Approaches to Knowledge and Understanding of Schizophrenia

by William T. Carpenter, Jr.

Abstract
The author describes the breadth of theories, concepts, and inquiry in psychiatry, and notes areas of major impact on medicine, the brain sciences, and severe mental disorders. Conflicts that sometimes divide the field are often based on a misunderstanding of competing methods. The major explanatory methods are based on the disease construct and questions of mechanism on the one hand, and the life story approach and questions of meaning on the other. Instead of being mutually exclusive alternatives, these methods are complementary and each can enhance the other. The author briefly defines schizophrenia, and notes the major advantages and assumptions associated with choice of a medical model. He argues that a broad medical (the biopsychosocial) model has advantages over more reductionistic models, particularly in accounting for alterations at one level (e.g., biological) associated with perturbation of the system at another level (e.g., psychological). In concluding, the author finds new directions emerging from several disciplines and a mature scientific psychiatry prepared to capitalize on converging opportunities.

The mental health profession has much to be proud of in its clinical, scientific, and scholarly achievements. It is a field in which powerful explanatory theories have been developed which plumb the depths of the unconscious mind and pursue the evolutionary development of biological systems. Constructs and paradigms have been established to elucidate complex human behaviors through intrapsychic mechanisms on the one hand (Freud 1900/1953, 1923/1961), and ancient brain physiological mechanisms on the other (MacLean 1954, 1973). Biology and medicine have been influenced by the powerful revisions in concepts implied by terms such as “psychoneuroendocrinology,” “neuropsychopharmacology,” and “psychoneuroimmunology.” Nowhere in the medical sciences has a basis for the practicing clinician’s simultaneous understanding of complex social systems and individual biological systems been more carefully cultivated. Mental health professionals made early, fundamental contributions to the fields of neuroanatomy and neuropathology, and have now played a leading role in the explosion of brain sciences associated with the era of neuropsychopharmacology (Lipton, DiMascio, and Killam 1978; Meltzer, in press). This breadth of intellect is not only represented in theory addressing multiple levels of abstraction in human functioning but also in a clinical specialty placing emphasis on the doctor/patient relationship and the exploration of the subjective and inner experiences of another person. Clinical observation is the cornerstone of scientific investigation in psychiatry, and Jaspers (1963) established phenomenology as the central discipline in the study of psychopathology. Throughout the history of psychiatry, the brain has been the bodily organ of central interest, but psychiatry must address disease in the comprehensive framework of human function with ramifications for biological, psychological, and social systems. McHugh and Slavney (1983) point out that psychiatrists are not distinguished from other medical specialists because they are concerned with “minds” rather than “bodies.” It is

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their focus on illness manifestations which appear in thoughts, perceptions, moods, and behaviors rather than in skin, bones, muscles, and viscera that defines the clinician concerned with mental illness.

We work with patients suffering from illnesses that are highly stigmatizing, and the stigma has a direct impact, not only on patients and their families, but also on the professionals and institutions traditionally responsible for clinical care and research for these diseases. For this reason, major breakthroughs in clinical accomplishment often receive little attention. Formerly a major cause of psychosis, general paresis of the insane is no longer the scourge of the Western world because the etiology, treatment, and prevention of tertiary syphilis has been defined. The major paradigmatic shift from attributing mental aberration to religious or moral attribution to explaining it as a medical illness has been a profound accomplishment, although the fight against stigma has not yet been won. Changes in clinical therapeutics and health care policy have combined to create an unprecedented alteration in hospital utilization. State hospital beds in the United States (largely for patients with schizophrenia) have dropped from over 550,000 in 1955 to less than 200,000 today, in spite of the fact that the population at risk has grown considerably.

Despite accomplishments, such as the above, our scientific and clinical work has just begun. The community has not been prepared for the massive influx of deinstitutionalized patients, and our therapies are what Lewis Thomas (1974) refers to as part-way technologies. Etiology and pathogenesis of the major illnesses remain enigmas, and there is insufficient knowledge on which to base preventive strategies.

Considering the rich conceptual and scientific background supporting mental health professions, there has been a major shortfall in the integration of knowledge relevant to schizophrenia. This is partly the result of both explicit and unwitting ideological commitments that have created a nonproductive and non-scientific polemic between opposing advocates of nature versus nurture, between the biophobe and the psychophobe. This phenomenon relates to an era in American psychiatry in which theory often became dogma and students were likely to be ideologically committed before they were in a position to understand fully the concepts, methods, and evidence associated with theory. Although social, psychodynamic, and biological concepts are neither incompatible nor mutually exclusive in psychopathological inquiry, advocates of one position tended to disdain the other positions. To an important extent, this may have been based on a failure to appreciate our two major pathways to knowledge (i.e., analysis of form and analysis of function) and the basic concepts guiding these explanatory analyses (i.e., disease, dimensions, behaviors, and the life story).

McHugh and Slavney (1983) provide an informative discussion of these issues. To assimilate the plethora of clinical and research data bearing on schizophrenia, we must recognize that there are competing methods of explanation and that these methods vary in focus (e.g., meaning vs. mechanism) and methodology (e.g., life story vs. correlation). Since they address different, but important, attributes of human disease, only an incomplete understanding of schizophrenia can be discerned from any one perspective.

McHugh and Slavney (1983) point out that many of the ideological battles and misunderstandings in psychiatry emanate from a failure to appreciate how we know what we know. Many workers seem to embrace one method to the exclusion of the other, and then fail to assess the limits of the method they have chosen. Conflict and misunderstanding in the field would be reduced if the following premises were acknowledged: (1) The competing explanatory methods are not mutually exclusive; (2) the development of knowledge is enhanced by the application of both methods; (3) both methods have strengths and limitations, and their natural focus is different; and (4) neither personal meaning nor correlational association should be confused with cause in the etiological sense.

The life story method of clinical observation develops an understanding of psychopathology through a personal history characterized by an appreciation of the individual's formative experiences, the personal manifestation of illness, the setting in which illness is manifest, the reaction of the personality to the illness, and the social response it evokes. The meaningful interplay of psychopathology, personal adaptation, and socioenvironmental factors over time is discovered through the life story method. It is the ideal framework for understanding the development and meaning of illness. Causes of illness in the sense of etiology are usually not established with the life story method, but it is a rich source of information from which to derive etiological and mechanistic hypotheses. The tendency to assert causation where only temporal sequence and personal

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1In emphasizing this point, I am indebted to Dr. Philip Berger.
meaning can be ascertained must be stringently avoided. The life story method has been particularly important in psychological and sociological inquiry, but it is also the principal tool in phenomenology and is indispensable in the care and study of the schizophrenic patient.

The analysis of function associated with the life story method addresses meaning, purpose, and function with observations drawn from higher and more complex levels of human organization (e.g., psychosocial) and interpretation and explanation usually applicable within these same systems. Paretthetically, it is the growing knowledge of the influence of psychological and social processes on development, function, and structure of biological systems that enables hypotheses of brain dysfunction to be derived from psychosocial observations and the life story approach. The analysis of form—asking the "how" questions of mechanism, pattern, and form—proceeds from identification to explanation. It seeks an empirical data base and the identification of forms or patterns. Explanation is then developed through a series of correlational analyses that result in increasingly robust predictive relationships. The fact of hallucinatory experience (a form) can identify two groups of humans (hallucinating and nonhallucinating). Correlations with family history of hallucinations, response to psychoactive drugs, course of illness, brain structure, and the like, provide a basis for hypothesizing causal mechanisms and, eventually, for developing a general theory of hallucinations. This method is commonly used in the natural sciences and medicine. Correlations in which temporal sequence and physiological implications are compatible with causation may lead to etiological and pathogenic hypotheses. For example, an excess prevalence of schizophrenia in biological (compared to adoptive) relatives of schizophrenic probands leads to a genetic hypothesis of etiology.

Although this is a powerful method that has led to major discoveries in medicine, the etiology and pathogenesis of schizophrenia remain unknown except for the association with certain early risk factors (e.g., genetic, birth and pregnancy complications, and season of birth). Strict rules of cause and effect must be observed, for most interesting correlations will not prove causal in the etiological sense. For example, structural changes in the brain may be correlated with schizophrenia, but whether this is related to etiology, a consequence of illness or treatment, an associated feature not causally connected, or an artifact has to be determined.

**What is Schizophrenia?**

When we think of schizophrenia, we think of an illness process destroying the inner unity of the mind and weakening the volition and drive that constitute our essential character (Kraepelin 1971). Although there is considerable variability in the effect of illness on different patients, the pathological processes that occur are usually longlasting. The mind loses the intimate connectedness between thought and emotion, and the mental life is often resplendent with distorted perception, false ideas, and lack of clarity or logic in thought. Aberrant motor and social behaviors are manifest.

The patient's place in society erodes in an interactive process reflecting the incapacity to engage and sustain social bonds and society's reaction to the social and personal deviancy caused by the illness. This illness strikes at the very heart of what we consider the essence of the person. Yet, because its manifestations are so personal and social, it elicits fear, misunderstanding, and condemnation in society instead of sympathy and concern. Schizophrenia remains unparalleled as a stigmatizing disease with all the societal consequences of personal shame, family burden, and inadequate support of clinical care, research, and rehabilitation. It is ironic that in a society with pride in individual freedom and achievement, the response to a person whose personal capacity is being eroded by disease is the withdrawal of opportunity.

**Models and Constructs**

Conceptual models are formulated to express our understanding of the illness and to guide the care and study of the patient with schizophrenia. Two crucial assumptions are involved:

1. **The disease model is the essential framework of reference.** Observations of the pattern of onset, distribution of cases, development of morbidity, course, treatment response, and associated features (e.g., evidence of disturbed brain function and structure) parallel relationships seen in other diseases where the disease model has provided a basis for discovering etiology, pathophysiology, treatment, and prevention. This issue of the *Bulletin* provides critical reviews of the supporting data.

2. Socially, we conceptualize schizophrenia as an illness because it engenders the protection and therapeutics associated with modern...
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medicine. It has proved humane, heuristic, and scientifically valid to view persons with the disordered functions associated with schizophrenia as having an illness. Alternative views of persons with schizophrenia as immoral, self-absorbed, unmotivated, demonically possessed, criminal, socially deviant, politically dissident, representing an extreme on normal dimensions of personal functioning, or simply as the irredeemable fringe of society have led to neglect and punishment.

2. Schizophrenia is a clinical syndrome. The clinical syndrome comprises patients who manifest sufficiently similar signs and symptoms of illness to suggest a degree of commonality and an ability to distinguish patients within the syndrome from patients with other diseases or syndromes. The movement from syndrome to specific disease is usually accompanied by an improved ability to define etiology, pathophysiology, nature of onset, treatment responsivity, and uniformity in course of illness.

The syndromal status for schizophrenia has enormous implications for the type of investigations reviewed in this issue. The task of diagnosis is always problematic because the clinical boundaries are fuzzy and the patients within the syndrome are heterogeneous. Boundaries between a syndrome and other syndromes or diseases can be defined, but they cannot be articulated with certainty in the assignment of the individual case. Progress in identifying salient etiological and therapeutic factors depends on the ability to subdivide the syndrome into more homogeneous putative disease entities. Dichotomizing schizophrenia on the basis of negative symptoms or the concept of deficit and nondeficit forms of the illness is the most important contemporary example (see Andreasen, in this Special Report). The syndromal status weakens correlational approaches because hypotheses valid for a subset of patients may not be confirmed for the cohort; Type II statistical errors and failure of replication studies are often the result.

The Medical Model

Models and concepts define and delimit our view of disease and the data we consider relevant. The medical model and disease concepts are most heuristic, and confirmation of prediction based on such models has affirmed their general validity. For example, the diagnosis of schizophrenia has important predictive association with family history of illness, response to neuroleptic (antipsychotic) drugs, age of onset, course of illness, cognitive functioning, brain abnormalities, season of birth, pregnancy and birth complications, and other medically relevant indices (see other articles, in this Special Report).

It is also necessary to limit our range of inquiry to provide direction and avoid chaos, for data without organizing principles and theory are meaningless. But which medical model and what data and concepts should be excluded? In my view, models that are relatively exclusive to one level of human functioning (e.g., sociological, psychological, and biological) cannot integrate all data presently known to be relevant to the study of schizophrenia. A broader model, the biopsychosocial medical model, has been described by Engel (1977). His critique of the biomedical model and defense of the validity of the biopsychosocial medical model is cogent to schizophrenia. General systems theory as applied to biological organisms is invoked. Essential tenets are a hierarchical organization (e.g., neural systems are superordinate to neurons) and a reverberating system (e.g., activity at one level influences other levels). Figure 1, adapted from Engel, depicts this model. Engel (1980) has described the interaction

Figure 1. Biopsychosocial model

1Abridged from Engel (1980).
between levels and the simultaneous responsiveness of multiple levels, illuminating the concept by describing the model's relevance to an instance of acute myocardial infarction. We can appreciate the validity of the concept in everyday experience. A common phenomenon such as a blush reveals the potent and specific interplay between levels of functioning of the human system. A subjective experience (psychological level) of shame, if it occurs in public (sociological level), is associated with a profound and curious vascular effect (biological level) to produce the blush. The fact that shame has cultural determinants and vascular response has subcellular biochemical determinants is noted simply to provide an example of multileveled interactions in human functioning. Cartesian mind/body dualism is not supported by present-day scientific concepts or data.

The biopsychosocial medical model has cogent implications for schizophrenia:

- The study of schizophrenia must ascertain the nature of disordered function at multiple levels of human organization.
- Interactions between these levels account for the manifestations of the disease.
- When multiple levels simultaneously subserve an observed dysfunction, it is not a priori evident which is primary.

Social experience leads to brain changes, and vice versa. When both are observed, it remains to be determined whether one "causes" the other (and, if so, the direction of causation), whether each has an independent cause, or whether both are consequent of the same cause.

Reductionistic models that presume causation at predetermined levels are vulnerable to two commonplace errors. First is the assumption of cause without scientific proof. Second is the exclusion of data relevant to causation drawn from other levels of functioning. For example, the observation of intrapsychic conflict in patients with schizophrenia was often presumed to be evidence of psychogenic etiology. Also, during the 1950's and 1960's, workers espousing psychological theories of schizophrenia offered observations of intrafamilial conflict as evidence supporting the schizophrenogenic mother postulate. In these examples we see the difficulty that arises when association is confused with causation. At present, there is a tendency to equate brain changes observed in patients with schizophrenia to a biological cause of schizophrenia.

The "blush" was used above to illustrate the intimate connectedness among sociological, psychological, and biological functions in the human organism and to demonstrate the futility of comprehending perturbations at one level without consideration of other levels. It also illustrates the process of the life story method, for how else would we learn of the required social circumstance and psychological reaction which enable us to understand the onset of the blush? If my mother walks into the room when I am sneaking a glance at an erotic photograph, we immediately appreciate what "caused" my blush. But if blushing were a disease, the meaningful connections so easily viewed as causal in everyday life must be placed in a scientific framework where rules of evidence are quite different. The "how" questions of mechanism at the physiological level would be addressed, but when defined at the biological level, the question of "why" would remain. The meaningful connections elucidated with the life story method would bear decisively on this issue. When the two methods are joined, we could reasonably account for why and how the blush occurred, but other questions such as the reason for some individuals being more vulnerable to blushing than others would remain. Our investigations would continue without an a priori basis for excluding vulnerability factors operating at biological, psychological, or sociological levels.

The blush example may seem trivial except to persons whose blushing has become a severe problem. A more compelling example comes from recent observations of dramatically enlarged cerebral ventricular structures in the brains of torture victims (Jensen et al. 1983). Cerebral atrophy had occurred in victims who had not sustained head injury, and did not appear to be temporary or secondary to dehydration or starvation. In this instance it is difficult to visualize medical investigation of the phenomenon evolving from one explanatory method rather than both. The disease construct and analysis of form will address mechanism, while the life story and analysis of function will address the experience at the personal level. The latter cannot be easily accommodated in the biomedical model, but the biopsychosocial medical model can incorporate the relevant data from both approaches. It would seem frivolous to argue that enlarged brain ventricles mark a sociopolitical phenomenon, a psychological subjective experience, or a biological phenomenon. A broader medical framework serves as a basis for a hypothesized physiological mechanism that might induce structural changes in response to subjective experience associated...
with torture (Kellner et al. 1983). This example is put forward, not as a model for ventricular enlargement observed in schizophrenia, but to make plain the risk in a priori assumptions of level of distal causality of a phenomenon manifest in anatomical or biological alteration. Are the structural brain changes that are sometimes observed in patients with schizophrenia the consequence of subjective experience? We do not know as yet, but the likelihood that this possibility will be given credence and explored is greater in the framework of the biopsychosocial medical model than in that of the biomedical model. Similarly, a model reductionistic at the psychological or social level would not even lead to the finding of structural brain change. Because the known risk factors for schizophrenia imply such insults, the hypothesis that changes in brain structure in schizophrenia are a consequence of subjective experience does not seem the most likely hypothesis, but it is a meritorious hypothesis. If this turned out to be the case, would it suggest that the pathological process in schizophrenia is induced in a social interactive context? Of course not! A social interactive context is feasible, an intrapsychic context is feasible, but so is the initiation of the pathological process at the biological level with subsequent changes in subjective experience that may lead in turn to structural changes.

Observing and defining all relevant associations is crucial to the scientific study of schizophrenia in the disease construct. Our theories, concepts, and hypotheses must explore the data wherever it leads; dogma and ideological imperatives have no legitimate role in science. But the scientists and the public must carefully distinguish between associative and causative (even meaningful association) and causation (Jaspers 1963). Premature endorsement of appealing theory discredits and undermines science, and it is not only psychogenic theory that is vulnerable to operating as dogma rather than science (Engel 1977).

If the biopsychosocial medical model is more valid than reductionistic models, what are the implications for the types of data to be judged relevant and for the methods of data interpretation? First, influences on schizophrenia may range from molecular genetics to culture, and the comprehensive study of schizophrenia will require research in many areas. Second, the fact that the general framework is broad and complex does not negate the importance of experiments that are narrow, specific, and reductionistic. Such experiments are often necessary to explore associations and examine predictive relationships. The complexity of the overall system can be reconsidered when higher order inferences from the data are proposed and explored.

An example may clarify these implications. A biochemical hypothesis of altered dopamine activity in specific brain nuclei can be explored in post-mortem tissue of schizophrenic patients and controls. A distinctive pattern in the schizophrenia group, if shown not to be an artifact or physiologically trivial, would merit further exploration. A predictive association with specific symptoms, course of illness, or family history of schizophrenia would define relevance but would not provide a basis for causal interpretation. Factors operating at various levels (genes or social experience, for example) can influence brain biochemistry and structure. The biopsychosocial medical model can define the range of factors involved and their potential interactions. Theory involving explanatory or causal relationships may be articulated at several levels with plausible mechanisms. The proofs that confirm or refute theory are generated in a series of hypothesis-testing studies in which design and interpretation must deal with the natural complexity and adaptive capacity of the human organism in a social milieu.

The complexity of the investigator's task need not be discouraging (it is quite fascinating, actually), nor do broad models require that all areas of inquiry receive equal attention. It is important, however, to note the enormous task undertaken by serious scientific inquiry into the origins of schizophrenia. New knowledge, paradigmatic shifts, and scientific "breakthroughs" often come from unanticipated sources. When a field has investigators locked into narrowly defined scientific activities, opportunities for gains are reduced. Many academic centers in the United States know from recent history the problem associated with espousing the psychological level of inquiry while trivializing other levels, or espousing the analysis of function and the life story construct to the exclusion of other methods. There is a tension in the field today between two approaches to correcting past mistakes. Those advocating a biomedical model would shift the level of interest to biology and shift method to analysis of form and the disease construct. Those advocating a biopsychosocial medical model would also place great emphasis on biology and the disease construct, but in a broader context involving a hierarchically organized, multilevel, reverberating system. In the latter approach, analysis of function and the life story approach would also be used in the acquisition of knowledge.
Which model is most heuristic? Which shall we choose? I believe the only trustworthy measure of merit is scientific validity. Scholars, clinicians, and scientists may reasonably debate the relative merits of competing medical models, but I believe that scientific dogma, social ideology, and political pressure undermine science when short-term expediency and personal satisfaction override long-term scientific goals.

At any given time, some problems in schizophrenia will appear more approachable, some techniques more promising, and some paradigms more influential. In the pursuit of knowledge of the disease, new priorities are set and emphases redirected. Most enduring is a medical model that can incorporate data drawn from disparate theory and level of abstraction, and facilitate synthesis over time. I find the broad medical model most heuristic, and have sketched the rationale for this choice elsewhere (Strauss and Carpenter 1981; Carpenter 1986a, 1986b; Carpenter and Keith 1986). McHugh and Slavney (1983) provide the cogent arguments for this position, and recent contributions from neuroscience illustrate the power of this model (for example, see Pert et al. 1985). Strauss and colleagues have argued that some current, reductionistic methods are ill-suited to the clinical investigation of schizophrenia (Strauss and Hafez 1981) and demonstrate the importance of the life story approach when free of the dogma of etiologically presumptive psychological investigation (Breier and Strauss, in press; Strauss, in press). When reductionistic models, whether psychoanalytic or biomedical, have become influential, the result has been investigative designs inadequate to address the complexity of schizophrenia and inadequate integration of data drawn from different domains.

Problems of reductionistic models are general to medicine, but the conflicts have been sharper and the resolutions more imaginative in psychiatry than in other medical specialties. The methods and models are in place to conceptualize and study schizophrenia, and to evaluate, treat, and rehabilitate persons ill with schizophrenia. The vigor and scientific excellence of research on schizophrenia today are evident in the review of diagnosis, genetics, biology, psychosocial factors, brain imaging, psychophysiology, and treatment provided in this issue by leading authorities on schizophrenia.

The future looks bright, indeed. Investigators can consider the following assets that have recently converged to enhance the study of schizophrenia:

- National Institute of Mental Health leadership in designating schizophrenia as the priority area for new research development.
- Concerned and effective citizen advocates.
- Dramatic increase in awareness and support by elected officials.
- Explosion of information and concepts in the brain sciences.
- Rapidly developing technologies that permit direct investigation of the intact human brain.
- Technologies, methods, and concepts now emerging from molecular biology and immunology that will help define normal brain development and specify genetic and environmental influences that adversely affect development.
- Sophisticated psychological models of psychopathology that can define the interplay of psychological and interpersonal experience and biological function.
- Unequivocal application of the disease construct as a method of study.
- Application of phenomenology and the life story method without the distortions of etiological presentations.
- A medical model with which investigators can define and integrate the range of data relevant to schizophrenia.
- Scientific methods and eloquent approaches to data management and analysis that can be applied at every level of investigation.

We can confidently anticipate the creative acquisition of new knowledge as the infrastructure of schizophrenia research is expanded.

References


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