

Cognitive Processes and Psychopathology

The Academy of Psychoanalysis held its second joint meeting with the AAAS in Montreal, 26–27 December; the meeting was cosponsored by the American Psychiatric Association and section N, Medical Sciences. The impetus for this symposium arose from the upsurge of interest in cognitive processes, the greater knowledge available from diverse sources of investigation, and the implications of such knowledge for the theory and practice of psychotherapy.

Harley Shands (Downstate Medical Center) stressed the timeliness of this endeavor. A signal achievement of Freud was to point out that the processes of human intellectual functioning are as subject to basic involuntary regularities as are the processes of physiology. His emphasis upon the unconscious was part of a general movement that reached another high point in Cannon's concept of the "wisdom of the body"; both these systems emphasize the adaptive nature of automatic processes characterized by regularity, with emphasis upon the very slight degree of conscious control that the human being can exert over his own "machine."

The psychoanalytic movement has tended to emphasize the affective component of these processes much more than the intellectual one, following an outbreak of anti-intellectualism early in this century. This trend concerned itself with the demonstration of deterministic movements in many fields of science, with the complete dismissal of teleology and the triumph of cause-effect thinking.

In recent years there is much evidence of cyclical movement in the other direction, which is apparent in the development of computers. The communications engineer now embraces the concept of purpose in the design of his machine; many apparently affective processes of decision-making can be imitated by efficient use of the purely "intellectual" potentials of the computer. Evolutionary trends in biology are further enlivened by the demonstration that even a simple data-processing instrument like Walter's *Machina speculatrix* can show unpredictable behavior.

From a totally different source, Shands continued, Piaget has demonstrated that a purely cognitive system

of "genetic epistemology" can be constructed which has remarkable implications for the understanding of sequential changes in human development. In marked contrast with most psychological systems, Piaget's relies upon a conception of adaptation borrowed from biology; this concept is entirely divorced from the central notion of motivation which afflicts most psychological systems with a voluntarism that entirely contradicts the basic idea of the unconscious. Using the idea of motivation introduces an insoluble contradiction into psychological theory in somewhat the same way that the idea of creation introduced an insoluble conflict into biology.

All of these considerations have obviously important implications for psychotherapy, the concept of thought-disorder as the pathognomonic feature of schizophrenia, the use of computer technology, and the influence of computer theory on psychiatry, as well as the nature and structure of psychoanalytic theory itself.

The program that followed was built around four main presentations highlighting contributions from psychoanalytic theory (Silvano Arieti, New York Medical College), holistic theories of psychopathology (Eugenia Hanfmann, Brandeis), information theory (J. G. Miller, University of Michigan), and genetic psychology (Barbel Inhelder, University of Geneva). These subthemes were further developed by panels representing many behavioral disciplines.

Arieti reviewed the contributions of Freud and of the Freudian school and went on to consider more recent psychoanalytic contributions. Despite the historical importance of Freud's discovery of two modes of thought, further progress toward the understanding of cognitive processes was blocked by concern with primary process as an expression of unconscious motivation. Subsequent studies were conducted within a framework of energetics rather than cognition; this also appears true for the more recent contributions to ego psychology which tend to bypass a direct concern with cognitive forms and mechanisms. Arieti stressed the importance of the microgenetic (Werner) dimension (the immediate sequence of necessary steps inherent in the occurrence of a psychological process) and the prior apprehension of objects in terms of parts rather than as wholes.

In discussing preverbal levels of cognition, he outlined the stages from exocept (sensorimotor thinking) to the image (early symbolization) and the endocept (imageless thought or preconscious thinking). Thinking at this stage is characterized by adualism (Baldwin), the inability to distinguish between inner and outer reality. With the acquisition of language, the jump to paleologic or prelogic occurs and is organized along the lines of establishing identity upon the basis of identical predicates rather than on the basis of identical subjects. On conceptual thinking, Arieti emphasized the degree to which cognition has been underestimated as a psychodynamic factor owing to emphasis on the primitive and the unstructured.

The panel focused on the historical relevance of Sullivan's contribution to cognitive theory (Rose Spiegel, William Alanson White Institute), the importance of the work of Sapir and Langer in understanding the hierarchic structure of cognitive processes (M. R. Green, William Alanson White Institute), and the need to consider the totality of the cognitive situation in its motivational, social, and communicative aspects as well as in its logical and perceptive aspects (J. P. Spiegel, Harvard Medical School). Also discussed was the danger of developing theories of human behavior based on an objective zoomorphism, that is, a point of view that overlooks the manifest differences between subhuman and human behavior, minimizing the role of symbolic activities in the life of man in favor of emphasis on the gratification of primary drives (Ludwig von Bertalanffy, University of Alberta).

Eugenia Hanfmann's paper outlined the contribution to cognitive theory of a holistic viewpoint, as exemplified in the work of Andras Angyal. This work further developed the concepts of autonomy and homonomy (mastery and love), the biosphere (the totality of subject-object interactions), the logical properties of systems, and the understanding of part functions in the light of organizational principles governing the whole. A neurosis itself is a system, a complete way of life, an organization with its own vitality. Basic to the neurosis is the state of partial isolation from the world. "The world that can be neither mastered nor communicated with remains alien and threatening." Growth potential becomes diverted to the maintenance of the iso-

lation, said Dr. Hanfmann. Health and neurosis are viewed as two dynamic *Gestalts* organizing the same material, each according to its own system principle and each competing for dominance. The possibility of each personal event having a double meaning, depending on whether it takes place within the *Gestalt* of health or of neurosis, is referred to by Angyal as the principle of universal ambiguity. The intra-organismic struggle is not between ego and id but between two incompatible orientations, two major ways of adapting to life, Hanfmann continued. Cognitive incapacity in the child leads to failure in differentiating appropriate distinctions concerning traumatic stimuli, and hence predisposes the child to premature and ill-adaptive generalizations.

E. A. Weinstein (Washington School of Psychiatry) took as a point of departure the importance for any study of behavior of defining the relations between language and the physical world. Dynamic psychiatry, with its own unifying tendency to connect words with things or events, often bypassed the more appropriate search for meaning within the current context. Weinstein drew attention to the congruence of Angyal's thought with that of Mead and Sapir, all of whom regarded perception and emotion as cognitive processes; both Sapir and Angyal believed that it is not drives and wishes of which one is aware but of the organizing principles. Another approach to an evaluation of holistic theory was made by Joseph Barnett (William Alanson White Institute), based on examination of the conceptual structure of psychoanalytic theories through consideration of their definitional bias: atomistic theories define segmental entities, for example, they define drives as causes (Freud); holistic theories define global entities (Angyal, Horney, Adler); experiential theories define action and process (Sullivan). Holistic theories tend to reveal a consistent cognitive bias; they emerge in a terminology emphasizing the cognitive posture and style (life style, character armor, identity, *Gestalt*) and cognitive operations (abstraction, generalization, learning). Clinical studies were introduced by D. A. Bloch (Jewish Board of Guardians), illustrating how cognitive processes as a kind of "permissible calculus" define and structure the permissible world of the child.

Computer analogies as well as the

relevance of general-systems theory and of information theory were introduced by Miller in a comprehensive historical survey and contemporary review of both lines of investigation. The validity of a general-systems approach rests on the sharing of a common environment, a genetic chemical source in protein, and the existence of formal identities indicating similar functional arrangements. Miller then dealt more specifically with the concept of information as the nonrandom patterning of matter and energy. He outlined the lines of congruence between the many categories of information-processing subsystems (input transducer, channel, decoder, learner, memory, decider, encoder, output transducer) and the subsystems involved in the general processing of matter-energy. He introduced the concept of information-input overload and the various adjustments that can be made to overload (omission, queuing, filtering, approximation, multiple channels, escape), and described some of the suggestive analogies to mechanisms of defense.

Joseph Jaffe (Columbia University) confined his remarks to systems at the level of small groups, the chief concern of the clinical psychiatrist. He outlined an area of psycholinguistic research in which redundancy estimates of verbal coding are utilized as an index of relatedness (cognitive congruence, social distance) between interacting speakers. Ulric Neisser's (Brandeis) discussion raised questions concerning the adequacy of the computer model to deal with the problem of motivation. He suggested that, in cognitive theory and information theory, motives arise only to explain a state of input, whereas in dynamic theory one starts with motives and purpose and then studies their vicissitudes. Seymour Papert (Massachusetts Institute of Technology), dissenting, dwelt on the role of the computer in suggesting certain ways of thinking and in uncovering the processes involved in the operation of intelligence. Papert suggested that questions of motivation cannot in principle be set apart from investigative work with computers, and that the proper role of cybernetics will be to provide the kind of abstract and formal framework out of which a greater abundance of useful models will emerge. Shands emphasized the contextual, transactional, and developmental aspects of the transfer of information. Information is always contained

in a context and the amount transferred always relates with a given transactional background; he referred to the treatment process as "enhancing colinguisticity."

In the final session on developmental aspects of the problem, Inhelder described new directions taken by the Geneva School in studies of the reasoning of mental retardates, of cases of senile dementia, of children and adolescents of the "pre-psychotic" type, and of dyspraxic, dyslexic, and dysphasic children. She reviewed the basic contributions of Piaget and his collaborators on the evolution of cognitive activity in ordered stages, an evolution manifested in the formation of operations of thinking. These operations originate in the sensorimotor activity of the infant and culminate at adolescence in integrated structures which are partially isomorphous with formal logic.

An operation is defined as an action capable of occurring internally and of being reversible. Notions of conservation (for example, the invariability of quantity of matter) can develop only on the basis of such reversibility. Inhelder differentiated the operative aspects of thought from the figurative aspects which pertain to symbolic imagery and language. In the interplay between these two aspects, cognitive operativity influences the formation of symbolic imagery by establishing meaning; once the figurative signifiers have been developed, they in turn favor the acquisition and fixation of further information. Reproductive imagery is transformed into anticipatory imagery by virtue of the mobility achieved under the influence of operative thought. Experiments clearly indicate the close parallel between the use of language and the operational behavior of the child in conservation tasks. Just as images become mobile and adequate, language becomes economical and structured under the impact of operational progress.

Brief reference was made to current investigations of pathological phenomena. In the case of retardates, reasoning is characterized by the blocking of operational activity at different stages of development; sequences in development occur at a slower pace and traces of previous levels remain.

The deterioration of thought processes seen in patients with senile dementia corresponds with those of children at certain levels of development,

ranging from some impairment in formal reasoning to the more severe breakup of operativity. On the basis of observations of prepsychotic children and their tendency to assimilate stimuli in an egocentric manner, it becomes obvious that development of operativity depends not only on internal regulations, but requires a motivational force directed toward the adaptation to reality. These studies have supported the general dictum that pathological phenomena of thought become more comprehensible when analyzed in developmental perspective. They have shown that operational construction, although it directs the progress of symbolism, is relatively independent of its symbolic support. The fact that cognitive operations disintegrate in an order that inverts their evolution suggests that development of operativity is an integrational process.

Certain difficulties in relating the Piaget system to clinical problem areas were explored by E. P. Dulit (Albert Einstein College of Medicine). The two specific issues he raised had to do with: the relative lack of emphasis in Piaget's work on the concept of heterogeneity, that is, the coexistence at one time of functions on more than one level; and the need to differentiate between the static imagery of which Piaget speaks and the creative role of imagery in the life of the adult. Both issues appear to derive from Piaget's primary interest in genetic epistemology, rather than from totality of the child's experience. Dulit took exception to Piaget's analogy of motivation as the motor which runs a movie camera; he pleaded for understanding of the kind of model that would enable us to understand more adequately how motivational and cognitive processes interdigitate.

E. H. Auerswald (Wiltwyck School for Boys) spoke of the relevance of the conceptual scheme of Piaget and Inhelder to the dysocial behavior traditionally considered as disorders of ego: crime, delinquency, alcoholism, and drug addiction. One prominent finding from studying the families of delinquents was the very striking deficit in conceptualization common to all members of a family. Parents were often unable to express well-differentiated concepts of space, weight, size, volume, or shape; they were equally lacking in concepts that allow for the organization of time into sequential events. The children in turn live in the actions of the moment, not in

thought, as if they had failed to develop the cognitive tools to enable them to reason before acting; they also appear to lack capacity to generalize experience by analogy and to categorize past experience in a way that makes meaningful the relations between past, present, and future. This appears to be a situation in which social phenomena account for the deficit in operativity.

B. Kaplan (Clark University) briefly compared the genetic psychology of Piaget and the comparative developmental approach of Werner, emphasizing the latter's early interest in psychopathology and his search for underlying archetypal patterning that applies to the pathological as well as to the normal. Multiple modes of personality organization are comprehended under a unitary principle, and pathology may be ultimately resolvable into two archetypal forms: a pathology of the understanding and a pathology of the imagination.

Shands, despite admiration for the Piaget system, also indicated its shortcomings in terms of meaning to the clinician. He referred to it as an ice palace of marvelous theoretical insights which manages to freeze the people out rather comprehensively. Piaget's studies are specifically oriented along developmental lines, whereas the problems confronting the clinician involve understanding of the particular maneuvers into the future that characterize the behavior of patients.

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Pest Control: Chemical, Biological, Genetic, and Physical Means

The 1964 meeting sponsored by Section O (Agriculture) of the American Association for the Advancement of Science was held on 27, 29 and 30 December 1964. Because of continued public interest in pest-control problems, a symposium consisting of six half-day sessions was developed so that leading authorities in the field could discuss the merits and potentialities of the various means whereby pests, both invertebrate and vertebrate, might be controlled. Of the various methods currently employed for the control of pests, conventional type pesticides constitute the chief means for controlling pests of agricultural importance.

The problem we face in the use of pesticides for the control of the many pests that affect our economy, our health, and general well-being can be briefly stated by quoting a paragraph from a special address delivered by Nyle C. Brady (U.S. Department of Agriculture):

We cannot live without pesticides in this intensely developed man-made society of ours. We could not maintain our agriculture, our health, or our present high levels of comfort and living. But, we are finding it increasingly difficult to *live* with pesticides.

The recognition that we must maintain effective pest-control procedures and at the same time strive to achieve control with a minimum of adverse side effects to man and his environment has led to an intensification of research efforts on more selective chemical pesticides and on various other approaches to pest control. Such research emphasizes the development of procedures that will avoid or minimize certain risks and side effects that are inherent in the use of broad spectrum pesticides.

It is generally recognized that biological agents, including parasites, predators, and disease organisms, play major roles in keeping many potential pests under natural control. How to use these natural control agents more effectively was the subject of discussion in two of the six sessions in the symposium. The application of genetic principles in the breeding and selection of crop varieties which resist or tolerate attack by pests represents another of the important means of pest control, especially diseases of agricultural crops. Accordingly, several topics dealing with breeding of plants and animals for resistance to pests and diseases were included. Suitable equipment is an essential part of the effective and efficient use of pesticides, and for applying cultural measures for the control of weeds and other pests. Thus engineering principles play a vital part in the application of pest control measures. Insects and other pests respond to various physical phenomena, such as light, other electromagnetic radiations, and sounds, thereby offering opportunities for pest control by such physical forces. One of the six sessions was devoted to a consideration of physical means for pest control.

The symposium brought together outstanding scientists having competence in several broad scientific dis-

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