Thought Disorder in Schizophrenia: Editor’s Introduction

by Philip S. Holzman

Investigations into the biology of schizophrenia and of the affective disorders have yielded valuable information about psychotic conditions. Two events have sparked this progress. The first was the introduction of the phenothiazines and the mood-altering drugs in the early 1950s, an event that produced testable biological theories about the drugs' action. The second was the set of two critical reviews of the biological studies of psychosis by Seymour S. Kety (1959), which exposed the many methodological errors that had marred biological studies of psychosis up to that time, and established the standard for acceptable experimentation in this area.

No advance comparable to the biological investigations of schizophrenia has captured the attention and interest of psychopathologists investigating psychological processes, even though it is the psychological aspects of psychosis that cry out most loudly for explanations. Fortunately, today conditions are ripe for a new understanding of psychological dysfunctions in the schizophrenias that is comparable to that brought earlier by advances from the biological sciences. The articles contained in this issue of the Schizophrenia Bulletin address in novel ways some relatively neglected aspects of the psychopathology of schizophrenia, namely the varieties of thinking disorders characteristic of schizophrenic patients and their possible underlying mechanisms.

Science advances in spurts. Many periodic eruptions of scientific progress appear to be tied to some advances in knowledge or in technology that then assume the role of scientific tools in other areas of exploration. Our expanding knowledge of brain chemistry surely can claim a decisive role in the extraordinary progress made in the biochemistry of psychosis. Significant conceptual and technological advances await comparable exploitation by the behavioral sciences. These advances include new methods of brain imaging, and the methods cognitive psychologists have been fashioning for the measurement of perceptual registration and the processing of ideas.

The theme of this issue is formal thought disorder, that is, disorders in the form of thinking and in the organization, control, and processing of thoughts. We are not concerned with the content of thoughts or certain pathological products like delusions. Formal thought disorder has long been considered to be a principal dysfunction of schizophrenic illness. Bleuler (1911/1950) believed that the basic symptom of schizophrenia is the "loosening of associations," his term for formal thought disorder. In his view, formal thought disorder was the basis for the other fundamental and secondary symptoms of the schizophrenias. Bleuler regarded the obvious pathological products of schizophrenic illness, like delusions, as attempts at recovery, as restitutive and reconstructive. As such, he argued, they represent accessory symptoms and are therefore merely epiphenomena. He had no doubt that the primary symptom, the disorder of thinking, was based on a brain dysfunction which, while still unknown and mysterious, would one day surely be known. But, since Bleuler, there has been no systematic effort to study thought disorder that is comparable.
to the generative effort that opened up the biology of mental disorders. It is of interest that at times Bleuler considered disorders of thought and attention as distinct fundamental symptoms of schizophrenia, and at other times he appeared to believe that the attentional dysfunction was secondary to the thought dysfunction. Bleuler’s description of the schizophrenic disorder of attention, however, is of a special kind. It is not a disorder of paying attention, although that can obviously be disordered when motivation is impaired. Both Kraepelin (1896/1919) and Bleuler (1911/1950) believed that the attentional dysfunction in schizophrenia involved what the German language refers to as passive attention. Bleuler wrote that even though the patients seem to be absorbed in themselves and are apparently paying little attention to their surroundings, they do register an astonishing number of events that are of little or no significance to them. It is as if the selective function of attention, which regulates the input of myriads of sensory events, is severely curtailed, and thus permits almost anything that stimulates the sense organs to be registered. “Thus,” Bleuler wrote, “both facilitating and inhibitory propensities of attention are disordered.” Consequently, as far back as Bleuler, one can demonstrate that there has been at least a historical interest in coupling attentional and thought disorders. Today we label them the cognitive dysfunctions of schizophrenia.

It seems evident that to understand the pathogenesis and perhaps even the etiology of the schizophrenias requires that we understand the basic dysfunctions of this set of disorders. If, as Bleuler believed, the basic dysfunction appears in thought organization, can it be identified before the obvious secondary symptoms set in? Early identification of thought disorder, especially in its subtle forms, would permit the studies that are otherwise impeded by the behavioral disorganization and deterioration that characterize the chronic form of the illness.

This question reflects the implicit general orientation of this set of articles: to find in the forms of thinking the distinguishing features of various disorders. The writings of both Kraepelin and Bleuler hint at that goal. Kraepelin (1896/1919), who received much of his scientific training in Wundt’s psychological laboratory in Leipzig, tried to understand the ways in which basic cognitive processes are organized in several disorders. He particularly concerned himself with the functions of attention, concentration, memory, and motility. Bleuler (1924) discerned several kinds of disorders in schizophrenic patients: incoherence, bizarre associations, incorrect association, clang association, condensation, stereotypy, association by contiguity, and phrase completion are some of the types he described. Both theorists apparently assumed that changes in psychological functions express the organizing principles of the person who manifests those changes which are therefore diagnostic of different disorders. Diagnostic activity here is to be understood as not merely to name a disorder but to come to understand its nature and so to recognize and even to control it.

The focus on thought disorder asks what psychological functions are selectively impaired in different mental disorders. It tries to establish how to recognize the presence of the primary symptoms of mental disorder before the secondary symptoms become conspicuous. This is strategically necessary as well as desirable for research and eventually for prevention, because the secondary, reactive symptoms may be absent or only inconsistently present. When present they may appear only in the advanced forms of the disorders where they have shown themselves to be refractory to scientific scrutiny. Indeed, when present, they actually impede or cut off further communication with the patient and thus bar one of the principal routes for exploring them.

Two impediments have slowed the investigation of cognitive disorders. The first is the tendency of many investigators to search for a single quality of thinking that would encompass all of schizophrenic thinking. Thus, for example, disorders of concept formation, of logical inference (“paralogical thinking”), and of narrow or wide inclusiveness have been introduced as both the principal descriptor of all schizophrenic thinking and as the explanation for the thinking disorders, a rather interesting demonstration of circularity in logic. It is noteworthy that Bleuler considered that the “disorder of association” encompassed many different types of thought disorder, and he considered them all to be symptomatic of the basic defect, which, in his opinion, was a brain disorder.

The second impediment was the absence of appropriate tools for the measurement of thought disorder. Now, however, reliable scales for the measurement of thinking disorders have been constructed, three of which are used in the set of studies reported in this issue of the Schizophrenia Bulletin, and whose manuals are reprinted here. In addition, cognitive psychology, which may be considered a basic science for studies of the varieties of thinking processes, has made significant progress in fashioning increasingly precise and...
Andreasen and Grove distinguish between "positive" and "negative" thought disorder. The former refers to such occurrences as disorganization, or loss of goal and incoherence. The latter refers principally to poverty of speech. Andreasen and Grove measured thought disorder by the Scale for the Assessment of Thought, Language, and Communication, which distinguishes 18 types of thought disorder. They report that manic patients showed disorganization, incoherence, and illogicality in a context of verbal fluency, which corresponds to Andreasen's category of "positive thought disorder." The hebephrenic schizophrenic patients were typically disorganized, incoherent, and illogical in a context of poverty of speech and content, an indication of "negative thought disorder." Paranoid schizophrenic patients showed similar kinds of thought disorder to hebephrenic patients, but with less poverty of content and less incoherence. Schizoaffective patients also resembled the schizophrenics. At followup, thought disorder in the manics tended to be significantly reduced, even to normal levels, while schizophrenics continued to show disorganized thinking. Andreasen and Grove suggest that the fluency dimension may be a critical one for distinguishing between affective psychoses and "core schizophrenia." They also note that while the thought disorder shown by the schizoaffective patients resembles that of the schizophrenics, at followup it appears to normalize, suggesting the more benign course of the manics. Andreasen and Grove suggest that the different qualities of thought disorder represent "different mechanisms" in the different psychoses. It is clear from their data, moreover, that the thought disorder of schizophrenic patients appears not only as impoverishment of content and speech, but as incoherence and illogicality, which suggests that the negative-positive dichotomy does not capture the richer yield of Andreasen's scale.

Holzman, Shenton, and Solovay argue that the disorders under consideration are properly considered thought disorders and not speech or language disorders. They used the Thought Disorder Index to examine the quality of thought disorder in a group of schizophrenics, schizoaffective patients (both manic and depressed subtypes), manics, and normals. Although the groups did not differ significantly with respect to total amount of thought disorder present, there were distinct differences in the kinds of thought disorder each of the psychotic groups displayed. In this respect, their results are congruent with those Andreasen and Grove reported. Manics showed loosely tied together ideas that were generally extravagantly combined, and a playful, breezy style of speaking. Schizophrenic thinking showed none of the manics' jocularity. Their thinking was fluid, unstable, overly concise, and confused, with a significant number of word and phrase peculiarities. Schizoaffective patients, for the most part, resembled the schizophrenic patients, although the depressed subtype tended to be very constricted and less productive than the manic subtype. The authors conclude that, from the vantage point of thought disorder, schizoaffective disorder should be considered a schizophrenic disorder, a conclusion that requires separate validation from other approaches.

Harrow and Marengo, using their thought disorder assessment techniques, report a longitudinal examination of thought disorder in schizophrenic, psychotic nonschizophrenic, and nonpsychotic patients. They observed that most of the thought disorder occurred in the schizophrenic and manic groups. The schizophrenic patients, however, generally showed the most severe kinds of thought disorder, a finding also reported by Holzman, Shenton, and Solovay. Interestingly, at followup 1½-2 years after discharge and again 2 years after the first followup, it was the schizophrenic patients who typically showed persistent or episodic thought disorder. The appearance of very severe thought disorder during hospitalization was associated significantly poorer general functioning outside the hospital. Although thought disorder was measurably present in all psychotic groups, it appeared to be a "key symptom" in the schizophrenic patients.

Spohn et al. report the effects of neuroleptic treatment on the thought disorder of 100 chronic schizophrenic patients, all of whom showed a therapeutic response to drug therapy. Using the Thought Disorder Index as the measuring instrument, they found that compared to bipolar patients and normal controls, the schizophrenic and schizoaffective patients show significantly more thought disorder, a finding consistent with those in the first two articles. The total thought disorder of schizoaffective patients is similar to that of schizophrenic patients, and both groups resemble "Bleulerian thought disorder." In general, thought disorder in chronic schizophrenia is not reduced to normal levels by drugs, although the most severe levels of thought disorder are affected. Spohn et al. suggest that the mild and minimal levels are not significantly attenuated. The residual...
thought disorder may reflect a central nervous system cognitive deficit. They entertain two hypotheses for how the neuroleptic drugs affect thought disorder: the drugs either act on cognitive pathways or increase social awareness, resulting in inhibited expression of disordered thinking. The authors prefer the first hypothesis.

Nuechterlein et al. ask to what extent schizophrenic symptoms, particularly disorders of thinking, are related to impairments in attention and information processing. They thus raise the question Bleuler had earlier proposed. They use a span of apprehension test and a special version of the continuous performance test (CPT), which uses blurred figures to make the task more difficult. Both tasks require effortful information processing, in addition to their other performance requirements. The authors examined 40 schizophrenic patients at the time of their hospital stay and 32 of them after their hospital discharge to determine the stability of the information-processing performance and the relation of that performance to thought disorder, as measured by the Thought Disorder Index and by subscales of the Brief Psychiatric Rating Scale (BPRS).

Only moderate but significant correlations were obtained between the CPT and span of apprehension, on the one hand, and fluid and perhaps confused thinking, on the other. These modest correlations were obtained in the schizophrenic group but not in the manic group. Their results are interesting in light of the probability that any valid measure of thought disorder contains both trait and state factors. Both the CPT and the span of apprehension test are moderately stable over time, suggesting that they may contain more "trait" variance than do the thought disorder assessments. The correlations obtained by the Nuechterlein group are, therefore, quite consistent with an interpretation that suggests trait characteristics for both thought disorder and the attentional measures in schizophrenic but not in manic patients. Similar correlations were obtained between the information-processing tests and the anergia scale of the BPRS, which the authors call a "negative" symptom. With their measures, they identify a constellation in schizophrenic patients that consists of (1) impaired active, effortful attention and information processing, (2) affective flattening, (3) motor retardation, and (4) a quality of thought disorder characterized by fluid and perhaps confused thinking. This constellation strongly resembles part of the constellation Bleuler identified as the primary symptoms of schizophrenia.

Knight et al., like Harrow and Marengo, attempt to predict outcome from thought disorder. They did not use a special scale to measure thought disorder, but constructed one from an inventory of patient characteristics, the Psychotic Inpatient Profile (PIP). They report that a measure of attentional impairment, inferred from the PIP, is related to outcome, such that the greater the attentional impairment, the worse the clinical outcome. They found only very weak support for the classification of thought disorder into positive and negative types, inasmuch as poverty of speech, defined as a "negative" thought disorder symptom, was not related to outcome. They argue that a variable like attentional impairment is a very complex one, and probably reflects different dynamic processes in different psychotic conditions. That is an argument whose pursuit requires more finely honed measures than the authors employed.

The two articles that follow use some of the new techniques of cognitive psychology to explore the cognitive processes that underlie thought disorders. Saccuzzo and Braff, using the method of backward masking, ask how quickly information is introduced into and then processed by the central nervous system of schizophrenics. The technique of backward masking permits one to measure how long it takes for a target to register and then for that engram to move from the stage of registration to short-term memory. For example, flash the letter B on a screen long enough for the subject to recognize it. After that recognition threshold has been established, flash the B again for the duration of that established recognition time (called the "critical recognition threshold"). Now, 120 ms later, follow that presentation by flashing a pattern of X's. The subject now reports seeing the X's but not the B. If the X's follow the B by, say, 500 ms, the subject reports seeing both the B and the X's successively. The second target, the X's, has acted as a mask that interfered with the experience of having seen the first target, the B. The critical time period between the two targets varies between subjects, but for schizophrenic subjects, the mask is effective for as long as 500 ms, whereas it ceases to be effective at about 250 ms in normal subjects.

Saccuzzo and Braff are particularly interested in identifying the stage of information processing at which dysfunctions can be reliably seen—whether early or late in that process. They tested schizophrenic, schizoaffective, bipolar, and depressed patients. All psychotic patients showed a persistent effect of the backward mask, which indicates,
the authors interpret, that processing is slower in psychotic patients than in normal subjects. Presumably information is registered, but only sluggishly transferred to the next stages of cognitive processing. Because of that sluggishness, the authors reason, less information becomes available for processing and for working over. This is an interesting interpretation, which the authors pit against an alternative: too much information is getting through, and both relevant and irrelevant information is being processed—a state of affairs that overloads the system. A program of studies can be instituted that will help to decide the issue. The authors do present cogent evidence for a time-linked impairment in the information-processing sequence, and they attempt to relate that impairment to the appearance of thought disorder in psychosis.

Patterson et al., in a preliminary report of work in progress, focus on the very early epochs of information processing in schizophrenic patients, those that occur less than 100 ms after the stimulus is received. The authors specifically want to ascertain whether there is a defect in sensory storage, slow information processing, failure to organize the responses, or in all of them. If the earliest stage of information processing is intact, the authors reason, it is likely that the defects occur later in the process. They, like Saccuzzo and Braff, used a backward masking paradigm. They recorded evoked potentials at the time of target presentation and at the time of presentation of the mask, and they used topographic mapping techniques to present a picture of the evoked potential at any one instant in the process. They tested 19 schizophrenic patients, 15 nonschizophrenic psychotic patients (consisting of both bipolar and schizoaffective patients), and 31 normal control subjects. They found clear differences between the normal group and both groups of psychotic patients, with great overlap between the two groups of patients. The differences occurred at 80 to 105 ms after the onset of the target, while the stimulus was still exposed. There is, thus, a difference between the normal and the psychotic groups in information registration that may translate into a dysfunction in expectancy and in the capacity to recognize incongruity. The specificity of this finding for schizophrenia is ambiguous, since the composition of the schizoaffective group, which the authors consider to be a nonschizophrenic group, may not, in fact, be different from that of the schizophrenic group. The purity of the nonschizophrenic group may therefore be compromised. The authors speculate that hippocampal and thalamic brain structures and processes may be involved.

Altogether, these empirical studies suggest that thought disorder in schizophrenic patients tends to have significant trait characteristics since it is present both during a psychotic episode and, in milder forms, after a psychotic episode. It is likely that thought disorder is a key symptom of schizophrenic conditions. Thought disorder has many manifestations, and schizophrenia can be distinguished from manic conditions on the basis of those qualities which can now be described with greater precision than heretofore. It is not clear whether schizophrenic thought disorder should be characterized as "negative," since many types of thought disorder do not easily fit into that category. It is probably more useful to describe the various qualities of thought disorder that can be reliably distinguished in schizophrenic conditions and then to look for their correlates. Severe thought disorder is responsive to drug treatment, but in schizophrenia there are residual thinking disorders. As a trait in schizophrenic conditions, thought disorders reflect as yet unidentified central nervous system pathology that involves very early stages of information processing and that implicates attentional grasp.

Three manuals of thought disorder assessment accompany these articles: the Assessment of Thought, Language, and Communication; the Thought Disorder Index; and the composite method used by Harrow and his associates. The editor expresses his hope that these articles will provide a departure point for psychopathologists to deepen, broaden, and clarify the cognitive dysfunctions in schizophrenic conditions. Some of the methods described here can be applied to populations at risk for psychotic conditions. They can also be used to help infer brain processes that may be involved in cognitive disorders, to aid in early detection of schizophrenic conditions, and to chart response to various therapeutic interventions.

References


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