The Paranoid and the Schizophrenic: The Case for Distinct Cognitive Style

by Peter A. Magaro

Abstract

The paranoid has traditionally been considered schizophrenic except for some rare cases which exhibit delusions but none of the other signs such as cognitive disorganization. We attempt to show that considering the paranoid as independent of schizophrenia and exhibiting varying degrees of pathology is more consistent with current research. Furthermore, we believe that there is enough description of the underlying cognitive process unique to the paranoid and distinct from the schizophrenic to warrant a separate inclusive category, and possibly the consideration of a particular personality, at least in terms of cognitive processes. We review the research in information processing and hemispheric functioning to demonstrate distinctive cognitive processing, and finally, we offer a higher order integration construct to explain the etiology of schizophrenia and paranoia in terms of thought processes.

We may be entering a new era in the classification of schizophrenia. In the first era, Kraepelin and Bleuler brought some order to the proliferating clinical observations of functional psychoses by subsuming several previously unrelated syndromes under the superordinate category of schizophrenia (Zilboorg and Henry 1941). The category was broad and eventually inclusive. Now may be the time to attempt a refinement of the schizophrenic category through establishing rules of exclusion based upon empirical criteria. The DSM-III is a beginning in the exploration of limitations on the breadth of the schizophrenia category, but, although research within the past three decades argues strongly for some radical changes in the inclusiveness of the schizophrenia category, the emerging system has not responded to such information as fully as one might hope.

We will argue here that at least one type of schizophrenia should not be included within the general category of schizophrenia, but should be categorized separately and at a level which recognizes degrees of pathology and possibly amounts of stress. We will take the position that the paranoid schizophrenic is a subtype of the paranoid disorder and, as such, is a separate disorder which is more different from than similar to the nonparanoid schizophrenic. In effect, in DSM-III terms, we will be arguing that the paranoid disorder category should include, as one manifestation, what was considered the paranoid schizophrenic.

We should make clear that in our use of the term paranoid we are not speaking solely of the delusional disorder (Winokur 1977) or simple delusional disorder (Kendler 1980) which have been found to have little relationship to schizophrenia. We consider the delusional disorders to represent the paranoid, but the paranoid who does not become disorganized and may never exhibit the thought disorder or the more obvious symptoms such as the hallucinations of the schizophrenic. In a time frame analysis, the delusional disorder may occur before a para-

Reprint requests should be sent to Dr. P.A. Magaro at The Ohio State University, Department of Psychology, Rm. 139, 164 W. 19th Avenue, Columbus, OH 43210.
Figure 1. Model for dimensions of paranoia and schizophrenia

Paranoid level of pathology

Low
- Paranoid personality (traits of inferiority, suspiciousness, etc.)
- Paranoid personality disorder
- Simple delusional disorder

Schizophrenic level of pathology

Low
- Schizophrenic personality
- Schizoid personality disorder

High
- Schizophrenia
- Disorganized schizophrenia
- Paranoia
- Acute paranoid disorder
- Paranoid schizophrenia

As each personality exhibits a greater degree of pathology, in terms of symptom patterns, from a minimal pathology to an extensive state of pathology, the various psychiatric syndromes are displayed. The paranoid process could, therefore, exhibit a range of syndromes from the paranoid personality disorder to paranoid schizophrenia.

The paranoid can also exist as a normal condition that is best characterized as the paranoid personality. Such personalities are an active segment of society. For instance, they have often found expression in the political process as charismatic leaders whose strong, dogmatic, suspicious belief systems happen to attract others and hence are not seen as delusional (Tucker 1968). Moor and Tucker (1979) discuss paranoid beliefs found in the culture which are not labeled delusional but have the intensity and rigidity of the delusion found in diagnosed paranoias. Some have gone even further and argued that besides the schizophrenia state expressing a high degree of creative thought (Keefe and Magaro 1980), at the time a delusion is beginning, some paranoias express a state comparable to the states of mystics, called the super-rational (Lenz 1979). In other words, the paranoid has been seen as not only normal in a statistical sense but ab-
normal in an ideal sense—someone who represents the best of the culture.

We are mainly interested in paranoid pathology. Through a combination of precipitating events, possibly acting upon a constitutional condition, deviant types of behavior appear which mainly reflect the distortion of a particular type of cognition. The condition also can worsen until one observes the symptom picture of a paranoid schizophrenic. The model, therefore, allows an individual to express different levels of pathology although that is not a necessary condition. Just as it is found that manics move through stages of increasing pathology, but that not all manic patients move through each stage (Carlson 1973), the paranoid is hypothesized to have the same degree of freedom. As such, we could find a "normal" paranoid as well as a long-term paranoid resident of a mental hospital. The biological, social, and psychological attributes that determine the process of the specific syndrome at a particular time should be the subject of future investigations.

The present article asks what is common to all of the states in terms of experimental evidence pointing to a common cognitive process. Unfortunately, most of our evidence is drawn from the paranoid who is also considered schizophrenic. We would expect to find that the cognitive processes active in the paranoid schizophrenic would be evident in the less disorganized paranoid conditions such as the paranoid disorder or the normal paranoid personality. We will not be discussing such work because there are only a few studies that have considered such populations. We will explain what data exist and what usually happens to pertain to the paranoid schizophrenic.

The diagnosis of paranoid schizophrenia has traditionally assumed the individual is schizophrenic first and paranoid second. That is, the superordinate class is schizophrenic and the subclass is paranoid. There are two main reasons that the paranoid has been considered a type of schizophrenic: one is the historical conception of a common etiology and the other is the similarity of symptoms. Etiological, in the descriptive psychiatric tradition, all schizophrenics, or at least those exhibiting hallucinations and delusions, are said to share a common organic dysfunction. The severity of the loss of reality for paranoid and nonparanoid schizophrenics makes it seem logical for both disorders to share the same serious deficit.

However, other groups such as the manic share some of the same symptoms with the schizophrenic but are not considered schizophrenic. The affective disorders as a group exhibit symptoms that are similar to the nonparanoid schizophrenic. In fact, the schizoaffective disorder category in the current DSM-III is to be used when a differential diagnosis cannot be made between schizophrenia and mania. Research in cognitive processes also recognizes a similarity between the affective disorders and schizophrenia largely because the same type of thought disorder—the prime symptom of schizophrenia—is also exhibited by manics (Andreasen and Powers 1974). The pathological groups exhibiting similar symptoms are not diagnosed as schizophrenic because they also exhibit behavior that is not exhibited by schizophrenics. We will review evidence that the paranoid also exhibits differential symptoms and is therefore classifiable alongside other recognized nonschizophrenic disorders. More important, however, is the consideration that the thought-world of paranoids is different from that of schizophrenics.

We will attempt to show that much of the empirical work that has either focused on homogeneous paranoid and nonparanoid schizophrenic samples or analyzed the symptom patterns of schizophrenics as a whole has found consistent differences between schizophrenics and paranoid schizophrenics on major dimensions, indicating dissimilar ways of organizing and understanding the world.

We shall begin by tracing the history of the descriptions of paranoid and nonparanoid schizophrenia. This discussion will be brief since a much more complete description is presented elsewhere in this issue by Kendler and Tsuang (1981).

We will then review the methods by which these groups are usually distinguished and discuss the current research instruments used for this purpose. Next, we sample current research to demonstrate the consistent and sometimes opposing cognitive styles of paranoid and nonparanoid schizophrenics. From such work we will revive the position of a separate paranoid personality on the basis that recent research clearly indicates that the cognitive processes of the schizophrenic and the paranoid are separate and independent.

The major purpose of the article is to review current research in in-
formation processing and hemispheric specialization in schizophrenia with special attention to paranoid-nonparanoid differences. From this work we infer some psychological and neurological mechanisms unique to paranoids and schizophrenics which, if validated by future research, would seriously question the assumption of a common etiology. We then propose an Integration Theory which both clarifies the processes distinguishing paranoia from schizophrenia and specifies the hypothetical mechanism which may produce symptoms common to both.

The Emergence of a Paradigm

Despite consistent theoretical recognition and empirical evidence of separate disorders, mainstream clinical and research traditions have, until quite recently, tended to regard most paranoids as a type of schizophrenia. Kraepelin (1919) included paranoids, catatonics, and hebephrenics under the single term dementia praecox on the basis of a hypothetical common organic etiology and deteriorated outcome. However, he later explicitly distinguished the paranoid (paraphrenia) from the schizophrenic (dementia praecox). Kraepelin noted that paranoia was a disease primarily of the intellect, whose secondary phenomena of delusions could produce emotional stress (Kraepelin 1976). He distinguished the fixed delusional system of the true paranoid from the meager, disconnected, or confused delusions of the schizophrenic. The main characteristic of the paranoid was "the insidious development of a permanent and unshakeable delusional system resulting from internal causes accompanied by a perfect presentation of clear and orderly thinking, willing, and acting" (Kraepelin 1976, pp. 212–213). Kraepelin thought that pure paranoia was relatively rare, but believed that paraphrenia was a more common condition. The schizophrenia-paraphrenia-paranoid dimension was defined by the degree of formal thought disorganization, with delusional but well-organized cognition occupying the paranoid pole of the continuum. In effect, a continuum of disorganization was established, with the most disorganized paranoid being considered schizophrenic. As described by Kendler and Tsuang (1981), the progression of Kraepelin’s thought ended with three categories of paranoid psychotic disorders of which one was schizophrenic. This group was also the most severe in terms of degree of thought disorder and accompanying symptoms. Considering that Kraepelin was organizing the symptoms of hospitalized patients, i.e., the seriously disorganized, it is not surprising that he would perceive the similarity of paranoids and schizophrenics more than the differences. Even within this population, however, he recognized that some paranoids were not schizophrenic and that level of disorganization was the major distinction between these disorders. We present the same position in figure 1 except that the disorganized paranoid is not considered as schizophrenic.

Bleuler (1950) coined the term schizophrenia to replace dementia praecox and added a fourth subtype (simple). Like Kraepelin, he also grouped paranoids with catatonics and hebephrenics, but used a new explanatory construct of disordered associative process to justify this scheme. Due to the clear clinical differences between paranoid and nonparanoid types, Bleuler expended considerable effort to defend the inclusion of paranoids as schizophrenics since he believed that most types of paranoids were schizophrenics.

While both Kraepelin and Bleuler acknowledged paranoia as a psychosis separate and different from paranoid schizophrenia, they differed on the practical importance of this category. Bleuler argued that pure paranoia was so rare that it should be disregarded as a formal diagnostic category. He classified parantheses as paranoid schizophrenics by identifying the major paranoid symptoms, delusions, and ideas of reference as special instances of the associative disturbance common to all schizophrenics, even though he recognized that the types of cognitive disturbance were dramatically different from the disorganized forms of schizophrenic thought disorder. Bleuler’s view has prevailed. The newly constructed DSM-III will seldom permit any of the paranoid disorder diagnoses because the category is almost symptom-free in terms of thought disorder symptoms. There would be delusions, but they would not lead to any great distress or disorganization. Hence, Bleuler’s perception of the rareness of the paranoid diagnosis will by definition persist into the future. But Bleuler clearly recognized the tentative nature of his classification system.

Under the term dementia praecox or schizophrenia we thus subsume a group of diseases which can be clearly distinguished from all other types
of diseases in Kraepelin’s system. They have many common symptoms and similar prognoses. Nevertheless, their clinical pictures may be extremely varied. This concept may be of temporary value only in as much as it may later have to be reduced (in the same sense as the discoveries of bacteriology necessitated the subdivision of the pneumonias in terms of the various etiological agents). [1950, p. 4]

Opposing the tradition of descriptive psychiatry, dynamic schools have clearly considered the paranoid to have a unique personality with a distinct etiology and defensive structure quite different from other schizophrenics, even though such persons may be at the same level of disorganization and hence exhibit similar symptoms. Meissner (1981), in an accompanying article, advances the concept of the paranoid personality who may have a period of schizophrenic adjustment in his life but not be schizophrenic. Further, he presents a clear and complete description of the psychological processes that are more common to the paranoid as distinct from the schizophrenic.

Dynamic theorists have consistently distinguished paranoids from nonparanoids on the basis of personality dimensions such as source of anxiety and major defense (Freud 1946; Fenichel 1945), stage of regression (Abraham 1954), level of development (Klein 1948), transference, and other characteristic reactions to therapy (Searles 1959). Klein (1948) differentiated the paranoid and schizophrenic according to their basic personality structures, which theoretically form at different developmental periods. The schizophrenic is unable to discriminate interpersonal reality consistently, while the paranoid achieves and maintains a rudimentary discrimination based on the early personifications of “good me” and “bad not-me.” The dynamic distinction between paranoid and nonparanoid schizophrenia has also been emphasized by Henderson and Gillespie (1956), who developed a separate diagnostic category for paranoids because not only did they exhibit a late onset and a circumscribed symptomatology but they also displayed a distinct underlying type of personality. The distinguishing characteristic of the personality is level of integration.

In each of these formulations, the paranoid is seen as developmentally more advanced, both emotionally and cognitively, than the nonparanoid. In short, there is considerable theoretical agreement among dynamic theorists that schizophrenia and paranoia are separate disorders with characteristic prognoses, onsets, premorbid histories, and dynamics. Admittedly differences between the schizophrenic and the paranoid are best seen with the paranoid disorder rather than with the paranoid schizophrenic. But even in the latter case, the type of thinking appears distinctly different from that of the schizophrenic.

Phenomenologically, there has been considerable consensus about the unique nature of the paranoid process. Kant (1964), in 1798, was one of the first to differentiate paranoia from other psychotic processes by the lack of formally disordered thought processes. Paranoia was:

that disturbance of the mind in which everything that the madman says is indeed consistent with the formal laws of thinking . . . but in which the subjective impressions of a falsely inventive imagination are taken for actual perceptions. Of this class are those who believe they have enemies everywhere; who regard all expressions, remarks, or other indifferent actions of other persons, as intended for them as traps set for them. Often, they are, in their unfortunate madness, so ingenious in analyzing that which others unwittingly do, in order to explain it to their own satisfaction, that, if their data were only accurate, one would have to pay every tribute to their intelligence. [p. 15]

Kant’s emphasis on the unique phenomenology of paranoid cognition, or at least on its clear difference from schizophrenic experience, has been frequently repeated by clinicians and theoreticians. In describing the paranoid penchant for overinterpretation, Sullivan (1953) speaks of the “spread of meaning,” Cameron (1951) of “sudden clarification,” Bowers (1974) of a “press for meaning,” Abrams, Taintor, and Lhamon (1966) of a “metahypothesis,” and Young and Jerome (1972) of “rigidity of internal representation.”

Best known, perhaps, is Cameron’s (1959) description of the paranoid cognitive style of overinclusion, culminating in the (delusional) “pseudo-community.” He argued that the dynamics underlying the paranoid’s creation of a separate conceptual world were distinguished from those motivating schizophrenic withdrawal. These explanatory constructs from divergent theoretical approaches owe their essential similarity to a consensus on the defining paranoid symptoms such as delusions or ideas of reference and an awareness of the notably different phenomenology
of paranoia and schizophrenia most often expressed in terms of their thinking process. However, despite the theoretical agreement on processes unique to the paranoid, and despite clinical and experimental observations that paranoids and nonparanoids seem as different from each other as from patients not carrying a diagnosis of schizophrenia, the traditional conception of schizophrenia as the superordinate category is difficult to dislodge. One obvious reason for not creating a cleavage between the varieties of paranoia and the varieties of schizophrenia is that there has not been a clear method for specifying the differences between paranoids and schizophrenics and transforming such differences into a reliable measuring instrument.

**Methods Discriminating Paranoid From Nonparanoid Schizophrenia**

The differential diagnosis of paranoid and nonparanoid schizophrenia remains a clinical, and therefore to some degree a subjective, enterprise. The lack of a reliable, standardized instrument for this purpose has contributed to the lack of clear distinctions between the two groups. Several objective, empirically based techniques have recently been developed to specify the behaviors or symptoms unique to each group. We shall briefly discuss three such methods: factor analysis of symptoms, psychodiagnostic test patterns, and symptom scales designed specifically for this purpose and typically employed in a research context.

**Factor Analyses of Symptom Ratings.** Guertin (1952) factor analyzed ratings of 52 symptoms in 100 hospitalized psychotics and found two general factors, one describing the paranoid (preoccupation with moral and sexual issues, feelings of persecution and suspiciousness), and the other describing the nonparanoid (motor retardation, loose associations, social confusion, muted affect). These distinctions are supported by the work of Lorr and his associates (Lorr, Jenkins, and O’Connor 1955; Lorr 1966), who generated first 10, then 5 factors of psychoses using the Inpatient Multidimensional Psychiatric Scale (Lorr 1953). Of the 10 factors, some seem clearly related to paranoid, some to nonparanoid, and some to affective psychoses. Paranoid factors were Hostile Belligerence, Paranoid Projection, and Grandiose Expansiveness; nonparanoid factors included Conceptual Disorganization and Perceptual Distortion. A later investigation reduced the number of psychotic factors to five (Lorr, Klett, and Cave 1967), of which two were associated with paranoid symptoms, two with nonparanoid symptoms, and one with depressive symptoms. The Paranoid Process factor included ideas of reference; delusions of persecution, conspiracy, control, and body destruction; ideas of personal superiority; and perceptual distortions including auditory, olfactory, and kinesthetic hallucinations. The Hostile Paranoia factor included perceptual distortions and verbal belligerence. Nonparanoid factors were Disorganized Hyperactivity (excitement, conceptual disorganization, and motor disturbances) and Schizophrenic Disorganization (retardation, disorientation, and conceptual disorganization).

Factor analyses suggest that paranoids differ from schizophrenics in being less confused and withdrawn, more hostile, and more likely to organize their experience through delusions. Nonparanoid symptoms include disorganized movement, motivation, and thinking. Generally, the cognitive aberration seems to be disorganization in the nonparanoid and hyperorganization in the paranoid. The paranoid exhibits symptoms of an “overorganized” intellectual system while the nonparanoid exhibits symptoms of an “underorganized” intellectual system. We will discuss this formulation more specifically in our interpretation of results in the information-processing work in schizophrenia. For now, we will only note that the symptom patterns of paranoid and nonparanoid schizophrenics are distinct, which is one criterion for separate classification categories.

**Psychodiagnostic Tests.** Two psychodiagnostic tests have often differentiated paranoid from nonparanoid schizophrenics: the Rorschach (Weiner 1966) and the Wechsler Adult Intelligence Scale (Hamlin and Lorr 1971; Schafer 1948, 1954; Weiner 1966). On the Rorschach, paranoids do not name colors as frequently, but they do have a higher form level, organization, and field articulation than nonparanoids. On the WAIS, paranoids score higher on Comprehension, Arithmetic, and Picture Completion (Schafer 1948; Weiner 1966), and better on WAIS-type analogies (Hamlin and Lorr 1971). Thus, we can conclude that in general the intellectual functioning in paranoids is markedly less distorted than in nonparanoid schizo-
Weiner (1966) reviewed and analyzed paranoid-nonparanoid differences on psychodiagnostic tests. He argued that cognitive dispositions partake underlie personality differences between these groups, and that test signs differentiating them reflect distinct levels of personality intactness. Paranoids exhibit higher proportions of F+ responses than nonparanoids, indicating better personality integration. Paranoids produce fewer W responses than normals, while nonparanoids produce more. Conversely, paranoids produce more and nonparanoids fewer D responses than normals (Weiner 1966). The greater frequency of whole card responses among nonparanoids generally implies a differentiated perceptual field.

In sum, the pattern of paranoid-nonparanoid differences on these tests indicates again that paranoid conceptual capacity is more intact, personality integration more developed, and the perceptual field more differentiated than in nonparanoid schizophrenics. Nonparanoids seem too confused or unmotivated to organize stimuli and react to them, and display a global approach to stimuli with less developed conceptual abilities.

Scale Definitions of Paranoia and Schizophrenia. Two recent reviews discuss operational definitions of paranoia and schizophrenia. Calhoun (1971) lists three methods used in schizophrenia research to distinguish paranoids from nonparanoids: (1) official hospital diagnosis; (2) behavior ratings based on specific characteristics of the two groups; and (3) self-report scales such as the Minnesota Multiphasic Personality Inventory. Calhoun suggested that these procedures may not yield the same groups, since correlations among the three methods are low. He suggested that behavioral ratings with detailed specification of target behaviors may provide more consistency across studies than provided by hospital diagnosis.

Ritzler and Smith (1976) also noted that most research has not adequately defined paranoid and nonparanoid schizophrenia. In a 5-year survey of recent literature, they found five major approaches to the paranoid subclassification: (1) diagnostic criteria unspecified; (2) staff or hospital diagnosis, without specification; (3) diagnosis confirmed by two clinicians; (4) diagnosis specified by standard scales or checklists; and (5) diagnostic signs and symptoms fully specified.

Determining paranoid status by hospital diagnosis alone is unreliable. With diagnostic styles and preferences varying among institutions, staff diagnosis is not much better than no specification at all, especially in a research effort where a common operational definition is necessary. A similar problem results from determining paranoid status by agreement of two independent clinicians. Since the diagnosticians are typically from the same institution or the same community of practitioners, their practice bears an uncertain relationship to diagnostic practice by others elsewhere. There is usually no explicit specification of the diagnostic criteria which allow replication. The very few studies which specify such criteria rarely use the same ones, and thus one cannot generalize across studies without first comparing the definitions used in each.

Studies which use standard diagnostic inventories and behavioral checklists to determine paranoid status usually generate a score for each subject in both paranoid and nonparanoid categories. The problems of subjective judgment and differing clinical practice are minimized. However, Ritzler and Smith (1976) suggest that such scales measure different characteristics of the paranoid subtype, and they therefore urge caution in equating subjects diagnosed similarly by different standard scales.

Behavioral scales that separate paranoid from nonparanoid schizophrenics include the Symptom-Sign Inventory (SSI), the Symptom Rating Scale (SRS), and the Maine Paranoid-Schizophrenic Rating Scale. The SSI, constructed by Foulds (1965) to measure symptoms of mental illness while excluding personality traits, is an individually administered self-report procedure in which 10 items comprising each subscale are posed as direct questions to the patient. Subscales for paranoid and nonparanoid schizophrenia are included. Gordon and Gregson (1970) found that clinically diagnosed paranoid and nonparanoid groups were not significantly separated on these subtests. To minimize classification errors, they weighted a subset of items which discriminated the two groups, resulting in a misclassification rate of about 16 percent. Since the weighted subtest is considerably quicker to administer and requires a reassessment in relatively few cases, it seemed to be a powerful alternative to the full SSI. However, this weighted measure has
been found to be dissimilar to other paranoid measures and not well separated from the schizophrenic scale (Magaro, Abrams, and Cantrell, 1981).

Two other difficulties exist with both the full SSI and the weighted SSI. First, since both are self-reports in which patients are queried directly, it may be obvious to patients that the purpose of the interview is to elicit information concerning their illness. Research on impression management suggests that patients may choose their responses to create desired impressions rather than present their symptoms objectively. Second, since the questions in the SSI are stated in the present tense, they elicit information concerning current status which may be influenced by factors such as stress or medication. In assigning patients to groups, one is usually interested in more enduring states. As noted earlier, Kraepelin (1976) argues that "a permanent and unshakeable delusional system" is a defining characteristic of paranoia and must not be confused with schizophrenic delusions, which are meager, disconnected, and confused. It is not possible to determine from a few responses at one sitting whether the person has a permanent delusional system or is experiencing transitory delusions. For instance, a negative response may indicate only that medication, suspiciousness, or some other factor is temporarily suppressing the report of a delusional system. However, the greatest problem with the scale is that it does not reliably separate the paranoid from the schizophrenic.

The SRS, a behavioral scale, was developed by Jenkins, Stauffacher, and Hester (1959) as a means of translating the signs observed during a conventional psychiatric interview into quantitative data. Cohen, Gruel, and Stumpf (1966) found the 20 SRS items reflected the following five factors: (1) uncooperativeness, (2) depression-anxiety, (3) paranoid hostility, (4) deteriorated thinking, and (5) poor motivation. The third factor is related to paranoid schizophrenia, while the fourth is related to nonparanoid schizophrenia.

Although the SRS reliably distinguishes paranoid and nonparanoid schizophrenics, the SRS factors differentiating the two groups do not reflect the usual picture of paranoid symptoms. For instance, Kraepelin (1976) stated that the occurrence of hallucinations is rare in paranoid schizophrenics, although such patients may have visions or hear warning or assuring voices. The inclusion of items such as "thinking disorganization" and "hallucinatory voices" in the paranoid factor raises questions about the factor's content validity. Others (e.g., Overall and Gorham 1962) have found the occurrence of thought disorganization and hallucinations to be more indicative of nonparanoid than paranoid schizophrenics. This blurring of accepted, defining symptom patterns suggests that the SRS scales tap a general factor of psychosis or disorganization.

To overcome the difficulties with the SSI and the SRS, the Maine Paranoid-Schizophrenic Rating Scale (Magaro, Abrams, and Cantrell 1981) was developed; it consists of two 5-item scales for paranoid and nonparanoid schizophrenia. Each item requires rating one symptom on a 5-point, labeled, Likert-type scale. The ratings on each 5-item scale are summed to yield scores for paranoid and schizophrenic symptomatology. The information for the scale is obtained from both direct interview and medical records.

The scale has shown good construct validity in the pattern of correlations between scale scores and several measures of psychological functioning (Magaro, Abrams, and Cantrell 1981). Ratings of overall pathology do not correlate with either scale because such ratings tap current status, while the Maine Scale is constructed also to measure a long-term state. Studies using the scale have demonstrated predictive and construct validity in separating paranoid and nonparanoid groups on information-processing styles (McDowell, Reynolds, and Magaro 1975; Ross and Magaro 1976; Franco and Magaro 1977; Picl, Magaro, and Wade 1979). Magaro, Abrams, and Cantrell (1981) have extended the scale's construct validity by demonstrating expected relationships with a variety of other cognitive performance variables. The two-factor structure of the scale has been demonstrated, as well as adequate test-retest and interrater reliabilities.

At this point, the Maine Scale is a well-researched instrument that separates paranoid from nonparanoid schizophrenics, and both from other diagnostic groups. Also, low scores on both scales allow a designation of a psychiatric control group which has psychotic symptoms. Moreover, the scale is not subject to the criticisms regarding the SSI and SRS. Since it requires information both from the patient and his record, it minimizes the possibility of impression
management and ensures that the rating will consider long-term states as well as current condition. Another advantage of the Maine Scale is its definition of paranoid and nonparanoid symptoms according to traditional clinical criteria.

**Research Strategies**

**Information Processing.** Recently, as psychology as a whole has become more interested in cognitive processes, research in schizophrenia has become more focused upon cognition, especially as conceptualized in an information processing framework. Much recent research in schizophrenia has focused on specific stages of information processing to isolate the cognitive process most characteristic of the schizophrenic. We shall now briefly review such work both to demonstrate the differences between paranoids and schizophrenics and to specify more clearly the cognitive processes which distinguish these groups. There are many ways to model an information-processing system depending on which processes are considered most relevant. Space does not permit the full elaboration of our model as presented elsewhere (Magaro 1980), but in what follows we do hope to raise the possibility that paranoids and schizophrenics use distinctive information processing strategies.

In general terms, the process of deriving meaning from a stimulus begins with the reception of a stimulus by the organism. In this stage the initial representation of the stimulus begins to be differentiated into meaningful parts. This initial representation is the icon. Neisser (1967) spoke of an initial preattentive focusing, which separated the field into discernible parts, and a following process, focal attention, which assembled the parts into a recognizable object. Both of these processes are employed to form a recognizable image. Encoding occurs during the brief duration of the icon and is the process that operates upon the recognizable stimulus to place it in memory. A current model, which we will use, demonstrates two encoding processes, labeled controlled and automatic, which transmit information from the icon. For example, a set of lines become recognizable as features during preattentive focusing and organized into a letter in focal attention. This letter may be examined in parallel as in automatic processing or in a serial manner as in controlled processing.

Schneider and Shiffrin (1977) infer automatic processing from the situation where repeated practice results in a sequence of memory nodes that are activated by a particular stimulus, seemingly without conscious control. Once activated and practiced, such automatic processing is difficult to modify or ignore, and is not limited by memory load or number of distractors. However, if a close examination of stimulus features is required, automatic processing will produce a large number of errors. Controlled processing, on the other hand, involves a sequential search of elements, so that as the number of elements to be processed increases, more time is needed. There are fewer errors, but fewer elements are processed if time is limited.

Once stimuli have been encoded in memory, they can be associated with other elements to form category groups which can generalize beyond the particular. The resulting assemblies can be combined with other assemblies to form a schemata which, in effect, is a more complex and generalizable representation of events. Once established, such categorization influences the encoding process and may determine the type of encoding employed. That is, when new or unusual stimuli are encountered, the schemata directs the controlled processing to recognize the percept that matches an acceptable category. When stimuli are often repeated, however, automatic processing will suffice to match percept with schemata. If an assembly is not highly practiced, we would not expect automatic processing to proceed, especially for novel stimuli. In some cases, attributes could be processed without conforming to the conceptual order of the assembly as in a simple recognition of neutral objects. We would expect all subsystems of the information processing system to function as a dynamic whole to form an integrated understanding of the environment. However, there is the possibility of a deficit or type of processing which could lead to a type of performance characteristic of specific pathological groups. We will now examine the experimental work in schizophrenia that has sought to identify the deficiency in one process.

**Icon Strength.** It is clear that there is a visual trace that is visible after the offset of a stimulus. This trace, called the icon, has generated a great deal of research and controversy regarding the properties and determinants of the process. The distinction most relevant to the
question of icon strength regards the actual strength of the icon in terms of its intensity or duration versus the amount or type of information that is processed while visible. Long (1980) forms the distinction in terms of memory effects and persistence effects, the latter being effected by target luminance or duration.

Another way of making the same distinction is to distinguish between the photoreceptor image on the retina which stores information through the duration of the image compared to storage in other portions of the visual system including central functions (Sakitt 1976). Energy effects such as the intensity or duration of the stimulus increase the strength of the icon and, therefore, permit information usage such as the number of letters identified. However, time is required to process, store, and possibly rehearse material after detection and before the report. This later encoding or information transmission is not directly relevant to the strength of the icon in terms of persistence.

Of most importance is the interpretation of a deficit on a memory storage task. Sakitt and Long (1978) consider icon persistence as a peripheral phenomenon rather than as a cognitive processing function. This distinction is most relevant when reviewing the research in schizophrenia because we are attempting to locate a deficit at a specific point in the chain of information processing. When a method combines two or more processes, it is difficult to assert the particular deficit expressed by the schizophrenic.

The early work in schizophrenia used a version of the Sperling technique to produce a measure of the span of apprehension. A Sperling (1960) procedure employs a 3 x 3 or 3 x 4 letter array where the subject has to report the total array (whole report) or just a row marked by a tone after stimulus offset (partial report). Partial report is greatly superior to the whole report immediately after stimulus offset. This superiority decreases up to around 250 msec where both are equal. The decreasing function is taken to reflect the decay of the icon.

It has been recognized that the partial report method involves other factors besides visual persistence such as memory storage, reading bias, and response criteria and, hence, has not been considered an adequate procedure for examining the strength of the icon as contrasted with the use of information on the icon (Long 1980). In fact, Sperling (1960) used the partial report method to support the idea of two components being present when a set of stimuli is reported. First, the information in the display available following stimulus termination, and second, a central processor operating upon the information and passing it into long-term memory for future operations.

Estes (1965) developed a forced choice method to examine more directly the span of apprehension or the amount of material that could be recognized while the visual trace was present. The subject had to detect one of two letters in a set of distractors. There is little need for memory here so the method is a more accurate estimate of the first of the Sperling components, the portion directly related to the persistence of the stimulus. The Sperling and Estes methods have both been used in research with schizophrenics.

Neale et al. (1969) used the Estes method and found that schizophrenics reported half the number of letters reported by a normal control group. Neale (1971) expanded the display size and found that both paranoid schizophrenics and nonparanoid schizophrenics were only able to detect two letters even when display size increased to 12. Normals processed around four stimuli and increased their detection up to a display size of eight. There were no differences between groups when one letter was presented with no distractors. The task here was to search through a list of letters until the target was found. It is obvious that the time spent deciding if each letter was a target or a distractor would influence the number of letters processed and tell us less about the duration of the icon at this intensity. In effect, this result may indicate that schizophrenics do not process information as quickly as controls mainly because they do not resolve the decision process as rapidly. That is, the schizophrenic may have an encoding deficit, but such findings may also relate to icon duration as the schizophrenic icon may have rapidly decayed and allowed the reporting of fewer letters.

Cash, Neale, and Cromwell (1972) used the full-report technique to examine the duration of the icon. It was assumed that since the whole report method does not involve any decision making (all letters have to be reported), an absence of a schizophrenic deficit here would argue against a rapid decay hypothesis for schizophrenics. The result was that schizophrenics and nonschizophrenics...
processed the same number of letters. Speed of processing information was the same in controls; hence, it was concluded that icon duration in schizophrenic groups was equal to that in others. However, the full report method is not a pure measure of icon duration because the reporting of the stimuli themselves takes time which interferes with the number of items visible in the icon. In such a case, icon strength may be different for two groups but solely because the shorter icon group may have responded more quickly and, thus, reported as many items as the larger icon group who had an icon of longer duration. Knight, Sherer, and Shapiro (1977) used the Averbach and Coriell (1961) modification of the Sperling (1960) procedure to examine icon duration. They found that chronic poor premorbid schizophrenics, who were the most severe or disabled, recalled fewer words in a full report than other schizophrenics or controls. As in the study by Cash, Neale, and Cromwell (1972), the icon is sufficient for all groups to read the same number of letters before the icon decays.

Another dominant method is the postexposure field procedure, which employs a mask of some form to obliterate the icon at specific intervals. The interval between the stimulus and the mask at which the stimulus can be recognized provides a measure of icon strength. The first study examining icon strength by this method was performed by Saccuzzo, Hirt, and Spencer (1974), who correctly noted that the span of apprehension work performed with schizophrenics using the partial and whole report technique confounds the information available in the icon with encoding, remembering, and reporting the information. To avoid such problems, they used a masking procedure to control the duration of the icon. The interstimulus interval was varied from 50 to 300 msec. They presented one- and eight-letter displays with the target letters being A's or T's. The mask was two W's superimposed on the targets. The results were that delusional patients and chronic schizophrenics produced a deficit in the middle delay time, 150 and 200 msec. At the short interstimulus intervals, 50 and 100 msec, all groups were similar in their rate of detection, usually above a chance level. It was only at longer intervals, when the total display size had to be processed, that paranoids and controls differed.

In a later study, Saccuzzo and Miller (1977) also varied the postexposure field with a masking technique. Here, however, a critical interstimulus interval was determined by increasing the interstimulus interval by steps of 2 msec until the letter targets were identified. They found that paranoid schizophrenics with a great deal of experience in the masking procedure required a significantly longer interstimulus interval than college students in order to encode enough information off the icon to meet the accuracy criterion. These results were similar to the previously reported schizophrenic patients when a simple recognition of a letter was required. Saccuzzo and Miller (1977) suggest that “the larger critical interstimulus interval in schizophrenics indicates that they were slower in encoding from iconic storage than normals” (p. 264). This interpretation of the masking procedure is related to speed of encoding rather than the strength of the icon itself. In effect, the masking procedure is interpreted as reflecting the speed of encoding which should involve the time taken up in the recognition process, discriminating a T from an A, and in emitting the response. However, they also relate the deficit to a peripheral (before higher cortical processes) process suggesting that they were measuring the persistence of the icon. This conflict in interpretation is central to specifying the deficit of the schizophrenic or paranoid.

The two processes that can be interpreted from the masking work are reflected in the different explanations of the schizophrenic deficit that are inferred from the masking condition. The work of Turvey (1973) points toward thinking of a backward mask as affecting central processing because it interferes with the categorization process. Deficits in backward masking would therefore reflect a schizophrenic problem in centrally manipulating or translating the elements on the icon into a recognizable form. Saccuzzo argues for the peripheral function but also concludes that the results are due to an encoding process which would, by definition, reflect more central processing function. As mentioned above, the question may be put in terms of the Sakitt (1976) distinction of memory on the retina or in other portions of the visual system including central functions. It is especially noteworthy that the more complex mask in a display which involves a great deal of processing such as in searching through a set of letters of a target is the condition which clearly produces a deficit for paranoid and
nonparanoid schizophrenics. When a single recognition is involved or competing stimuli are not introduced or there is no need to process a number of stimuli, the deficit is not evident.

Steronko and Woods (1978) used Saccuzzo and Miller's (1977) method in a test of college students who scored high on the MMPI-168 scales 2, 7, and 8, denoted schizotypic, and arrived at a similar conclusion. The 2-7-8 group and another high MMPI scoring control group needed a longer delay of masking stimulus to achieve the letter recognition criterion. This result suggested that the Saccuzzo and Miller (1977) masking task was able to produce differences in a normal population; however, it appeared that the deficit is not unique to schizophrenic type individuals but to anyone exhibiting an elevated MMPI profile indicating the presence of pathology.

Steronko and Woods (1978) interpreted their results by suggesting that the masking procedure is not an adequate means to investigate the strength of the icon because the mask itself degrades the stimulus icon by concatenation, resulting in one unintelligible icon rather than two distinct ones. This thinking suggests that the icon in schizophrenics may require more time to develop, either due to impairment in icon formation or iconic storage impairment. Also, the icon may develop normally but persist for an abnormally long time, leading to confounding pairs of icons and less-than-adequate perception. All of these problems demonstrate the difficulty in interpreting icon strength results when the postexposure field is varied with the use of a mask (Long 1980).

Of greater importance, however, is that the masking procedure may be producing a situation where the encoding process rather than the icon itself is examined. Others have also noted that the assumption that the mask erases the icon is not correct and that a more likely explanation is that there is a summation effect (Erikson and Collins 1964). Long (1980), in a review of iconic memory procedures, notes that the assumption of icon erasure with the mask is seriously questioned. In any case, it is an open question what type of processing is measured by a masking procedure and what types of strategies or processing biases can be employed to improve performance. The overall suggestion, therefore, is that the masking procedure itself may involve more than a measure of icon formation but also reflect degree of icon separation or processing time. The Saccuzzo work does clearly suggest a problem in encoding if not icon persistence.

If we also consider work using other methods, we do not find an icon strength deficit. This conclusion is confirmed in the studies that used the integration task developed by Erikson and Collins (1964) to measure icon strength. Here the time interval between two seemingly random dot patterns is shortened until they fuse to form a single letter or number. The time interval between the stimuli, ISI, defines the strength of the icon. Detection accuracy increases as a decreasing function of the ISI. Knight et al. (1978) used a modification of this method and found no icon duration deficits in schizophrenics. They considered their previous finding of a schizophrenic deficit in icon duration when they used the partial report method (Knight, Sherer, and Shapiro 1977), and concluded that such a finding was probably due to the multiple processes involved in the partial report technique. Spaulding et al. (1980) also used the Erikson and Collins (1964) integration task and found no differences between schizophrenics and patient controls. In an excellent review of the stages in icon formation, they concluded from their results and a review of past work that the icon in schizophrenics or paranoids is not deficient in strength.

Another method used to assess icon strength has been that of stimulus duration. A number of studies have found a relationship between icon persistence and stimulus duration (Sperling 1967; Long and Sakitt 1980). This method presents an ascending and descending order of stimulus durations until the stimulus is recognized to a specific criterion. Saccuzzo, Hirt, and Spencer (1974) used this method to determine a threshold for the masking task. The measured duration of stimulus presentation of single letter stimuli was varied in order to determine threshold. Exposure durations started high and were gradually reduced with alternations between relatively higher and lower durations. An estimate was obtained of the minimum exposure to meet a criterion in the identification of one of two letters. The result was that chronic undifferentiated schizophrenics required longer stimulus durations than acute paranoids, psychiatric controls, and normals who did not differ. In effect, only chronics took signifi-
cantly longer than the other three groups to acquire a recognizable icon.

In a later study (Brody, Saccuzzo, and Braff 1980) comparing schizophrenics to depressives and elderly patients, the elderly were found to require exceedingly long stimulus durations to detect a letter while schizophrenics and depressives were equal. It is noteworthy that the schizophrenics were paranoid schizophrenics who were relatively young. The threshold for the schizophrenic group in this study was similar to that for the chronic group of the earlier study (Saccuzzo, Hirt, and Spencer 1974) but longer than that for the paranoid group, although possibly not significantly so. A study recently completed in our laboratory found no difference between schizophrenics, paranoids, normals, or psychiatric controls, either acute or chronic, in a temporal recognition task involving letters (Magaro 1980). In most cases, therefore, in the condition where icon intensity or duration is involved, the icon of schizophrenics, paranoid or not, has the same strength as seen in other groups. The evidence points toward thinking of the masking results as reflecting a central process—compared with the preattentive process involved in Young’s work (Magaro 1978). As in most other human activities, individual differences appear to affect the speed or amount of information that is processed or transmitted into long-term storage. At this point the paranoid-schizophrenic distinction becomes crucial because encoding strategies are probably the most important individual difference variables in understanding the two groups.

**Controlled vs. automatic processing.** The main distinction in encoding that we feel most clearly clarifies paranoid and schizophrenic processes makes use of the controlled-automatic distinction demonstrated by Schneider and Shiffrin (1977). However, another distinction made by Neisser (1967), the preattentive-focal attention process, is also important to our purpose. When the stimulus is first presented and before there is a distinction or labeling of the object, the field has to be separated into distinct elements. That is the preattentive process. After elements are distinguished and are becoming combined into a recognizable image, the lines and colors become a tree, so to speak; we are speaking of focal attention.

A recent study which employed procedures to measure each process found that nonparanoid schizophrenics exhibited a deficit in the preattentive process while paranoid schizophrenics did not (Cox and Leventhal 1978). On different measures of preattentive attention such as counting number of tilted figures in a matrix of upright figures or detecting inverted figures in an upright set of figures, nonparanoid schizophrenics took longer or made more errors. Of most interest was a procedure called enrichment, which attempted to enhance the stimulus elements that directly affected preattentive discriminability. Here the schizophrenics improved their performance to the levels of the paranoids and psychiatric controls. Although the results may only mean that the more severe schizophrenics—in this case the nonparanoids, who were also process schizophrenics—do worse than the less severe—the paranoid schizophrenics, who were also reactive—the improvement in performance of the schizophrenics does suggest that the icon could be adequately differentiated with greater element discriminability. The latter interpretation suggests that although the paranoid had no difficulty with discriminating and reporting elements in an icon, the nonparanoid did not focus upon the relevant stimulus elements but required a greater discriminability to separate elements. The authors interpret their results as a problem in attention or an interference during the preattentive encoding stage. In a moment we will offer another interpretation of the results which considers the type of encoding employed by each group.

Up until this point, we have discussed the formation of the icon and the initial encoding when the stimulus field is initially separated into distinguishable elements.
Other considerations of the encoding process allow investigation of individual differences in information-processing strategies. Controlled processing relies upon the establishment of a particular recognizable category which is searched for in the stimulus pattern. In effect, there has to be a clear category in the memory set which allows a recognition of the target in a stimulus field. This is not to say that automatic processing does not require specific objects in memory, but since the automatic processing does not require an item by item search, the target in the stimulus field must be clearly distinguishable in order to be detected. Let me illustrate how the increase in discriminability can improve the accuracy of automatic processing.

In the preattentive processing study by Cox and Leventhal (1978) discussed above, we noted that the nonparanoid increased his performance level when the stimulus elements were made more discriminable. Other groups did not demonstrate this effect. In the present terms, we would say that the increased discriminability allowed those who were employing an automatic type of processing to improve their performance. The stimulus field was discriminated enough to allow a process to work efficiently. When the stimulus field was not as discriminable, a controlled processing would have been more effective. Paranoids used controlled processing in the first place and thus increased target discriminability did not produce that much of an advantage. Nonparanoids used an automatic processing which is favorably effected by an increase in stimulus discriminability.

A study in our laboratory (Pic'l, Magaro, and Wade 1979) suggested that schizophrenics use automatic processing and paranoids use controlled processing. The measure was the number of errors by each group in a task requiring the counting of dots. Paranoids made more errors when there were more dots to count. The controlled processing function presented by Schneider and Shiffrin (1977), in which accuracy is dependent upon frame size or number of figures in the field, shows the same curve as the paranoids on this task. Schizophrenics, on the other hand, made the same number of errors across frame sizes, indicating an automatic or at least a noncontrolled processing strategy. Normals and nonschizophrenic controls performed like paranoids. Results are rather consistent, then, that paranoids use a controlled processing strategy while paranoids use an automatic processing strategy, even though the more efficient strategy would depend upon the particular nature of the task. Another recent study (Clooney and Murray 1977) used a similar methodology. They presented a task that required the detection of the odd letter in series of two, three, and four letters. The major finding was that paranoids processed serially when making both “same” and “different” judgments whereas schizophrenics did not exhibit this strategy.

At this point, we will note that both encoding strategies require a representation in memory of the object that is being recognized. We have followed Hayes-Roth (1977) and labeled that single memory element a cogit, which is a single bit of information such as a letter, a number, or a word (Magaro 1980). The encoding strategies are codes that explain how a stimulus representation on the icon or in the visual field is recognized. In each case, a representation of the object is required. The exact nature of the code that transforms the physical field into a meaningful piece of information is a continued subject of investigation. We have applied two strategies that explain the match under specific circumstances. In either controlled or automatic processing, however, a cogit is required to extract information from the stimulus field. As such, memory processes themselves become crucial to understanding the type of encoding employed by certain groups because the strength of the cogit may influence the type of encoding strategy that is employed in the particular situation.

We do not expect that either the schizophrenic or the paranoid has cogits that are deviant. If a word is presented, both groups should discriminate that stimulus into the same features as others do and recognize it as the same word. As such, we would not expect that there would be recognition memory deficits. There is a minimal amount of associations required in recognition memory—mainly, the association between two words or other stimuli if so used. However, what of the case in which a number of associations have to be constructed in memory in order to complete a task such as remembering words that were presented. We believe there would be deficits in this process for the nonparanoid schizophrenic. The deficit would be in the recall of material because recall is best performed when a number of associations are organ-
ized into what we will discuss as an assembly.

If there are strong assemblies, the word is organized, so to speak, and expectancies are strong concerning what should exist in the physical external world. Therefore, when encoding this field, there will be a naturalistic constant serial search for the cogit which is expected by the conceptual order. In other terms, there may be a categorical set which is due to organization in memory, and this will produce a consistent style of serial processing. Those who do not share such a rigid conceptual organization will not engage in serial processing so extensively. They will rely upon individual categories to recognize stimulus elements. Therefore, an automatic type of processing would serve in such a case because all that is required is a recognition of elements depending upon their discriminability. We now will briefly review the memory research to see if schizophrenics and paranoids do exhibit memory systems which vary in organization and are also related to their style of encoding.

Memory. Memory in schizophrenia has been studied rather extensively and is reviewed elsewhere (Magaro 1980). The studies can be separated into those that examine recognition and those that examine recall. A number of studies have used recognition tasks to measure the operation of short-term memory. At this stage, we are discussing the cogit and its direct associations. In the usual recognition task, cogs are learned and recognition memory is tested using a list of similar stimuli. A related method uses a paired-associate recognition task in which pairs of stimuli are learned and the subject is tested for recognition of the match to one of the pair. In the first case, there are no association-related configurations required. In the second case, a configuration is used with specific associations. Hayes-Roth (1977) explains that the strength of the association is a function of recency and frequency. Recognition memory, therefore, measures the strength of the associated value of the cogit in terms of these factors. The icon and the encoding are not a primary part of the task since stimuli are presented for long periods of time, and the same stimulus is thus recognized by all groups.

Most recognition studies have found schizophrenic subgroup differences or schizophrenic-control differences in recognition. Nachmani and Cohen (1969) found no difference between controls and a mixed patient group of acute nonparanoid schizophrenics. Bauman and Murray (1968) also report no difference between a group of normals and a mixed patient group of paranoid and nonparanoid schizophrenics (probably mostly acute) even though the alternatives in the recognition list were semantically or acoustically similar to the correct words. Koh, Kayton, and Berry (1973) presented words and high- and low-association nonsense syllables in a recognition task to young acute nonpsychotic nonparanoids. Again the recognition memory of schizophrenics in a signal detection analysis was found to be as good as that of normals. The conclusion was that regardless of frequency, conceptual categories, or association values, the recognition memory of schizophrenics is as good as that of normals.

While acute schizophrenics and paranoids do not have difficulty with recognition tasks, a deficit in the recall memory in schizophrenics but not paranoids has been repeatedly demonstrated, especially if the subject has to form his own cogit assembly. Investigations have usually centered on locating the source of the difficulty. Recall tasks, either in the form of paired associates or in recall of a complete stimulus list, encourage the development of cogit assemblies. Investigators manipulate the associative value of words because the associational and linguistic relationships which play a significant role in recognition are crucial to recall (Koh, Kayton, and Berry 1973). Hence, recall tasks are a test of the ability to form or use cogit assemblies.

We believe the two groups demonstrate specific and distinct difficulties. While the nonparanoid has the greatest difficulty with the strength of configurations, the paranoid has strong idiosyncratic higher-order assemblies which interfere with the formation of new assemblies. Differences in the recall memory of paranoid and nonparanoid schizophrenics suggest that nonparanoids have difficulty using associations or assemblies. This is not found with paranoids or normals. Koh and Kayton (1974) asked normals and acute nonparanoid schizophrenics to recall words varying in frequency, imagery, concreteness, meaningfulness, and affectivity under delay and no-delay conditions. Overall, the recall of normals was superior to that of nonparanoid schizophrenics.
Schizophrenics made more intrusion errors, both from within and outside the memory list. Apparently the schizophrenic was not able to generate an internal structure to aid him in recall. In the same study that found no differences in recognition memory, Koh, Kayton, and Berry (1973) used ordered and free recall to examine the subjective organization, degree of categorical clustering, and hierarchical clustering schemas of acute nonparanoid schizophrenics. Schizophrenics did not show normative categorical clustering to the same extent as normals, nor did they show as much subjective organization to facilitate recall. Normals were superior on both uncategorized and categorized word lists. Whereas normals increased their categorical clustering (recalling items from the same conceptual category together) and subjective organization (grouping items together through trials) over trials, schizophrenics did not.

Another study not only demanded that the schizophrenic form his own assembly but provides a hint about why it is difficult for him to do so. Bauman and Kolinsy (1976) studied interference effects in the short-term memory of acute schizophrenics. The task involved the recall of seven digits, but the order of recall was varied. The first analysis examined only the initial response of each subject in each serial position. Although normals exhibited superior recall over positions, schizophrenics followed the same recall function found with normals. Greater recall was found in the beginning and end of the list. The next analysis examined the effects of the interpolation of the subject's responses on recall, that is, the degree of recall once the subject had to recite prior digits. Here it was found that schizophrenics had poorer recall the more they had to recall prior digits. They also made more omissions and insertions but fewer reversals than normals. The conclusion was that as the schizophrenics responded, they experienced greater difficulty with retrieval. The authors suggest that the problem was that of response interference which was due to the lack of processing.

Some may argue that schizophrenics fell increasingly further behind normals as the number of outputs increased because of a rehearsal problem. Search through memory, as indicated by Shiffrin (1970) and Norman (1966), may be considered as a sequential or serial activity, rather than a random one. Subjects usually begin at some point in the task and sequentially scan through memory until they locate the item to be retrieved. The digit recall risk in this experiment required covert rehearsal prior to each response. If, for example, the first digit probed was the fourth in the input sequence, then the subject would have to rehearse the first three digits in the series before he/she arrived at the response. Thus, seven memory searches were required for each presentation of a seven-digit list. Because the memory search was serial, it follows that digits in the first input positions were rehearsed more frequently than were those in the last. Since the role of rehearsal, as suggested by Bernback (1970) and Bjork (1970), is to produce replicas of a single memory trace, thus enhancing the probability of long-term storage, it may be that the last input items particularly were lost from schizophrenic memory store because of inadequate rehearsal. [Bauman and Kolinsny 1976, p. 37]

Put in other terms, the subject was required to recreate the total list in order to present the digit at the expected position. Another way of expressing this process would be that they were required to "unitize" the list; that is, form the individual cogits into an assembly in order to form a single memory unit. We would contend that the schizophrenic was not able to do this since he does not usually engage in the serial activity which is necessary for such unitization. Possibly the results can be explained in terms of rehearsal but for our analysis of the encoding results, we suggest that they do not serially process in any stage of information processing including rehearsal but prefer the more holistic automatic search. As the authors note in the above quotation, the task requires a serial processing in rehearsal. We postulate that regardless of rehearsal, the task requires a strategy of serial processing, controlled processing, in memory. That strategy in itself is not a usual schizophrenic approach to discriminating a visual field or forming assemblies. Hence, there would be a deficiency in the formation of assemblies for the schizophrenic if such a process was required and not aided by experimental conditions. In short, nonparanoid schizophrenics do not generate the associational structures which aid memory because there is little internal organization of elements. We do not find any work which reports this deficit with paranoids.

Assemblies and Schemata. While the nonparanoid schizophrenic seems to perform memory tasks poorly because of weak cognitive structures, the paranoid's assem-
bly strength may be either helpful or a hindrance, depending on task requirements. When paranoid and nonparanoid conceptual performance is examined in a recognition task where information regarding the target object is added slowly to an inadequate data base, paranoids tend to reach conclusions quickly rather than wait for more information.

The paranoid operates with the metahypothesis that, to process his experience, it is preferable to form an incorrect hypothesis than none at all. Furthermore, the greater the degree of paranoid severity, the stronger this metahypothesis. [Abrams, Taintor, and Lhamon 1966, p. 495]

McReynolds, Collins, and Acker (1964) found that delusional schizophrenics attempted to identify more pictures, and identified more pictures correctly in the McGill Closure Test than nondelusional schizophrenics, supporting their view that the former have “a stronger tendency to organize ambiguous stimuli in a meaningful way” (pp. 211–212). In short, paranoids tend to assign specific meaning to stimuli in a stereotyped manner, a style which functions adaptively in situations where such expectations are justified. If the experimental situation is constructed so that expectations are not justified, however, we would expect the paranoid to exhibit a deficit. On the other hand, the nonparanoid’s lack of conceptual control should permit a comparatively unbiased processing of complex perceptual material.

McDowell, Reynolds, and Magaro (1975) directly tested the effect of expectancy in paranoids and schizophrenics. A signal detection task was employed to demonstrate the interaction between task requirements and paranoid-nonparanoid adaptation. It was predicted that where optimum performance should be improved by conceptual processes (expectation of a high-probability message), paranoids would perform better than nonparanoids; but in the same task altered so that such expectations hinder performance (low probability message), nonparanoids would perform better. It was also predicted that normal performance would be intermediate between the schizophrenic groups in both high- and low-probability stimulus conditions, since normal adaptation represents an integrated mean between these two schizophrenic deviations.

Nonparanoids, paranoids, and hospital aides listened to sentences ending in high- or low-probability words masked by one of five levels of white noise. As predicted, paranoids and normals identified the masked word more accurately than nonparanoids when task performance was facilitated by conceptual processes (expectation of a probable ending). When expectations operated to decrease performance (improbable endings), paranoids and schizophrenics both performed worse than normals. Generally, predictions regarding the relative performance of paranoids and schizophrenics on the two task conditions were supported. The effects of the paranoid conceptual emphasis (controlled processing) and the schizophrenic perceptual emphasis (automatic processing) were most clearly demonstrated in the medium difficulty ranges, where paranoid performance was maximized on probable endings and nonparanoid performance was maximized on improbable endings. For the schizophrenics, lack of expectations permitted more accurate recognition of improbable words. Normals performed significantly better than either pathological group in the low-probability condition, suggesting that normals switch their processing strategies depending upon the situation.

Such results suggest that it is the semantic quality of thought which determines the type of deficit for nonparanoids. An alternate and more basic suggestion may be that it is the actual syntactic quality of language that produces a deficit. Carpenter (1976) asked schizophrenic and normal subjects to listen to strings of disconnected words, whole sentences with clicks imbedded before, in, or after a clause break, and a passage of connected discourse. During designated test pauses, subjects wrote down as many words as they could recall and indicated the location of clicks within recalled sentences. Schizophrenic subjects did not differ from the normal group in the proportion of recall attributable to syntactic structure. Further, all subjects showed the same amount and kind of migration of clicks in the direction of syntactic boundaries. As far as comprehension of the material was concerned, there was no difference between schizophrenics and normals. Thus, schizophrenic subjects do tend to organize verbal material according to clause boundaries.

Subjective organization. Koh, Kayton, and Berry (1973) make the most direct attack on the question of associations and higher-order assemblies. Following Miller's
(1956) unitization theory, they hypothesize that the schizophrenic cannot “chunk” input material into larger units to lessen the load of short-term memory. In our terms, he does not develop the associational strength between cogits to create strong assemblies. Using a fixed and free recall procedure which explores the type and quality of the cogit assemblies, they were able to examine the subjective organization, degree of categorical clustering, and hierarchical clustering schemas used by young, acute nonparanoid, nonactively psychotic schizophrenics.

As mentioned before, they found that schizophrenics do not use normative categorical clustering schemes to the same extent as normals nor do they use as much subjective organization to facilitate recall. Normals were superior with both uncategorized and categorized word lists. While controls increased their categorical clustering (recalling items together in the same category) and subjective organization (grouping items together through trials), schizophrenics did not. Since the recognition memory was the same for schizophrenics and controls in this study, the problem for nonparanoids was in the chunking process. The schizophrenic did not chunk to any great degree nor did he organize by any common method, that is, the organizations developed by the schizophrenic widely differed from each other and from controls. The individualistic subjective organization suggests that schizophrenics have loose conceptual associations and they do not form the assemblies which are common in the normal population. Poor recall, therefore, was due to the lack of strong assemblies which are further due to a lack of strong associations. Hence, even though the cogit has the same strength as that of normals, as evidenced in the lack of group differences in the recognition studies, associations which form the assemblies are weak. Since the use of organizational schemes places the non schizophrenic patient group between schizophrenics and normals, the authors conclude that the organization deficit in schizophrenics is a matter of degree and not quality (Koh, Kayton, and Berry 1973).

Larsen and Fromholt (1976) studied schizophrenics' use of categorical organization. Normal and schizophrenic subjects were required to establish a stable organization for 25 unrelated words through repeated, self-paced sorting into self-determined categories. Subsequently, they were asked to recall the words. Schizophrenics required more trials to complete the sorting tasks but, once this was achieved, they recalled as many words in as orderly a manner as normal subjects. Further, the two groups did not differ with respect to the organizational structure in the sortings. The results do not support the assumption that deficient retrieval operations contribute to the recall deficit of schizophrenics. They are consistent, however, with the hypothesis of a mnemonic organizational deficiency in schizophrenia. These authors argue that a single presentation of materials is probably not sufficient for schizophrenics to impose a stable organizational scheme. Unlike normal individuals, they require many trials to achieve such stability. The instability in their organizational scheme then is what underlies the often observed recall deficits.

Other studies have investigated complex information processing at the level of the schemata. Task demands operated differentially for paranoids, nonparanoids, and controls. Hirt, Cuttler, and Genshaft (1977) designed a series of motor, perceptual, and symbolic tasks ranging on a continuum of complexity. Generally, schizophrenics were found to be slower and paranoids faster than the other groups on symbolic tasks. The procedure was interesting in its approach to varying conceptual demands on subjects. As more conceptual demands were added, there was a concomitantly greater need to use assemblies. Accordingly, the deficit of the nonparanoid schizophrenic increased while leaving the paranoid unchanged.

With tasks of increasing complexity, the different strategy or conceptual characteristics of each subgroup become clearer. Neufeld (1977) studied judgments of word similarity by paranoid and nonparanoid schizophrenics and normals. A multidimensional scaling solution compared the three groups on dimensions used in judging verbal meaning. Paranoids used more dimensions than normals and nonparanoids, suggesting an emphasis on conceptual processing. Paranoid judgments were also much less accurate than normal judgments. Neufeld inferred that there was greater unpredictability in the judgments of paranoids. Apparently, the assemblies of the paranoids were more idiosyncratic; there was greater individual variability between paranoids. In other terms, the assemblies were more complex
than those of normals, but the dimensions employed were also more personal.

Another study by Neufeld (1976) examined the processing of multiple stimulus dimensions by paranoids, nonparanoids, and normals on visual and verbal stimuli. When judging schematic faces and visual forms, schizophrenic groups were less sensitive than normals to stimulus variations, but their judgments were not impaired by this insensitivity. Paranoids used stimulus dimensions differently than the other groups. When judging similarity between word pairs, paranoids again combined stimulus dimensions differently than the other groups. While both schizophrenic groups were apparently as sensitive to the semantic dimensions of variation as normals, paranoids used these dimensions to produce different interstimulus relationships than normals. Gregson and Fearnley (1974) varied complexity of processing by increasing the number and size of color samples used in relative similarity judgments by acute paranoids, nonparanoids, and normals. Perceptual judgments of nonparanoids more closely resembled mechanistic processing by a camera. In contrast, paranoids in each condition had the greatest imbalance of attention, regardless of whether the strategy was appropriate. These findings again suggest that different cognitive strategies were employed by each group. Here the paranoid seemed to overuse conceptual control so that it interfered with more appropriate processing.

The paranoid strategy of attributing meaning according to rigid conceptual expectations functions adaptively in situations where the expectation is justified, but maladaptively where the expectation is not justified. It is this phenomenon that alerted Shakow (1962) to the paranoid-nonparanoid differences in reaction time experiments, which he termed "the difficulty in forming a segmental set." What is called both "rigidity of set" and "difficulty in forming a set" are two aspects of the same process. For the paranoid, new sets are difficult to acquire because established sets become rigid. Generally, these rigid sets generate expectations for probable events. In this sense, delusions may be seen as pathologically extreme examples of sets, which anticipate improbable and therefore deviant events. Their lack of validation marks them as deviant. Possibly when the paranoid becomes more disturbed, the assembly becomes more rigid, which does not allow the flexibility to entertain the possibility of discrepant information which further creates the impression of greater deviancy.

Bassos (1973) demonstrated the effect of rigid sets when he found that paranoids were much more likely than normals or nonparanoids to distort remembered, affect-laden material in ways that reflected delusional themes, even when considerable constraint was present in the form of definite meaning. Fergus and DeWolfe (1974) found that paranoids, but not nonparanoids, respond to the Logical Consequences Test with dominant concepts predicted from their delusions. In short, paranoids as distinct from schizophrenics tend to assign specific meaning to all stimuli in a stereotyped manner. At times their rigidity may be beneficial in that they are also less suggestible than nonparanoids. Ham, Spanos, and Barber (1976) found that paranoid symptoms were negatively related to subjective measures of suggestibility as used in hypnosis research. This suggests a greater independence of thought and possibly a lesser need for a dependency relationship in terms of certainty being provided by an outside source, possibly exemplified by extensive institutionalization, the solution most often produced by the nonparanoid.

In a discussion which is similar to our explanation of the cognitive style of the paranoid and the schizophrenic, McConaghy (1960) states that there are two types of deviations in associational patterns, a strengthened capacity to assign logical meaning to events or a weakened capacity to exclude irrelevant associations. In the former case, established meanings resist conflicting associations, and in the latter case the thought process becomes vague, is characterized by intuition rather than reasoning, and meaning is elusive. McConaghy considers the first a characteristic of paranoid and the second a characteristic of nonparanoid thought. We have come to this same conclusion in our brief glance at some of the information-processing literature.

We can now anticipate our discussion of integration theory by summarizing the cognitive styles of paranoids and schizophrenics. Paranoids rely on a rigid conceptual process without adequate constraint from perceptual data, stimulus features stripped of a conceptual loading, while schizophrenics rely primarily on perceptual data without adequate
categorization and classification from conceptual processes. Situations vary in the need to employ either process. The schizophrenic or paranoid cognitive process will be found to be adaptive or maladaptive depending upon the demands of the situation in terms of its congruence with the dominant cognitive style.

The paranoid performs the initial encoding from iconic storage in a particular manner, a serially controlled processing that does not allow for the grasping of a great deal of information that may be secondary but relevant to the task. The assembly defines the material that will be recognized, and a serial search of stimulus elements is enacted to find the specified elements. Because the paranoid fails to consider the sensory context of stimuli, which are required to produce the information that allows a fluidity of conceptualization, he has difficulty in situations requiring flexible schemata.

In the formation of schemata, a conceptual process, the schizophrenic shows a deficit. He attends to the sensory aspects of stimuli in an automatic processing fashion and exhibits a deficit when conceptual organization would be helpful either in the form of searching for information in the stimulus field or in memory. The dual hypotheses for paranoids and schizophrenics suggest that the two groups engage in distinctly different thought-worlds. If our hypotheses are supported in further work, we will have clarified the cognitive process underlying the "unshakable delusional system" of Kraepelin's (1976) paranoid and the "associative disturbance" of Bleuler's (1950) schizophrenic. We shall now explore the possibility that the characteristic cognitive style of each group may reflect a specific neurological organization.

Hemispheric Preferences and Schizophrenia

Describing psychological functions by means of the operation of the cerebral hemispheres has been used to explain phenomena ranging from the evolution of consciousness to mirror-image discrimination (Corballis and Beale 1976). The rapidly evolving area of hemispheric specialization is relevant to our discussion because the processes characteristic of each hemisphere are similar to those we have identified in our view of schizophrenia and paranoia. Although it is highly speculative and potentially reductionistic to translate cognitive styles into hemispheric processing preferences, there is some evidence for the possibility that differential hemispheric functions are the neurological substrate of the information theory constructs relevant to schizophrenia and paranoia.

Most of the early work on hemispheric activation indicated that the nature of the stimulus material determined which hemisphere would control processing and responding. Early studies focused on the verbal-spatial distinction. Later studies suggested that a distinction based on the requirement for analytic or holistic processing more adequately explained differential competencies of the hemispheres. In either case, the general hypothesis is that when stimuli are presented, both hemispheres will begin to process the material, but some types of material will be processed more competently and efficiently by one hemisphere.

In addition to the clear influence of processing demands, individual differences influence hemispheric functioning. An individual's preference for the use of one hemisphere, though it may be detrimental to task performance, can determine that the less competent hemisphere is used. This is not to say that individuals switch hemispheres at will but that individual preferences may supersede or interact with task demands. The consistent findings of individual difference effects clear the way for the possibility that pathological groups may have unusual hemispheric preferences.

Work on information processing generated the hypothesis that differences between paranoids and schizophrenics on various measures of performance could result from a paranoid preference for controlled processing and a schizophrenic preference for automatic processing. The automatic-controlled processing dichotomy is similar to the distinction between right and left hemisphere processing, respectively (Kinsbourne 1974). The former is described as dominant for verbal-analytic processing and the latter for holistic-visual-spatial processing.

To validate the potential correspondence of information-processing strategies and hemispheric specialization requires the description of the role of each hemisphere in processing information. The right hemisphere is the locus of visual-spatial, nonlinguistic activity, which could correspond to automatic processing. The left hemisphere is the locus of abstract, linguistic processing which could correspond to controlled
processing directed by the assemblies.

Studies of brain-damaged patients suggest that automatic and controlled processing are emphasized by right and left hemispheres, respectively. For example, patients with right posterior cerebral lesions behave as if preattentive structuring has not occurred (Hecaen and Angelergues 1962). Similarly, patients with intact right hemispheres but with lesions in the left hemisphere draw pictures without detail but with good gestalt (Warrington, James, and Kinsbourne 1966), suggesting that controlled processing is a left-hemisphere function. The correspondence between type of processing and hemispheric activation suggests that differences between paranoid and nonparanoid schizophrenics in information-processing strategies may reside in patterns of hemispheric functioning.

We have hypothesized that the schizophrenic and the paranoid prefer or are limited to specific modes of processing. Unfortunately there is no work available which is revelant to the possibility that paranoids and schizophrenics prefer or are limited to left- and right-hemisphere processing, respectively. There is, however, evidence for a left-hemisphere deficit or, as we prefer, a right-hemisphere dominance for nonparanoid schizophrenics. We would expect a left-hemisphere processing, respectively. There is, however, evidence for a left-hemisphere deficit or, as we prefer, a right-hemisphere dominance for nonparanoid schizophrenics. We prefer or are limited to specific cognitive tasks and the abnormal time course of these ratios in the psychotic implied that psychosis involved a defect of interhemispheric integration.

Bigelow and Rosenthal (1972) report that the only significant difference at autopsy between schizophrenic and matched control brains was the thickness of the corpus callosum, with those of the schizophrenic group an average 18 percent thicker. If increased interhemispheric communication is interpreted as leading to inadequate integration because of an overload of the system, then the increased size of the corpus callosum may constitute a defect of interhemispheric integration.

Beaumont and Dimond (1973) showed that schizophrenics match shapes and letters as well as normals and nonschizophrenic psychiatric controls when the stimuli
to be matched are presented to the same hemisphere. Schizophrenic performance declined, however, relative to both control groups when stimuli were presented to different hemispheres, a finding the authors interpreted as supporting a hypothesis of "partial brain disconnection" in schizophrenia. Unfortunately, this study did not distinguish between schizophrenic subgroups; results are therefore not informative about the specific patterns of paranoids and schizophrenics. What can be inferred, however, is that both schizophrenics and paranoids exhibit a deficit in integration of material across hemispheres. The following theoretical discussion advocates such a position.

An Integration Theory of Schizophrenia and Paranoia

The preceding brief reviews of current work in information theory and hemispheric dominance have sampled the accumulating evidence for a separation of paranoid from nonparanoid schizophrenics, not just as a subgroup of schizophrenia but as a separate diagnostic category. Not only are the cognitive processes of these groups different, but these distinct processes may also reflect differences in hemispheric preferences. While no definite conclusions can be drawn regarding hemispheric function in schizophrenia, we have identified two major hypotheses inviting further investigation. We do believe, however, that evidence regarding symptomatic and performance differences between paranoids and schizophrenics shows that consideration of the paranoid as simply a variant of the schizophrenic is unwarranted. In what follows, we present a unified explanatory scheme developed to account for the strong preference for a particular cognitive process or the lack of an integration of cognition processes in these two groups.

Integration theory is a theoretical framework which accounts for the findings of symptomatic, clinical, experimental, and neurological differences in paranoid and schizophrenic processes. This approach explains schizophrenic performance as an inability to integrate perceptual and conceptual processes in a normal manner (Magaro 1980). The basic postulates are that paranoids rely on conceptual processes without adequate constraint by perceptual data, and that schizophrenics rely primarily on perceptual data without adequate categorization and classification from conceptual processes. Demands of particular situations or tasks determine whether these styles are adaptive. The prediction of differential subgroup performance therefore depends on a careful analysis of task requirements. The frequent (but not invariable) finding that paranoids perform more like normals than nonparanoids reflects the general advantage of a conceptual rather than a perceptual style in task execution and problem solving.

Developmental theorists like Piaget (1952) and Werner (1948) have specified that an integration or equilibrium between perceptual processes and conceptual structures is necessary for adequate adaptation. The preference for a conceptual or perceptual style may originate in early development. Thus, a developmental framework like Piaget's may help define the concept of integration and explain the processes and stages of perceptual-conceptual integration.

For Piaget, mental development involves the creation of increasingly complex and adaptive psychic structures, or schemas. The child progresses from purely reflexive behavior to behavior guided increasingly by internal representations (albeit initially illogical and partial representation) of objects, space, time, and causality. Schemas are both the means and product of adaptation, which is guided by the process of assimilation and accommodation. Assimilation is the process by which the environment is apprehended through existing schemas, and accommodation is the process by which existing schemas are modified to fit more closely with data gleaned from the environment. Piaget stresses that these two basic adaptive processes are complementary; both are simultaneously present in every act. When a child grasps a toy, it is assimilated through the existing grasping schema but also accommodated insofar as a different sort of grasp facilitates its manipulation. This different sort of grasp is registered as a unique action-object sequence, which in the sensory-motor period represents a new or modified schema. Assimilation and accommodation are dialectically involved in every cognitive act. They function to maintain equilibrium in the face of new data. Piaget's theory of adaptation, in which dialectic processes of assimilation and accommodation produce equilibrium at successively higher levels of schemata-complexity, is translatable to a
theory of integration of conceptual and perceptual systems.

Information processing always involves sequential systems of functioning, moving from the perceived event to encoding and then to memory and conceptual organization. These systems are normally integrated, characterized by a good fit between structures. Under the impact of novel or discrepant data, however, their integration is threatened—for example, when there is no conceptual schema for perception, or when perception does not supply the data required by a strong schema. In such conditions of disequilibrium (which, for Piaget, normally precede major cognitive growth at three transitional phases), one of three solutions may occur: (1) the schema may be modified to fit the new perception (imbalance favoring accommodation); (2) the percept may be distorted in order to fit existing schemas (imbalance favoring assimilation); or (3) a combination of both may occur, as is usual. Any of these solutions tends to reestablish equilibrium, although the third, an integration of perceptual and conceptual processes, leads to the most stable and efficient adaptation. We shall examine this process in more detail by suggesting that normative periods of disequilibrium represent critical periods of vulnerability for pathological forms of integration.

Childhood Schizophrenia and Childhood Paranoia

The preschizophrenic child achieves a normal initial differentiation of assimilation and accommodation, attaining object constancy and self-object differentiation in the first year to 18 months of life. The child enters the capacity for representational thought and a new form of disequilibrium. While the child is capable of directed searching, remembering, and complex internal representation, and can consequently process more and subtler data, he is overwhelmed by the sheer amount of information now available as a result of these new skills. The equilibrium between assimilation and accommodation is threatened. The "perceptual resolution" occurs when the child does not progress beyond the initial disequilibrium of the preoperational period. Such a child continually alters his concepts to fit immediate perceptions. Perception is not organized by concepts; instead, schemas vary with each perception. In Piaget's terms, the child emphasizes accommodation. This resolution corresponds well with descriptions of the majority of childhood schizophrenics. The child has symbols, language, and a primitive notion of the other, but has not developed the "secondary schemas" necessary to achieve a stable representation of the world in the face of continual perceptual flux. Integration is fleeting at best, and perception dominates conceptualization, with schemas dissolving as new elements are apprehended. Thus, both perceptions and concepts appear distorted, fantasized. We call this form of adaptation childhood schizophrenia.

Another response to the preoperational disequilibrium is a "conceptual resolution," in which the child develops some connections between concepts. Initially these connections are tenuous and unstable, and are threatened by discrepant or changing percepts. To maintain these emergent cognitive structures, the child disregards or distorts perceptual data. While he continues to differentiate and develop his concepts, their relation to perceptual reality becomes less direct. He disregards perceptual data in order to maintain the stability of his concepts. In Piaget's terms, assimilation is dominant. The child with a conceptual resolution appears to have concepts and behavior which are idiosyncratic and egocentric. But the process leading to these idiosyncratic concepts is different from the process of the perceptually bound child whose concepts continually change to accommodate different stimuli. In this second case, concepts are tied to such a limited perceptual base that they appear to be delusional or without a frame of reference. We call this type of adaptation childhood paranoia.

Robins (1966) reports that a third of preschizophrenic children show "odd ideas or paranoid trends." Zigler and Levine (1973) report a positive relationship between paranoid status and premorbid competence, which they cautiously interpret as an indication that paranoidists achieve a higher developmental level in their premorbid period than nonparanoid schizophrenics. Further evidence by Sommer and Witney (1961) and Zigler and Phillips (1961) supports the view that paranoidists have achieved higher premorbid levels of development.

In Piaget's theory, the third period of disequilibrium between accommodation and assimilation occurs when the child begins to acquire "formal operations" (age 11+). Formal operations are highly
abstract, internalized actions involving hypothetico-deductive and future-oriented reasoning. In this transitional stage the child moves from thought based on the concrete and present to thought considering the abstract, the hypothetico-deductive, and the impossible.

Children who did not achieve a stable integration in the preoperational period function poorly as the transition to formal operations approaches toward the end of the first decade. The child with a perceptual resolution will not progress to the stage of formal operations. As an adolescent, he will fall further behind cognitively, tending to be isolated from his peers. His school performance is likely to become increasingly atypical for his age level while his behavior will appear more and more unusual, until he is ultimately called "schizophrenic." There is evidence for the view that a predisposition for adult schizophrenia exists at an early age. Adult schizophrenics are poor achievers and socializers as children (Barthell and Holmes 1968) and use language characterized by "driven overproductivity of talk" (Namache and Ricks 1966). The predisposition may not, however, be seen as pathological in childhood. Although a noticeable disturbance before age 5 is a good predictor of adult schizophrenia (Morris, Escoll, and Wexler 1956), more schizophrenics show disturbances in early adolescence than in childhood (Watt 1972).

On the other hand, the adolescent who made a conceptual resolution in the preoperational period approaches the transition to formal operations with some facility. His resolution, which will have alienated him from peers during later childhood, will now appear as an ability to abstract, conceptual thought. He may for a time even attract peers seeking to emulate his capacity for abstraction. But he can only incompletely adopt formal operations, because the few conceptual categories on which he has relied since early childhood are not open to perceptual correction or modification. Thus, he will expand and abstract his concepts, but without a perceptual base these concepts will become increasingly isolated from reality. Eventually his concepts may become so discrepant that he will be diagnosed as paranoid schizophrenic or he will find a cultural-vocational niche in which such thought is adaptive.

In summary, integration theory views childhood schizophrenia as the result of an inability to resolve the disequilibrium of Piaget’s preoperational stage with normal integration. Two types of nonintegrative resolutions are possible: perceptual and conceptual. Each of these leads to a type of childhood disturbance which is eventually identified as either schizophrenic or paranoid.

Integration theory follows Piaget’s view that the dialectic process of adaptation following disequilibrium exists across all stages of development, and is crucial to normal cognitive growth. Schizophrenia and paranoia as cognitive styles are behavioral expressions of a failure to integrate conceptual and perceptual systems. The level of development at which a failure of integration occurs may determine the actual clinical symptoms and hence the diagnosis. We have hypothesized that failure at very early stages produces childhood schizophrenia or childhood paranoia. Inadequate integration at the stage specific for childhood schizophrenia may remain subclinical due to favorable environmental conditions, but it will persist as a predisposition to paranoid or schizophrenic pathology in adulthood depending on the congruence of adolescent integration with the resolution adopted in childhood (Magaro, Miller, and McDowell 1976).

Conclusion

Our major focus has been on the consistent distinctions between paranoids and schizophrenics. The evidence is at least strong enough to demand a separation of the two groups in research designs. Our analysis suggests that the clinical dimension on which paranoids differ is level of conceptual organization, and those patients heretofore classified as paranoid disorder or paranoid schizophrenic could henceforth be classified “paranoid-integrated” or “paranoid-nonintegrated” as suggested by Foulds and Owen (1963). What is most promising about the present formulation is that information-processing strategies may separate the two groups and that the characteristic cognitive style of each group may correspond to distinct stages in the processing system. The similarity of information-processing strategies and specialized hemispheric capacities now occupies our attention, and our work is continuing with the hypothesis that paranoids are left-hemisphere processors and schizophrenics are right-hemisphere processors.

The clear separation of paranoids and schizophrenics also has therapeutic implications. Para-
noids are underrepresented in chronic cohorts (Strauss 1973), which suggests that they possess more of the skills required for hospital discharge and community tenure. The idea that the "integrated paranoid" would not require hospitalization and would have a good prognosis implies that some paranoids could function in society.

The integrated paranoid should share the essential mechanisms and descriptions of the clinical paranoid, but lack the most exaggerated delusional characteristics. This possibility should be studied both to assess the paranoid cognitive style without potentially confounding hospitalization effects, and also to investigate the mechanism of pathogenesis. This suggested extension of the study of psychopathology is necessarily speculative because there is little research focusing on the successful adaptation of paranoids and schizophrenics. The initial tasks would be to discover the identifying signs of the nonclinical paranoid, and the current roles available which would be expected to support a paranoid adaptation.

Nonclinical paranoids should have rigid, simplified basic concepts which may be used to organize a wide array of unrelated data. London (1931) suggests that one such basic cognitive structure is a clear view of threatening relationships. As soon as one element of that gestalt appears, the paranoid overgeneralizes that similarity to the entire relationship. Thus, the paranoid needs clear-cut relational structures permitting a minimum of unstructured human relations. Occupational or social roles must not make perceptual demands for accurate recognition of novel stimuli; rather, these must encourage elaboration and enrichment of a few themes. Roles must permit the expression of suspicion and hostility, and permit or require a rigid belief system without much chance of disconfirmation.

The idea of a paranoid cognitive style in the absence of pathological symptoms is not foreign to personality theorists (Shapiro 1965), but it is new to the area of psychopathology. It would seem that a merger of these fields may provide a more meaningful conceptualization of a condition without the confounding effects of institutionalization or labeling (Magaro, Gripp, and McDowell 1978). We simply do not have the data needed to reach intelligent conclusions about the paranoid or the schizophrenic who functions in society without the stigma of illness. Surely there is a need for research to move in that direction.

Meissner's (1978) excellent discussion of the paranoid process can serve as a guide for such work, but we are not familiar with a comparable work on the successful adaptation of the schizophrenic.

As with all new theoretical approaches, the research promise may be greater than the initial accuracy of conception; but there is little question that considering paranoids a subclass of schizophrenia ignores the reality of reliable empirical differences between these groups. The current unified nosology does not do justice to the uniqueness of schizophrenia, which becomes blurred in a multitude of types and processes, or of paranoia, which remains the impure deviant of a "true" schizophrenic state.

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**The Author**

Peter A. Magaro, Ph.D., is Professor, Department of Psychology, Ohio State University, Columbus, OH.

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