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Methodological Issues in Using a Polydiagnostic Approach to Define Psychotic Illness

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Although a polydiagnostic approach to the definition of psychotic disorder provides many advantages to the researcher, there are also disadvantages. A comparison between several different sets of operational criteria using the OPCRIT computer program on a consecutive series of 397 psychotic subjects is described. The results show that although current diagnostic procedures are generally reliable, such approaches can still only supplement skilled clinical judgement, and there remain many pitfalls for the unwary.

The practice of defining psychiatric disorder operationally has become widely accepted in research since the 1970s following the introduction of the St Louis criteria (Feighner *et al*, 1972). During the past two decades the number of different operational criteria has proliferated, and it has now become virtually mandatory to use operational definitions of disorder in any paper aimed for publication in reputable journals. Although operational criteria were originally devised for research use only, in 1980 the American Psychiatric Association published the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM–III) to provide diagnostic rules for the clinician as well as the researcher. This marked a significant step in the use of operational criteria. The DSM–III definitions have now been overtaken by a revised version, DSM–III–R (American Psychiatric Association, 1987), and even these criteria are destined to be superseded by DSM–IV and the new, 10th revision of the World Health Organization's *International Classification of Diseases* which will come into use throughout the world in 1993. The mental disorders section will consist of three alternative versions, one of which will be operationally defined diagnostic criteria for research.

Operational definitions are designed to be easily applied and to facilitate agreement as well as communication between clinicians. This has led to an improvement in inter-rater reliability of diagnosis. In addition, it is relatively straightforward to incorporate each criterion into the format for a structured interview and to devise computerised scoring programs. The ease with which this can be performed enables structured interviews to be written which can be administered and scored with good reliability and validity by lay interviewers who have no psychiatric training (Robins *et al*, 1988). This can then provide a highly cost-effective means of acquiring information about the incidence and prevalence of a broad range of psychiatric illness in large general population samples where the employment of clinicians would usually be considered far too costly. The explicit nature of operational criteria can enhance agreement not just nationally but internationally (e.g. ICD–10). Finally, the authors of operational definitions of disorder such as those in DSM–III have been at pains to take an aetiologically 'atheoretical' perspective. Thus behavioural, biological and psychodynamic schools should find the same definitions equally acceptable.

There are now many different sets of operational definitions, especially for psychotic illness (e.g. St Louis criteria; Feighner *et al*, 1973; Research Diagnostic Criteria; Spitzer *et al*, 1975; DSM–III, DSM–III–R; American Psychiatric Association, 1980, 1987). However, none of these approaches to defining disorder has proven validity. Indeed, which of the many alternatives is the most valid definition of a psychiatric disorder will remain speculative until aetiology can be precisely defined. We have elsewhere considered in more detail some of the effects of the increasing application of operational definitions upon psychiatric nosology, with particular reference to depression (Farmer & McGuffin, 1989). Briefly, these are as follows. Firstly, there is a restricted range of information used in the operational diagnostic process compared with the usual clinical situation. Previous psychiatric history, informant information, previous response to medication, as well as commodities that are difficult to define such as 'clinical impression', are usually omitted from operational definitions. Further, there is a tendency for operational definitions to focus on positive symptoms rather than on less easily rated negative items such as amotivation or anhedonia.

Secondly, the 'top down' diagnostic schema imposed by operational definitions provide a rather rigid system. This inevitably causes some patients to fall outside the major categories into 'atypical' or 'not elsewhere specified' groups. Other nosological systems such as the Present State Examination

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CATEGO computerised scoring program are more flexible in this respect (Wing *et al*, 1974; Wing & Sturt, 1978).

Thirdly, the absence of standardised severity ratings within definitions can mean that both mild self-limiting illness and severe life-threatening disorder are included within the same diagnostic category (e.g. DSM-III major depression). If the severity threshold for disorder is set too low the majority of the population will score positively for lifetime ever illness, which is also clearly a problem.

Lastly, the absence of a diagnostic hierarchy in definitions of disorder such as those contained in DSM-III-R is also problematic for the clinician as well as for some types of research, for example genetic studies. While there may be strong arguments against the introduction of such hierarchies, there is also the need for unequivocal guidance in some instances which so far has been missing. In particular, DSM-III and DSM-III-R criteria give only limited guidance for the rater to decide in a case with an admixture of depressive and psychotic symptoms whether the diagnosis is one of psychotic depression or schizophrenia. In practice, this decision is left to the researcher's or clinician's personal judgement, and therefore is subject to the same potential types of prejudice and bias that the introduction of operational criteria was meant to overcome.

As we have hinted before, the most serious problem besetting those attempting to choose a diagnostic schema is that of validity. No single definition has proven superior validity over others since the aetiology or pathogenesis of most psychiatric disorders is unknown. To overcome this, several authors have advocated a polydiagnostic approach, in which several sets of criteria are applied to the same subject (Kendell, 1983). In order to facilitate such an approach, the Operational Criteria (OPCRIT) Checklist for psychotic illness and a suite of programs for data entry and scoring were devised (McGuffin *et al*, 1991). Using such a polydiagnostic approach poses a number of problems, including the obvious statistical one of multiple testing. In this paper, we consider further some of the issues concerning the use and abuse of operational criteria and the polydiagnostic approach by examining the relationship between definitions included in the OPCRIT system as applied to a large series of subjects with non-affective psychoses.

Method

The OPCRIT system consists of a checklist of 90 items and a suite of personal computer programs which facilitate the application of multiple operational definitions of schizophrenia and affective disorder (McGuffin *et al*, 1991). The checklist consists of the items contained in five sets of criteria covering schizophrenia and affective illness (Feighner *et al*, 1972; Spitzer *et al*, 1975; Taylor & Abrams, 1978; American Psychiatric Assocation, 1980, 1987), two commonly applied definitions of schizophrenia (Schneider, 1959; Carpenter *et al*,1973), a version of the French criteria for non-affective psychoses (Pull *et al*, 1987), and three extra methods of subtyping schizophrenia (Tsuang & Winokur, 1975; Crow, 1980; Farmer *et al*, 1983). Where items from different sets of criteria closely overlap, an attempt was made to condense them into a single item. However, this was not always possible so there is some degree of repetition within the checklist. Explicit glossary definitions of each item were produced and where possible these were derived from the original published criteria. The scoring algorithms were also based on the published criteria and incorporated in the OPCRIT scoring program written in quickBASIC. Reliability assessment made by three independent raters has been carried out and is described in detail elsewhere (McGuffin *et al*, 1991). Inter-rater agreement was highly significant for all of the sets of operational criteria included in the checklist. An additional reliability check on a subset of 50 cases was carried out for this study. Inter-rater agreement between SW and DC for DSM-III criteria and RDC was calculated using the kappa statistic and found to be satisfactory (0.76 and 0.82 respectively).

The checklist therefore provides a relatively straightforward way of applying multiple operational criteria and multiple diagnoses to a large series of patients so that the relationship between different operational definitions can be examined. The checklist was applied by two experienced clinicians (SW and DC) after careful scrutiny of the detailed case records of 397 psychotic subjects derived from the Camberwell Psychiatric Case Register. The subjects represent 90% of all first-episode/first-contact cases recorded on the register between 1964 and 1984 with a case-record diagnosis (ICD-8 and ICD-9; World Health Organization, 1967, 1978) of schizophrenia, paranoia, paranoid disorders, paraphrenia or psychosis not elsewhere specified. In the remaining 10% of cases recorded on the register, case records could not be located. The sample was selected in order to obtain an operationally defined cohort of first-episode/first-contact schizophrenic subjects from a defined catchment area for a series of other studies concerning the incidence, ethnicity, sex differences, and criminality in schizophrenia, and which are described elsewhere (Castle *et al*, 1991; Wessely *et al*, 1991).

The following comparisons for the operational criteria included in the OPCRIT program were carried out. Firstly, a straightforward frequency distribution of diagnoses for each set of criteria are presented. DSM-III and DSM-III-R are commonly used definitions and familiar to many clinicians and researchers. While these definitions seem to be similar, this is tested by comparing the overlap of diagnoses for the two sets of criteria. As the data concern consecutively admitted non-affective psychotic subjects, comparison of the three subtyping classifications of schizophrenia included in the OPCRIT program is reported. The French empirical criteria are probably unfamiliar to most Anglophone psychiatrists, thus DSM-III-R schizophrenia

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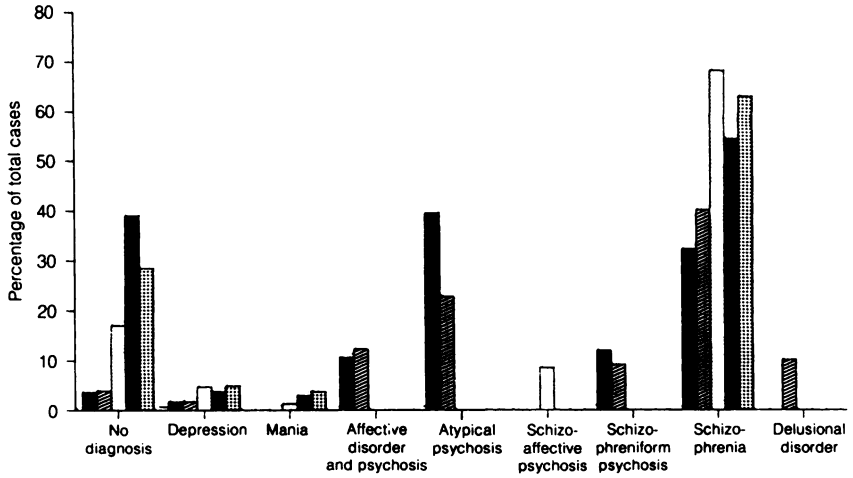


Fig. 1 Percentage of 397 psychotic subjects assigned to each diagnosis by the five sets of operational criteria: DSM-III (■), DSM-III-R (▨), RDC (□), Feighner (▩), and Taylor & Abrams (⊞).

is used as a useful reference point for diagnostic assignment by the French criteria. Lastly, many diagnostic problems are caused by combined affective and psychotic symptoms. The effect of changing the rating on one item, namely 'affective symptoms prominent', is examined to see how biased rating could affect diagnosis. Thus the sensitivity of the Research Diagnostic Criteria to alterations in the rating of this single item is examined.

Results

The frequencies of diagnosis for 397 consecutively admitted psychotic subjects from the King's Psychosis Study are shown in Fig. 1. The figure shows that the sample consists mainly of subjects with schizophrenia, which is the commonest diagnosis for all criteria except DSM-III, where atypical psychosis is the commonest category. DSM-III and DSM-III-R criteria result in the fewest unclassified cases ('No diagnosis' in figure) while the criteria of Feighner *et al* (1972) and Taylor & Abrams (1978) have the most subjects falling into unspecified categories (39% and 29% respectively). Figure 1 also shows that only a few cases are assigned to affective disorder, schizophreniform and schizo-affective disorder categories, and 10% of subjects are diagnosed as having DSM-III-R delusional disorder.

Two classifications included in OPCRIT (Schneider, 1959 (first-rank symptom definitions); Carpenter *et al*, 1973) are for schizophrenia only. Thus 74% of subjects fulfil Carpenter

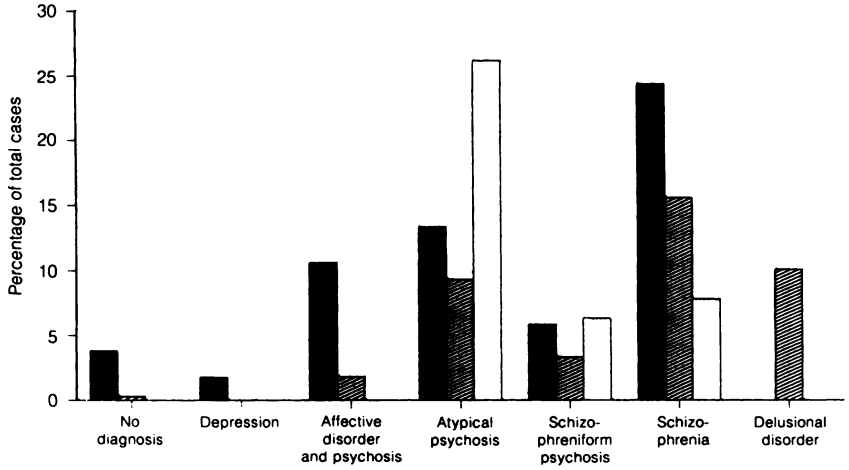


Fig. 2 Percentage of 397 psychotic subjects assigned to the same diagnosis by DMS-III and DSM-III-R (■), assigned to the diagnosis by DSM-III-R only (▨), and by DSM-III only (□).

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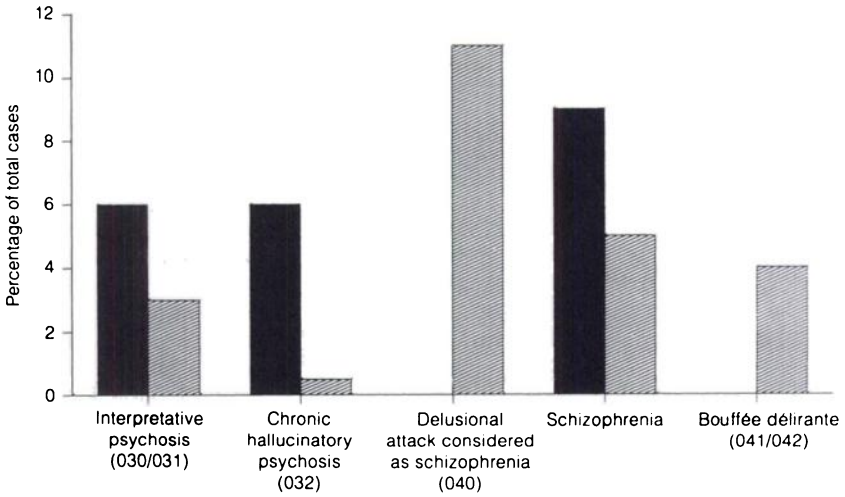


Fig. 3 Diagnostic overlap between DSM-III-R schizophrenia and diagnosis included in the French criteria for non-affective psychoses (DSM-III-R schizophrenia + French criteria ■ , French criteria only ▨). (French INSERM numbers are given in parentheses.)

criteria for schizophrenia (Carpenter *et al*, 1973) and 56% have Schneiderian first-rank symptoms (Schneider, 1959).

Figure 2 shows the diagnostic overlap between DSM-III and DSM-III-R. While there is almost total agreement for 'no diagnosis' and major depression, there is considerable discrepancy for cases of schizophrenia and atypical psychosis. The figure shows where the two classes agree about diagnosis and the percentage diagnosed by the DSM-III-R criteria only and by DSM-III criteria alone.

OPCRIT includes three subtyping classifications, those of Tsuang & Winokur (1974), Crow (1980) and Farmer *et al* (1984). Fifteen per cent of subjects were not schizophrenic according to any classification and were therefore not subtyped. Tsuang & Winokur's criteria include paranoid and non-paranoid subtypes, the latter consisting of undifferentiated and hebephrenic categories. Of schizophrenic subjects, 31% were Tsuang & Winokur paranoid subtype and 53.4% non-paranoid. These subtypes are fairly concordant, showing a significant if weak association with the paranoid-like (P-type) and hebephrenic-like (H-type) subtypes of Farmer *et al* (1984) ($\chi^2 = 14.61$, d.f. = 1 $P = 0.001$, Phi coefficient = 0.21). Crow criteria assign 71% of cases to Type 1 and 14.1% to a 'mixed' category. There were no Crow Type 2 cases.

Figure 3 shows the diagnostic overlap between the French empirical criteria for the non-affective psychoses and DSM-III-R schizophrenia. It is noteworthy that 56% of

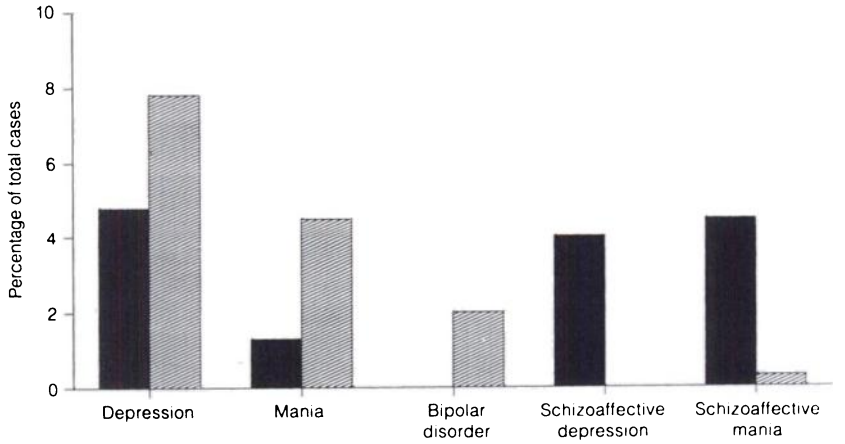


Fig. 4 Effect on diagnostic frequencies for RDC with the change in rating of a single item relating to the prominence of affective symptoms in psychotic illness (affective symptoms not prominent ■ , affective symptoms prominent ▨).

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subjects are unclassified by the French criteria for non-affective psychoses. Finally Fig. 4 shows the sensitivity of diagnostic assignment altering one rating on OPCRIT, namely 'affective symptoms predominate the clinical picture', for the Research Diagnostic Criteria. Although only a few cases have diagnosis of affective disorder, changing the rating of a single item which may merely reflect rater bias has a marked effect on diagnostic frequencies.

Discussion

This review of the problems encountered when a polydiagnostic approach is used to define psychotic illness has been based on data collected for other studies of psychosis (Wessely *et al*, 1991; Castle *et al*, 1991), the results of which are presented separately. There are clearly problems inherent in retrospective rating of case notes as items not mentioned as present in the record are scored as absent on OPCRIT and this may be incorrect. However, based on our previous experience with the use of OPCRIT in this way (Farmer *et al*, 1983; McGuffin *et al*, 1984) we doubt that this is the sole reason for the discrepancies between criteria highlighted in our results. Figure 1 shows that DSM-III and DSM-III-R provide the most restrictive criteria for schizophrenia, classifying 32% and 40% of psychotic subjects respectively while the RDC, Carpenter, and Schneider criteria provide much broader definitions (68.3%, 73.6%, and 56.4% respectively). Our previous studies using OPCRIT show similar proportions of subjects assigned to these definitions. If items present but not recorded were the sole cause of discrepancies between definitions, such consistent findings across studies would not have been found.

As we have discussed, restrictive criteria leave many subjects with significant psychopathology outside the major diagnosis in 'no diagnosis', or 'not elsewhere specified', or atypical categories. In this respect it is noteworthy that the largest number of psychotic subjects from this series are assigned to the DSM-III 'atypical' psychosis group. As such cases form the majority DSM-III definition, it seems paradoxical that they should constitute an 'atypical' grouping.

The effect of the number and nature of diagnoses included in each set is also shown in Fig. 1. Ten per cent of subjects are classified as DSM-III-R delusional disorder, a diagnosis corresponding to paranoid disorder in DSM-III. Although OPCRIT can assign DSM-III paranoid disorder, the criteria were not fulfilled by any subjects from these data. Similarly 8.5% of cases diagnosed RDC schizo-affective disorder are presumably distributed to other disorders by other authors' criteria. Lastly, only three diagnoses are available for the Feighner criteria and this may account for the large number of cases ending up in the 'no diagnosis' group (39%).

Only minor changes were undertaken by the work group revising DSM-III in 1987. While DSM-III and DSM-III-R are highly comparable for some diagnoses, in others subtle changes to wording lead to quite large differences in assigned diagnosis. Thus Fig. 2 shows that although only a few of the 397 subjects in this series were diagnosed as depressed, there was 100% concordance between the two diagnostic systems in this diagnosis. In addition there was also almost 100% agreement for subjects falling outside both classifications and ending up in the 'no diagnosis' category. Agreement between the two classifications is also good for affective disorder with psychosis, with a small excess of cases assigned to this category by DSM-III-R.

Less agreement is shown between classifications for atypical psychosis, schizophreniform disorder and schizophrenia. This is especially surprising for the diagnosis of schizophrenia since the two sets of criteria are similar. The difference is accounted for by the requirement in DSM-III that deterioration in functioning in work, social functioning and self-care be present, while DSM-III-R merely states that such functioning is disturbed only during the acute phase of the illness. While the difference in wording may be slight, it has a large effect on the number of cases assigned to a schizophrenic diagnosis. Thus 24.4% of the total sample are diagnosed as schizophrenic by both DSM-III and DSM-III-R. However, a further 7.8% of all subjects are diagnosed schizophrenic according to DSM-III and not DSM-III-R, while 15.6% of the total are schizophrenic according to DSM-III-R and not DSM-III.

Figure 3 shows the percentage of subjects assigned to the French empirical criteria for non-affective psychoses. Of the psychotic series, 18% are diagnosed as chronic schizophrenic according to the French classification with a further 11% diagnosed as having 'delusional attack' considered as schizophrenia. Relatively small numbers of cases are assigned to the categories interpretative psychosis, chronic hallucinatory psychosis and bouffée délirante. In addition the figure also shows that all subjects with a diagnosis of chronic hallucinatory psychosis are diagnosed according to DSM-III-R as schizophrenic, while none of the cases categorised as 'delusional attack' have DSM-III-R schizophrenia. Approximately 22% of the 'no diagnosis' group are schizophrenic according to DSM-III-R.

Figure 4 illustrates the sensitivity of one set of operational criteria, namely the Research Diagnostic

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Criteria, to changing the rating of a single item. In subjects with an admixture of affective and psychotic symptoms, the rater is required to make a judgement as to the relative prominence of these. The effect of globally changing this rating is shown, with the black bars showing the percentage of cases in each diagnostic group when affective symptoms are not prominent and the shaded bars showing the effect when this item is scored positively, that is, the rater judges that affective symptoms are prominent. The diagnosis of schizoaffective disorder is clearly highly susceptible to this particular type of rater judgement.

Two of the three subtyping classifications for schizophrenia, those of Tsuang & Winokur (1975) and Farmer *et al* (1984), gave similar results, although they have been derived quite differently. The criteria of Tsuang & Winokur (1975) were based on clinical experience and were an attempt to devise an explicit subtyping for Feighner-positive schizophrenic subjects. The Farmer criteria were derived from multivariate statistical analyses of two different samples of schizophrenics (Farmer *et al*, 1983, 1984). Despite the different origins, the agreement for subtype assignment was highly statistically significant.

The criteria of Crow provide a somewhat different subtypology, and as with our previous studies no 'pure' Type 2 cases – showing only negative and no positive symptoms – were identified (Farmer *et al*, 1987), even though 14.1% of cases were assigned to a 'mixed' type intermediate between pure Type 1 and Type 2.

Although diagnostic procedures are now generally reliable, there are still many pitfalls for the unwary. We have shown that even small or subtle changes in rating a single item can lead to massive shifts in diagnosis and some sets of criteria, for example RDC, may be more susceptible to this than others. Research in certain areas may also be more vulnerable in this respect than others, for example, research requiring the identification of a simple dichotomy such as 'case' versus 'non-case' in genetic and biological marker research. Thus reliance on single accounts of cross-sectional psychopathology or on information derived from lay interviewers is likely to magnify or compound these problems. Less vulnerable in this respect would be a group or consensus diagnostic assignment since this is less dependent on the diagnostic prejudices of one or two raters. Similarly, the major and more severe psychiatric syndromes are likely to be diagnosed with greater accuracy than less severe or less clearly defined syndromes.

How may the problem be resolved? Firstly, careful attention to the accurate recording of all diagnostic information from as many sources as possible will enhance accuracy. Secondly, clinicians must be involved in the final decision about the diagnosis. Thirdly, more than one rater or clinician should be used; preferably a team of clinicians should meet to evaluate all information before a consensus assignment is made. Fourthly, longitudinal information about the course of the illness should be obtained to increase diagnostic accuracy. A single episode of DSM-III-R 'major depression' may herald the onset of schizophrenia, schizoaffective, or bipolar disorder, or may occur in the context of obsessive-compulsive disorder, phobic disorder, or an anxiety state, or merely be followed by continuing good health. If ten years' worth of subsequent information follows this initial diagnosis, an accurate assignment of the case is more likely than if the assignment is made only one month after the episode.

Next, authors of future operational criteria should provide clear and unequivocal guidance regarding diagnostic hierarchy. In particular, the required balance of type, severity, and duration of groups of symptoms relative to each other should be made more explicit than in current criteria. This is particularly important for the balance between affective and psychotic symptoms for, as we have shown, minor changes in raters' subjective views of symptom balance lead to massive shifts in diagnostic assignment, with all the attendant poor reliability. Those wishing to examine issues of comorbidity further would be free to ignore such hierarchies. However, for many types of research, hierarchical guidelines are essential since without them good reliability is sacrificed, and while reliable definitions are not necessarily valid, valid definitions must be reliable.

Lastly, although a polydiagnostic approach has been advocated as providing all possible options, this again merely acts as an adjunct to skilled clinical judgement – for in the final analysis this remains the most reliable and valid tool the researcher possesses.

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