As a psychical axis of the personality, self-science achieves the optimal and permanent self-organization. Any psychical self-organization must lead to development and self-development. The main engine of the development is the human need for self-achievement.

Beginning with 1959, American humanist psychology (represented by A. Maslow, and C. Rogers) and E. Fromm developed the concept of self-actualization - the main impulse of creativity, according to which man becomes "master of his own conscious" (Ey). Self-achievement is synonymous to the entire functioning of the person. Psychical self-organization is essentially self-discovery, self-development, and self-achievement.

(f) **Stimulated Emission in the HPS.** There is a need for stimulating actions which may cause and entertain synergism. Psychology considers that the main stimulator of psychical activity is motivation. However, this role may be also played by affectivity. Within the thinking process, the most important "stimulated emissions" are the problem, question, and hypothesis.

Psychology demonstrated that if stress rises above a certain critical level, the quality of psychical activity diminishes. However, stress may be considered as a "stimulated emission," which is favorable if it reaches an optimal intensity, or unfavorable if its intensity rises

above certain limits.

(g) The Slaving Principle and the Psychological Experiment.

Understanding and applying the synergetic slaving principle are very important for projecting and developing an *optimal experimental model*. This principle requires the experimenter to separate the variables of an investigated system into *dominating variables* (unstable and dynamic) and *dominated variables* (stable and rigid). Therefore, the experimenter simplifies facts and concentrates on essential aspects, selecting a small number of items and variables. Synergetics assumes that unstable variables dominate stable variables. The psychological experiment has an interest in both variables and functional nonvariables. In addition, the psychological experiment considers the possibility of dominating and controlling the other non-variables (whether functional or nonfunctional) without losing information related to them.

B. Arguments in Favor of Synergetic Psychology in My Own Research

(a) In the new modality of human learning experimentally substantiated and called by us *structural synergetic learning*, we understood that more than the accomplished organization, *the organizing organization*, is the fundamental operation which is capable of stimulating development, progressive construction, and self-achievement of the personality (Manzat, 1986). Therefore, human learning may become not only structural but also structuring.

(b) Within the process of structural synergetic learning, dysfunctionā order and functional (creative) disorder may also exist. The main

principle underlying structural synergetic learning theory is *the principle of the complementary relationship between order and disorder*, which states that order acts and even co-acts with disorder. Within structural synergetic learning order, there is no equilibrium state, but a constructive state according to which order is constituted and exists through disorder by passing from one state to another.

(c) *The principle of efficient synergy*, which is fundamental in structural synergetic learning, assumes optimal and optimizing cooperation of all stages and structures of the HPS; these stages and structures sustain each other through cooperation.

(d) The *phase transition* from synergetics was applied in the research of specific transfer functions in structural synergetic learning. Transfer from learning may be correctly understood by applying the analogy with the *phase transition*.

(e) In a study on *constructing and operating of scientific concepts*, we have considered this concept as being similar to a synergetic system. Through synergetic - cooperation relationship with other concepts, synergetics develops and enriches its own organization. In addition, synergetics amplifies its capability as organizer-transformer of the concepts with which it cooperates in the conceptual operational system frame (Manzat, 1988).

Organization of human psychism is based on synergetic dialectics, as opposed to holism and merism (both of which are one-sided concepts); however, organization of human psychism accepts the complemen-

tarity of holism and merism.

Synergetics pleads for a harmonious vision of the world which should be reevaluated in human psychology studies as well. Psychological harmony never stems from order or symmetry; symmetry is too static. Dynamism stems from tearing apart symmetry and asymmetry. Recent studies in neuropsychology (Sperry) have proved the functional asymmetry of man's cerebral hemispheres. Essential for man's inner harmony is the polarity symmetry-asymmetry.

Synergetics opens up new horizons to psychological research not only concerning its description and interpretation, but also concerning human development. Synergetism may also favor the theoretical and experimental steps in psychology. Furthermore, psychology too can provide new directions of development in this area.

Promoting the development of a dynamic systems theory and being an impulse for a post-modernistic epistemology of the complexity, synergetics should retain the human psyche as the most dynamic and complex system of all. Psychology and medicine have suggested the phenomenon of synergy. It is up to profound research of self-organization at the human level to ensure progress of study in the area of synergy.

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