

Schizophrenia: The Characteristic Symptoms

by Nancy C. Andreasen and Michael Flaum

Abstract

The specific symptoms that have been felt to characterize schizophrenia have varied widely over time and across cultures, as has the diagnostic and prognostic importance placed on these symptoms. In this report, the historical concepts of what constitutes the "characteristic symptoms" of schizophrenia are reviewed in the context of the development of *DSM-IV*. Through the existing literatures as well as through previously unpublished data sets, the dimensions of reliability, specificity, validity, and descriptive value of the various signs and symptoms used to classify schizophrenia are explored. In addition, the structure of the *DSM-III-R* definition of schizophrenia with that of the proposed revisions of the *International Classification of Diseases (ICD-10)* are contrasted, demonstrating several potentially meaningful differences. It is concluded that a comprehensive description of the signs and symptoms of schizophrenia should place a strong emphasis on both positive and negative symptoms. Principles and approaches to guide the development of *DSM-IV* are suggested.

Conceptual and Historical Background

Historical Background. The definition and criteria of schizophrenia in *DSM-III-R* cannot be understood without examining the historical background that led to the development of the definition in *DSM-III*. This is because only minor changes were made between *DSM-III* and *DSM-III-R* while the differences between *DSM-II* and *DSM-III* were major (American Psychiatric Association 1968, 1980, 1987a).

The definition of schizophrenia in *DSM-III* represented a sharp break with decades of American and European nosological tradition. Before *DSM-III*, most American psychiatrists used a relatively broad definition of schizophrenia based largely on the Bleulerian 4As: associations, affect, autism, and ambivalence. At its broadest, the boundaries of the concept of schizophrenia included Kasanin's (1933) schizoaffective disorder, Hoch and Polatin's (1949) pseudoneurotic schizophrenia, and good prognosis schizophrenia (Vailant 1964; Stephens et al. 1966), as well as nonpsychotic variants such as simple and latent schizophrenia (Bleuler 1911/1950). With a few swift strokes of the nosological scalpel, however, many of these forms of traditional schizophrenia were dissected away in *DSM-III* and included in other categories: psychosis not elsewhere classified (schizoaffective, schizophreniform, and paranoid disorders), affective disorders (mood-incongruent manic and major depressive disorders), and even personality disorders (schizotypal personality disorder). The resulting concept of schizophrenia that emerged in *DSM-III* has been repeatedly shown to be among the narrowest in existence (Helzer et al. 1981; Endicott et al. 1982; Klein 1982; Stephens et al. 1982; McGlashan 1984; Moller et al. 1989; Loranger 1990).

The decision to reduce the concept of schizophrenia to its "bare bones" was to a large extent based on the empirical evidence available at the time *DSM-III* was being developed. During the late 1960's and early

Reprint requests should be sent to Dr. N.C. Andreasen, Dept. of Psychiatry, University of Iowa College of Medicine, 500 Newton Rd., Iowa City, IA 52242.

1970's, two important cross-national studies of schizophrenia were conducted: the *International Pilot Study of Schizophrenia* (IPSS; World Health Organization 1973) and the U.S.-U.K. study (Kendell et al. 1971; Cooper et al. 1972). Both studies suggested that American psychiatrists used a much broader definition of schizophrenia than their colleagues in other parts of the world. Specifically, American psychiatrists often tended to see schizophrenia in patients whom their international colleagues viewed as manic-depressive.

A second important conceptual development that exerted a major influence on the *DSM-III* concept of schizophrenia during the 1970's was an increased emphasis on improving the reliability of diagnosis and the evaluation of symptoms. Several influential studies presented critiques of the reliability of diagnosis (Kreitman et al. 1961; Beck et al. 1962; Sandifer et al. 1964, 1968; Spitzer and Fleiss 1974). The critiques, in turn, led to an interest in identifying symptoms that were more "objective," such as delusions and hallucinations, and that could therefore be defined more reliably; delusions and hallucinations are essentially all-or-none phenomena and are sharply delimited from normal experience. Bleulerian symptoms, on the other hand, were seen as relatively softer since they tend to be on a continuum with normality. British psychiatrists, such as Frank Fish (1962) and John Wing (1970; Wing et al. 1974), stressed the importance of empirical approaches to phenomenology in addition to emphasizing the importance of German approaches. The Schneiderian school, which proposed the pathognomonic nature of "first-rank symptoms," assumed great importance during the 1970's (Schneider 1959, 1974; Mellor 1970). These

symptoms were given prominence in standard interviewing instruments such as the Present State Examination (PSE; Wing 1970) and the Schedule for Affective Disorders and Schizophrenia (SADS; Endicott and Spitzer 1978), which have formed the basis for most research on schizophrenia during the past two decades.

A final influential contribution during the 1970's was an emphasis on using course of illness in addition to cross-sectional symptoms to improve the reliability and validity of the diagnosis of schizophrenia; the influential Washington University criteria (also referred to as the Feighner criteria) required a duration of symptoms of at least 6 months before a diagnosis of schizophrenia could be made (Feighner et al. 1972). A large number of studies were conducted that showed these criteria to have strong predictive validity (Bland and Orn 1979; Tsuang et al. 1979; Helzer et al. 1981, 1983; Guze et al. 1983; Lloyd and Tsuang 1985; Moller et al. 1989).

These influences all affected the *DSM-III* definition of schizophrenia. The new schizophrenia in *DSM-III* was defined as a disorder lasting at least 6 months, including both prodromal and residual periods, that is characterized primarily by delusions and hallucinations during the active period of illness. The description of characteristic symptoms placed great emphasis on Schneiderian first-rank symptoms.

Relatively minor modifications were made in the *DSM-III* criteria as *DSM-III-R* was being developed. Kendler et al. (1989) have recently reviewed the changes and their rationale. Because the criteria were seen as too complex, an effort was made to simplify them based on both historical tradition and research findings. Negative symptoms were given

more emphasis by increasing the relative weighting of flattened and inappropriate affect. In an effort to recognize that bizarreness may be culturally dependent, bizarre delusions were redefined; a definition seeking to reflect Jaspersian concepts of "nonunderstandability" (i.e., involving a phenomenon that the person's culture would regard as totally implausible) replaced the previous, more objective definition ("content is patently absurd and has no possible basis in fact"), and a listing of four Schneiderian symptoms (delusions of being controlled, thought broadcasting, thought insertion, or thought withdrawal) was replaced by examples of one Schneiderian symptom (thought broadcasting) and one symptom similar to Schneiderian delusions of control (being controlled by a dead person). In *DSM-III-R*, the major distinction between schizophrenia and delusional disorder turns on this definition of bizarre delusions since delusional disorder is defined in terms of the presence of "nonbizarre" delusions. A 1-week duration criterion was added for the group of symptoms appearing in the A criterion. The B criterion, which specified deterioration in functioning in *DSM-III-R*, was broadened. Overall, the net effect of these changes appears to be a further narrowing of the definition of schizophrenia in *DSM-III-R*.

Ironically, although *DSM-III* represented an attempt to realign American psychiatry with British and European traditions, it is often perceived internationally as an "American system" that broke with European tradition. As noted above, comparative nosologic studies have indicated that the current American definition of schizophrenia is much narrower than that used by the rest of the world.

The publication of *DSM-IV* will coincide with the publication of the *International Classification of Diseases*, 10th revision (ICD-10). Several factors make it desirable that the *DSM-IV* definitions approximate those of ICD-10 as closely as possible. Improving international communication is one important pressure. The research community that studies schizophrenia is truly international, and it is important that investigators be able to conduct cross-national attempts to validate one another's findings. The recent disparate findings concerning D_2 receptors measured with positron emission tomography scanning highlight the problems that may arise when different constructs of schizophrenia are applied, given that the Swedish sample represented a more acute, younger, floridly psychotic sample while the Hopkins sample was older and more chronic (Andreasen et al. 1988). A second major pressure arises from the fact that American diagnoses must often be coded for administrative and clinical purposes using the ICD system; consequently, it is important that the American definitions corresponding to the ICD-10 codes be as close to the ICD-10 definitions as possible to achieve maximal diagnostic precision and clarity.

The draft of the ICD-10 system (World Health Organization 1989) for defining schizophrenia and related disorders is quite different from the American system. All conditions on the schizophrenia/psychosis spectrum are grouped together under the major heading "Schizophrenia, Schizotypal, and Delusional Disorders" (the F20 group). The definition of schizophrenia requires a duration of only 1 month (in contrast to the 6-month duration criterion of *DSM-III-R*). Positive symptoms of psychosis, and particularly Schneiderian symptoms,

are given even more prominence than they are in *DSM-III-R*. Negative symptoms are given somewhat more prominence as well, in that they are mentioned specifically and can be used to diagnose schizophrenia if present in conjunction with relatively mild thought disorder (e.g., irrelevant speech). Simple schizophrenia, a purely negative form of schizophrenia, is included as one of the subtypes in ICD-10. The definition of schizoaffective disorder in ICD-10 is markedly different from that in *DSM-III-R* in that it takes a predominantly cross-sectional approach and requires the simultaneous presence and approximate balance of psychotic and mood symptoms; consequently, many patients classified as mood-incongruent manic or major depressive disorder (and probably even some classified as mood congruent) will be classified as schizoaffective disorder in ICD-10.

Conceptual Background. Most of the previous attempts to develop diagnostic criteria have depended on common sense and clinical experience in judging the number and type of characteristic symptoms that should be used to select criteria. Once criteria have been selected in this manner, their reliability and predictive validity can be assessed. This strategy is quite appropriate when nosological systems are in a young developmental period and when very few empirical data are available concerning the frequency and severity of definitional or characteristic symptoms.

However, the development of various structured interviews and rating scales, which have been applied to a large number of data sets, may make it possible to employ more empirical, data-based, biometric approaches to the development of criteria for

schizophrenia for *DSM-IV* (Frances et al. 1989). The reliability of most characteristic symptoms of schizophrenia has been improved through the development of structured interviews such as the SADS, the Diagnostic Interview Schedule (DIS; Robins et al. 1981), the Structured Clinical Interview for *DSM-III* (SCID; Spitzer and Williams 1984), and the Comprehensive Assessment of Symptoms and History (CASH; Andreasen 1985). The base rate of the symptoms of schizophrenia has been, or is being, evaluated in large groups of patients at various stages of the illness. Once a group of patients has been identified who are considered to have schizophrenia according to some acceptable definition—for example, that used in the Research Diagnostic Criteria (RDC; Spitzer et al. 1975), *DSM-III*, or *DSM-III-R*—biometric approaches such as discriminant function analysis can be applied to identify which symptoms are more powerful in achieving that classification efficiently (Pfohl and Andreasen 1978).

Several basic biometric principles guide the selection of symptoms for inclusion in diagnostic criteria. One characteristic of symptoms that is widely agreed upon is adequate reliability; a kappa of 0.5 or 0.6 is usually considered to be acceptable, but kappas of 0.7 or greater are preferable. Other things being equal, symptoms that have demonstrated high rates of reliability are preferable, and ideally this high rate of reliability should be demonstrated in more acute and more chronic samples and in a relatively large number of diagnostic settings.

A second desirable characteristic is an adequate base rate. If a particular symptom or sign (e.g., thought withdrawal) is pathognomonic of schizo-

phrenia but occurs very infrequently, that symptom is very useful diagnostically when it occurs but should probably not be incorporated as a criterion symptom in a standard nomenclature. No specific minimal base rate has been agreed upon at this point, but common sense suggests that a sign or symptom probably should not be included if its base rate is less than 10–15 percent. Criteria should be limited to those symptoms that occur relatively frequently, and an ideal rate would probably be greater than 30 or 40 percent.

In addition to evaluating the performance characteristics of the specific items used in diagnostic criteria, the overall purposes of diagnostic criteria themselves—gatekeeping (as efficiently as possible), and describing and educating—should also be considered. The major purpose of gatekeeping is simply to classify. To achieve this function, the diagnostic criteria should emphasize the inclusion of a minimal number of symptoms that will help clinicians and researchers classify patients, including those who “belong” within the syndromal construct and excluding those who do not. Ideally, this list of symptoms should be as parsimonious as possible; in fact, if a clustering of only two or three symptoms (or even one) were pathognomonic of the disorder, only a very short list would be necessary. The gatekeeping rationale was behind Bleuler’s emphasis on thought disorder as a pathognomonic symptom and Schneider’s emphasis on first-rank symptoms. Cloninger’s work with the clinic 500 sample exemplifies the use of modern biometric approaches to identify criteria useful for gatekeeping; a stepwise discriminant function analysis or other such multivariate techniques can assist in identifying the shortest

list of symptoms possible to achieve classification (Cloninger et al. 1985).

A second function of diagnostic criteria is to provide a comprehensive description of the disorder and to educate clinicians, residents, and medical students about its characteristic symptoms. The *DSM-III* and *DSM-III-R* criteria have been widely used as teaching tools for residents and medical students. While it can be argued that the descriptions of the disorders in the text should serve this educational function, in real life most people carry and consult only the *DSM-III-R* “Mini-D” (American Psychiatric Association 1987b). Thus, they get their concepts of the characteristic symptoms of each disorder from the criteria themselves. This means that the criteria used to define schizophrenia should be selected to convey the full clinical flavor of the disorder.

In general, the existing *DSM-III-R* criteria tend to provide a compromise between these two functions, which are potentially at cross-purposes. The gatekeeping function is best served by a very short list of symptoms, while the descriptive and educational function is best served by a long and comprehensive list. As the criteria are revised, an attempt should be made to identify that list of symptoms which appears to strike the optimal balance between efficient classification and comprehensive description.

Polythetic Versus Monothetic. Kraepelin’s (1904, 1919) concept of schizophrenia was polythetic, although he clearly considered negative or deficit symptoms to be more important clinically. Bleuler (1911/1950) introduced the concept of pathognomonic symptoms and derived an essentially monothetic construct in that he said that thought

disorder was pathognomonic of schizophrenia. The search for a pathognomonic symptom was further extended by Schneider (1959), who selected a completely different type of symptom as pathognomonic; that is, he selected particular forms of positive symptoms as his pathognomonic markers of the disorder. The Feighner criteria represented a polythetic construct (Feighner et al. 1972). The RDC, deriving from the Schneiderian thinking that informed the PSE and the work of Wing et al. 1974, emphasized Schneiderian first-rank symptoms (Spitzer et al. 1975). This emphasis was carried over to *DSM-III*, although with some modifications and corrections as evidence emerged that Schneiderian first-rank symptoms were really not pathognomonic. The current *DSM-III-R* system can be regarded as either polythetic or monothetic, depending on what one considers to be a primal element. *DSM-III-R* is monothetic in that it requires that all patients with schizophrenia have some type of positive symptom of psychosis. It is polythetic in that the positive symptoms may be variable and may include delusions, hallucinations, or positive formal thought disorder.

Broad Versus Narrow. As the above historical review has indicated, the boundaries of schizophrenia have expanded and contracted over the years. Kraepelin’s original definition of the disorder (1904) was relatively narrow, but Bleuler (1911/1950) broadened this concept. Psychoanalysts throughout the world (but particularly in the United States) continued to expand the concept steadily until the 1950’s, at which point substantially more than 1 percent of patients seen by psychiatrists were diagnosed as having schizophrenia, at least in some sections of the United

States (Cooper et al. 1972). This was impressively demonstrated by Kuriansky et al. (1974), who found that more than 80 percent of psychiatric admissions to a New York hospital during the early 1950's received a clinical diagnosis of schizophrenia as opposed to fewer than 40 percent at the same hospital a decade earlier. Rediagnosis by research psychiatrists revealed no differences between the patient groups.

The Feighner criteria, RDC, and *DSM-III* represented an attempt to "correct" this excessive breadth of the definition. The narrowing was done in two ways: one involved introducing the 6-month duration criteria, and the other involved emphasizing florid or positive symptoms of psychosis and deemphasizing deficit, Bleulerian, or negative symptoms. The current *DSM-III-R* criteria include only positive symptoms, plus catatonia and abnormalities of affect; the criteria are essentially written so that some form of positive psychotic symptoms (delusions, hallucinations, or positive formal thought disorder) is required to make the diagnosis. The ICD-10 criteria are narrower in that they stress the importance of Schneiderian symptoms, but broader in that they also recognize negative symptoms, have a shorter duration criterion, include simple schizophrenia, and are operationally likely to include a larger number of patients within the overall category of schizophrenia.

Conceptual Structure of Existing *DSM-III-R* Criteria

The *DSM-III-R* criteria represent an attempt to modify and correct the *DSM-III* criteria even further. The overall structure consists of six criteria. The A criterion specifies the

characteristic symptoms. The B criterion requires deterioration in functioning. The C criterion defines the boundary between schizophrenia, schizoaffective disorder, and mood disorder. The D criterion specifies the duration of the disturbance; it also includes a list of prodromal and residual symptoms that may be present before or after the characteristic symptoms listed in the A criterion and that can be used to demonstrate that psychopathology has been present during the entire 6-month period in which symptoms are required. The E criterion rules out organic factors that may have initiated or maintained the disturbance. The F criterion defines the boundary between schizophrenia and autism. This review focuses primarily on the A criterion, with some discussion of the B and D criteria.

Criterion A of *DSM-III* consisted of a relatively complex list that placed considerable emphasis on positive symptoms of psychosis and especially on Schneiderian symptoms. The *DSM-III-R* criteria require any one of three defining features to be present.

Criterion A1 is polythetic. Essentially, it requires any two out of five different symptoms. This list includes delusions, prominent hallucinations (defined on the basis of duration rather than severity), several forms of formal thought disorder (incoherence or marked loosening of associations), catatonic behavior, and abnormalities in affect (either flat or grossly inappropriate). Criterion A2 indicates that the diagnosis can be made on the basis of delusions alone if they are present in an "extreme" form. In *DSM-III*, the definitional emphasis was on Schneiderian symptoms. In *DSM-III-R*, the emphasis has been changed to "bizarre delusions," which are defined as

"involving a phenomenon that the person's culture would regard as totally implausible" and exemplified by a Schneiderian symptom (thought broadcasting) and a modification of the Schneiderian concept of delusions of control (being controlled by a dead person).

Criterion A3 permits the diagnosis of schizophrenia to be made only in the presence of hallucinations if they are sufficiently severe; the "rate limiting" item in this instance is auditory hallucinations that are relatively persistent and nonaffective in content or that involve one of two Schneiderian symptoms (voices commenting or voices conversing).

Criterion B requires some type of deterioration in functioning. This was stated relatively explicitly in *DSM-III* as deterioration from a previous level of functioning in such areas as work, social relations, and self-care. *DSM-III-R* elaborates this further: "during the course of the disturbance, functioning in such areas as work, social relations, and self-care is markedly below the highest level achieved before the onset of this disturbance or, when the onset is in childhood or adolescence, failure to achieve expected level of social development" (p. 194). This modification was meant to assist in identifying deterioration in those cases in which the actual age of onset is difficult to determine due to the presence of poor premorbid functioning. Because the concept of "deterioration in functioning" is no longer stated in the criterion, however, it may be subject to misinterpretation. The criterion now begins with "during the course of the disturbance," which students and residents often interpret to mean that chronic impairment in functioning is required and that schizophrenia cannot be diagnosed in individuals who are able to work,

have relatively normal social relationships, or care for themselves.

The prodromal and residual symptoms, listed in criterion D, include a list of nine signs and symptoms. These have been reordered between *DSM-III* and *DSM-III-R*, and one additional symptom has been added (marked lack of initiative, interests, or energy) to provide more recognition of the importance of negative symptoms. Some of these are redundant with the A criterion (blunted or inappropriate affect) or the B criterion (marked impairment in role functioning as wage earner, student, or homemaker). The list mixes mild positive and mild negative symptoms somewhat randomly, and sometimes it mixes both positive and negative signs within a single item (digressive, vague, overelaborate, or circumstantial speech; poverty of speech; or poverty of content of speech). Two of these symptoms are required during the prodromal or residual phase, and the prodromal phase is defined somewhat differently than it is in the B criterion ("a clear deterioration in functioning before the active phase of the disturbance"). The list is similar but not identical to the nine symptoms used to define schizotypal personality in *DSM-III-R*. Some items are nearly identical (e.g., odd beliefs, unusual perceptual experiences, odd or eccentric behavior) while others appear in one list but not the other (impairment in role functioning among prodromal symptoms, suspiciousness or paranoia ideation among schizotypal symptoms).

Problems and Issues Raised by the Existing *DSM-III-R* Criteria

The above conceptual and historical review suggests that the existing cri-

teria must be examined further, with an emphasis on the following problems and issues.

Consonance With ICD-10. As has been described above, *DSM-III-R* and ICD-10 differ in several important ways. ICD specifies a much shorter duration (1 month), requires that the characteristic symptoms listed in the ICD equivalent of the A criterion be present for 1 month, and does not include the concepts of prodromal or residual symptoms. The listing of characteristic symptoms stresses Schneiderian concepts much more prominently than does *DSM-III-R*. (Any one from a list of four is sufficient to make the diagnosis, apparently reflecting a continuing belief that these symptoms are pathognomonic.) There are major differences in definition of terms. Criterion A1D of ICD ("persistent delusions of other kinds that are culturally inappropriate or implausible") is comparable to the "bizarre delusions" criterion of *DSM-III-R*, but the examples provided in the two systems indicate that they are conceptually far apart; *DSM-III-R* lists Schneiderian-like symptoms while ICD lists "religious or political identity, superhuman powers and ability, etc."

Very few data are currently available to indicate the effects of *DSM-III-R* on the diagnostic boundaries defined by *DSM-III*, but the existing evidence reveals that *DSM-III-R* has further narrowed the concept of schizophrenia by requiring that, if delusions are the only positive symptom present, they must be bizarre (Fenton et al. 1988). The B criterion, if interpreted to require impairment in role function, will further narrow the definition. The ICD definition has not been in use as yet, although it is similar to the

CATEGO (Wing et al. 1974) system, since it depends heavily on requiring the presence of positive symptoms during the past month. The CATEGO system has been shown to be broader than *DSM-III* (Helzer et al. 1981).

Thus, the major difference between ICD and *DSM* is that the ICD criteria probably embody a broader concept of schizophrenia than do the *DSM* criteria. Further, ICD contains the category of simple schizophrenia, which is defined on the basis of negative symptoms alone and specifically excludes cases characterized by prominent positive symptoms. This further broadens the conceptual definition of schizophrenia in ICD. ICD also explicitly recognizes the importance of negative symptoms by mentioning them in criterion A2H, although negative symptoms alone are not sufficient to make a diagnosis of schizophrenia. (This appears to introduce some inconsistency in the system, given that simple schizophrenia is a subtype of schizophrenia.)

The problems of consonance with ICD raise the following questions: Should the duration criterion be modified? Should the concepts of prodromal or residual symptoms be abandoned? Should Schneiderian symptoms be given more prominence? Should negative symptoms be given more prominence? Should the overall concept of schizophrenia be broadened?

Lack of an Empirical Base. The current *DSM-III-R* criteria were developed by slow accretions and modifications of previous methods for diagnosing schizophrenia. Because of a concern about excessive breadth and poor reliability, Bleulerian approaches were abandoned in the development of the Feighner criteria and subsequently the RDC, which

jointly formed the basis for *DSM-III*. The items selected for *DSM-III*, and subsequently for *DSM-III-R*, were not subjected to an empirical examination of their reliability, base rate, or discriminating power. They simply represented a clinical consensus of "what works." The need to develop *DSM-IV*, combined with the current existence of a variety of data sets consisting of patients who have been previously diagnosed as having schizophrenia, may provide an opportunity to develop diagnostic criteria using modern biometric methods. Such criteria would be more efficient, have better coverage, and be more scientifically valid.

Excessive Complexity. In spite of attempts to simplify them, *DSM-III-R* criteria remain very complex. To make a diagnosis of schizophrenia, clinicians must assess the presence or absence of a total of at least 12 different signs and symptoms (delusions, prominent hallucinations, incoherence, loosening of associations, catatonic behavior, flat affect, inappropriate affect, nonaffective verbal hallucinations, voices commenting, voices conversing, bizarre delusions, thought broadcasting). They must remember which symptoms permit the diagnosis to reach criterion level when only one is present and when two are required. They must make distinctions among delusions and hallucinations as to whether such symptoms are Schneiderian or non-Schneiderian, bizarre or nonbizarre, and mood congruent or mood incongruent. They must employ some concepts that are often poorly understood by the average clinician, such as thought broadcasting. In actual practice, many clinicians have difficulty making distinctions that are much less subtle, such as between delusions and formal thought disorder.

der. Asking them to be aware of relatively subtle distinctions in psychopathology may simply be asking too much. Further, clinicians must be aware of and assess a list of 9 prodromal symptoms in addition to the 12 symptoms in the A criterion. Finally, the new definition of bizarre delusions, which plays a crucial role in *DSM-III-R* since it provides a major component of the distinction between schizophrenia and delusional disorder, may be problematic (Flaum et al. 1991). A relatively more subjective definition has replaced a more objective one (implausible, as opposed to impossible); the major differences between the *DSM-III-R* examples (Schneiderian symptoms) and ICD-10 examples (religious or political identity, superhuman powers) illustrate how different concepts of implausibility may be.

Coverage of Negative Symptoms. Historically, negative symptoms have formed the conceptual core of schizophrenia. Both Kraepelin and Bleuler agreed that these were the defining features of this disorder. Kraepelin (1904, pp. 26-27) stated:

The complete loss of mental activity and of interest in particular, and the failure of every impulse to energy, are such characteristic and fundamental indications that they give a very definite stamp to the condition in both cases. Together with the weakness of judgment, they are invariable and permanent fundamental features of dementia praecox, accompanying the whole evolution of the disease. Compared with these, all other disturbances, however prominent they may be in individual cases, must be regarded as merely transitory, and therefore not absolutely diagnostic, features. This holds good, for instance, of delusions and hallucinations, which are very fre-

quently present, but may be developed in very different degrees or be altogether absent, or disappear, without the fundamental features of the disease or its course and issue being in any way affected.

Bleuler (1911/1950, p. 13) states:

Certain symptoms of schizophrenia are present in every case and at every period of the illness even though, as with every other disease symptom, they must have attained a certain degree of intensity before they can be recognized with any certainty. . . . For example, the peculiar association disturbance is always present, but not each and every aspect of it. Sometimes the anomalies of association may manifest themselves in "blocking" or in the splitting of ideas; at other times in different schizophrenic symptoms, . . .

As far as we know, the fundamental symptoms are characteristic of schizophrenia, while the accessory symptoms may also appear in other types of illness.

With the deemphasis on Bleulerian symptoms embodied in the Feighner criteria, RDC, and *DSM-III*, the study of negative symptoms was minimized during the past decade. However, a resurgence of interest in negative symptoms has occurred, and substantial empirical research literature has been amassed. This literature must be reviewed to determine whether negative symptoms should be given a more prominent position in the diagnostic criteria so as to describe more adequately the core or characteristic features of schizophrenia. At the moment, the *DSM-III-R* criteria require the presence of positive symptoms but do not require any negative symptoms at all. Thus, the historical concept of schizophrenia has been turned upside

down in the pursuit of improved reliability.

Evaluation of Issues and Problems on the Basis of Existing Data

Narrowness of Definition and Consonance With ICD. A number of studies have established that *DSM-III* criteria provide a relatively narrow definition of schizophrenia, as compared with several other systems that enjoy wide usage. Six such studies are summarized in table 1 (Helzer et al. 1981; Endicott et al. 1982; Klein 1982; Stephens et al. 1982; McGlashan 1984; Coryell and Zimmerman 1987). The results of these studies indicate that the Feighner and *DSM-III* criteria appear to yield the narrowest definitions while the others, such as RDC, the IPSS 12-Point Flexible System (Carpenter et al.

1973a), and the New Haven Schizophrenia Index (Astrachan et al. 1972), have somewhat broader definitions. Thus, it seems clear that *DSM-III* substantially reduced the boundaries of schizophrenia. The study by Klein (1982) appears to indicate that basing the diagnosis on the presence of first-rank symptoms actually broadens the definition beyond *DSM-III*. As noted above, the limited data that are available to compare *DSM-III* to *DSM-III-R*, suggest that the latter may have further narrowed the definition of schizophrenia (Fenton et al. 1988). Inevitably, no studies exist that compare *DSM-III-R* criteria with those in ICD-10, making this a primary issue for the upcoming field trials.

Does the increased narrowness of *DSM-III* produce gains in predictive validity? This literature review identified four studies that addressed this question, all of which involved the

patient samples listed in table 1. Helzer et al. (1981) found that the *DSM-III* and Feighner criteria for schizophrenia were more strongly predictive of chronicity and social decline than were the respective criteria of RDC and CATEGO. Although the authors initially speculated that this was probably attributable to the 6-month duration criteria alone, a later study revealed that nontemporal symptom factors also appeared to play an important role (Helzer et al. 1983). Endicott et al. (1986) found that although there was up to an eightfold difference in diagnostic rates among the criteria systems compared, all the systems performed similarly but poorly in predicting indices of short-term outcome. McGlashan (1984) also found the predictive validity to be roughly equivalent among the four systems evaluated in that sample (*DSM-III*, RDC, Feighner, and New Haven) but

Table 1. Breadth of definitions of schizophrenia

Diagnostic system	Helzer et al. 1981 (n = 125) ¹ %	Endicott et al. 1982 (n = 168) ³ %	Klein 1982 (n = 46) ⁴ %	Stephens et al. 1982 (n = 283) ² %	McGlashan 1984 (n = 400) ³ %	Coryell & Zimmerman 1987 (n = 97) ¹ %
<i>DSM-III</i>	15	11	28	37	29	37
RDC (probable and definite)	22	18	33	46	30	22
Feighner	14	7	24	38	24	20
New Haven	—	26	—	88	46	—
Flexible (≥5 points)	—	13	63	53	—	—
Taylor-Abrams (1978)	—	4	26	66	—	—
Presence of FRS	—	—	56	37	—	—
<i>DSM-I</i> (AMA 1952)	—	—	—	83	—	—
CATEGO (all schizophrenia groups)	42	—	—	—	—	—

Note.—RDC = Research Diagnostic Criteria; FRS = first-rank symptoms; AMA = American Psychiatric Association.

¹All patients had psychotic symptoms but the sample was not limited to schizophrenia.

²All patients had a hospital diagnosis of schizophrenia, schizoaffective disorder, or paranoid state.

³The patient sample was diagnostically heterogeneous.

⁴All patients had a *DSM-II* hospital diagnosis of schizophrenia.

found that each demonstrated reasonably good diagnostic stability and prediction of long-term outcome. Coryell and Zimmerman (1987) evaluated diagnostic validity in terms of short-term outcome and familial aggregation, and they concluded that of the three criteria for schizophrenia that were tested (*DSM-III*, RDC, and Feighner), each appeared to be validated by these measures and there were no significant differences among them. Thus, although the empirical evidence is far from conclusive, there appears to be some support for the predictive validity of the more stringent criteria such as those in *DSM-III*, but the evidence also suggests that the broader RDC definition may also have equally predictive validity.

First-Rank Symptoms. Another important issue raised by ICD is the importance of first-rank symptoms.

Koehler et al. (1977) have compared the frequency with which these symptoms were rated in four different studies: one done in Germany by the authors, one done in England by Mellor (1970), one done of an American sample by Carpenter et al. (1973*b*), and one done of an international sample by Carpenter and Strauss (1974). As shown in table 2, the base rate of any single Schneiderian symptom is relatively low and tends to vary somewhat unnervingly from one study to another. However, the figures presented in table 2 are based only on Schneider-positive schizophrenic patients, while table 3 shows the overall prevalence of at least one first-rank symptom in all patients with a diagnosis of schizophrenia. Again, the prevalence varies significantly, ranging from a low of 28 percent to a high of 72 percent. Table 4 summarizes the frequency of first-rank symptoms in six American

samples of schizophrenic patients, three of which were limited to first-episode patients (Andreasen 1988, 1990 [unpublished data]; Green and Nuechterlein 1988 [unpublished data]; Lieberman 1989 [unpublished data]; Andreasen 1990; Haas 1990 [unpublished data]). Here the numbers are less variable, but the base rates are relatively low, suggesting that these symptoms may not be sufficiently descriptive to be given prominence in *DSM-IV*.

A related problem is the specificity of first-rank symptoms. When first-rank symptoms were originally introduced to English-speaking psychiatrists, they were touted as being highly specific. If they were present, a diagnosis of schizophrenia was virtually certain. This view was widely accepted during the late 1960's and early 1970's, but in the mid-1970's, a series of studies began to question the specificity of first-rank symp-

Table 2. Frequency distribution of 10 first-rank symptoms in Schneider-positive schizophrenic patients¹

First-rank symptom	Germany Koehler et al. 1977 (n = 69)	England Mellor 1970 (n = 173)	United States Carpenter et al. 1973 <i>b</i> (n = 53)	International Carpenter & Strauss 1974 (n = 354)
	%	%	%	%
Audible thoughts	1.5	11.6	20	28
Voices arguing	7.2	13.3	—	22
Voices commenting	24.6	13.3	—	10
Thought broadcasting	27.5	21.4	33	26
Thought insertion	17.4	19.7	20	23
Thought withdrawal	24.6	9.8	15	25
"Made" affect, feelings, or impulses	1.5	9.3	11	16
"Made" volition	20.3	9.2	28	29
Somatic passivity	37.7	11.6	17	—
Delusional perception	55.1	6.4	—	—

¹Reprinted, with permission, from Koehler et al. (1977). Copyright © American Medical Association, 1977.

Table 3. Prevalence of first-rank symptoms in schizophrenia¹

Type of study	Number of schizophrenic patients	% with first-rank symptoms
Case Record		
Huber (1967)	195	72
Taylor (1972)	78	28
Abrams & Taylor (1973)	71	34
Koehler et al. (1977)	210	33
Prospective		
Mellor (1970)	166	72
Carpenter et al. (1973b)	103	51
Carpenter & Strauss (1974)	801	57

¹Reprinted, with permission, from Koehler et al. (1977). Copyright © American Medical Association, 1977.

toms. Table 5 summarizes three such studies, two done by Taylor and Abrams (1973, 1975) and a third by Carpenter and Strauss (1974). These studies suggest that first-rank symptoms occur in a substantial number of patients suffering from affective illness, indicating that these symptoms are, in fact, nonspecific and not pathognomonic of schizophrenia.

In summary, while including first-rank symptoms may be appropriate based on their historical importance, limitations regarding their reliability, base rates, and specificity suggest that they should not be given undue prominence or treated as the major criterion symptoms that are pathognomonic of the disorder.

Table 4. Frequency of first-rank symptoms in chronic and first-episode schizophrenic patients

Symptoms	Chronic schizophrenic patients			First-episode schizophrenic patients		
	Andreasen 1990 (n = 111) % ¹	Green & Nuechterlein (unpublished data) (n = 101) % ¹	Andreasen (unpublished data) (n = 55) % ¹	Lieberman (unpublished data) (n = 50) % ²	Haas (unpublished data) (n = 52) % ¹	Andreasen (unpublished data) (n = 24) % ¹
Voices commenting	22	4	26	NA	31	25
Voices conversing	21	13	21	NA	19	17
Being controlled	25	12	11	34	37	29
Mind being read	26	23	28	42	33	38
Thought broadcasting	10	14	17	36	19	29
Thought insertion	13	6	20	20	27	38
Thought withdrawal	14	10	11	5	17	13

Note.—NA = not available.

¹Percent rated ≥ 3 (moderate, severe, or extreme) on Scale for the Assessment of Positive Symptoms (SAPS).

²Percent rated ≥ 3 (definite) on Schedule for Affective Disorders and Schizophrenia (SADS).

Table 5. Specificity of first-rank symptoms (FRS)

	Sample	% with FRS
Taylor & Abrams 1973	52 manics	12
Carpenter & Strauss 1974	66 manics	23
	119 depressives	16
Taylor & Abrams 1975	53 manics	8

The Relevance of Negative Symptoms. As the above historical and conceptual review has indicated, negative symptoms have traditionally been considered a prominent component of schizophrenia and possibly as the core or fundamental symptoms of the disorder. *DSM* introduced a radical change by requiring the presence of positive symptoms to make the diagnosis of schizophrenia. One important aspect of the fourth edition of *DSM* is an evaluation as to whether there is a sufficient data base to support giving negative symptoms more prominence. If they are given more prominence, an important related issue becomes how this prominence should be achieved. Several alternatives are possible. One is to add more negative symptoms to the list required to make the diagnosis. A second is to use the positive and negative dimensions as a method for subtyping schizophrenia. A third is to reintroduce the concept of simple schizophrenia, a purely negative form of schizophrenia that is characterized by the presence of severe negative symptoms in the absence of delusions and hallucinations. This report will cover only the first issue. The subjects of subtyping and simple schizophrenia will be fully presented in literature reviews developed for *DSM-IV* that will be published in a forthcoming issue of the *Schizophrenia Bulletin*.

During the past decade, interest in negative symptoms has increased substantially. While Hughlings-Jackson (1931), Strauss et al. (1974), Wing et al. (1974), and others have also stressed their importance, the publication of Crow's article in the *British Medical Journal* in 1980, proposing a two-syndrome hypothesis of schizophrenia based on positive and negative dimensions, was a seminal piece of research. There is now a very large body of research literature examining the reliability, internal consistency, and predictive validity of negative symptoms. Much of this research is summarized in two overview book chapters, in which Barnes and Liddle (1990) have evaluated the evidence for the validity of negative symptoms while Marks and Luchins (1990) have examined the relationship between brain imaging findings and positive and negative symptoms.

Briefly, both these reviews support the importance of the construct of negative symptoms. Negative symptoms have been very consistently found to be reliable if they are adequately defined (Overall and Gorham 1962; Krawiecka et al. 1977; Andreasen 1982; Lewine et al. 1983; Kay et al. 1987). They have also been found to be internally consistent and highly correlated with one another, suggesting that they in some sense represent a valid construct (Andreasen and Olsen 1982; Bilder et al. 1985; Liddle 1987). Negative symp-

toms have also been shown to be associated with a number of independent validators in a variety of studies, including cognitive impairment (Johnstone et al. 1978; Bilder et al. 1985; Cornblatt et al. 1985; Liddle 1987; Andreasen et al. 1990), a differential treatment response (Angrist et al. 1980; Breier et al. 1987; Singh et al. 1987; Van Kammen and Boronow 1988), and poor outcome (Carpenter et al. 1978; Johnstone et al. 1979; Pogue-Geile and Harrow 1984, 1985). Negative symptoms also tend to be quite stable over time (Pfohl and Winokur 1983; Pogue-Geile and Harrow 1985; Johnstone et al. 1986; Biehl et al. 1989). They are also correlated with motor abnormalities (Owens and Johnstone 1980; Jeste et al. 1984; Waddington et al. 1987; Barnes 1988).

Among external validators, the relationship between negative symptoms and evidence of structural brain abnormality has been most widely studied. As reviewed by Marks and Luchins (1990), a total of 18 studies have shown a direct relationship between neuroanatomical abnormalities and positive or negative symptoms, while 2 more showed an indirect relationship. On the other hand, five studies showed no relationships, and three showed relationship in the direction opposite to the one usually hypothesized (i.e., an association of ventricular enlargement with positive symptoms rather than negative symptoms).

Thus, a substantial body of literature appears to support the importance of negative symptoms in schizophrenia. In fact, the literature currently supporting their stability and validity is much stronger than the literature that can be marshaled in support of the stability and validity of first-rank symptoms or proba-

bly even positive symptoms in general. Most existing evidence indicates that positive symptoms are neither internally consistent nor stable over time. They do predict a better treatment response with neuroleptic drugs but may not predict long-term outcome.

This evidence seems to suggest that it would be appropriate to consider giving negative symptoms a more prominent position within *DSM-IV*.

Role of Empirical Evidence and the Problem of Complexity

Since the original development of *DSM-III*, a substantial empirical data base has been amassed concerning the reliability of the symptoms used in the A criterion as well as of a variety of other symptoms that might be included in *DSM-IV*.

The reliability of the specific symptoms used in *DSM-III* or *DSM-III-R* is one important empirical issue. If the symptoms are not sufficiently reliable, they probably should not be included. Table 6 presents reliability data from three different studies using two different instruments and two different sets of diagnostic criteria. The earlier Andreasen et al. (1982) study involved a variety of patients, as well as interviewers from a variety of backgrounds who rated patients evaluated on videotape. The Endicott et al. (1982) study also examined a diagnostically heterogeneous sample of larger size and applied *DSM-III* criteria. Although the data for other criteria are not presented in this particular table, in general greater reliability was achieved when interviewers used the SADS to make diagnoses with RDC criteria than when they applied *DSM-III* criteria. The

Table 6. Reliability of *DSM-III* or *DSM-III-R* symptoms of schizophrenia

Symptoms	Andreasen et al. 1982 ¹ (SADS-RDC)	Endicott et al. 1982 ² (SADS- <i>DSM-III</i>)	Andreasen 1989 ¹ (CASH) ¹
Delusions	0.86	0.59	0.76
Hallucinations	0.92	—	0.93
Incoherence	0.70	0.57	0.79
Loosening of associations	0.57	0.47	0.70
Catatonic behavior	—	—	—
Flat affect	0.70	0.13	0.80
Inappropriate affect	0.62	—	0.61
Nonaffective verbal hallucinations	0.61	0.47	—
Voices commenting	0.84	—	0.98
Voices conversing	—	—	0.82
Thought broadcasting	0.34	0.48	0.97
Bizarre delusions	0.75 ³	0.29 ³	0.44
Mood-incongruent delusions	0.47	—	—

Note.—SADS = Schedule for Affective Disorders and Schizophrenia; RDC = Research Diagnostic Criteria; CASH = Comprehensive Assessment of Symptoms and History.

¹Intraclass *r*.

²Kappa coefficient.

³Definition differs from *DSM-III-R*.

reliability data collected for symptoms using the CASH tended to show the highest reliability for the various symptoms.

Negative symptoms have tended to be minimized in diagnostic criteria in the post-Feighner era, primarily because investigators suspected that these symptoms would have poor reliability. With the development of more objective definitions of negative symptoms such as those embodied in the Scale for the Assessment of Negative Symptoms (SANS; Andreasen 1983), for example, it became evident that adequate reliability could be achieved for negative symptoms. Reliability coefficients of negative

symptoms in five different cultural settings are summarized in table 7 (Ohta et al. 1984; Andreasen 1986 [unpublished data]; Humbert et al. 1986; Moscarelli et al. 1987; Phillips 1987, unpublished manuscript). As this table indicates, objective definitions lead to good-to-excellent reliability of most negative symptoms. Global ratings are consistently above 0.6 in all studies. Data concerning positive symptoms, as assessed by the Scale for the Assessment of Positive Symptoms (SAPS; Andreasen 1984), are also summarized. In general, the reliability coefficients for positive symptoms shown in table 7 are higher than those reported in ear-

Table 7. Interrater reliability of negative and positive symptoms in different cultural settings

	Intraclass <i>r</i>				
	Japan: Ohta et al. 1984	Iowa: Andreasen 1986 (unpublished)	Spain: Humbert et al. 1986	Italy: Moscarelli et al. 1987	China: Phillips 1987 (unpublished)
Negative/positive symptoms					
Negative (global ratings)					
Alogia	0.63	0.65	0.95	0.69	0.99
Affective flattening	0.72	0.85	0.84	0.69	0.90
Avolition-apaty	0.75	0.94	0.86	0.75	0.82
Anhedonia-asociality	0.73	0.90	0.77	0.73	0.86
Inattentiveness	0.79	0.88	0.89	0.66	0.83
Positive (global ratings)					
Hallucinations	—	0.96	0.93	0.86	0.84
Delusions	—	0.96	0.90	0.88	0.42
Bizarre behavior	—	0.90	0.88	0.83	0.99
Positive formal thought disorder	—	0.93	0.99	0.82	0.94

lier studies. The reason for this is unclear, but it may reflect the possibility that reliability is improved by more detailed definitions and the use of extensive descriptions and examples.

As the concept of bizarre delusions assumed a pivotal role in *DSM-III-R*, the reliability with which the bizarre versus nonbizarre distinction could be made became important. Kendler et al. (1983) reported that of the five dimensions of delusional experience he examined (conviction, extension, bizarreness, disorganization, and pressure), bizarreness had the lowest reliability (weighted kappa = 0.30). We recently conducted a study specifically to address this question, and we found a similarly low reliability estimate (kappa of 0.31) using the *DSM-III-R* wording (Flaum et al. 1991). This suggests either that the concept be reduced in importance in

DSM-IV or that the definition and examples of what is meant by "bizarre" be more clearly stipulated.

There is very little empirical evidence regarding the reliability of assessing prodromal and residual symptoms. During the process of revising *DSM-III*, it was suggested that prodromal and residual symptoms be dropped from the criteria, largely because of concerns that the severity and duration of these symptoms could not be reliably assessed (Kendler et al. 1989). At the time, only one study had addressed this issue (Endicott et al. 1982), and it was therefore decided to hold off on such a change and reconsider the suggestion during the *DSM-IV* process. Unfortunately, this review did not identify any subsequently published reports that provide reliability data for prodromal and residual symptoms. In the Endicott et al. (1982) study, the interrater reliability

was found to be poor for three of the prodromal symptoms (kappa of < 0.15 for vague speech, unusual perceptions, and flat affect), moderate for three others (kappa of 0.5–0.6 for social isolation, impaired role functioning, and odd thinking), and good for two symptoms (kappa = 0.73 for peculiar behavior and impairment in hygiene). We have recently evaluated the reliability of prodromal and residual symptoms, again in the context of a large reliability study of the CASH. The results, shown in table 8, demonstrate that when the ratings are made jointly (interrater design), the agreement between two raters is reasonably good for both prodromal and residual symptoms. However, a more stringent test of reliability, and one that more closely approximates clinical reality, is one in which two raters evaluate the symptoms on the basis of independent interviews (test-

Table 8. Interrater and test-retest reliability of DSM-III prodromal and residual symptoms

Symptoms	Interrater intraclass <i>r</i>		Test-retest intraclass <i>r</i>	
	Prodromal	Residual	Prodromal	Residual
Social isolation	0.63	1.00	0.00	0.63
Impairment in work/school	0.73	0.17	0.36	0.81
Peculiar behavior	0.62	0.00	0.34	0.00
Impairment in personal hygiene	0.79	1.00	0.25	1.00
Blunted or inappropriate affect	0.71	0.57	0.52	0.75
Odd speech (digressive, vague, etc.)	0.91	0.84	0.21	0.41
Odd beliefs, magical thinking, etc.	1.00	1.00	0.33	1.00
Unusual perceptual experiences	0.79	0.65	0.00	0.47
Mean	0.77	0.65	0.25	0.63

retest design). In our hands, this design yielded a consistently low level of agreement for all prodromal symptoms. Further, we suspect that the ability to assess the onset and duration of these symptoms (which is critical, given their role in the criteria) will also prove to be problematic. We are unaware of any data that address this specifically, and this will be explored in the upcoming field trials.

Criterion B was substantially rewritten between *DSM-III* and *DSM-III-R*. This rewriting may have inadvertently introduced a major change that may have substantially narrowed the definition of schizophrenia in *DSM-III-R*. No reliability data are available concerning the "deterioration criteria" in either *DSM-III* or *DSM-III-R*. It would clearly be worthwhile to collect some data concerning the reliability of this judgment.

The base rate of symptoms is a second important empirical issue. Table 9 summarizes the base rates for the signs and symptoms used to diagnose schizophrenia in *DSM-III-R* (the A criterion symptoms), as assessed in two Iowa samples. In gen-

Table 9. DSM-III-R symptoms: Base rates in two Iowa samples¹

Symptoms	1985 (<i>n</i> = 111)	1988 (<i>n</i> = 55)
Delusions	85	89
Prominent hallucinations	50	35
Incoherence	7	0
Marked loosening of associations	17	19
Catatonic behavior	—	15
Affective flattening	88	86
Inappropriate affect	50	37
Bizarre delusions	—	—
Thought broadcasting	14	22
Auditory hallucinations	70	56
Voices commenting	33	30
Voices conversing	31	23

¹Base rates are based on a rating of ≥ 2 ("mild but definitely present") coded for this item on the Scale for the Assessment of Negative Symptoms (SANS) or the Scale for the Assessment of Positive Symptoms (SAPS). Symptoms specified in the criteria as "prominent" or "marked" are equated with SANS/SAPS ratings of 4 (marked) or 5 (severe).

eral, the base rates of most *DSM* symptoms are acceptably high. The base rates of three symptoms—*incoherence*, *marked loosening of associations*, and *thought broadcasting*—may, however, be marginal.

An empirical issue that is rarely discussed but is fundamentally important is the fact that diagnostic criteria necessarily dichotomize signs and symptoms that are present on a continuum in everyday clinical life. In making *DSM-III*, *DSM-III-R*, or *ICD-10* diagnoses, clinicians are simply asked to determine whether symptoms are present or absent, sometimes with the qualifier that the symptoms must be “prominent” or “marked.” Figures 1-4 display the base rates of symptoms that are present at different thresholds of severity. The data in figures 1 and 2 show each level of severity for positive and negative symptoms in a sample of 111 consecutively admitted schizophrenic patients, most of whom had established chronicity but required readmission in an acute-care facility. Figures 3 and 4 display analogous data for a second, independent Iowa sample, who were collected and assessed in the same manner 3 years later. The results are similar and show that hallucinations and delusions, along with most negative symptoms, are extremely prevalent when a rating of 3 or greater is stipulated and are relatively common even when a rating of 4 or greater is required. Bizarre behavior, formal thought disorder, and inappropriate affect are relatively less prevalent and are uncommon if a rating of 4 or greater is required. Catatonic behavior (not shown in the figures) was assessed only in the latter sample and was found to be rare, with only 6 percent of the sample being rated as 3 or greater.

Figure 1. Effects of changing the severity threshold on base rates of positive symptoms in an Iowa sample of 111 *DSM-III* schizophrenic patients (1985)

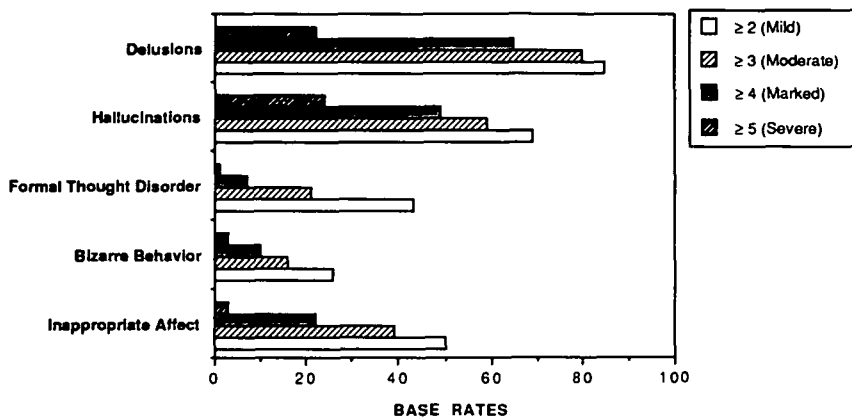
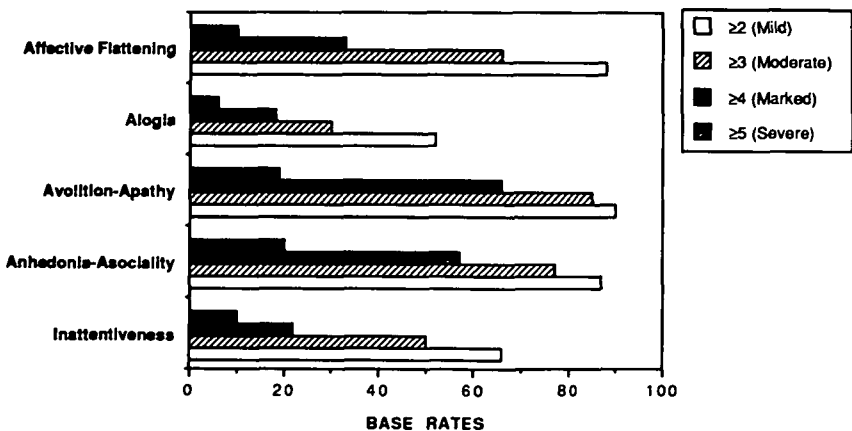


Figure 2. Effects of changing the severity threshold on base rates of negative symptoms in an Iowa sample of 111 *DSM-III* schizophrenic patients (1985)



As the previous historical and conceptual review has indicated, the excessive complexity of the criteria is also a concern. Table 10 illustrates the results of sample analyses designed to test the consequences of simplifying the criteria. The approach used in these analyses is simply to ask clinicians to rate the presence or absence of four positive

symptoms (hallucinations, delusions, positive formal thought disorder, and bizarre behavior) and four negative symptoms (affective blunting, alogia, avolition, and anhedonia). This relatively simple list is much easier to remember. Four different definitions have been tried: broad, intermediate, narrow-1 and narrow-2. The “broad” definition is a simple poly-

Figure 3. Effects of changing the severity threshold on base rates of positive symptoms in an Iowa sample of 55 DSM-III schizophrenic patients (1988)

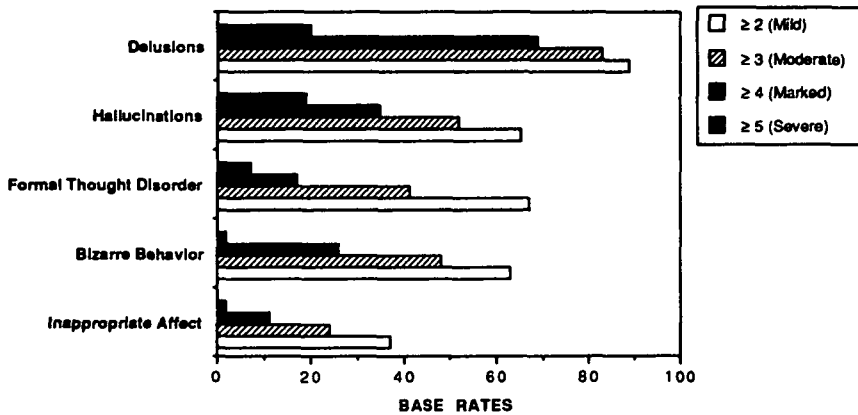
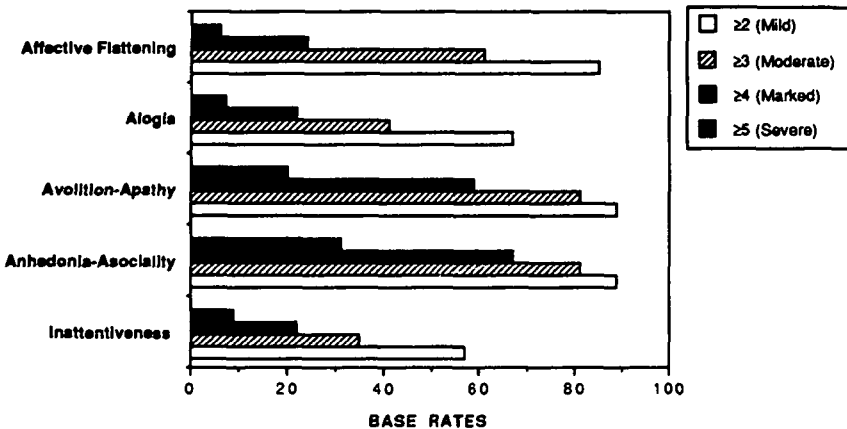


Figure 4. Effects of changing the severity threshold on base rates of negative symptoms in an Iowa sample of 55 DSM-III schizophrenic patients (1988)



thetic definition that includes patients who have at least two of any seven positive or negative symptoms (with avolition and anhedonia grouped as a single item). "Intermediate" is also a polythetic definition requiring at least two signs or symptoms to be present, including three positive symptom items (hallucinations, delusions, and positive formal thought disorder) and two negative symptom

items (affective blunting or other negative symptoms). "Narrow-1" requires at least one of the two common positive symptoms and at least one of four negative symptoms or positive formal thought disorder. "Narrow-2" is a simplified approximation of the existing DSM-III-R criteria; it permits the diagnosis of schizophrenia either if delusions and hallucinations are present, or if delu-

sions or hallucinations are present as long as one of these two positive symptoms is accompanied by a negative symptom or positive formal thought disorder. These four alternative criteria sets are explored using three different thresholds for each of the symptoms: mild, moderate, or severe. At the mild level, the clinician is simply asked to determine whether the symptom is definitely present to at least a mild degree. The moderate and severe levels require not only that the symptom be present, but also that it have some sort of effect on the patient's behavior or lifestyle.

As table 10 indicates, these simplified criteria very closely approximate the classification of patients previously diagnosed using DSM-III if a severity threshold of only 2 is required. Three out of the four definitions correctly classify 98 percent of the patients. Narrow-1 tends to be the narrowest. A substantial number of patients continue to be appropriately classified when a threshold of 3 or greater is applied, but the classification rate drops fairly sharply (to the 60-70% level) if a threshold of 4 or greater is required.

This data analysis illustrates an approach that can be used to achieve a simplified definition that will continue to maintain existing classification rates. This particular data analysis was limited to patients suffering from schizophrenia alone. Therefore, it does not adequately test changing the criteria by simplifying them. It is conceivable that simplifying the criteria might lead to an erroneous inclusion of patients with other diagnoses into the category of schizophrenia. Further, ratings of the various symptoms were completed by trained investigators who are intimately familiar with the definitions used. These analyses do not test how simplified

Table 10. Effects of changing the definition and item threshold on the classification of three cohorts of DSM-III diagnosed schizophrenic patients (in %)

Threshold	Broad	Intermediate	Narrow-1	Narrow-2
1985 cohort				
2	98	98	86	98
3	90	88	79	90
4	74	75	60	73
1988 cohort				
2	98	98	93	98
3	89	89	80	89
4	65	64	52	65

Note.—Table 10 explores the inclusion/exclusion of patients previously diagnosed as having schizophrenia according to DSM-III when criteria are changed or the item threshold is changed.

Item threshold can be either:
 2—mild but definitely present.
 3—moderate.
 4+—marked or severe.

Four different criteria sets have been applied:

- (1) Broad.
- (2) Intermediate.
- (3) Narrow-1.
- (4) Narrow-2.

These are defined as follows:

Broad:

At least two of the following:
 Hallucinations.
 Delusions.
 Positive formal thought disorder.
 Bizarre behavior.
 Affective blunting.
 Alogia.
 Avolition or anhedonia.

Intermediate:

At least two of the following:
 Hallucinations.
 Delusions.
 Positive formal thought disorder.
 Affective blunting.
 Other negative symptoms (alogia, avolition, or anhedonia).

Narrow-1:

Both (1) and (2):
 (1) Delusions or hallucinations.
 (2) At least one of the following:
 Positive formal thought disorder.
 Affective blunting.
 Alogia.
 Avolition.
 Anhedonia.

Narrow-2:

Either (1) or (2):
 (1) Delusions and hallucinations.
 (2) Delusions or hallucinations.
and
 at least one of the following:
 Positive formal thought disorder.
 Affective blunting.
 Alogia.
 Avolition.
 Anhedonia.

criteria might function in the hands of untrained clinicians.

Conclusions

Several conclusions appear to emerge from this overview that suggest future directions and potential options.

1. The *DSM* and *ICD* definitions of schizophrenia are currently very different. This difference lies primarily in two areas. *ICD* places more emphasis on first-rank symptoms than does *DSM* and requires a shorter duration. Simply put, the *ICD* definition describes a disorder characterized by relatively short periods of severe psychosis, while the *DSM* definition places less emphasis on persistent psychotic symptoms but greater emphasis on chronicity. No analyzed data are currently available that will permit us to determine whether American psychiatrists diagnose and treat patients who have prominent positive symptoms that persist for at least a month. It is noteworthy, however, that the feasibility of establishing a 1-month period of psychotic symptoms is only relevant in first-admission patients. Patients with established chronicity are likely to be diagnosed the same by both systems.

One option is to adopt an approach similar to that of *ICD* and require only 1 month of symptoms, reducing the emphasis on prodromal and residual symptoms. This approach would have the benefit of reducing dependence on prodromal and residual symptoms, which at this stage have neither any adequacy of reliability documented nor their base rate assessed. The above literature review suggests that it would be difficult to adopt the *ICD* definition in toto, however, because of its heavy emphasis on Schneiderian first-rank

symptoms. It also suggests that these symptoms do not have adequate specificity to make them the primary defining features of schizophrenia, nor do they have an adequate base rate (or perhaps adequate reliability).

2. The existing *DSM* criteria do not make optimal use of modern biometric approaches to developing diagnostic criteria. These criteria have not been based on identifying symptoms with established reliability and a high enough base rate to provide adequate coverage of the symptoms observed in schizophrenia. There is now a reasonably large number of data sets consisting of both chronic and first-episode patients. These data sets can be used to develop a more data-based and empirical approach to developing diagnostic criteria. This approach will require data sets comprised of both schizophrenic patients and patients with other major illnesses (e.g., manic disorder, severe depression). Discriminant analyses can be used to identify the symptoms most useful in classifying patients and can be compared across independently collected samples. As these analyses are done, the possibility that different criteria may be necessary for first-episode patients and for more chronic patients should be considered. This represents a "bootstrapping" approach to the development of criteria. An alternate approach is to use the methods applied in the analyses summarized above. That is, alternative sets of criteria can be written that appear to have desirable characteristics, such as simplicity and adequate coverage. If these criteria are equally good in classifying patients previously diagnosed with schizophrenia by *DSM-III* or *DSM-III-R* and in excluding patients with other diagnoses, their improved simplicity and

coverage suggest that they would be better alternatives.

3. Negative symptoms have long been recognized to be very important and possibly the most fundamental symptoms of schizophrenia. Although they have been minimized in *DSM-III* and *DSM-III-R*, their historical importance and the resurgence of research studies suggesting their internal consistency and validity suggest that they should be given more prominence in *DSM-IV*. In addition to the sample criteria provided for table 9, other types of criteria could be written that would increase the emphasis on negative symptoms. One approach might be to have two required listings of symptoms: one list would consist of positive symptoms (e.g., delusions, hallucinations, positive formal thought disorder) and the other of negative symptoms (e.g., affective blunting, alogia, avolition, anhedonia). An alternative would be to couch criterion B, the "deterioration in functioning" criterion, in terms of negative symptoms. Yet a third alternative would be to refurbish the list of prodromal symptoms so that they are subdivided into positive and negative, and to thereby stress the concept that mild negative symptoms may occur as either a prodromal or a residual state in patients who have transient episodes of more severe positive symptoms. This approach would have an additional advantage in that dividing the prodromal/residual symptoms into positive and negative subgroups would make them easier to remember and would assist in simplifying the criteria.

4. *DSM-III* and *DSM-III-R* have substantially narrowed the definition of schizophrenia. *DSM-III-R* appears to be even narrower than *DSM-III*. Since the *ICD* definition is very likely to lead to a broader classifica-

tion net and since consonance with ICD is an important goal, the possibility of broadening the criteria must at least be considered. The importance of negative symptoms and the possibility that there is, in fact, a relatively pure negative form of schizophrenia (i.e., simple schizophrenia) also suggest that broadening the concept could be desirable.

Several options are possible. One option is to maintain the existing definition of schizophrenia, which is narrower than that used by the rest of the international community. If this decision is selected, any modifications in the criteria will strive toward maintaining the inclusion of the same patients as were classified within schizophrenia by *DSM-III* or *DSM-III-R*. This approach has the advantage of being the most conservative in that it would not produce any sharp breaks with existing American practice, but it would have the disadvantage of making the American system very different from ICD and possibly employing on a concept contrary to the overall historical concept of the disorder.

A second alternative would be to broaden the definition. If this approach were chosen, the most logical direction to take would be to adopt a definition similar to that in ICD. This approach would rely primarily on reducing the duration criteria. A third alternative would involve broadening the coverage of symptoms so that negative symptoms are given more prominence and the diagnosis of schizophrenia can be made in patients who have a "pure negative" syndrome. Either of these latter two alternatives has the disadvantage of producing a break with existing practices and would be much less conservative than the first option discussed above.

Note.—This literature review was based on both a Medline search and a historical review. The Medline search involved entering the words "schizophrenia/nosology," "schizophrenia/phenomenology," "schizophrenia/symptoms," "schizophrenia/negative symptoms," and "schizophrenia/positive symptoms" and obtaining a listing of all references since 1960. This yielded a total of 580 references. Unfortunately, since "DSM-III" is not a key word available through Medline, this could not be used to assist in either identifying or sifting through references. The references were then screened to identify those studies containing information that would be specifically useful to the issues and problems described in this article: this reduced the list to about 250. In addition, it was also considered important to review major seminal contributions occurring before 1960, given that the diagnosis of schizophrenia has been in existence for more than 100 years and that this disorder has been the subject of intensive empirical research during most of that time. The size and breadth of this research literature (as well as the time limitations of Medline itself) precluded conducting a Medline search for that entire interval, but seminal contributions were identified by selecting very frequently referenced articles or books from the references identified via the Medline search.

References

- Abrams, R., and Taylor, M. First-rank symptoms, severity of illness, and treatment response in schizophrenia. *Comprehensive Psychiatry*, 14:353-355, 1973.
- American Psychiatric Association. *DSM-II: Diagnostic and Statistical Manual of Mental Disorders*. 2nd ed. Washington, DC: The Association, 1968.
- American Psychiatric Association. *DSM-III: Diagnostic and Statistical Manual of Mental Disorders*. 3rd ed. Washington, DC: The Association, 1980.
- American Psychiatric Association. *DSM-III-R: Diagnostic and Statistical Manual of Mental Disorders*. 3rd ed., revised. Washington, DC: The Association, 1987a.
- American Psychiatric Association. *Quick Reference to the Diagnostic Criteria From DSM-III-R*. Washington, DC: The Association, 1987b.
- Andreasen, N.C. Negative symptoms in schizophrenia: Definition and reliability. *Archives of General Psychiatry*, 39:784-788, 1982.
- Andreasen, N.C. *The Scale for the Assessment of Negative Symptoms (SANS)*. Iowa City, IA: The University of Iowa, 1983.
- Andreasen, N.C. *The Scale for the Assessment of Positive Symptoms (SAPS)*. Iowa City, IA: The University of Iowa, 1984.
- Andreasen, N.C. *The Comprehensive Assessment of Symptoms and History (CASH)*. Iowa City, IA: The University of Iowa, 1985.
- Andreasen, N.C. Positive and negative symptoms: Historical and conceptual aspects. In: Andreasen, N.C., ed. *Modern Problems of Pharmacopsychiatry: Positive and Negative Symptoms and Syndromes*. Vol. 24. Basel, Switzerland: S. Karger, A.G., 1990. pp. 1-42.
- Andreasen, N.C.; Carson, R.; Diksic, M.; Evans, A.; Farde, L.; Gjedde, A.; Hakim, A.; Lal, S.; Nair, N.; Sedvall, G.; Tune, L.; and Wong, D. Workshop on schizophrenia, PET, and dopamine

- D₂ receptors in the human neostriatum. *Schizophrenia Bulletin*, 14:471-484, 1988.
- Andreasen, N.C.; Flaum, M.; Swayze, V.W.; Tyrell, G.; and Arndt, S. Positive and negative symptoms in schizophrenia: A critical reappraisal. *Archives of General Psychiatry*, 47:615-621, 1990.
- Andreasen, N.C.; McDonald-Scott, P.; Grove, W.M.; Keller, M.B.; Shapiro, R.W.; and Hirshfeld, R.M.A. Assessment of reliability in multicenter collaborative research with a videotape approach. *American Journal of Psychiatry*, 139:876-882, 1982.
- Andreasen, N.C., and Olsen, S. Negative and positive schizophrenia, definition, and validation. *Archives of General Psychiatry*, 39:789-793, 1982.
- Angrist, B.; Rotrosen, J.; and Gershon, S. Differential effects of amphetamine and neuroleptics on negative vs. positive symptoms in schizophrenia. *Psychopharmacology*, 72:17-19, 1980.
- Astrachan, B.M.; Harrow, M.; Adler, D.; Brauer, L.; Schwartz, A.; Schwartz, C.; and Tucker, G. The checklist for the diagnosis of schizophrenia. *British Journal of Psychiatry*, 121:529-539, 1972.
- Barnes, T.R. Tardive dyskinesia: Risk factors, pathophysiology, and treatment. In: Granville-Grossman, K., ed. *Recent Advances in Clinical Psychiatry*. No. 6. Edinburgh, Scotland: Churchill Livingstone, 1988.
- Barnes, T.R., and Liddle, P. Evidence for the validity of negative symptoms. In: Andreasen, N.C., ed. *Modern Problems of Pharmacopsychiatry: Positive and Negative Symptoms and Syndromes*. Vol. 24. Basel, Switzerland: S. Karger, A.G., 1990. pp. 43-72.
- Beck, A.T.; Ward, C.H.; and Mendelson, M. Reliability of psychiatric diagnosis: II. A study of consistency of clinical judgements and ratings. *American Journal of Psychiatry*, 119:351-357, 1962.
- Biehl, H.; Maurer, K.; Juang, E.; and Krumm, B. The WHO psychological impairments rating schedule (WHO/PIRS): II. Impairments in schizophrenics in cross-sectional and longitudinal perspective. The Mannheim experience in two independent samples. *British Journal of Psychiatry*, 155(Suppl. 7):71-77, 1989.
- Bilder, R.M.; Mukherjee, S.; Rieder, R.O.; and Pandurangi, A.K. Symptomatic and neuropsychological components of defect states. *Schizophrenia Bulletin*, 11:409-419, 1985.
- Bland, R.C., and Orn, H. Schizophrenia: Diagnostic criteria and outcome. *British Journal of Psychiatry*, 134:34-38, 1979.
- Bleuler, E. *Dementia Praecox, or the Group of Schizophrenias* (1911). Translated by J. Zinkin. New York: International Universities Press, 1950.
- Breier, A.; Wolkowitz, O.M.; Doran, A.R.; Roy, A.; Boronow, J.; Hommer, D.W.; and Pickar, D. Neuroleptic responsiveness of negative and positive symptoms in schizophrenia. *American Journal of Psychiatry*, 144:1549-1555, 1987.
- Carpenter, W.T.; Bartko, J.J.; Strauss, J.S.; and Hawk, A.B. Signs and symptoms as predictors of outcome: A report from the International Pilot Study of Schizophrenia. *American Journal of Psychiatry*, 135:940-944, 1978.
- Carpenter, W.T., and Strauss, J.S. Cross-cultural evaluation of Schneider's first-rank symptoms of schizophrenia: A report from the International Pilot Study of Schizophrenia. *American Journal of Psychiatry*, 131:682-687, 1974.
- Carpenter, W.T.; Strauss, J.S.; and Bartko, J.J. Flexible system for the diagnosis of schizophrenia: Report from the World Health Organization International Pilot Study of Schizophrenia. *Science*, 182:1275-1278, 1973a.
- Carpenter, W.T.; Strauss, J.S.; and Muleh, S. Are there pathognomonic symptoms in schizophrenia? An empiric investigation of Schneider's first-rank symptoms. *Archives of General Psychiatry*, 28:847-852, 1973b.
- Cloninger, R.; Martin, R.L.; Guze, S.B.; and Clayton, P.J. Diagnosis and prognosis in schizophrenia. *Archives of General Psychiatry*, 42:15-25, 1985.
- Cooper, J.E.; Kendell, R.E.; Gurland, B.J.; Sharp, L.; Copeland, J.R.M.; and Simon, R. *Psychiatric Diagnosis in New York and London*. Maudsley Monograph Series No. 20. London: Oxford University Press, 1972.
- Cornblatt, B.A.; Lenzenweger, M.F.; Dworkin, R.H.; and Erlenmeyer-Kimling, L. Positive and negative schizophrenic symptoms: Attention and information processing. *Schizophrenia Bulletin*, 11:397-408, 1985.
- Coryell, W., and Zimmerman, M. Progress in the classification of functional psychoses. *American Journal of Psychiatry*, 144:1471-1473, 1987.
- Crow, T.J. Molecular pathology of schizophrenia: More than one disease process? *British Medical Journal*, 280:66-68, 1980.
- Endicott, J., and Spitzer, R.L. A diagnostic interview: The Schedule for Affective Disorders and Schizophrenia. *Archives of General Psychiatry*, 35:837-844, 1978.

- Endicott, J.; Nee, J.; Cohen, J.; Fleiss, J.L.; and Simon, R. Diagnosis of schizophrenia: Prediction of short-term outcome. *Archives of General Psychiatry*, 43:13-19, 1986.
- Endicott, J.; Nee, J.; Fleiss, J.; Cohen, J.; Williams, J.B.W.; and Simon, R. Diagnostic criteria for schizophrenia: Reliabilities and agreement between systems. *Archives of General Psychiatry*, 39:884-889, 1982.
- Feighner, J.P.; Robins, E.; Guze, S.B.; Woodruff, R.A.; Winokur, G.; and Munoz, R. Diagnostic criteria for use in psychiatric research. *Archives of General Psychiatry*, 26:57-63, 1972.
- Fenton, W.S.; McGlashan, T.H.; and Heinsen, R.K. A comparison of DSM-III and DSM-III-R schizophrenia. *American Journal of Psychiatry*, 145:1446-1449, 1988.
- Fish, F.J. *Schizophrenia*. Bristol, England: John Light and Sons, Ltd., 1962.
- Flaum, M.; Arndt, S.; and Andreasen, N.C. Reliability of bizarre delusions. *Comprehensive Psychiatry*, 32:59-65, 1991.
- Frances, A.J.; Widiger, T.A.; and Pincus, H.A. The development of DSM-IV. *Archives of General Psychiatry*, 46:373-375, 1989.
- Green, M.F., and Nuechterlein, K.H. Unpublished data, prepared for MacArthur analyses, collected in 1988.
- Guze, S.B.; Cloninger, R.; Martin, R.L.; and Clayton, P.J. A follow-up in a family study of schizophrenia. *Archives of General Psychiatry*, 40:1273-1276, 1983.
- Helzer, J.E.; Brockington, I.F.; and Kendell, R.E. Predictive validity of DSM-III and Feighner definitions of schizophrenia. *Archives of General Psychiatry*, 38:791-797, 1981.
- Helzer, J.E.; Kendell, R.E.; and Brockington, I.F. Contribution of the six-month criterion to the predictive validity of the DSM-III definition of schizophrenia. *Archives of General Psychiatry*, 40:1277-1280, 1983.
- Hoch, P., and Polatin, P. Pseudoneurotic forms of schizophrenia. *Psychiatric Quarterly*, 23:248-276, 1949.
- Huber, G. Symptomwandel der psychosen und pharmakopsychiatrie. In: Kranz, H., and Heinrich, K., eds. *Pharmakopsychiatrie und Psychopathologie*. Stuttgart, West Germany: Thieme Verlag, 1967.
- Hughlings-Jackson, J. *Selected Writing*. Edited by J. Taylor. London: Hodder and Stoughton, Ltd., 1931.
- Humbert, M.; Salvador, L.; Segui, J.; Oliols, J.; and Oliols, J.D. Estudio interfabilidad version espanola evaluacion de sintomas positivos y negativos. *Rev Departamento Psiquiatria Facultad de Medicina, University of Barcelona*, 13:28-36, 1986.
- Jeste, D.V.; Karson, C.N.; Iager, A.; Bigelow, L.B.; and Wyatt, R.J. Association of abnormal involuntary movements and negative symptoms. *Psychopharmacology Bulletin*, 20:380-381, 1984.
- Johnstone, E.C.; Crow, T.J.; Frith, C.D.; Stevens, M.; Kreel, L.; and Husband, J. The dementia of dementia praecox. *Acta Psychiatrica Scandinavica*, 57:305-325, 1978.
- Johnstone, E.C.; Frith, C.D.; Gold, A.; and Stevens, M. The outcome of severe acute schizophrenic illnesses after one year. *British Journal of Psychiatry*, 134:28-33, 1979.
- Johnstone, E.C.; Owens, D.G.; Frith, C.D.; and Crow, T.J. Relative stability of positive and negative features in chronic schizophrenia. *British Journal of Psychiatry*, 150:60-64, 1986.
- Kasanin, J. The acute schizoaffective psychosis. *American Journal of Psychiatry*, 90:97-126, 1933.
- Kay, S.R.; Fiszbein, A.; and Opler, L.A. The Positive and Negative Syndrome Scale (PANSS) for schizophrenia. *Schizophrenia Bulletin*, 13:261-267, 1987.
- Kendell, R.E.; Cooper, J.E.; and Gourlay, A.G. Diagnostic criteria of American and British psychiatrists. *Archives of General Psychiatry*, 25:123-130, 1971.
- Kendler, K.S.; Glazer, W.M.; and Morgenstern, H. Dimensions of delusional experience. *American Journal of Psychiatry*, 140:466-469, 1983.
- Kendler, K.S.; Spitzer, R.L.; and Williams, J.B.L. Psychotic disorders in DSM-III-R. *American Journal of Psychiatry*, 146:953-962, 1989.
- Klein, D. Relation between current diagnostic criteria for schizophrenia and the dimensions of premorbid adjustment, paranoid symptomatology, and chronicity. *Journal of Abnormal Psychology*, 91:319-325, 1982.
- Koehler, K.; Guth, W.; and Grimm, G. First-rank symptoms of schizophrenia in Schneider-oriented German centers. *Archives of General Psychiatry*, 34:810-813, 1977.
- Kraepelin, E. *Lectures on Clinical Psychiatry*. Translated and edited by Thomas Johnstone. New York: Hafner, 1904.
- Kraepelin, E. *Dementia Praecox and Paraphrenia*. Translated and edited by R.M. Barclay and G.M. Robertson. Edinburgh, Scotland: E. and S. Livingstone, 1919.
- Krawiecka, M.; Goldberg, D.; and Vaughan, M.A. Standardized psychiatric assessment for rating chronic

- patients. *Acta Psychiatrica Scandinavica*, 55:299-308, 1977.
- Kreitman, N.; Sainsbury, P.; and Morrissey, J. The reliability of psychiatric assessment: An analysis. *Journal of Mental Science*, 107:887-908, 1961.
- Kuriansky, J.B.; Deming, W.E.; and Gurland, B.J. On trends in the diagnosis of schizophrenia. *American Journal of Psychiatry*, 131:402-408, 1974.
- Lewine, R.R.J.; Fogg, M.; and Meltzer, H.Y. Assessment of negative and positive symptoms in schizophrenia. *Schizophrenia Bulletin*, 9:368-376, 1983.
- Liddle, P.F. The symptoms of chronic schizophrenia: A reexamination of the positive-negative dichotomy. *British Journal of Psychiatry*, 151:145-151, 1987.
- Loranger, A.W. The impact of *DSM-III* on diagnostic practice in a university hospital: A comparison of *DSM-II* and *DSM-III* in 10,914 patients. *Archives of General Psychiatry*, 47:672-675, 1990.
- Lloyd, D.W., and Tsuang, M.T. Duration criteria and long-term outcome in affective disorder and schizophrenia. *Journal of Affective Disorders*, 9:35-39, 1985.
- Marks, R.C., and Luchins, D.J. Relationship between brain imaging findings in schizophrenia and psychopathology: A review of the literature relating to positive and negative symptoms. In: Andreasen, N.C., ed. *Modern Problems of Pharmacopsychiatry: Positive and Negative Symptoms and Syndromes*. Vol. 24. Basel, Switzerland: S. Karger, A.G., 1990. pp. 89-123.
- McGlashan, T.H. Testing four diagnostic systems for schizophrenia. *Archives of General Psychiatry*, 41:141-144, 1984.
- Mellor, C.S. First-rank symptoms of schizophrenia. *British Journal of Psychiatry*, 117:15-23, 1970.
- Moller, H.J.; Hohschrann, M.; Cording-Tommel, C.; Schmid-Bode, W.; Wittchen, H.; Zaudig, M.; and von Zerssen, D. The classification of functional psychoses and its implications for prognosis. *British Journal of Psychiatry*, 154:467-472, 1989.
- Moscarelli, M.; Maffei, C.; and Cesana, B.M. An international perspective on assessment of negative and positive symptoms in schizophrenia. *American Journal of Psychiatry*, 144:1595-1598, 1987.
- Ohta, T.; Okazaki, Y.; and Anzai, N. Reliability of the Japanese version of the Scale for the Assessment of Negative Symptoms (SANS). *Japanese Journal of Psychiatry*, 13:999-1010, 1984.
- Overall, J.E., and Gorham, D. The Brief Psychiatric Rating Scale. *Psychological Reports*, 10:799-812, 1962.
- Owens, D.G., and Johnstone, E.C. The disabilities of chronic schizophrenia: Their nature and the factors contributing to their development. *British Journal of Psychiatry*, 136:384-395, 1980.
- Pfohl, B., and Andreasen, N.C. Development of classification systems in psychiatry. *Comprehensive Psychiatry*, 19:197-207, 1978.
- Pfohl, B., and Winokur, G. The micro-psychopathology of hebephrenic/catatonic schizophrenia. *Journal of Nervous and Mental Disease*, 171:296-300, 1983.
- Phillips, M. "Scale for the Assessment of Negative Symptoms and Scale for the Assessment of Positive Symptoms, Chinese Version." National Center for Psychiatric Training, Shashi Psychiatric Hospital, Shashi, Hubei, People's Republic of China (unpublished), 1987.
- Pogue-Geile, M.F., and Harrow, M. Negative and positive symptoms in schizophrenia and depression: A followup. *Schizophrenia Bulletin*, 10:371-387, 1984.
- Pogue-Geile, M.F., and Harrow, M. Negative symptoms in schizophrenia: Their longitudinal course and prognostic importance. *Schizophrenia Bulletin*, 11:427-439, 1985.
- Robins, L.N.; Helzer, J.E.; Croughan, J.; and Ratcliff, K.S. National Institute of Mental Health Diagnostic Interview Schedule: Its history, characteristics, and validity. *Archives of General Psychiatry*, 38:381-389, 1981.
- Sandifer, M.G.; Hordern, A.; Timbury, G.C.; and Green, L.M. Psychiatric diagnosis: A comparative study in North Carolina, London, and Glasgow. *British Journal of Psychiatry*, 114:1-9, 1968.
- Sandifer, M.G.; Petus, G.; and Quad, E.D. A study of psychiatric diagnosis. *Journal of Nervous and Mental Disease*, 139:350-356, 1964.
- Schneider, K. *Clinical Psychopathology*. Translated by M.W. Hamilton. New York: Grune & Stratton, Inc., 1959.
- Schneider, K. Primary and secondary symptoms in schizophrenia. In: Hirsch, S.R., and Shepherd, M., eds. *Themes and Variations in European Psychiatry*. Bristol, England: John Wright, 1974. pp. 40-46.
- Singh, M.M.; Kay, S.R.; and Opler, L.A. Anticholinergic-neuroleptic antagonism in terms of positive and negative symptoms of schizophrenia: Implications for psychobiological subtyping. *Psychological Medicine*, 17:39-48, 1987.

- Spitzer, R.L.; Endicott, J.; and Robins, E. *Research Diagnostic Criteria*. New York: Biometrics Research Division, New York State Psychiatric Institute, 1975.
- Spitzer, R.L., and Fleiss, J.L. A re-analysis of the reliability of psychiatric diagnosis. *British Journal of Psychiatry*, 125:341-347, 1974.
- Spitzer, R.L., and Williams, J.B.W. *Structured Clinical Interview for DSM-III (SCID)*. New York: Biometrics Research Division, New York State Psychiatric Institute, 1984.
- Stephens, J.H.; Astrup, C.; Carpenter, W.T.; Shaffer, J.W.; and Goldberg, J. A comparison of nine systems to diagnosis of schizophrenia. *Psychiatry Research*, 6:127-143, 1982.
- Stephens, J.H.; Astrup, C.; and Mangrum, J. Prognostic factors in recovered and deteriorated schizophrenics. *American Journal of Psychiatry*, 122:1116-1121, 1966.
- Strauss, J.; Carpenter, W.T.; and Bartko, J. An approach to the diagnosis and understanding of schizophrenia: III. Speculations on the processes that underlie schizophrenic symptoms and signs. *Schizophrenia Bulletin*, (Experimental Issue No. 11):61-69, 1974.
- Taylor, M. Schneiderian first-rank symptoms and clinical prognostic features in schizophrenia. *Archives of General Psychiatry*, 26:64-67, 1972.
- Taylor, M.A., and Abrams, R. The phenomenology of mania: A new look at some old patients. *Archives of General Psychiatry*, 29:520-522, 1973.
- Taylor, M.A., and Abrams, R. Acute mania: Clinical and genetic study of responders and non-responders to treatments. *Archives of General Psychiatry*, 32:863-865, 1975.
- Taylor, M.A., and Abrams, R. The prevalence of schizophrenia: A reassessment using modern diagnostic criteria. *American Journal of Psychiatry*, 135:945-948, 1978.
- Tsuang, M.T.; Woolson, R.F.; and Fleming, J.A. Long-term outcome of major psychoses: I. Schizophrenia and affective disorders compared with psychiatrically symptom-free surgical conditions. *Archives of General Psychiatry*, 36:1295-1301, 1979.
- Vaillant, G.E. Prospective prediction of schizophrenic remission. *Archives of General Psychiatry*, 11:509-518, 1964.
- Van Kammen, D.P., and Boronow, J.J. Dextro-amphetamine diminishes negative symptoms in schizophrenia. *International Clinical Psychopharmacology*, 3:111-121, 1988.
- Waddington, J.L.; Youseff, H.A.; Dolphin, C.; and Kinsella, A. Cognitive dysfunction, negative symptoms, and tardive dyskinesia in schizophrenia: Their association in relation to topography of involuntary movements and criterion of their abnormality. *Archives of General Psychiatry*, 44:907-912, 1987.
- Wing, J.K. A standard form of psychiatric Present-State Examination and a method for standardizing the classification of symptoms. In: Hare, E.H., and Wing, J.K., eds. *Psychiatric Epidemiology: An International Symposium*. London: Oxford University Press, 1970. pp. 93-108.
- Wing, J.K.; Cooper, J.E.; and Sartorius, N. *The Measurement and Classification of Psychiatric Symptoms*. London: Cambridge University Press, 1974.
- World Health Organization. *The International Pilot Study of Schizophrenia*. Vol. 1. Geneva, Switzerland: The Organization, 1973.
- World Health Organization. "Mental Disorders: Glossary and Guide to Their Classification in Accordance With the Tenth Revision of the International Classification of Disease. Draft of Chapter 5: Mental, Behavioral and Developmental Disorders." Geneva, Switzerland, 1989.

Acknowledgments

This work was supported in part by grants MH-31593, MH-40856, MH-43271, and a Research Scientist Award MH-00625 from the National Institute of Mental Health; and the Nellie Ball Trust Research Fund, Iowa State Bank and Trust Company, Trustee.

The Authors

Nancy C. Andreasen, M.D., Ph.D., is Professor, and Michael Flaum, M.D., is Assistant Professor Department of Psychiatry, University of Iowa College of Medicine, Iowa City, IA.

