Adequate methods of classifying patients into meaningful groups are necessary for comparing large numbers of patients or for studying the incidence, etiology, treatment, and outcome of different disorders. Clinical diagnosis is one classification method, but since diagnostic systems and criteria for diagnosis vary, and since no one system has been definitely validated, improved methods for classifying patients need to be developed.

The development of clinically more useful classifications of patients can be approached in several ways. One of these ways is described in Chapter 1 and concerns WHO's programme on standardization of psychiatric diagnosis, classification, and statistics. Another is the computer-simulated diagnosis discussed in Chapter 11. It is possible, however, that current diagnostic categories, even if combined and standardized, can be improved upon and that other methods of classifying patients might yield groups with a common etiology, course, and response to treatment. For this reason, a third method for identifying groups of patients has been attempted: cluster analysis, an "empirical" method. A noteworthy feature of this type of method is that, once items are selected and ratings made, cases are classified entirely on the basis of statistical criteria of their similarity. In the process of clustering, each item is given a weight equal to that of the others. Aside from the decision of which criteria of similarity should be embodied in the clustering program selected, no clinical theory affects the process of classification.

The use of empirical methods for classifying individuals is a relatively recent development that has been made possible by the computer. It has been used in classifying plants and animals into species and genera by Sokal and Sneath (1963), who have called such methods "numerical taxonomy." A similar effort was made by Grinker et al. (1968), who used a clustering program to group borderline psychotic patients into several categories. Paykel (1971) and Mattsson (1965) have also employed similar techniques for the purpose of psychiatric classification. The empirical methods have advantages that make them promising for psychiatric research and practice especially for dealing with the kinds of problem studied in the IPSS. They also involve certain difficulties. In the search for an optimal method for classifying patients in the IPSS, several variations of these empirical techniques were tried at Headquarters and in different Centres.

12.1 Goals of Empirical Grouping

The major aim of an empirical grouping of members of any sample is to promote the delineation of the "natural groups" within that population. This process is described in detail by Sokal and Sneath (1963). It is assumed that a number of individuals within a large population will have many
features in common and will be generally different from other groups whose members will have other features in common. If ratings of individuals are made on a large number of variables, and certain mathematical procedures are used, these "natural" groups will be elicited. According to Sokal and Sneath, the individuals in these natural groups will be the ones most likely to have in common any other characteristics that might be evaluated. For example, if patients who have many symptoms in common are grouped together, it is probable that they also have similar genetic or environmental backgrounds and a similar course of illness and response to drugs. If, on the other hand, a few key symptoms are used as the sole criteria for classification, the theory states that predictability of other variables will be lessened. Although it departs from a model of diagnostic groups based on a few "key" criteria, the conception of "natural groups" is especially attractive in the field of cross-cultural psychiatry where one must otherwise choose between different diagnostic systems that have been developed from culturally more limited samples of patients. The danger of making such a choice is that by adapting one diagnostic system to a variety of different cultures, real differences in the nature and manifestation of psychiatric disorders might be lost. The constant reapplication of "established" theories may hinder the recognition of important new facts.

At the very least, the application of empirical grouping methods to psychiatric patients can be useful in defining more rigorously the usual diagnostic criteria for classifying patients and providing a criterion for choosing among current diagnostic systems. Beyond this, empirical methods may also help uncover previously unnoticed associations between variables. At best, empirical grouping methods could help to provide a universally applicable classification system with the greatest predictability of a large number of other variables.

12.2 Criteria for Evaluating Empirical Grouping Methods

Different types of empirical methods produce different results. The most important measure of usefulness of an empirical programme is the extent to which it yields the kinds of categories needed for the goals of the project for which it is used. Thus, some studies might require maximum homogeneity, for example, in duration or severity of illness of each group of patients. Others might require those categories best able to predict a particular general variable such as outcome. A major goal of classifying patients in the IPSS — an important goal but difficult to define concretely — is to establish in what sense, if any, similar patients, especially "schizophrenics," can be said to exist in various cultures. Although this goal does not specify operationally the nature of similarity, it carries an assumption common to numerical taxonomy and to many schools of psychiatry: that patients who are "really similar" will be alike in all or almost all important variables. This assumption implies a typological, rather than a dimensional, approach to psychiatric disorders, and suggests that a typological model of "similar" patients can be usefully constructed. Once meaningful groups of similar patients have been formed by an empirical method, the characteristics of each group can be abstracted in a "typical pro-
file" so that a method can be developed for placing new patients into these groups.

The goal of forming natural groups is an ideal that can be only approximated. It can best be approached by using several steps and several criteria, each helping successively to clarify the next. Groups are formed, their validity is tested, and these findings are then used to develop improved criteria for groups; regrouping is performed, and the resulting groups are again evaluated.

In this process there are several criteria that offer some help in the initial testing of the usefulness of the empirical groups identified by the computer. One early test is the degree to which the groups of patients produced by the computer conform to the diagnostic categories in which the patients were placed by the psychiatrist who evaluated them. Since each Centre has somewhat different diagnostic principles, complete correlation of one empirical grouping with all the diagnostic usages in all Centres is impossible. Approximations, however, confirm at least that the computer program is working along general clinical principles.

This test provides an indication of the clinical meaningfulness of a particular computer program, but it does not suffice to use only this criterion. A similar criterion that is useful during the initial evaluations of empirical methods is the extent to which an empirical group compares with the classification of patients by a method such as the CATEGO program for systematically assigning patients to previously defined categories.

Once the empirical groups more or less approximate the clinical diagnoses and the CATEGO classifications, the further development and selection of empirical techniques need no longer aim at simple reproduction of the usual clinical categories but can begin to attempt to identify more universally meaningful groups. For example, groups characterized by striking typical profiles, or groups that make "clinical sense" in some way, such as confirming clinical impressions about a relationship among variables, are of particular interest. The relationships of the identified groups to variables such as response to treatment, course of illness, genetic background, social background, and psychophysiological and biochemical measures, are the ultimate validating criteria for any of the groups described. Unfortunately, however, few of these criteria can currently be used with universal acceptance to confirm or invalidate a given diagnostic system. Nevertheless, the ultimate goal is to identify reasonably homogeneous groups that are highly predictive of such variables.

Besides these important "external" criteria of the validity of patient groups, empirical methods for grouping patients can also be evaluated by other more technical criteria. One of the most crucial is whether groups produced by a program will be radically altered as a result of small changes in data input, such as the addition of a few items or a few patients. If group composition changes with the addition of a few items to the rating scale or a few patients to the population, the method cannot be used for the definition of stable groups desirable for the study of etiological and other factors.

Another criterion for judging the usefulness of empirical methods is the distribution of patients within the groups. Although this is not a rigid
criterion, it is helpful in eliminating certain methods. For example, when one common method for grouping patients was applied to part of the IPSS sample, 92 of a total of 131 patients were placed into one group, whereas the other 39 patients were distributed into 14 other groups. This type of output is not useful for most psychiatric purposes unless it can be demonstrated that it is valid according to some external criteria.

A useful method for evaluating empirical clustering programs is to test them on a sample in which the component groups are already known. For example, the Washington FRC tested six clustering methods by applying them to a group of 100 fictitious "patients" whose ratings on the PSE were fabricated by the investigators to represent five distinct "classical" diagnostic categories. It was found that only one of the six clustering methods used reproduced the original input groups of paranoid schizophrenic, manic-depressive manic, manic-depressive depressed, simple schizophrenic, and neurotic depressed "patients".

12.3 Types of Empirical Methods

The output of an empirical method of grouping will depend on: (1) the type of data used in the program, e.g., dichotomous or scaled data, or data requiring preliminary factoring; (2) whether the method uses distance or correlational measures of similarity; and (3) the way in which groups are formed (e.g., nodal, hierarchical, or linkage approaches). At each of these levels the choice of method affects the kinds of grouping produced. Any choice at each level has certain advantages and disadvantages — many of which remain to be clarified by further empirical research. Nevertheless, the effects of some choices are immediately apparent. For example, with some methods the investigator must specify in advance the number of groups he wants the program to produce. Certain methods can employ only a limited number of variables in grouping the patients. Correlational methods place patients in groups on the basis of similar patterns of profiles, rather than on the basis of their receiving the same ratings or approximately the same ratings on each of the variables measured. With correlational methods a patient with severe delusions, hallucinations, and feelings of depression, for example, would be placed in the same group as other patients who were only mildly symptomatic in these areas but had an identical pattern of symptoms. Distance definitions of similarity, on the other hand, probably tend to stress severity more than patterns of symptoms in grouping patients.

An interesting feature of all empirical methods is that they require the investigator to re-evaluate and specify precisely what he means by similarity between two patients. He must specify whether he wants patients to be grouped together on the basis of similar intensity of symptoms, similar patterns of symptoms, similarity based on heavy weighting of one or two symptoms, equally weighted similarities on a wide group of symptoms, or a combination of several of these.

In an attempt to test many of the empirical methods available, Headquarters and several of the participating Centres in the IPSS applied different techniques to the grouping of patients using the data collected. In most instances, PSE ratings were used as the data from which patients were
clustered. Although this meant that non-correspondence of cluster groups with Centre diagnostic groupings might be increased because psychiatric history data were not included in the cluster programs, it had the advantage that it simplified the analysis.

12.3.1 Nodal methods

Several different nodal methods were used. These methods have the common property of selecting subjects that serve as nodes around which clusters are formed.

The London FRC employed a nodal program developed by Everitt (1970), using a method similar to that described by MacQueen (1968). In the Everitt program, the definition of similarity among patients is based on distance measures. The user specifies the number of groups into which the data are to be divided or a range of values in which he is interested. For this given number of groups or range of values, the program finds that number of starting points around which the clusters will be formed. These starting points, as defined by values of ratings that define characteristics of the patients, are used as initial estimates of the characteristics that will be most typical of the particular group being formed. Patients are then allocated to one of the groups depending upon which of the characteristics defined by the starting point they have most in common. Each time a patient is added to a group, the starting point is redefined to yield somewhat of an average value for all the patients now constituting the particular group. After an initial rough classification has been achieved by allocating all of the patients under consideration to groups, any patient may be reclassified until all the patients in a group are more similar to the characteristics defining their groups than they are to the characteristics defining any other group.

The original starting points are obtained by first finding the two patients who are most different from each other. The third starting point is then defined by finding the patient who is farthest from the two patients already chosen, etc., until the predetermined number of starting points has been achieved. The characteristics of these patients are then taken as the initial estimates of the characteristics of the groups to be formed. The optimal number of starting points (groups) for a given set of data is not defined by the program, but methods for determining this number are currently being investigated.

The Everitt method is characteristic of nodal techniques in that it places patients in mutually exclusive groups, in contrast to hierarchical programs that produce branching patterns of groups and subgroups. A nodal method would not, for example, directly produce a group of schizophrenic patients comprised of groups of hebephrenic, paranoid, catatonic, and simple schizophrenic subtypes. This is one example of how the choice of a program determines to some extent the kinds of group produced, regardless of the nature of the data. The output of a program of this type would be more satisfactory to a psychiatrist who conceives of patients as falling into mutually exclusive groups of equal importance than to a psychiatrist who conceives of psychiatric patients as belonging to overlapping groups.
or to several major groups comprised of subgroups. To some extent this program can be adapted to the latter conception if the procedure is run once to define initial groups and then run again with each of these initial groups separately to define subgroups. However, such a rerun will again exert specific effects on the final groups produced.

To provide an example of the kinds of results that might be expected, the Everitt program was used to cluster 160 patients from the London and Aarhus series. To evaluate the output, the characteristics of the groups were examined to determine whether they made "clinical" sense. It was found that only one of the groups produced by this run of the Everitt program made immediate sense in diagnostic terms. This group was comprised of patients with florid paranoid schizophrenia who had "nuclear" symptoms or auditory hallucinations. A second group was characterized by fewer florid schizophrenic symptoms but high scores on anxiety and depression. A third group also showed few florid schizophrenic symptoms, but had considerable motor retardation and poverty of speech, with low anxiety and depression. The conclusion from this particular output was that the Everitt program did produce 'meaningful' groups, although not ones that receive ordinary diagnostic labels. It might prove useful to distinguish between such subgroups of schizophrenic patients in addition to, or even instead of, the subgroups commonly used. However, here again, the relative usefulness of the many subclassifications, which might be derived by using different cluster techniques and different input materials, should be assessed in terms of their applicability to independently collected data and of their ability to predict some external criterion such as outcome or response to treatment.

Another nodal clustering method, somewhat similar to the Everitt program, was used in the Washington FRC. This program employs the method described by Lorr and Radhakrishnan (1967) for use in conjunction with the Inpatient Multi-dimensional Psychiatric Scale (IMPS). As a nodal program, it produces groups that are mutually exclusive and without hierarchical structure. It uses a correlational measure of similarity of patients and thus compares profiles of patients rather than individual scores. The program was used with data that had been factored to produce "syndrome scores".

The Lorr and Radhakrishnan method selects an arbitrary level of correlation below which profiles will be considered to be dissimilar. It then takes as a starting point that profile to which the greatest number of other profiles are similar. A second profile is then added that is similar to the largest number of profiles showing similarity to the first. Then a third profile is added that has the highest number of similar profiles in common with the first two, and so on, until all profiles that meet the criterion for similarity to the profiles that make up this growing cluster have been added. This process is then repeated with the remaining unclustered profiles, and again with the profiles remaining unclustered from the first two clusters, etc., until all profiles that have sufficient similarity with each other to meet the criterion are clustered.

Application of this technique to FSE data from several samples of Washington patients resulted in a fairly even distribution of patients into groups and some approximation of the groups to the diagnostic categories in which patients had been placed by the Centre psychiatrists. However, the program performed poorly on one important criterion: the ability to main-
tain the same groups with the addition of a few more patients to the sample. A further problem with this program was that up to 72% of the sample was not put into any group. Lorr and Radhakrishnan have reported instances of over 50% of a sample not being clustered with the application of their technique to data from the IMPS. They handle this difficulty by grouping the unclustered patients, using a discriminant function analysis, to put them into the clusters already constructed. Because another grouping technique seemed more fruitful, the Washington Centre did not proceed to that step.

At Headquarters, yet another nodal method was used for developing empirical groups — that developed by Rogers and Tanimoto (1960). This method defines similarity between two subjects through the use of a similarity ratio, the total number of attributes two subjects have in common divided by the total number of attributes possessed by either or both. To derive this ratio, all ratings are dichotomized into presence or absence. A "distance measure" is then derived, which is a function of the similarity ratio between the subjects. The distance of each subject from all the other subjects is calculated. The most typical subject — the subject with the least distance from all others — is considered a "prime node". The subjects most similar to this "prime node" are grouped with him in a "clump". The amount of heterogeneity in the clump is determined by another formula in the program. This initial clump of patients is then removed from the data and the remainder of the data are treated in the same way to derive another clump. This process of forming groups that are then removed from the remainder of the data continues until none of the patients left are similar enough to each other to form further groups. One feature of this and the Lorr and Radhakrishnan program is that each takes groups successively from the "middle" of the population. This differs from the Everitt program, which separates the population at one time into several relatively homogeneous groups.

One promising output from this program produced groups that were non-random in relation to Centre diagnosis, but again the diagnosis-cluster correlation was far from perfect. A six cluster output clustered 30 of 66 Aarhus patients, so that all members of one cluster were manic-depressive, depressed type, and all members of another cluster were manic-depressive, manic type. The 8 patients in a third cluster had all been diagnosed as schizophrenic. The symptoms that were selective for most of these clusters also described recognized syndromes.

Although these results are promising, several points need further investigation. It would be important to study the characteristics of the 36 of the 66 patients who remained unclustered. As with the Lorr and Radhakrishnan program already described, these patients could probably be put into established clusters through the use of discriminant function analysis or by certain manipulations of the original program, but the fact that over half of the sample was not put into clusters originally raises the question of whether the program can effectively go beyond selecting out the most distinctive patients and actually find the basic natural groups within the entire population. Another point to be determined is whether these clusters would remain stable if the remaining patients in the Aarhus sample were added, or if the method were applied to samples from other Centres.

The Rogers and Tanimoto program was also used to cluster patients using
psychiatric history data as input. While the distribution of patients in clusters compared to Centre diagnosis was not random, especially for patients with a history of previous psychiatric disorder, the correspondence of patient cluster to diagnosis was not as convincing as when the PSE data had been used as input. Nevertheless, in view of the promise shown by this method with the PSE and history data used separately, it is quite possible that even better results would be obtained if these sources of data were combined.

Another clustering technique, the Rubin-Freedman program (1967), was tested in the Washington Centre. This program uses a somewhat different measure of similarity from that used by the programs described above, i.e., a "fractional match" coefficient that defines similarity of patients as the number of identical ratings between two patients on an item-by-item basis, with a correction made for matches occurring by chance alone. While somewhat akin to the similarity coefficient described for the Rogers and Tanimoto program, the fractional match coefficient is different in that it defines similarity of nominal rather than dichotomized data. Since the PSE items can be rated 0, 1, 2, ?, NR, NA, NI for each item on each patient, it was felt that it might be valuable to treat these as nominal data, considering each rating as having a separate meaning. Unfortunately, this method was not successful when applied to the IPSS data. It was finally eliminated from use in the IPSS. Because of the large numbers of zero ratings in the data — a common feature of data collected with such inventories — patients were being matched by the fact that they shared the absence of symptoms. This type of similarity has been likened to grouping elephants and stones together because neither has wings. In attempting to cope with this and other problems, numerous variations were introduced into the coefficient used. Nonetheless, the output was frequently marked by shifts of up to 63% of patients from group to group with small changes in data input.

12.3.2 Linkage method

A linkage method was used by the Aarhus FRC for clustering patients. This particular method employed a single linkage technique in which a cluster is formed by adding patients successively, each being selected from the sample because he is most similar to the last patient chosen. The results were discouraging, however, since it appeared that in a chain of "similar" patients, for example, patients A and B were indeed similar and patients O and P were similar, but patient P was not at all similar to patient A — the criteria for similarity having changed considerably through the intervening patients from B to O. A useful lesson learned from the Aarhus experience was that with clustering programs the fact that an initial result replicates the Centre diagnoses moderately well with one sample does not establish that the program is worthwhile. One of the early outputs of this program had separated depressed and schizophrenic patients as successfully as the Rogers and Tanimoto, Rubin-Freedman, and Everitt programs. With the addition of new patients to the sample, however, and after closer inspection of the clinical pictures of the patients that had been grouped together, what had seemed to be a worthwhile technique proved
to be not so promising.

The next step in clustering taken by the Aarhus Centre marked a change in orientation — a change that may be characteristic of future efforts with these programs. This change involved compromising the ideal of a rather pure empirical approach by moving towards a clustering method that combines the use of clustering techniques with more elements from clinical diagnostic systems. The goal of such a combination is to use both clinical and clustering methods in a reverberating manner so that each can serve as a check and a source for improvement for the other. Specifically, in Aarhus, an investigator devised a list of symptoms in order of their being characteristic, in her opinion, of each of four syndromes: schizophrenia, mania, depressive psychosis, and neurosis. The computer was then programmed to group patients using these symptoms as weighted criteria. This procedure is currently being refined. The results from the computer output are being used to help redefine the criteria and also to re-evaluate the nature of the patient sample.

12.3.3 Hierarchical method: the McKeon program

One hierarchical clustering program was employed for analysing the IPSS data in the Washington Centre and proved to be the most fruitful of the methods applied there. This program, developed by McKeon (1967), begins by clustering similar patients into two $\sqrt{N}$ groups (where $N =$ number of patients). The program then reduces the number of separate groups by combining at each step the two most similar groups from the preceding output. Similarity between groups was originally defined using a distance measure, but after some preliminary experience a correlation measure was substituted. Because of the successive combination of two groups at each iteration, one can note at any point which groups have been combined to form the next lower number of groups. This makes it possible to trace the hierarchy of group structure.

Although both the Everitt program and the McKeon program require that the investigator decide what is the most meaningful number of groups, in the McKeon program this is an a posteriori rather than an a priori decision. Instead of affecting the output that is generated, the decision involves selecting which level of the output represents the best grouping. The McKeon program provides a measure that helps the investigator decide from a mathematical point of view which are the best structured sets of groups — a figure that indicates the magnitude of within-group homogeneity that is sacrificed by the next step of combining two of the previously defined groups.

An initial problem with the McKeon program stemmed from the fact that it had originally been designed to define similarity of patients by using distance measures, i.e., by using the magnitude rather than the pattern of scores. Early applications of this program to the IPSS data repeatedly separated out patients with extreme severity of psychopathology but did not yield groups that seemed to be clinically meaningful from other points of view. For this reason correlational measures were substituted for the distance measures, and the combination of a hierarchical program with correlational criteria of similarity yielded groups of patients that were more clinically meaningful than those generated by any other technique used in
the Washington Centre. This impression was confirmed by using the pro-
gram with "data" especially fabricated to represent 100 fictitious "pa-
tients" rated to depict different classical syndromes. The hierarchical
program was more successful than the Rubin-Freedman or Lorr and Radhakrishnan
program in reproducing the groups that the fabricated "patients" were de-
signed to represent. It also produced groups that remained the most stable
when changes in the sample of patients and items were introduced into the
data.

Having proved successful in these tests, the hierarchical program with
 correlational measures of similarity was used to cluster patients from each
of the nine Centres separately. The data used for this clustering were
scores on 32 "dimensions" that were derived for this purpose from the PSE
items (see Appendix) and adapted from factors originally derived by Fleiss
and Zubin (1969) from similar data. Based on the clinical decision
that the most interesting division of patients in any one Centre might fall
between 6 and 12 groups, the mathematically optimum cluster output within
this range for each Centre was then selected. These results were then com-
pared with the Centre diagnoses and the CATEG0 classification of the patients.
For both Centre and CATEG0 diagnoses, there were several striking correla-
tions with cluster membership. There were also some clusters that were less
specifically related to the diagnostic categories.

Table 12.1 shows the relationship between cluster membership and Centre
diagnosis for the 132 patients seen in the Washington Centre. In this com-
parison, patients with schizophrenic diagnoses occurred in all 8 clusters.
Nevertheless, there was a non-random relationship between diagnosis and
cluster membership ($\chi^2 = 57.88$, df = 28, $p < .001$). For example, Clusters
1, 3, 5, 7, and 8 were comprised almost completely (96%) of schizophrenics.
Cluster 4 had 38% of diagnosed neurotics, although this cluster comprised
only 11% of the total sample, and Cluster 2 had 7 of the 8 psychotically
depressed patients.

The profile characteristics of the 8 clusters reflected the diagnoses
that were over-represented in those groups. For example, Cluster 1, pre-
dominantly composed of patients diagnosed as schizophrenic, was highest on
dimensions of paranoid delusions and restlessness. Cluster 4 with a large
proportion of neurotics had no high peaks but had moderate peaks on depres-
sion and somatic concerns. Another interesting subgroup was Cluster 8.
This cluster contained 4 patients who had particularly bizarre behaviour
and in general symptoms unusual for the 132-patient sample. The profile
of this cluster had a peak on the dimensions of unkempt appearance and
smaller peaks on auditory hallucinations and sexual and fantastic delusions.
The characteristic profiles of the other clusters described other combina-
tions of symptoms but none that resembled the usual clinical diagnostic
categories.

The profiles resulting from the cluster analysis performed separately
on the data from each of the Centres were reviewed. In terms of comparison
to local diagnosis, results were similar to those described for the
Washington data. Clusters from several Centres were similar to each other
with respect to their characteristic profiles. For example, in each of 5
Centres (Aarhus, Agra, London, Taipei, and Prague) clusters of patients

345
<table>
<thead>
<tr>
<th>CENTRE ICD DIAGNOSIS</th>
<th>CLUSTER</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1  2</td>
<td>3  4</td>
</tr>
<tr>
<td>Schizophrenia (295.0-295.9)</td>
<td>17 25 12 4 17 2 16 4</td>
<td>97</td>
</tr>
<tr>
<td>Manic-depressive psychosis, manic type (296.1)</td>
<td>0  1  0 1 0 0 0 0</td>
<td>2</td>
</tr>
<tr>
<td>Other affective psychoses (296.0, 296.2, 296.3, 296.8, 298.0)</td>
<td>0   7  0 1 0 0 0 0</td>
<td>8</td>
</tr>
<tr>
<td>Neuroses and personality disorders (300.0-301.9)</td>
<td>0 10 0 8 1 2 1 0</td>
<td>22</td>
</tr>
<tr>
<td>Other psychoses (297.9, 298.3, 298.9, 299)</td>
<td>1 1 0 1 0 0 0 0</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>18 44 12 15 18 4 17 4</td>
<td>132</td>
</tr>
</tbody>
</table>
were produced that were characterized by profiles with peaks on the dimensions of hypomania, belligerence, restlessness, lack of insight, grandiose delusions, and delusions of persecution and reference. Other clusters, however, appeared to be unique for a particular Centre in terms of the profiles characterizing them. These similarities and unique groups were exactly what one might hope for from this use of cluster analysis. The results suggest that many similar groups of patients existed in several Centres, while certain groups seen in some Centres had counterparts in only a few other FRCs or were unique.

To determine further what similar groups of patients could be identified in the different Centres, the cluster outputs from the nine FRCs were themselves clustered. This maintained the identity of the patient groups in each Centre while still permitting comparison of all patients in the nine-centre sample. To accomplish this, mean profiles on dimension scores were calculated for each of the clusters from the 9 Centres, a total of 75 clusters. These 75 profiles were then clustered, using the McKeon hierarchical program. This was performed in two ways, once using a distance measure of similarity and once using a correlational measure.

The 10 cluster output of the distance analysis was the best structured output mathematically, and its profiles had the clearest peaks. This output for the 1202 patients from the 9 Centres is compared with the ICD diagnosis given by Centre psychiatrists in Table 12.2.

Of the patients with a diagnosis of neurosis or personality disorder, 57% are in Cluster 6, although this cluster represents only 18% of the sample. Of the patients diagnosed as manic-depressive, manic type, 42% are in Cluster 3, although this cluster represents only 9% of the sample. For the patients diagnosed as manic-depressive, circular or depressed type, 25% are in Cluster 8, although this cluster represents only 8% of the sample. The $\chi^2$ for Table 12.2 is 319 with 45 degrees of freedom, significant at $p < .005$. These figures indicate that while there is not a complete correspondence between diagnosis and cluster membership, the relationship is far from random, and patients from particular diagnostic groups tend to fall into certain clusters.

There is thus some correspondence between cluster membership and clinical diagnosis. The question now remains whether the amount of non-correspondence is indicative of "error" in the clustering technique or whether it indicates that the cluster is considering other meaningful similarities among patients that are lost when patients are assigned to the more usual diagnostic categories.

To answer this question, it is first necessary to describe the symptom profiles characteristic of each of the 10 clusters. The mean score on each of the 32 dimensions used as input to the cluster program was calculated for each cluster. These mean scores were transformed into standard scores with a mean of 50 and a standard deviation of 10. A dimension was considered more characteristic of a cluster if the raw score for the cluster and the standard score were both elevated. Such an elevation of both scores meant not only that a symptom was frequently present in the members of the cluster, but also that it was relatively more common in that cluster than in other clusters. Table 12.3 shows the characteristic high and low dimen-
<table>
<thead>
<tr>
<th>CENTRE ICD DIAGNOSIS</th>
<th>CLUSTER</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Schizophrenia (295.0-295.9)</td>
<td>51</td>
<td>69</td>
</tr>
<tr>
<td>Manic-depressive psychosis, manic (296.1)</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Manic-depressive psychosis, circular and depressed; Reactive depressive psychosis (296.0, 296.2, 296.3, 298.0)</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Neurosis and personality Disorders (300.0-300.9; 301.0-301.9)</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>Other psychoses (296.9, 297.9, 298.3,298.9, 299)</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>84</td>
<td>106</td>
</tr>
<tr>
<td>Cluster</td>
<td>High Raw Score and T Score</td>
<td>High Raw Score or T Score</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Somatic concerns</td>
<td>Reported belligerence</td>
</tr>
<tr>
<td></td>
<td>Retarded movement</td>
<td>Lack of insight</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depression</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Withdrawal</td>
</tr>
<tr>
<td>2</td>
<td>Reported restlessness</td>
<td>Depression</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reported belligerence</td>
</tr>
<tr>
<td>3</td>
<td>Reported belligerence</td>
<td>Hypomania</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of insight</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reported restlessness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delusions of reference</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and persecution</td>
</tr>
<tr>
<td>4</td>
<td>Lack of insight</td>
<td>General suspiciousness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reported belligerence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delusions of reference</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and persecution</td>
</tr>
<tr>
<td>5</td>
<td>Flat affect</td>
<td>Bizarre behaviour</td>
</tr>
<tr>
<td></td>
<td>Retarded movement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of insight</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Retarded speech</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Withdrawal</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Visual hallucinations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reported belligerence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depression</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reported restlessness</td>
</tr>
<tr>
<td>7</td>
<td>Visual hallucinations</td>
<td>Other hallucinations</td>
</tr>
<tr>
<td></td>
<td>Grandiose delusions</td>
<td>Lack of insight</td>
</tr>
<tr>
<td></td>
<td>Delusions of reference</td>
<td>General suspiciousness</td>
</tr>
<tr>
<td></td>
<td>and persecution</td>
<td>Reported restlessness</td>
</tr>
<tr>
<td></td>
<td>Auditory hallucinations</td>
<td>Flat affect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reported belligerence</td>
</tr>
<tr>
<td>8</td>
<td>Retarded movement</td>
<td>Disorientation</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>Lack of insight</td>
</tr>
<tr>
<td></td>
<td>Retarded speech</td>
<td>Withdrawal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Unkempt appearance</td>
<td>Bizarre behaviour</td>
</tr>
<tr>
<td></td>
<td>Lack of insight</td>
<td>Observed belligerence</td>
</tr>
<tr>
<td></td>
<td>Withdrawal</td>
<td>Incomprehensibility</td>
</tr>
<tr>
<td></td>
<td>Observed restlessness</td>
<td>Non-social speech</td>
</tr>
<tr>
<td></td>
<td>Retarded speech</td>
<td>Hypomania</td>
</tr>
<tr>
<td></td>
<td>Auditory hallucinations</td>
<td>Reported restlessness</td>
</tr>
<tr>
<td></td>
<td>Incongruous affect</td>
<td>Reported belligerence</td>
</tr>
<tr>
<td></td>
<td>Flat affect</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Unkempt appearance</td>
<td>Obsessions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fantastic and sexual</td>
</tr>
<tr>
<td></td>
<td></td>
<td>delusions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anxiety</td>
</tr>
</tbody>
</table>
sion scores for each of the ten clusters.

These profiles reveal interesting differences among the characteristic symptoms of the different clusters. Cluster 1, a diagnostically mixed group but without any patients diagnosed as manic-depressive, manic type, is a group marked by a picture of belligerent, retarded depression with somatic preoccupations and lack of insight. This cluster transcends diagnostic lines to include neurotic, psychotically depressed, and schizophrenic patients—many of the latter were diagnosed as "pseudoneurotic" or "atypical" schizophrenia by Centre psychiatrists. Cluster 2 is a group that again transcends the diagnostic categories but contains a disproportionately high number of neurotic patients. The patients in this cluster are characterized by restlessness, depression, and belligerence, but compared to those in Cluster 1, have little retardation or lack of insight, and few somatic concerns. Cluster 3, with a disproportionately large number of manic patients and with many schizophrenics placed in the schizo-affective subgroup, is characterized by belligerent, hypomanic restlessness with delusions of persecution. Cluster 4, apparently a paranoid schizophrenic-like group, contains a relatively large number of diagnosed schizophrenics and has a profile which, like that of Cluster 3, is marked by belligerence and delusions of persecution but which, unlike Cluster 3, has fewer manic symptoms. The profile of Cluster 4 contrasts with Clusters 5 and 9, which also have high proportions of schizophrenics. The patients in Cluster 5 are remarkable for their flat affect, retarded movement and speech, withdrawal, and bizarre behavior. Cluster 9, on the other hand, contains a group of more severely regressed schizophrenic patients marked by unkempt appearance, lack of insight, withdrawal, and high scores on many other symptoms. Cluster 6 is a group with a large number of neurotic patients and a low level of symptomatology. Cluster 7, while similar to Cluster 3 in that it contains a large number of manic and schizophrenic patients, is characterized by a more floridly psychotic profile than Cluster 3, with visual hallucinations, grandiose delusions, delusions of reference, auditory hallucinations, and several other symptoms and signs. Cluster 8 has a disproportionately high number of diagnosed psychotic depressed patients and is marked by a profile of retarded movement and speech, depression, disorientation, and withdrawal. A relatively large number of the schizophrenics in Cluster 8 were placed in the diagnostic subgroup of schizo-affective schizophrenia. These are apparently "depressed schizo-affective" as compared with the "manic schizo-affective" patients found in Cluster 3. Cluster 10 is a small group of 8 patients with unkempt appearance and few other symptoms except for obsessions, fantastic and sexual delusions, and anxiety. Four of the patients came from the Washington sample and were regressed but stabilized chronic schizophrenics. Although they had fit the IPSS screening criteria, they had been intermittently symptomatic with several hospitalizations over many years and lived very restricted lives.

From these profiles it appears that, in terms of the full range of symptoms all treated equally— in contrast with a few key symptoms—the clusters are defining different and more homogeneous groups than are the clinical diagnoses. For example, there are 104 patients diagnosed as schizophrenic in Cluster 6—a cluster with a relatively small number of peak
symptoms. The schizophrenic patients in this group, in this respect, are more similar to neurotics than they are to the 98 schizophrenics in Cluster 5, who have flattened affect, retarded movement, lack of insight, retarded speech, and withdrawal, or to the 49 schizophrenics in Cluster 3 characterized by reported belligerence, hypomania, restlessness, delusions of persecution, and lack of insight. A possible explanation is that some patients, who were diagnosed as schizophrenic on the basis of their clinical history, might at the time of the present state examination have had only neurotic symptoms.

One way of investigating further the relationship between Centre diagnoses, cluster membership, and cluster profiles is to examine the distribution of diagnostic subgroups by cluster. Table 12.4 shows the Centre diagnosis by subgroup of the patients diagnosed as schizophrenic in each of the 10 clusters. The $X^2$ of this table with 81 degrees of freedom is 352, significant at the $p < .005$ level, indicating that the assignment of subgroup diagnoses by cluster is far from random. The subgroups that account for the largest percentage of this correlation with the cluster are: hebephrenic, latent, and atypical for Cluster 1; paranoid (only slightly over-represented) for Cluster 2; schizoaffective for Cluster 3; hebephrenic for Cluster 4; simple, catatonic, and "unspecified" for Cluster 5; acute schizophrenic reaction, latent, and schizoaffective for Cluster 6; "unspecified" for Cluster 7; schizoaffective and atypical schizophreniform attack for Cluster 8; and catatonic schizophrenia for Cluster 9. Cluster 10 is too small to give a meaningful statistic for this purpose.

The examination of the cluster profiles clarifies to some extent why different subgroups of schizophrenics were found in each of the 10 Clusters. For example, Cluster 5 with a heavy loading of simple, catatonic, and "unspecified" schizophrenics has a characteristic profile marked by flat affect, retarded movement, lack of insight, retarded speech, withdrawal, and bizarre behaviour. Cluster 3 with a proportionately large number of schizoaffective diagnoses is marked by reported belligerence, hypomania, lack of insight, restlessness, and paranoid delusions. (An interesting incidental finding is that about half the patients in the IPSS sample of 1202 with the diagnosis of paranoid state were in this small cluster that represented about 1/12 of the total sample.) Cluster 6 with a characteristic profile having no high peaks of symptomatology was weighted with schizophrenics placed in the subgroups of acute, latent, and schizoaffective — all diagnoses with few of the characteristics of "process" or chronic schizophrenia. While some of the correspondence between profiles and subgroup diagnosis was less strong, the inspection of these subgroup diagnoses nevertheless helps to clarify why the "schizophrenic" patients found their way into clusters with different characteristic profiles.

The breakdown by subgroup and profile also helps to explain why some schizophrenics are in clusters containing proportionately large numbers of patients with non-schizophrenic diagnoses. The schizophrenics in Cluster 3, a cluster with a large number of manic patients, include many patients with the subgroup diagnosis of schizoaffective — marked by a profile of belligerence, hypomania, lack of insight, reported restlessness, and paranoid delusions. The schizophrenics in Cluster 6, a cluster marked by a large
### Table 12.4 Schizophrenic Diagnoses by Subtype

<table>
<thead>
<tr>
<th>Subtypes</th>
<th>Cluster</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>Simple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hebephrenic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catatonic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paranoid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizo-affective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atypical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- = Proportionally high concentrations of subtype diagnoses
number of neurotics, were heavily weighted with subgroup diagnoses of oneiroprenia (295.4), pseudoneurotic (295.5), and schizo-affective (295.7) schizophrenia.

These results can be used to demonstrate how cluster analysis contributes to the cross-cultural comparison of psychiatric patients, using as it does profiles that include all symptoms noted, rather than only selected variables, to define similarity.

An initial question that these results can help to answer is to what extent patients from the same Centre who receive the same diagnosis can be considered similar to each other when another measure of similarity is used. For example, the sample from the London FRC is remarkable for its large number of diagnosed paranoid schizophrenics. Seventy-five of the 100 patients diagnosed as schizophrenic in that Centre were placed in the paranoid schizophrenic subgroup. This 75% of schizophrenics diagnosed as paranoid is by far the largest percentage of such patients of any of the Centres. The question is whether these patients are a fairly homogeneous group in terms of symptom profiles as well as diagnosis. Although it has been shown in Chapter 10 that the symptom profiles of Centre groups diagnosed as paranoid schizophrenia are similar by some measures, this does not mean that in other ways the classification of patients in these groups is the most homogeneous. In fact, cluster analysis distributes the patients diagnosed as paranoid schizophrenic in London rather evenly among 9 of the 10 clusters derived from that Centre alone. If the London patients were a homogeneous group, they would form a single cluster when compared with paranoid schizophrenics from other Centres. Again, this is not the case. The paranoid schizophrenics from the London Centre are fairly evenly distributed over 7 of the 10 clusters derived from the entire IPSS sample. These two findings demonstrate that the profiles of the individual paranoid schizophrenic patients from the London Centre are in fact heterogeneous when analysed by a cluster method that treats all symptoms as equivalent. Although London patients given the diagnosis of paranoid schizophrenia have by some measures similar symptom profiles to patients with this diagnosis in other Centres, the cluster analysis shows that other conclusions are possible when different criteria of similarity are used. To determine which type of classification is most useful for a given purpose would require external criteria.

A second question, one especially important for the IPSS, is to what extent patients from different Centres with the same diagnoses are similar. The results of clustering show that some diagnoses from all Centres considered together tend to fall into the same cluster. For example, patients diagnosed as manic-depressive, manic type, by different Centres tend to occur in the same clusters rather than distributing themselves randomly over the entire range of clusters. In fact, only the diagnosis of schizophrenia seems almost randomly distributed throughout the clusters, and this apparent randomness diminishes when the subgroup diagnoses are considered. This demonstrates that when profiles based on equal weighting of symptoms are used as criteria, schizophrenia as a general diagnosis does not identify similar patients from different Centres.

Hebephrenic schizophrenia is one example in which the similarity of patients given the same diagnosis in different Centres is supported by the
cluster results. Forty-five of the 86 patients given this diagnosis by Centre psychiatrists fell into Cluster 4. The other 41 hebephrenic patients were scattered throughout 8 other clusters.

Another use of clustering techniques as applied to the IPSS data is to help clarify the meaning and validity of subgroup diagnoses. The large percentage of the diagnosed hebephrenic schizophrenics in one cluster has already been mentioned. Patients diagnosed as catatonic schizophrenic, on the other hand, are represented heavily in two clusters, 5 and 9. This can be interpreted to reflect that patients with a diagnosis of catatonic schizophrenia often fit into one of two patient types, rather than into one type as is more characteristic of hebephrenia. The first profile characteristic of a diagnosis of catatonic schizophrenia in this study is that of the florid symptomatology described for Cluster 9. This corresponds somewhat to the hyperactive form of catatonia often described. The second cluster in which there is an over-representation of catatonic is Cluster 5, which is marked by patients with flat affect, retarded movement, lack of insight, retarded speech, withdrawal, and bizarre behaviour. This profile corresponds somewhat to the retarded form of catatonia.

The diagnostic subgroup of schizo-affective schizophrenia is another diagnosis that is somewhat clarified by the clustering results. This group is over-represented in Clusters 3 and 6. Cluster 3 contains a large number of manic patients and its characteristic profile includes reported belligerence, hypomania, lack of insight, restlessness, and paranoid delusions. This would seem to reflect a type of schizo-affective schizophrenia that is more akin to mania than to depression. The other cluster in which schizo-affective schizophrenics are over-represented is Cluster 6, which has a large number of manic-depressive patients, depressed type, and many neurotic patients, especially with neurotic depression. The profile of this cluster consists of visual hallucinations, belligerence, depression, and restlessness. It contains schizo-affective schizophrenic patients whose state is more similar to a number of depressive conditions than to mania. Again, it must be stressed that the allocation of patients to the different clusters is a function of the dimensions or symptoms selected for establishing the profiles. Nevertheless, the splitting of schizo-affective schizophrenics into manic and depressed affective groups, as found, for example, in the Diagnostic and Statistical Manual of the American Psychiatric Association (1968), may well represent a useful division of patients.

The cluster output can also be used to evaluate how "unusual" those patients are who receive unusual diagnoses. For example, the diagnosis of paranoid state (297.9) was given to 27 patients in the entire IPSS sample. Ten of these patients were from Aarhus. Eight of the 10 were allocated to one of the clusters from the 9 cluster Aarhus output, indicating considerable homogeneity among them. In the clustering of patients from all Centres, these patients were combined with 3 patients with the same diagnosis from Prague. The other 16 patients with the same diagnosis given by other Centres were scattered over 4 other clusters. These results indicate that the patients from Aarhus with the diagnosis of paranoid state were a fairly homogeneous group; however, when compared to patients from other Centres they did not form a cluster by themselves, showing that, in fact, they were
not an unusual group of patients. Rather, they were included in the cluster with other patients classified as schizophrenic and manic-depressive, manic, both by Centre diagnosis and by CATEGO.

Another diagnosis used to a relatively great extent by one Centre was "other specified schizophrenia" (295.8). This was the coding used for those patients from the Moscow FRC with the diagnosis of shift-like schizophrenia. This diagnosis was applied to 34 patients from the Moscow Centre, and the same ICD number, 295.8, was given to a total of 44 patients from the entire IPSS series. The cluster results did not support the hypothesis either that these patients represented a homogeneous group within the Moscow Centre or that they represented an unusual group different from other patients in the IPSS series. Although 11 of the 34 patients from Moscow who received this diagnosis fell into one of the clusters from that Centre, the other 23 patients with this diagnosis were scattered in 8 of the remaining 9 clusters. The group of patients with the diagnosis of "other specified schizophrenia", when clustered together with the entire sample of IPSS patients, did not separate out into a separate group but mixed rather evenly through 8 out of the 10 IPSS clusters.

The blending of unusual diagnostic groups into the entire sample when categorized by cluster analysis does not imply that patients who actually do have unique profiles are also likely to be lost when such techniques are used. For example, it was the impression of some of the IPSS investigators that many patients from the Agra Centre were quite different from those seen in any of the other FRCs. By both CATEGO and Centre diagnosis, however, the Agra patients blended with patients from the other Centres. Their uniqueness, if any existed, was thus not apparent by these methods. However, a different picture emerged after clustering. One of the clusters, Cluster 9, consisted exclusively of patients from the Agra series. This small cluster of 28 patients included 26 placed in CATEGO Class S (schizophrenic), 25 of whom were diagnosed as schizophrenic by the Centre psychiatrists (12 catatonic, 4 unspecified, 3 acute schizophrenic reaction, 2 simple, 2 hebephrenic, 1 paranoid, and 1 schizo-affective). This cluster had a striking profile marked by extremely high scores on unkempt appearance, lack of insight, and withdrawal. This cluster also had by far the largest number of symptom peaks on its profile compared to the other clusters. The other symptoms that characterized this group were restlessness, retarded speech, auditory hallucinations, incongruous affect, flat affect, bizarre behaviour, belligerence, incomprehensibility, non-social speech, and hypomania. These results demonstrate that with clustering techniques a unique group can maintain its identity and not be lost among other patients.

A final application of cluster analysis to the IPSS is to help clarify which symptom profiles, irrespective of diagnosis, are found in all Centres — thereby suggesting universally similar types of patients —, and which profiles are commonly found only in a smaller group of Centres. Cluster 4 with a high proportion of schizophrenics and a profile marked by lack of insight, general suspiciousness, belligerence, and delusions of reference and persecution was constituted by groups of patients from all 9 FRCs, as was Cluster 6, with a high proportion of neurotic patients and a profile of belligerent, restless depression, and visual hallucinations. On the other
hand, Cluster 2 containing a very mixed diagnostic population and having a profile very much like that of Cluster 6, but with more restlessness and no peak on visual hallucinations, was comprised of groups of patients only from the developed countries. Cluster 9, with the most florid, severe symptom profile, contained patients from Agra only.

Such a relationship between Centres and patient profile types can serve to generate hypotheses regarding the distribution of types of patients in different countries. Is there, for example, a particular type of patient that comes to treatment primarily in developed countries, as suggested by the distribution by Centre in Cluster 2? Are the patients with Cluster 9 symptoms from Agra really found only in that Centre, and if so, to what can this be attributed?

The above results represent the major types of contribution that cluster analysis can make to the categorization of patients in the IPSS. It indicates the degree of heterogeneity of the profiles of patients placed into the same diagnostic categories within a Centre, and whether patients given the same diagnoses in different Centres do in fact have similar profiles. It can help to clarify the meaning and validity of subgroup diagnoses, and the extent to which unusual diagnoses truly represent unusual patients. Cluster analysis can separate out groups of unique patients that would be lost by more customary diagnostic procedures, and it can suggest, irrespective of diagnosis, how culturally universal or restricted are certain patient profiles.

The final judgement regarding the relative merits of cluster groupings as compared with more conventional diagnostic categories must await data that will provide external validation. Follow-up and premorbid data will be helpful in such an evaluation. Controlled studies of response to treatment and of the genetic, social, and familial relationships of the different groups of patients will also assist in confirming or invalidating these classifications.

Some of the validating data will be forthcoming in the follow-up study of the IPSS. In the meantime, however, other factors need to be considered. The clusters described here were generated from PSE data alone. For some diagnostic categories, especially circular conditions such as manic-depressive psychosis, circular type, history data may need to be included in the clustering process. It remains to be seen to what extent present state information alone can be used to predict course of illness and other features that are often thought to be predictable only on the basis of history. For example, Cluster 10 of the 1202-patient cluster output seemed to group patients with a more chronic history of psychiatric disorder. It is also possible that this cluster represents the patients with the worst prognosis. It is certainly possible that chronicity in itself is reflected in the symptomatology present at any given time.

**Summary and Conclusions**

The results reported here demonstrate that cluster programs are capable of grouping patients in a manner that is generally compatible with some clinical diagnoses, as determined both by psychiatrists and by CATEGO, and that
they can suggest other categories not generally included in diagnostic classifications. Cluster techniques can also go beyond partial replication of diagnoses to help specify similarities and differences between patients placed in the usual diagnostic categories. In the IPSS, for example, patients diagnosed as schizophrenic are distributed in all clusters. No "schizophrenic profile" in terms of all symptoms weighted equally was elicited. Some diagnosed schizophrenic subtypes, however, tended to be concentrated somewhat in particular clusters. The profiles of certain schizophrenic subgroups were more closely related to the profiles of patients with non-schizophrenic diagnoses than to those of other schizophrenics, as was also shown by the CATEG analysis.

The application of cluster techniques to the IPSS data has suggested further which patient symptom profiles were common to all or nearly all Centres and which profiles were found primarily in one or a small number of Centres. One "schizophrenic" and one "neurotic" cluster with their respective profiles were found to be represented by groups of patients from all Centres. A cluster of schizophrenics with especially severe symptoms was composed of patients from only one of the 9 Centres.

In the IPSS, the inclusion of psychiatric history and followup data will help to validate the different methods of classification used in the study. Although local factors affecting the history and outcome will have to be taken into consideration, it will be possible, for example, to describe groups for which Centre diagnosis, CATEG class, and cluster membership overlap, and then to determine which classification system correlates best with various psychiatric history and outcome characteristics of the groups.

In the effort to improve validity of patient classification, each of the methods of classification can assist the other. Clustering programs can contribute in two ways. First, since clustering programs are influenced by theoretical judgements only in the selection of the data and in the assumption that all symptoms are equivalent, they can contribute objective validity to the more clinical procedures. Second, the clustering program can help to point out which "established" diagnostic categories should not be kept separate. For example, manics and more overactive schizophrenics were grouped together when patients from 9 Centres were clustered. If this is replicated when the analysis is repeated on other populations, or if psychotic and neurotic depressed patients are repeatedly placed in the same clusters, the value of continuing to separate such groups would need further examination.
# APPENDIX

## ITEM COMPOSITION OF 32 DIMENSIONS

<table>
<thead>
<tr>
<th>DIMENSIONS</th>
<th>ITEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Depression</td>
<td>2.1, 3.1, 3.2, 3.3, 3.4, 4.01, 4.16, 5.2, 6.1, 6.2, 6.3, 7.01, 7.02, 7.03, 7.04, 7.05, 7.06, 7.07, 7.11, 7.12, 12.47, 15.03, 15.04, 15.23</td>
</tr>
<tr>
<td>2. Anxiety</td>
<td>8.5, 8.6, 8.7, 8.8</td>
</tr>
<tr>
<td>3. Reported restlessness</td>
<td>4.10, 8.3</td>
</tr>
<tr>
<td>5. Retarded speech</td>
<td>14.07, 14.09, 16.08, 16.11, 16.12</td>
</tr>
<tr>
<td>6. Retarded movement</td>
<td>14.05</td>
</tr>
<tr>
<td>8. Somatic concerns</td>
<td>4.17</td>
</tr>
<tr>
<td>9. General suspiciousness</td>
<td>12.17, 12.18, 15.18, 17.08</td>
</tr>
<tr>
<td>10. Observed belligerence</td>
<td>15.14, 15.15, 17.10</td>
</tr>
<tr>
<td>11. Reported belligerence</td>
<td>5.1</td>
</tr>
<tr>
<td>12. Obsessions</td>
<td>10.01, 10.02, 10.04</td>
</tr>
<tr>
<td>13. Unkempt appearance</td>
<td>14.03</td>
</tr>
<tr>
<td>14. Disorientation</td>
<td>17.02</td>
</tr>
<tr>
<td>15. Lack of insight</td>
<td>13.1</td>
</tr>
<tr>
<td>16. Depersonalization-</td>
<td>11.01, 11.02, 11.03, 11.04, 11.09, 11.11, 11.12, 11.13, 11.16, 11.17</td>
</tr>
<tr>
<td>derealization</td>
<td></td>
</tr>
<tr>
<td>and reference</td>
<td></td>
</tr>
<tr>
<td>18. Grandiose delusions</td>
<td>12.65, 12.67, 12.68, 12.77, 15.17</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>19.</td>
<td>Delusions of passivity</td>
</tr>
<tr>
<td>20.</td>
<td>Depressive and nihilistic delusions</td>
</tr>
<tr>
<td>21.</td>
<td>Fantastic and sexual delusions</td>
</tr>
<tr>
<td>22.</td>
<td>Visual hallucinations</td>
</tr>
<tr>
<td>23.</td>
<td>Auditory hallucinations</td>
</tr>
<tr>
<td>24.</td>
<td>Other hallucinations</td>
</tr>
<tr>
<td>26.</td>
<td>Withdrawal</td>
</tr>
<tr>
<td>29.</td>
<td>Flat affect</td>
</tr>
<tr>
<td>30.</td>
<td>Labile affect</td>
</tr>
<tr>
<td>31.</td>
<td>Incongruous affect</td>
</tr>
<tr>
<td>32.</td>
<td>Extenuating circumstances</td>
</tr>
</tbody>
</table>
CHAPTER 13

A CONCORDANT GROUP OF SCHIZOPHRENICS

13.1 Definition of a Concordant Group within Schizophrenia

The three preceding chapters have described three different methods of grouping patients: clinical diagnosis, CATEGO, and cluster analysis. These chapters have focused on the distinctive features of each method and on the characteristics of the groups defined by each. The purpose of the present chapter is to consider ways in which the data resulting from these three separate methods can be compared to yield further information about the nature of the patients in this study and about the nature of schizophrenia.

Patients who receive a clinical diagnosis of schizophrenia and who also fall into CATEGO Class S represent a group of patients who have been diagnosed as schizophrenic in a highly standardized manner. However, both clinical diagnosis and CATEGO give differential weights to various factors, such as prominent symptoms, elements of the past history, and features of the course of illness. Each of these methods thus makes basic assumptions about the differential importance of the various data collected about each patient. While these assumptions are derived from the clinical observations and experience of a large number of psychiatrists over many years, it is conceivable that they are not the most valid assumptions possible. For example, it may be that the symptom patterns on which they were originally based have changed over the years, or it may be that the original observations were invalid. It is therefore very useful also to group patients according to a method that gives equal weight to all data, such as cluster analysis. The patients in the IPSS were grouped according to McKeon's programme, which is one form of cluster analysis. (A description of this method is given in Chapter 12.)

Utilizing the groupings of the IPSS patients that result from these three methods of classification, it is possible to identify a group of schizophrenic patients who have been diagnosed as schizophrenic in a standardized clinical fashion and by a diagnostic clinical computer program, and who also fall into one of those McKeon's clusters that contain a statistically significantly larger number of schizophrenics than would have been expected by chance. This group can be considered a concordant group of schizophrenic patients. In terms of the specific categories of the IPSS, this group is made up of all patients who received a clinical diagnosis of schizophrenia, fall into CATEGO Class S, and belong to McKeon's cluster 4, 5 or 7. Throughout the present chapter, this group will be referred to as the concordant group. The advantage of such a group is that it consists of patients who have been diagnosed in a standardized fashion according to clinical assumptions and who at the same time belong to clusters that statistically select out schizophrenic patients without regard to clinical assumptions.

There are three specific reasons why it is desirable to define such a group. First, it permits the identification and description of a group of
schizophrenic patients that excludes many patients who have been diagnosed as schizophrenic because of lack of standardization of the diagnostic process, variation in clinical assumptions, or culture-bound factors. Second, it makes it possible to examine the question of whether there are representatives of such a group in all Centres. Third, it identifies a group of patients to whom particular attention may be given during the followup phase of the study to determine if their course of illness differs from that of other schizophrenic patients.

If it can be shown that such a group of patients exists in all countries and has a specific clinical picture and course of illness differentiating it from other groups of schizophrenic patients, then a description of this group can serve as the starting point for a transculturally applicable definition of schizophrenia.

Figure 13.1 illustrates the distribution of patients in the study by clinical diagnosis, CATEGO Class, and McKeon cluster. The portions of the columns above the horizontal line represent the schizophrenics in the study, and the portions below this line represent the non-schizophrenics. These divisions are further split into those patients who belong to CATEGO Class S and those who belong to other CATEGO classes. McKeon clusters 4, 5, and 7 each contains a statistically significantly greater number of patients who have been clinically diagnosed as schizophrenic than expected by chance. There is a total of 306 such patients. These are the patients who constitute the concordant group.

Figure 13.2 is a Venn diagram showing the number of patients in various possible combinations of the three classification systems.

13.2 Characteristics of the Concordant Group

13.2.1 Schizophrenic subgroups

The distributions of schizophrenic diagnostic subgroups given by the FRC psychiatrists for all schizophrenics combined and for the concordant group are shown in Table 13.1. For each subgroup, the percentage of patients in the concordant group is indicated. Thus, of the 811 patients with the clinical diagnosis of schizophrenia, 31 received the diagnosis of simple schizophrenia (295.0), while of the 306 patients in the concordant group, 6 were diagnosed as simple schizophrenics. These 6 patients represented 19.4% of all simple schizophrenics in the study.

It can be seen from the table that the majority of the patients in the concordant group had a diagnosis of paranoid schizophrenia. The number of paranoid schizophrenic patients in the concordant group was significantly higher than the number that would be expected if 306 patients were chosen at random from among the 811 schizophrenics ($\chi^2 = 7.96$, df = 1, $p < .01$). When the distribution of schizophrenic subgroups in the concordant group was compared to the distribution of subgroups among all schizophrenics, a significant difference was seen between the two distributions ($\chi^2 = 41.9$, df = 9, $p < .01$). For hebephrenic schizophrenia (295.1), paranoid schizophrenia (295.3), and schizophrenia unspecified (295.9), over 40% of the total number of patients in each of these subgroups were in the concordant
FIG. 13.1 DISTRIBUTION OF PATIENTS BY CLINICAL DIAGNOSIS,
CATEGÓ CLASS, AND MECKON'S CLUSTER GROUP

*Number of schizophrenic patients in these clusters
higher than expected by chance
FIG. 13.2 VENN DIAGRAM SHOWING THE COMPOSITION OF CONCORDANT, SEMICONCORDANT, AND DISCREPANT GROUPS

Clinical diagnosis of schizophrenia (811 patients)

CATEG S (563 patients)

<table>
<thead>
<tr>
<th>Clinical diagnosis (ICD Number)</th>
<th>CATEG group</th>
<th>McKeon cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concordant group</td>
<td>295</td>
<td>S and 4, 5 or 7</td>
</tr>
<tr>
<td>Semiconcordant group</td>
<td>295</td>
<td>S or 4, 5 or 7</td>
</tr>
<tr>
<td>Discrepant group</td>
<td>295</td>
<td>Neither S nor 4, 5 or 7</td>
</tr>
</tbody>
</table>

McKeon clusters 4, 5, 7 (550 patients)

Clinical diagnosis of schizophrenia
TABLE 13.1 DISTRIBUTION BY SUBGROUP OF SCHIZOPHRENIA:
ALL SCHIZOPHRENICS AND CONCORDANT GROUP

<table>
<thead>
<tr>
<th>Clinical Diagnosis ICD No.</th>
<th>All schizophrenic (295.0 - 295.9)</th>
<th>Concordant</th>
<th>% of subgroup in concordant group</th>
</tr>
</thead>
<tbody>
<tr>
<td>295.0</td>
<td>31</td>
<td>6</td>
<td>19.4</td>
</tr>
<tr>
<td>295.1</td>
<td>86</td>
<td>37</td>
<td>43.0</td>
</tr>
<tr>
<td>295.2</td>
<td>54</td>
<td>17</td>
<td>31.5</td>
</tr>
<tr>
<td>295.3</td>
<td>323</td>
<td>152</td>
<td>47.1</td>
</tr>
<tr>
<td>295.4</td>
<td>79</td>
<td>30</td>
<td>38.0</td>
</tr>
<tr>
<td>295.5</td>
<td>25</td>
<td>1</td>
<td>4.0</td>
</tr>
<tr>
<td>295.6</td>
<td>15</td>
<td>2</td>
<td>13.3</td>
</tr>
<tr>
<td>295.7</td>
<td>107</td>
<td>29</td>
<td>27.1</td>
</tr>
<tr>
<td>295.8</td>
<td>44</td>
<td>12</td>
<td>27.2</td>
</tr>
<tr>
<td>295.9</td>
<td>47</td>
<td>20</td>
<td>42.6</td>
</tr>
<tr>
<td>Total</td>
<td>811</td>
<td>306</td>
<td>37.7</td>
</tr>
</tbody>
</table>

TABLE 13.2 AGE-SEX DISTRIBUTION OF CONCORDANT GROUP

<table>
<thead>
<tr>
<th></th>
<th>15-24</th>
<th>25-34</th>
<th>35-44</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>73 (43)</td>
<td>70 (41)</td>
<td>28 (16)</td>
<td>171 (100)</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45 (33)</td>
<td>49 (36)</td>
<td>41 (30)</td>
<td>135 (100)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>118 (39)</td>
<td>119 (39)</td>
<td>69 (23)</td>
<td>306 (100)</td>
</tr>
</tbody>
</table>
group. However, only 4% of those with latent schizophrenia (295.5), and 13.3% of those with residual schizophrenia (295.6) were included in the concordant group.

13.2.2 Age and sex distribution

The age and sex distribution of the patients in the concordant group is shown in Table 13.2. Nearly 80% of the patients were younger than 34 years. The age distribution did not differ from that of the non-concordant group of schizophrenics (all schizophrenics minus the concordant group). However, there was a significantly higher percentage of males in the concordant group than in the non-concordant group ($\chi^2 = 4.52, df = 1, p < .05$). Similarly, there was significantly higher percentage of single patients in the concordant group (64.4%) than in the non-concordant schizophrenic group (56.4%) ($\chi^2 = 4.9, df = 1, p < .05$), which is perhaps to be expected in view of the predominance of young males in the concordant group.

13.2.3 Psychiatric history

Analysis of the psychiatric histories of the patients in the concordant group revealed that there was a great deal of similarity among the histories of their illness. In 268 patients (88%) the onset of the present episode was insidious.

When the distribution of patients by duration of present illness, from onset of symptoms to the time of initial evaluation at the FRC, was examined it was found that in approximately two-thirds of the patients (214 of 306) the episode leading to their inclusion in the study had begun less than 6 months prior to the initial evaluation at the Centre.

In most patients (153) the course of the present illness up to the point of initial evaluation had been one of steady deterioration. Thirty-four patients had been improving prior to initial evaluation; sixty patients had remained unchanged since the onset of symptoms; and 53 patients had had partial remissions prior to the initial evaluation. Course was unknown in 6 cases.

In considering the findings concerning evaluation of the presence or absence of precipitating factors, premorbid personality, and presence of previous symptoms, it should be remembered that these are extremely difficult to assess. Further studies are necessary to investigate more thoroughly these areas of the psychiatric history.

The histories of 33% of concordant patients indicated that precipitating factors connected in time and content with the present illness were present. This frequency differed significantly from that in the non-concordant group of schizophrenics in which precipitating factors were noted in 45% ($\chi^2 = 10.3, df = 1, p < .01$). 31% (94) of the concordant group had had previous inpatient treatment, as compared with 38% (192) of the non-concordant group ($\chi^2 = 6.1, df = 1, p < .05$). 87% (267) of the concordant patients were rated as having abnormalities of premorbid personality while 83% (417) of the non-concordant group had such abnormalities; this difference is not statistically significant.

365
13.2.4 Psychopathological characteristics

The psychopathological characteristics of the concordant group were examined in two ways: by using the profile of the 27 Groups of Units of Analysis (GUs), and by using Units of Analysis (UAs). Figure 13.3 illustrates the pattern of the 27 GUs for the concordant group. The most prominent GU was lack of insight. Only 4% of the concordant group patients did not have this symptom. The other GUs on which the concordant group had high scores were auditory hallucinations, flatness of affect, experiences and delusions of control, and predelusional signs. Poor rapport and other circumstances which made it difficult to obtain information in the interview were symptoms also frequently found.

When the frequency of positive ratings for UAs was examined, the concordant patients were found to have the following psychopathological characteristics: 97% of patients had lack of insight, 74% had auditory hallucinations, 70% had verbal hallucinations, 70% had ideas of reference, 67% had delusions of reference, 66% had suspiciousness, 66% had flatness of affect, 64% had voices speaking to the patient, 64% had delusional mood, 64% had delusions of persecution, 64% gave inadequate description, 52% had thought alienation, and 50% had thoughts spoken aloud. There were no other symptoms that were present in 50% or more of the patients, although some symptoms were present almost as frequently — delusions of control (48%), hearing voices speak full sentences (44%), and poor rapport (43%).

13.3 Comparison of Concordant Group Patients with Discrepant Group Patients

In order to examine the question of how the concordant group of schizophrenic patients differed from the group of patients who were given a clinical diagnosis of schizophrenia but who were not classified in CATEGO Class S and also did not fall into McKeon's cluster 4, 5, or 7 (this group will hereinafter be referred to as the discrepant group), the two groups were compared in terms of distribution of schizophrenic subgroup and in terms of psychopathological characteristics.

Table 13.3 shows the distribution by schizophrenic subgroup for the group of all schizophrenics, the concordant group, and the discrepant group. It also indicates the percentage of patients in each diagnostic subgroup present in the concordant and discrepant groups. Thus, 37 of the 306 concordant patients were diagnosed hebephrenic schizophrenia (29.1%) and these 37 patients represent 43% of all hebephrenic schizophrenics in the study, while 6 of the 154 discrepant patients were diagnosed as hebephrenic schizophrenic, these 6 patients representing 7% of all hebephrenic schizophrenic patients in the study.

It can be seen from the table that for the following subgroups there was a much higher percentage of patients in the discrepant group than in the concordant group: hebephrenic (43% versus 7%), paranoid (47.1% versus 11.1%), acute (38% versus 22.5%), and schizophrenia unspecified (42.6% versus 12.8%). On the other hand, for certain subgroups there was a much higher percentage of patients in the discrepant group than in the concordant group, i.e., latent (60% versus 4%), residual (53.3% versus 13.3%), and other (45.5%
FIG. 13.3 PROFILE OF AVERAGE PERCENTAGE SCORES (27 GUA's), CONCORDANT GROUP

1. Quantitative psychomotor disorder
2. Qualitative psychomotor disorder
3. Quantitative disorder of form of thinking
4. Qualitative disorder of form of thinking
5. Affect-laden thoughts
6. Predelusional signs
7. Experiences of control
8. Delusions
9. Neurasthenic complaints
10. Lack of insight
11. Distortion of self-perception
12. Derealization
13. Auditory hallucinations
14. "Characteristic" hallucinations
15. Other hallucinations
16. Pseudohallucinations
17. Depressed elated
18. Anxiety, tension, irritability
19. Flatness
20. Incongruity
21. Other affective change
22. Indication of personality change
23. Disregard for social norms
24. Other behavioural change
25. Psychophysical disorders
26. Cooperation difficulties, circumstances related
27. Cooperation difficulties, patient related
<table>
<thead>
<tr>
<th>Subgroup of Schizophrenia</th>
<th>All schizophrenia</th>
<th>Concordant</th>
<th>Discrepant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Z%</td>
<td>No.</td>
</tr>
<tr>
<td>295.0</td>
<td>31</td>
<td>100.0</td>
<td>6</td>
</tr>
<tr>
<td>295.1</td>
<td>86</td>
<td>100.0</td>
<td>37</td>
</tr>
<tr>
<td>295.2</td>
<td>54</td>
<td>100.0</td>
<td>17</td>
</tr>
<tr>
<td>295.3</td>
<td>323</td>
<td>100.0</td>
<td>152</td>
</tr>
<tr>
<td>295.4</td>
<td>79</td>
<td>100.0</td>
<td>30</td>
</tr>
<tr>
<td>295.5</td>
<td>25</td>
<td>100.0</td>
<td>1</td>
</tr>
<tr>
<td>295.6</td>
<td>15</td>
<td>100.0</td>
<td>2</td>
</tr>
<tr>
<td>295.7</td>
<td>107</td>
<td>100.0</td>
<td>29</td>
</tr>
<tr>
<td>295.8</td>
<td>44</td>
<td>100.0</td>
<td>12</td>
</tr>
<tr>
<td>295.9</td>
<td>47</td>
<td>100.0</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>811</td>
<td>100.0</td>
<td>306</td>
</tr>
</tbody>
</table>
versus 27.2%).

The psychopathological characteristics of the concordant group can be compared with those of the discrepant group in terms of profiles of 27 GUAs and frequency of UAs. Figure 13.4 illustrates the profiles of 27 GUAs for these two groups of patients as compared with one another. It can be seen that the greatest differences between the two groups are in the GUAs of delusions (6, 7, 8), hallucinations (13, 14, 15), and flatness of affect (19), which were more prominent in the concordant group than in the discrepant group. An analysis of variance was carried out on the average percentage scores to determine if there was a significant difference between these profiles. This analysis indicated that the profiles were in fact different (P < .001).

Table 13.4 compares the most frequently positive UAs for these two groups of patients. It indicates that the concordant group is characterized by a larger number of UAs with a high frequency of positive ratings than the discrepant group. Lack of insight was frequently present in both groups. It was scored positively in 97% of the concordant schizophrenics and 56% of the discrepant schizophrenics. Auditory hallucinations were present in 74% of the patients in the concordant group and in none of the patients in the discrepant group. Verbal hallucinations were present in 70% of concordant schizophrenics and in none of the discrepant schizophrenics. Flatness of affect was present in 67% of concordant schizophrenics and in 23% of discrepant schizophrenics. Units concerned with delusions were more frequently positive in the concordant group than in the discrepant group. For example, delusions of reference were present in 67% of concordant schizophrenics but in only 25% of discrepant schizophrenics. Units concerned with depressive symptomatology, such as depressed mood and hopelessness, occurred more frequently in discrepant schizophrenics than in concordant schizophrenics.

Thus, a comparison of the psychopathology of concordant schizophrenics and discrepant schizophrenics indicates that they differ markedly with regard to hallucinations, delusions, flatness of affect, and depressive symptomatology. The concordant schizophrenics scored much higher on delusions, hallucinations, and flatness of affect, while the discrepant schizophrenics scored higher on depressive symptomatology.

13.4 Comparison of Concordant Group and Psychotic Depression Group

In Fig. 13.5 the profile of average scores on GUAs of the concordant group is compared with the profile of all psychotically depressed patients in the study. The differences are most marked in the GUAs of insight (10), experiences of control (7), auditory hallucinations (13), "characteristic" hallucinations (14), flatness of affect (19), and cooperation difficulties, patient related (27). These GUAs are all more prominent in the concordant group, as would be expected. The depressed patients had higher scores on affect-laden thoughts (5), depressed mood (17), neurasthenic complaints (9), and psychophysical signs (25).

The profiles appear to be dissimilar, and an analysis of variance shows
FIG. 13.4 PROFILES OF AVERAGE PERCENTAGE SCORES (27 GUAs)
CONCORDANT GROUP AND DISCREPANT GROUP

1. Quantitative psychomotor disorder
2. Qualitative psychomotor disorder
3. Quantitative disorder of form of thinking
4. Qualitative disorder of form of thinking
5. Affect-laden thoughts
6. Predelusional signs
7. Experiences of control
8. Delusions
9. Neurasthenic complaints
10. Lack of insight
11. Distortion of self-perception
12. Derealization
13. Auditory hallucinations
14. "Characteristic" hallucinations
15. Other hallucinations
16. Pseudohallucinations
17. Depressed-related
18. Anxiety, tension, irritability
19. Flatness
20. Incongruity
21. Other affective change
22. Indication of personality change
23. Disregard for social norms
24. Other behavioural change
25. Psychophysical disorders
26. Cooperation difficulties, circumstances related
27. Cooperation difficulties, patient related
<table>
<thead>
<tr>
<th>Percentage of Cases in which Unit of Analysis is Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100%</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>Concordant Group (236 patients)</td>
</tr>
<tr>
<td>60 Lack of Insight</td>
</tr>
<tr>
<td>Discrepant Group (134 patients)</td>
</tr>
<tr>
<td>127 Inadequate description</td>
</tr>
</tbody>
</table>
FIG. 13.5 PROFILES OF AVERAGE PERCENTAGE SCORES (27 GUAs), CONCORDANT GROUP
AND PSYCHOTIC DEPRESSION GROUP

1. Quantitative psychomotor disorder
2. Qualitative psychomotor disorder
3. Quantitative disorder of form of thinking
4. Qualitative disorder of form of thinking
5. Affect-laden thoughts
6. Predelusional signs
7. Experiences of control
8. Delusions
9. Neurasthenic complaints
10. Lack of insight
11. Distortion of self-perception
12. Derealization
13. Auditory hallucinations
14. "Characteristic" hallucinations
15. Other hallucinations
16. Pseudohallucinations
17. Depressed-elated
18. Anxiety, tension, irritability
19. Flatness
20. Incongruity
21. Other affective change
22. Indication of personality change
23. Disregard for social norms
24. Other behavioural change
25. Psychophysical disorders
26. Cooperation difficulties, circumstances related
27. Cooperation difficulties, patient related
that this degree of dissimilarity is significant \( p < .001 \). Kendall’s Tau coefficient between the two groups is .231, as compared with a Tau value of .373 for all patients with a clinical diagnosis of schizophrenia compared with all psychotically depressed patients. These findings indicate that the concordant group of schizophrenics is even less similar to the psychotically depressed patients than is the group of all clinically diagnosed schizophrenics.

A comparison of the most frequently positive UAs yielded the figures shown in Table 13.5. Aside from lack of insight, none of the most frequently positive UAs of the concordant patients appeared among the most frequently positive symptoms of the depressed patients. Hallucinations, delusions, and flatness of affect characterized the concordant schizophrenics; depressed mood, self-depreciation, anxiety, slowness, and psychophysiological signs such as sleep problems, early waking, and diurnal variations were characteristic of the depressed patients.

13.5 Comparison of Concordant Group Patients by Field Research Centre

Once a concordant group of schizophrenics has been defined, it is possible to further examine the question of whether there are similar groups of schizophrenics in all Centres. Fig. 13.6 illustrates the distribution of the concordant group patients by FRC. It can be seen that there were concordant schizophrenics in every one of the FRCs. The number of such patients in each Centre ranged from 15 in Moscow and Washington to 61 in Cali; the numbers are sufficiently large to permit a comparison of the concordant patients among Centres.

Table 13.6 shows the Centre by Centre distribution of the subgroups of schizophrenia for the concordant group. In Aarhus, Ibadan, London, Taipei, Washington, and Prague the largest schizophrenic subgroup was paranoid schizophrenia. In Agra, it was schizophrenia unspecified, while in Moscow it was schizophrenia, other. The concordant group in Cali was more evenly divided among the subgroups than in the other Centres.

Average percentage scores on GUAs for the concordant group in each Centre are presented in Table 13.7. It can be seen that in general the scores across centres were high on lack of insight; auditory hallucinations; flatness of affect; cooperation difficulties, patient related; experiences of control; predelusional signs; and delusions. Scores were in general low on psychomotor disorders, neurasthenic complaints, depressed-related mood, anxiety-tension-irritability (except Cali), other behaviouiral change (except Washington), psychophysical signs, and other affective change (except Washington).

The Centres differed markedly in their scores on the following GUAs: quantitative disorder of form of thinking and speech (scores were relatively high in Washington and Prague, relatively low in Agra and London, intermediate in the other Centres); qualitative disorder of form of thinking and speech (relatively high scores in Aarhus, Washington, and Prague, and relatively low scores in other Centres); other hallucinations (relatively high scores in Aarhus, Ibadan, and Washington; relatively low scores in
<table>
<thead>
<tr>
<th>Units With Positive Scores In:</th>
<th>Concordant Schizophrenia 306 Patients</th>
<th>Psychotic Depression 59 Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100%</td>
<td>60 Lack of insight</td>
<td>84 Depressed mood</td>
</tr>
<tr>
<td>80-90%</td>
<td>66 Verbal hallucinations</td>
<td>28 Gloomy thoughts</td>
</tr>
<tr>
<td></td>
<td>34 Ideas of reference</td>
<td>30 Hopelessness</td>
</tr>
<tr>
<td></td>
<td>70 Auditory hallucinations</td>
<td>111 Early waking</td>
</tr>
<tr>
<td>70-80%</td>
<td>46 Delusions of reference</td>
<td>112 Worse in morning</td>
</tr>
<tr>
<td></td>
<td>36 Suspiciousness</td>
<td>115 Sleep problems</td>
</tr>
<tr>
<td></td>
<td>92 Flatness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>67 Voices speak to patient</td>
<td></td>
</tr>
<tr>
<td></td>
<td>33 Delusional mood</td>
<td></td>
</tr>
<tr>
<td></td>
<td>41 Delusions of persecution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>127 Inadequate description</td>
<td></td>
</tr>
<tr>
<td>60-70%</td>
<td>126 Unwilling to cooperate</td>
<td>43 Delusions of self-perception</td>
</tr>
<tr>
<td></td>
<td>38 Thought alienation</td>
<td>91 Anxiety</td>
</tr>
<tr>
<td></td>
<td>39 Thoughts spoken aloud</td>
<td>60 Lack of insight</td>
</tr>
<tr>
<td>50-60%</td>
<td>40 Delusions of control</td>
<td>2 Retardation</td>
</tr>
<tr>
<td>40-50%</td>
<td>68 Voices speak full sentences</td>
<td></td>
</tr>
<tr>
<td>Subgroup of schizophrenia</td>
<td>Aarhus</td>
<td>Agra</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>ICD Number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>295.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>295.1</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>295.2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>295.3</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>295.4</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>295.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>295.6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>295.7</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>295.8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>295.9</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Groups of Units of Analysis</td>
<td>Aarhus</td>
<td>Agra</td>
</tr>
<tr>
<td>----------------------------------------------------------------</td>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>1. Quantitative psychomotor disorder</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>2. Qualitative psychomotor disorder</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>3. Quantitative disorder of form of thinking</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>4. Qualitative disorder of form of thinking</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>5. Affect-laden thoughts</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>6. Predelusional signs</td>
<td>28</td>
<td>39</td>
</tr>
<tr>
<td>7. Experiences of control</td>
<td>59</td>
<td>31</td>
</tr>
<tr>
<td>8. Delusions</td>
<td>29</td>
<td>21</td>
</tr>
<tr>
<td>9. Neurasthenic complaints</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>10. Lack of insight</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>11. Distortion of self-perception</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>12. Derealisation</td>
<td>29</td>
<td>9</td>
</tr>
<tr>
<td>13. Auditory hallucinations</td>
<td>63</td>
<td>59</td>
</tr>
<tr>
<td>14. &quot;Characteristic&quot; hallucinations</td>
<td>37</td>
<td>24</td>
</tr>
<tr>
<td>15. Other hallucinations</td>
<td>36</td>
<td>16</td>
</tr>
<tr>
<td>16. Pseudo-hallucinations</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>17. Depressed-related</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>18. Anxiety, tension, irritability</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td>19. Flatness</td>
<td>37</td>
<td>73</td>
</tr>
<tr>
<td>20. Incongruity of affect</td>
<td>29</td>
<td>28</td>
</tr>
<tr>
<td>21. Other affective change</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>22. Indicative for personality change</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>23. Disregard for social norms</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>24. Other behavioural change</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>25. Psychophysical disorders</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>26. Cooperation difficulties, circumstances related</td>
<td>34</td>
<td>13</td>
</tr>
<tr>
<td>27. Cooperation difficulties, patient related</td>
<td>70</td>
<td>41</td>
</tr>
</tbody>
</table>

* Not rated
Cali, Moscow, and Prague); pseudohallucinations (relatively high in London and Moscow and relatively low in Aarhus, Agra, Cali, Ibadan, and Prague); disregard for social norms (relatively high in Washington; relatively low in Ibadan and Taipei). The score on incongruity of affect was very low in London.

Table 13.8 presents the Tau values for Centre by Centre comparisons of the concordant group in terms of average percentage scores on GUAs. It can be seen that in 30 of the 36 possible comparisons the Tau value indicated significant similarity.

Since the cluster analysis of the patients was done on the basis of absolute scores, it is possible that some patients who had a similarity of rank order of GUAs but marked differences in absolute scores may have been excluded from the concordant group. This might tend to reduce the level of similarity reflected by Tau calculations. Therefore, Centre by Centre comparisons of profiles were also done with an analysis of variance method that utilizes absolute scores. The results, presented in Table 13.9, show that there were no significant differences between any pair of Centres. Since ANOVA Centre by Centre for the group of all schizophrenics and for the group of paranoid schizophrenics had indicated that there were some pairs of Centres having significant differences for these groups, the present findings suggest that the concordant group may be a more homogeneous group than either of the other two.

In Table 13.10 the 15 most frequently positive UAs for the concordant group by Centre are listed. For each Centre the table shows the ranks of the 15 UAs most frequently seen in the concordant group, all centres combined. Thus, of the 15 most frequently positive UAs for the concordant group, all centres combined, 14 were among the 15 most frequently positive UAs in Aarhus. The corresponding figures for the other Centres are Agra 11/15; Cali, 13/15; Ibadan, 14/15; London, 14/15; Moscow, 14/15; Taipei, 14/15; Washington, 12/15; and Prague, 11/15. Thus, it can be seen that there is a high degree of similarity among the concordant groups in the different Centres with regard to the symptoms most frequently present.

In conclusion, it can be said that the concordant groups in the different Centres showed a high degree of similarity to one another, both when compared by their GUA profiles and when compared by their most prominent UAs.

13.7 Comparison of Discrepant Patients by Field Research Centre

Fig. 13.6 illustrates the distribution of the discrepant schizophrenic patients by FRC. The number of such patients in each Centre varied from 7 in London and Taipei to 39 in Moscow.

Table 13.11 presents the average percentage scores on GUAs for the discrepant group in those Centres with 15 or more patients in the group. It can be seen that, apart from lack of insight and cooperation difficulties, patient related, there were no GUAs with a score higher than 50 in more than one Centre. Scores were relatively high across Centres on affect-laden thoughts, predelusional signs, depressed-ulated, flatness of affect and cooperation difficulties. Scores were uniformly low on experiences of con-

378
<table>
<thead>
<tr>
<th>FRC</th>
<th>Aarhus</th>
<th>Agra</th>
<th>Cali</th>
<th>Ibadan</th>
<th>London</th>
<th>Moscow</th>
<th>Taipei</th>
<th>Washington</th>
<th>Prague</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aarhus</td>
<td>.63</td>
<td>.68</td>
<td>.66</td>
<td>.46</td>
<td>.48</td>
<td>.67</td>
<td>.43</td>
<td>.58</td>
<td></td>
</tr>
<tr>
<td>Agra</td>
<td>.58</td>
<td>.61</td>
<td>.49</td>
<td>.48</td>
<td>.61</td>
<td>.47</td>
<td>.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cali</td>
<td>.68</td>
<td>.60</td>
<td>.67</td>
<td>.68</td>
<td>.45</td>
<td>.48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibadan</td>
<td>.67</td>
<td>.65</td>
<td>.74</td>
<td>.42*</td>
<td>.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London</td>
<td>.67</td>
<td>.60</td>
<td>.36*</td>
<td>.29*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moscow</td>
<td></td>
<td>.70</td>
<td>.41*</td>
<td>.34*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taipei</td>
<td></td>
<td>.46</td>
<td>.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washington</td>
<td>.39*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prague</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ \ast = p > .001 \]
### Table 13.9 P Values of ANOVA Interaction (of 27 GUA's) Centre by Centre: Concordant Group

<table>
<thead>
<tr>
<th>FRC</th>
<th>Aarhus</th>
<th>Agra</th>
<th>Cali</th>
<th>Ibadan</th>
<th>London</th>
<th>Moscow</th>
<th>Taipei</th>
<th>Washington</th>
<th>Prague</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aarhus</td>
<td>.08</td>
<td>.12</td>
<td>.13</td>
<td>.03</td>
<td>.11</td>
<td>.23</td>
<td>.07</td>
<td>.02</td>
<td>.14</td>
</tr>
<tr>
<td>Agra</td>
<td></td>
<td></td>
<td></td>
<td>.05</td>
<td>.02</td>
<td>.01</td>
<td>.03</td>
<td>.07</td>
<td>.02</td>
</tr>
<tr>
<td>Cali</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.07</td>
<td>.03</td>
<td>.14</td>
<td>.11</td>
<td>.04</td>
</tr>
<tr>
<td>Ibadan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.02</td>
<td>.11</td>
<td>.12</td>
<td>.01</td>
</tr>
<tr>
<td>London</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.05</td>
<td>.04</td>
<td>.01</td>
</tr>
<tr>
<td>Moscow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.15</td>
<td>.06</td>
</tr>
<tr>
<td>Taipei</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.04</td>
</tr>
<tr>
<td>Washington</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.09</td>
</tr>
<tr>
<td>Prague</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.05</td>
</tr>
</tbody>
</table>

p < .001 = significantly different
<table>
<thead>
<tr>
<th>RANK (R)</th>
<th>All centres combined</th>
<th>SCORE (%)</th>
<th>Aarhus N=20</th>
<th>Agra N=30</th>
<th>Call N=61</th>
<th>Ibadan N=56</th>
<th>London N=55</th>
<th>Moscow N=15</th>
<th>Taipei N=35</th>
<th>Washington N=15</th>
<th>Prague N=19</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lack of insight</td>
<td>97</td>
<td>1 100</td>
<td>1 100</td>
<td>1 97</td>
<td>1 91</td>
<td>1 100</td>
<td>1 100</td>
<td>1 100</td>
<td>3 80</td>
<td>1 100</td>
</tr>
<tr>
<td>2.</td>
<td>Auditory hallucinations</td>
<td>74</td>
<td>5 80</td>
<td>3 77</td>
<td>4 72</td>
<td>1 91</td>
<td>14 58</td>
<td>10 60</td>
<td>7 71</td>
<td>6 60</td>
<td>2 94</td>
</tr>
<tr>
<td>3.</td>
<td>Ideas of reference</td>
<td>70</td>
<td>11 70</td>
<td>3 77</td>
<td>2 74</td>
<td>13 55</td>
<td>2 80</td>
<td>6 73</td>
<td>3 80</td>
<td>2 80</td>
<td>8 58</td>
</tr>
<tr>
<td>4.</td>
<td>Verbal hallucinations</td>
<td>70</td>
<td>11 70</td>
<td>3 77</td>
<td>5 70</td>
<td>3 79</td>
<td>5 73</td>
<td>10 60</td>
<td>3 80</td>
<td>**</td>
<td>6 63</td>
</tr>
<tr>
<td>5.</td>
<td>Delusions of reference</td>
<td>67</td>
<td>7 75</td>
<td>13 60</td>
<td>6 69</td>
<td>7 64</td>
<td>11 65</td>
<td>2 87</td>
<td>7 71</td>
<td>6 60</td>
<td>6 63</td>
</tr>
<tr>
<td>6.</td>
<td>Suspiciousness</td>
<td>66</td>
<td>7 75</td>
<td>3 77</td>
<td>9 54</td>
<td>6 66</td>
<td>15 56</td>
<td>3 80</td>
<td>2 83</td>
<td>3 80</td>
<td>12 53</td>
</tr>
<tr>
<td>7.</td>
<td>Flatness of affect</td>
<td>66</td>
<td>2 90</td>
<td>3 77</td>
<td>8 59</td>
<td>11 59</td>
<td>7 71</td>
<td>27 11</td>
<td>6 69</td>
<td>6 60</td>
<td>2 84</td>
</tr>
<tr>
<td>8.</td>
<td>Voices speak to patient</td>
<td>65</td>
<td>14 65</td>
<td>9 67</td>
<td>5 70</td>
<td>4 75</td>
<td>10 67</td>
<td>14 47</td>
<td>7 71</td>
<td>**</td>
<td>8 58</td>
</tr>
<tr>
<td>9.</td>
<td>Delusional mood</td>
<td>64</td>
<td>7 75</td>
<td>14 57</td>
<td>2 74</td>
<td>14 54</td>
<td>3 76</td>
<td>7 67</td>
<td>13 60</td>
<td>6 60</td>
<td>32</td>
</tr>
<tr>
<td>10.</td>
<td>Inadequate description</td>
<td>64</td>
<td>2 90</td>
<td>10 63</td>
<td>7 67</td>
<td>7 64</td>
<td>11 65</td>
<td>3 80</td>
<td>11 69</td>
<td>1 93</td>
<td>4 74</td>
</tr>
<tr>
<td>11.</td>
<td>Delusions of persecution</td>
<td>64</td>
<td>7 75</td>
<td>2 80</td>
<td>31 63</td>
<td>9 63</td>
<td>4 75</td>
<td>3 80</td>
<td>7 71</td>
<td>5 67</td>
<td>12 53</td>
</tr>
<tr>
<td>12.</td>
<td>Unwilling to cooperate</td>
<td>57</td>
<td>4 85</td>
<td>40 48</td>
<td>5 71</td>
<td>5 73</td>
<td>14 47</td>
<td>5 77</td>
<td>1 93</td>
<td>4 74</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Thought alienation</td>
<td>52</td>
<td>14 65</td>
<td>20 51</td>
<td>9 63</td>
<td>7 71</td>
<td>13 53</td>
<td>37</td>
<td>6 60</td>
<td>**</td>
<td>32</td>
</tr>
<tr>
<td>14.</td>
<td>Thoughts spoken aloud</td>
<td>50</td>
<td>14 65</td>
<td>40 43</td>
<td>15 50</td>
<td>7 71</td>
<td>14 47</td>
<td>15 51</td>
<td>15 53</td>
<td>6 60</td>
<td>16</td>
</tr>
<tr>
<td>15.</td>
<td>Delusions of control</td>
<td>48</td>
<td>50 48</td>
<td>12 48</td>
<td>45 53</td>
<td>10 60</td>
<td>15 51</td>
<td>6 60</td>
<td>37</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Percentage of positive ratings in relationship to the total number of patients in the group

** Not rated
<table>
<thead>
<tr>
<th>Groups of Units of Analysis</th>
<th>Agra N=32</th>
<th>Moscow N=39</th>
<th>Washington N=37</th>
<th>Prague N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quant. psychomot. dis.</td>
<td>14</td>
<td>6</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>2. Qual. psychomot. dis.</td>
<td>15</td>
<td>2</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>3. Quant. dis. form think.</td>
<td>20</td>
<td>4</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>4. Qual. dis. form think.</td>
<td>12</td>
<td>1</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>5. Affect-laden thoughts</td>
<td>14</td>
<td>27</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>6. Predelusional</td>
<td>17</td>
<td>10</td>
<td>22</td>
<td>26</td>
</tr>
<tr>
<td>7. Exp. of control</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>8. Delusions</td>
<td>8</td>
<td>5</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>9. Neurasthenic</td>
<td>10</td>
<td>17</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>10. Insight</td>
<td>65</td>
<td>69</td>
<td>27</td>
<td>79</td>
</tr>
<tr>
<td>11. Self-perception</td>
<td>5</td>
<td>7</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>12. Derealization</td>
<td>1</td>
<td>8</td>
<td>41</td>
<td>13</td>
</tr>
<tr>
<td>13. Auditory halluc.</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>14. Charact. halluc.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>15. Other halluc.</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>16. Pseudo-halluc.</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>17. Depressed-related</td>
<td>18</td>
<td>29</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>18. Anx., tension, irrit.</td>
<td>16</td>
<td>7</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>19. Flatness</td>
<td>50</td>
<td>10</td>
<td>17</td>
<td>29</td>
</tr>
<tr>
<td>20. Incongruity</td>
<td>40</td>
<td>15</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>21. Other affect. change</td>
<td>9</td>
<td>2</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>22. Personal. change</td>
<td>14</td>
<td>13</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>23. Disregard soc. norms</td>
<td>50</td>
<td>5</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>24. Other behav. change</td>
<td>29</td>
<td>7</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>25. Psycho-physical</td>
<td>11</td>
<td>13</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>26. Cooperation, circum.</td>
<td>19</td>
<td>41</td>
<td>40</td>
<td>28</td>
</tr>
<tr>
<td>27. Cooperation, patient</td>
<td>48</td>
<td>23</td>
<td>52</td>
<td>51</td>
</tr>
</tbody>
</table>
trol, delusions, distortion of self-perception, auditory hallucinations, characteristic hallucinations, other hallucinations, pseudohallucinations, and other affective change. In Agra, the score on disregard for social norms was high compared with the other Centres. The Washington group scored higher than the other groups on derealization.

Table 13.12 shows the 15 most frequently positive UAs for the discrepant group, all Centres combined, and the frequency and rank order of these Units for each of the 4 Centres with 15 or more patients in the discrepant group. It can be seen that of the 15 most frequent symptoms for all Centres combined, 8 were among the 15 most frequent in Agra. The corresponding figures for the other Centres are Moscow, 10/15; Washington, 10/15; and Prague, 8/15. These findings suggest that the discrepant group is symptomatically less homogeneous than the concordant group.

13.8 Summary

A concordant group of schizophrenic patients has been defined consisting of all patients who received a clinical diagnosis of schizophrenia, were categorized in CATEGO Class S, and who also fell into one of the McKeon's clusters containing significantly larger number of schizophrenics than expected by chance. It was felt that such a concordant group is minimally contaminated by patients diagnosed as schizophrenic because of lack of standardization of the diagnostic process, variations in clinical assumptions, or culture-specific factors. When the psychopathological characteristics of this concordant group were studied, it was found to be characterized by symptoms that are traditionally associated with schizophrenia - hallucinations, delusions, and flatness of affect. A comparison of the psychopathology of the concordant group with that of the discrepant group (i.e., the group of those patients having a clinical diagnosis of schizophrenia but classified neither in CATEGO S nor in McKeon's cluster 4, 5, or 7) revealed that these symptoms were more prominent in the concordant group.

When the psychopathological characteristics of the concordant group were compared to those of the psychotically depressed patients, the concordant group of schizophrenia was found to be even less similar to the depressed group than the group of all schizophrenics had been. Concordant schizophrenics were present in every one of the Centres in the IPSS. When the psychopathology of these patients was compared by Centre, it was found that they were characterized by a clinical pattern that was similar across all Centres.

It can therefore be concluded that it is possible to identify a group of schizophrenic patients having a distinctive pattern of symptoms that is consistent across Centres, and that there are patients who belong to this group in every Centre in this study.

This group can be re-examined, using data obtained from the follow-up study, to investigate how its course and prognosis compares to those of other groups of schizophrenics, and to assess whether course and prognosis of the concordant patients are as similar as their symptoms are. If the patients do in fact prove to be similar in course and prognosis as well as in symptomatology, then the group would be a good subject for studies of
Table 13.12 Fifteen Most Frequently Positive Units of Analysis by Centre and All Centres Combined. Rank Order of Frequency and Percentage of Positive Ratings: Discrepant Group

<table>
<thead>
<tr>
<th>Rank</th>
<th>All Centres Combined*</th>
<th>Score**</th>
<th>Agra N=32</th>
<th>Moscow N=39</th>
<th>Washington N=37</th>
<th>Prague N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R (N=154 patients)</td>
<td></td>
<td>R S</td>
<td>R S</td>
<td>R S</td>
<td>R S</td>
</tr>
<tr>
<td>1.</td>
<td>Inadequate description</td>
<td>63</td>
<td>1 81</td>
<td>5 = 38</td>
<td>1 81</td>
<td>1 = 80</td>
</tr>
<tr>
<td>2.</td>
<td>Lack of insight</td>
<td>56</td>
<td>2 66</td>
<td>1 69</td>
<td>2 62</td>
<td>1 = 80</td>
</tr>
<tr>
<td>3.</td>
<td>Unwilling to cooperate</td>
<td>50</td>
<td>6 53</td>
<td>12 = 26</td>
<td>2 62</td>
<td>3 73</td>
</tr>
<tr>
<td>4.</td>
<td>Poor rapport</td>
<td>46</td>
<td>3 = 63</td>
<td>12 = 26</td>
<td>4 = 54</td>
<td>4 60</td>
</tr>
<tr>
<td>5.</td>
<td>Suspiciousness</td>
<td>39</td>
<td>8 47</td>
<td>15</td>
<td>3 57</td>
<td>33</td>
</tr>
<tr>
<td>6.</td>
<td>Depressed mood</td>
<td>37</td>
<td>14 = 31</td>
<td>2 51</td>
<td>6 46</td>
<td>27</td>
</tr>
<tr>
<td>7.</td>
<td>Gloomy thoughts</td>
<td>34</td>
<td>13</td>
<td>3 49</td>
<td>13 = 30</td>
<td>10 = 40</td>
</tr>
<tr>
<td>8.</td>
<td>Ideas of reference</td>
<td>34</td>
<td>22</td>
<td>15 = 21</td>
<td>7 = 38</td>
<td>10 = 40</td>
</tr>
<tr>
<td>9.</td>
<td>Disorder of pitch</td>
<td>28</td>
<td>7 50</td>
<td>15 = 21</td>
<td>7 = 38</td>
<td>24</td>
</tr>
<tr>
<td>10.</td>
<td>Sleep problems</td>
<td>27</td>
<td>28</td>
<td>18</td>
<td>7 = 38</td>
<td>27</td>
</tr>
<tr>
<td>11.</td>
<td>Hopelessness</td>
<td>27</td>
<td>16</td>
<td>13 = 23</td>
<td>7 = 38</td>
<td>5 = 47</td>
</tr>
<tr>
<td>12.</td>
<td>Delusions of reference</td>
<td>25</td>
<td>16</td>
<td>13</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>13.</td>
<td>Delusions of persecution</td>
<td>24</td>
<td>14 = 31</td>
<td>3</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>14.</td>
<td>Delusional mood</td>
<td>23</td>
<td>13</td>
<td>13</td>
<td>13 = 30</td>
<td>10 = 40</td>
</tr>
<tr>
<td>15.</td>
<td>Hypochondriacal</td>
<td>23</td>
<td>22</td>
<td>5 = 38</td>
<td>8</td>
<td>20</td>
</tr>
</tbody>
</table>

* including 8 cases in Aarhus, 5 in Cali, 4 in Ibadan, 7 in London, and 7 in Taipei.

** percentage of positive rating, in relation to the total number of patients in the group.
socio-demographic, cultural and etiological variables that may be significant in schizophrenia.
14.1 Significance of Achieving IPSS Aims

It is now time to consider whether the aims set out in Chapter 1 of this volume have been achieved. The immediate aim was to answer the following four questions:

(a) In what sense can it be said that schizophrenic disorders exist in different parts of the world? Do they differ in form or content? Does the clinical course differ?

(b) Can other functional psychoses also be recognized and do they run a recognizably different course?

(c) Can techniques be developed for recording and classifying symptomatology, psychiatric history data, and social data, reliably?

(d) Can teams of research workers be trained to use these techniques so that comparable observations can be made in both developed and developing countries?

Underlying this immediate aim of the IPSS was the ultimate purpose of fostering epidemiological studies with a view toward achieving better prevention and control of disease. The attempt to reach an understanding of the interaction between morbidity and environment is at the heart of social medicine and of its subdiscipline, social psychiatry. That attempt is most likely to be successful if one can begin with agreed definitions.

The immediate goals, therefore, were deliberately circumscribed. The investigators were well aware of the pitfalls in this field of research and of the opinion of some experts that the time is not yet ripe for large-scale international projects of this type. It was felt, however, that progress could probably be made if precise, limited, and short-term goals were set, with a main emphasis upon method. Answering question (a) — whether there is any exact and communicable sense in which it can legitimately be said that schizophrenia exists in nine different populations — would represent a clear addition to existing knowledge, in view of the state of the literature as reviewed in Chapter 2. Good psychiatric studies are being carried out all over the world at the moment, but their results cannot be fully utilized if the "schizophrenia" of one study cannot be compared with that of another. No attempt was of course made to measure the distribution of the functional psychoses in the populations studied. Any clues found suggesting a differential distribution would be regarded as a bonus; the study was not intended to be epidemiological. Nevertheless, if the question of the existence of schizophrenia in nine populations could be answered, this would
mean that it had indeed been possible to devise methods of standardizing
the collection and classification of clinical data and that specially trained
research teams had been able to apply these methods successfully. An ad-
vance would therefore have been made towards solving one of the fundamental
epidemiological problems. In future epidemiological studies, the numerator
would carry a more precise meaning than it had in the past. Moreover, the
benefit would not be limited to enhancing the comparability of epidemiologi-
cal studies. Work in many other fields would become comparable in a sense
in which it is not comparable at the moment. Studies on genetics, etiology,
precipitation, treatment, prognosis, or course would acquire meaning on a
new level if they could, with confidence, be compared with each other.
Thus, the immediate aims of the IPSS, though limited in themselves,
have important implications. For the sake of convenience they will be dis-
cussed in the reverse order to that listed above.

14.2 Development of Research Teams

Nine Centres were chosen on the basis of their having psychiatrists
with prior interest and experience in the field of epidemiology and because
they conformed to criteria, set out in Chapter 1, making it likely that an
appropriate series of patients could be collected.

Five Centres were situated in research institutes with a long tradi-
tion of scientific work. They provided their own staff and facilities and
fitted the IPSS into their current research programmes. The other 4 Centres
were in university departments of psychiatry located in cities in develop-
ing countries. It was found that participants in these Centres were well
able to fit the extra commitments into their round of duties and the quality
of documents was, in general, quite as high as from the other Centres. Psy-
chiatrists and social scientists in all 9 FRCs found it relatively easy to
master the techniques used in the study and apply them reliably; assist in
the design and direction of a research operation; organize and manage the
collection, coding, and dispatch of data; and cooperate with each other in
ensuring balanced progress of the whole project. All the groups found the
experience scientifically and clinically rewarding, and there is no doubt
that in each Centre the IPSS fostered or initiated a tradition of epidemi-
ological research. Moreover, a high morale developed within each team and
among the Centres so that the collaboration was mutually instructive and
rewarding. Several lines of investigation have been suggested by the study
and are being carried out in collaboration between two or more Centres.
Clinical training has also been enriched. In reaching this first aim, there-
fore, the IPSS has been a thoroughgoing success.

The development of teams of this kind, particularly in the developing
countries, has a further important implication. Once a tradition of skilled
epidemiological work has been established in a particular school, some of
the younger psychiatrists trained there will themselves wish to enter the
field. It may be hoped that future teachers of psychiatric epidemiology
have been nurtured by the present study.

387
14.3 Development of Methods of Clinical and Social Measurement

Of the various measuring instruments used and developed within the IPSS, the advantages and limitations of the partially standardized Present State Examination (PSE) have been confirmed. To take the limitations first: these are built into the instrument and therefore demand care if it is to be used properly. The items are restricted to conventional clinical phenomena such as phobias, obsessions, delusions or perceptual disorders; no enquiry is made concerning more general attitudes, premorbid personality characteristics, fantasies, or the content of dreams.

The period covered by the PSE is one month prior to the interview, for subjectively-described symptoms, and the actual period of examination for the rating of speech, observed affect, and behaviour. Thus, disorders that require a clinical history to be diagnosed, such as personality deviations, mental retardation, drug or alcohol abuse, and so on, cannot be described by the PSE procedure except insofar as a neurotic or psychotic disturbance is superimposed. The PSE is naturally most applicable during the acute stages of an illness (and may, therefore, occasionally have to be given in two or more stages). Signs and symptoms of organic brain disease are excluded since there are other reliable means of rating them. The interview is based upon cross-examination; that is, the clinician has an agreed definition of each symptom in mind and questions the patient until he is satisfied that the symptom is present or absent. The decision is the examiner's; the patient's "Yes" or "No" is not in itself decisive in making a rating. Thus psychiatrists who are used to a non-directive interview may find it difficult to adjust their technique, and some are unwilling to do so. These limitations are necessary for the success of the interview and they must be borne in mind when interpreting the results.

The advantages of the PSE method were also demonstrated by the study. It is acceptable to patients and to most clinicians and was readily applicable in all 9 Centres. The symptoms as defined are readily comprehensible and rateable. The items translate easily into languages of very different structures. The interviewing technique is surprisingly flexible without undue loss of reliability; much of the validity of the rating, from a clinician's point of view, is based on the fact that he is not completing a questionnaire but deciding for himself whether or not a symptom is present. When a skilled clinician carries out a PSE it is difficult to detect, without special knowledge, that the interview is in any way standardized. The items rated are clearly relevant to the information that most clinicians want to gather about their patients, and they provide a means of comprehensively covering the "present state". Many psychiatrists incorporated parts of the PSE into their ordinary clinical work and it has been successfully used in postgraduate education. The virtues of the procedure so far as classification is concerned will be dealt with later.

Training in the use of the PSE was given initially in the London FRC. Throughout the study, regular training seminars were held at which videotaped, filmed, and live interviews were rated and item ratings discussed in detail. This was most effective for clarifying the meaning of questions and definitions and for making explicit the instructions that could not be
specified in detail in the schedule. Coding problems were also identified and discussed. Intercentre reliability could also be partly assessed by considering the results of these exercises.

More direct assessment of reliability was carried out in the Centres themselves. It was arranged for two clinicians to be present at the same interview, one examining and one observing, or for them to interview the same patient separately at an interval of a few days. The intraclass correlation coefficient was used to analyse the reliability of item ratings. The range found for pairs of psychiatrists, rating PSE items, was 0.43 to 0.97, with a median of 0.77. The more reliable items were usually those rated on the basis of the patient's subjective report, while those with a lower reliability were found in the section concerned with speech, affect and behaviour, rated from observation.

The biggest gap in reliability testing arose from the fact that it was not possible for one of the Headquarters psychiatrists to spend a great deal of his time visiting Centres and acting as a central reference point for assessing interview technique. All the other aspects could be tested: rating of patients' responses, coding, and classification; but there is very little evidence to indicate whether interview techniques varied markedly from one Centre to another. There is no doubt that errors in rating occurred, as is shown in Chapter 11. These must have been relatively few, if the reliability results are accepted. The errors that were discovered were, however, very interesting, since it was possible to learn from them. It became clear that a specific glossary of symptoms was needed that would incorporate differential definitions (specifying, for example, the difference between delusions of reference and auditory hallucinations speaking in the third person, the difference between delusions of control and a subcultural belief in being possessed, or the difference between thought insertion and a grandiose conviction that thoughts come from God). These lessons, together with those learned from the US/UK Bilateral Diagnostic Project and the Medical Research Council projects in which the PSE was used, have been incorporated in the instruction manual to the 9th edition. Training can now be much more precise. In future studies, considerably more attention should be given to preliminary training in the use of instruments such as the PSE. The fact that no clinical facilities are available at WHO itself makes it necessary that this should be carried out elsewhere.

Methods of combining PSE items have been discussed in Chapters 7 and 11. The approach used to derive Units of Analysis (UAs) has the advantage that it ensures, on the whole, a minimum level of intercorrelation within Units, while retaining clinical meaning. These Units are then grouped according to the gross type of psychopathology present (delusions, perceptual disorders, etc.). Either UAs or Groups of Units of Analysis (GUAs) can be used to provide descriptive profiles, consisting of a set of mean scores. The symptoms and syndromes derived, purely clinically, by the CATEGO system can be used in the same way.

Thus the PSE has been subjected to a fairly extensive test and its acceptability, applicability, and reliability have seemed satisfactory. It is quite probable, as the US/UK study showed, that this degree of standardization alone would be likely to help standardize the diagnostic process,
even without a specification of the diagnostic rules. However, this can only be the case where the diagnostic rules applied are basically those that fit the PSE system. Doctors who use other rules, for example, those who take into account whether a patient has a generally inadequate life pattern when making a diagnosis of schizophrenia, were free to obtain the necessary extra information in other ways (the Washington case mentioned on p. 313 illustrates that this did in fact happen).

An example of applying a similar technique to the rating of previous episodes of illness was also given in Chapter 11 and seems worth developing further, since it was reliable and helpful.

The particular version of the PSE used in this study is not recommended for general use unless one's aims are similar to those of the IPSS and special training is given. In the current study extensive clinical trials of the PSE at the Field Research Centres (FRCs) led to revisions and adaptations of the PSE that increased its suitability for use in the IPSS. The experience from the IPSS provides rich material for further revisions or adaptations of the PSE for other national, international, or transcultural studies.

The other instruments were developed specially for this study. Inevitably, therefore, they are still relatively unstandardized and unreliable, in comparison with the PSE. The difficulties of making comparable cross-cultural assessments of details of psychiatric history, social background, and functional ability are immense. Nevertheless, since such assessments are crucial to the study of psychiatric disorders it is essential that further work be done to develop methods of evaluating these variables.

14.4 Identification of Schizophrenia and Other Functional Psychoses

The effect of selecting only patients aged between 15 and 44 years is to exclude, on the one hand, the childhood and prepubertal psychoses and, on the other those of later onset. The age criterion may have influenced the sample since some 20% of schizophrenias in women, a smaller proportion in men, and a substantial group of affective conditions in both sexes first begin after age 44. This restriction should not greatly affect the conclusions regarding schizophrenia but it does mean that the symptom profiles of conditions such as depressive psychosis are not necessarily characteristic of the whole clinical range. For purposes of differential description, however, the age restriction is an advantage rather than a disadvantage, since schizophrenia is the main condition under study. The other inclusion and exclusion criteria were laid down in order to obtain as closely comparable a selection of cases as possible, but there is no doubt that they were not interpreted identically in all Centres. Thus, certain patients accepted into the series in Washington were not represented in any numbers in most of the other series. Perhaps the most exclusive selection occurred in London, where a very high proportion of patients were diagnosed as suffering from paranoid schizophrenia. For this reason, it is not possible to suggest that variations in the diagnostic composition of the series of patients collected in the 9 Centres represent real differences in the populations attending the clinics. An even greater restriction on interpretation is the fact
that the psychiatric services available in the 9 areas, and the use made of these services, varied enormously.

These are precisely the reasons why the study was never intended to be epidemiological in nature. They did not, however, prevent an examination of the first two questions concerning the identification of patients with schizophrenia and other functional psychoses in the 9 Centres in the hope of obtaining clear-cut answers. The problem of whether schizophrenic and other functional psychoses could be successfully identified in nine culturally contrasted populations was approached in three different ways.

14.4.1 Clinical diagnosis

The most direct way was to study the distribution of diagnoses in the nine series of patients. When this was the criterion used there was very little doubt about the answer, as the data in Chapter 10 show. All the Centres contributed cases with a diagnosis of schizophrenia, mania, or depressive psychosis. In itself, of course, this does not really answer the question, since it is quite conceivable that these terms mean different things in different parts of the world. This is even more true when rubrics such as hebephrenic, catatonic, paranoid, acute, or latent schizophrenia are used.

However, since all the patients had been examined with the PSE, clinical profiles could be drawn for the various diagnostic groups showing the frequency of key characteristics derived from the ratings of PSE items (such as the UA and CUAs described in Chapter 7 or the symptoms and syndromes described in Chapter 11). This exercise showed that the group of patients given a diagnosis of schizophrenia (category 295 in the International Classification of Diseases) in one Centre tended to have a symptom profile similar to that of patients given the same diagnosis in the other Centres. This was also true of patients with mania (296.1), psychotic depression (296.0, 296.2, and 298.0), and neurotic depression (300.4); each diagnostic group had its own characteristic symptom profile that was consistent across the Centres. In the case of the three main diagnoses — schizophrenia, mania, and depressive psychosis — the profiles were markedly different from each other, both overall and within each Centre wherever numbers were large enough to make comparison possible. It appears reasonable to suggest, on the basis of this evidence alone, that examples of the three conditions occur in all Centres. These are only group profiles, and there are admittedly many limitations to the analysis of group profiles, but it seems likely that more analytic methods would also show that Centre psychiatrists were, to some extent, using common diagnostic principles to allocate patients to these three groups.

The subclassification of schizophrenia appears less satisfactory, since the group profiles of paranoid, hebephrenic, acute and schizo-affective subgroups had so much in common, though there were some differences in individual symptoms among the groups. However, these questions are not best settled by comparing group profiles but by using more analytic methods, such as computer-simulations of the clinical diagnostic process or empirically derived taxonomies.

These methods also require an initial condensation of PSE items, since
there are too many items to be analysed even on the most modern computers. The method of condensation adopted may affect the resulting classification, and this possibility should be taken into account when interpreting the results of applying standardized techniques of classification. Two such techniques have been described in this volume and the results will briefly be reviewed.

14.4.2 Computer-simulated diagnosis

The first of these techniques was to standardize the diagnostic principles that clinicians seem to use and to apply them, in the form of a computer program, to PSE data in order to obtain a completely standard reference classification. If this proved to be successful, i.e., if the computer classification matched the diagnostic one used by participating psychiatrists, there could be little doubt (a) that the psychiatrists' diagnostic rules had been represented in some precisely specifiable way in the computer's program of instructions, and (b) that the same principles must apply throughout all the Centres. Either the computer classification or the psychiatrists' diagnoses, in that case, could be used to answer our question about the distribution of the major diagnostic groups in the 9 series.

If, on the other hand, there were differences between the two types of classification, it might be possible to utilize them to discover how to make diagnostic processes more reliable. If, for example, the computer classification agreed with the diagnoses of one group of psychiatrists but not with those of another group, it would be hoped that a study of the differences would reveal what principles of diagnosis were being used by the two groups and whether they could be reconciled.

In fact, as Chapter 11 shows, there was a very substantial measure of agreement between the CATEG classification and the clinical diagnoses (grouped into schizophrenic, manic, and depressive) in 7 of the Centres, and a fair degree of agreement even in the other 2 PRCs. Within the limits set by the PSE and CATEG systems, therefore, an unequivocal answer can be made to the question about the distribution of the functional psychoses.

Using as a criterion a concordant classification by the Centre psychiatrist and by CATEG, the three major functional psychoses appear in every one of the 9 series of patients. In particular, schizophrenia, in a form immediately recognizable by any psychiatrist in the world (and usually diagnosed as the paranoid variety), is by far the commonest condition in each series. The key symptoms in most cases are delusions of control, thought broadcast, thought insertion, thought withdrawal, and auditory hallucinations of certain kinds. Mania also occurs in every one of the 9 series, as do depressive disorders.

The identification of subgroups of schizophrenia was not so convincing. The paranoid, hebephrenic, acute, and schizo-affective varieties seemed rather difficult to distinguish by using CATEG procedures. It will be remembered that their profiles had appeared very similar to one another in Chapter 10. Perhaps the addition of factors such as age, sex, mode of onset, and previous personality would enable a reliable differential diagnosis to be made.
The only major disagreements with the CATEG0 classification were found in the two series collected in Moscow and in Washington. The Moscow Centre is renowned for its school of diagnostic thought, the principles of which are summarized in Chapter 2. The course of the condition is much emphasized and certain changes in the patient's personality are regarded as very significant. These are precisely the sorts of factors that are not considered by CATEG0. The situation in Washington is generally similar, though different in detail. Here, too, there is considerable preoccupation with personality changes, social performance, and details of the history, which are not considered by CATEG0. Although the Moscow school uses schizophrenic subgroups that are unfamiliar elsewhere (shift-like, sluggish, and periodic), while the American Centre uses the conventional categories, the effect in both cases is to considerably broaden the limits of schizophrenia as compared with the usage of the other 7 Centres and of CATEG0. Whether it would be possible to specify precisely a further set of rules that could be applied to reliably measured historical data is impossible to say, but the effort would appear to be worthwhile.

Certain uncommon but important differences between diagnostic and computer groupings indicated the need for more careful definition of symptoms such as delusions of control, thought insertion, and various kinds of auditory hallucination. These can be incorporated in any future study.

14.4.3 An empirical taxonomy

The CATEG0 procedure is based upon a hierarchical principle similar to that used by clinical diagnosticians. If certain fundamental schizophrenic symptoms are found, a diagnosis of schizophrenia is made irrespective of the other symptoms present, unless, of course, they are organic in origin. (This is another application of the hierarchical principle. Cases with a possible organic etiology were naturally excluded from the main series.) Only if the diagnosis is not schizophrenia is another diagnosis considered. This is not, of course, absolutely true but it does appear to be generally the case. A completely different approach is that of cluster analysis, where it is assumed that all the PSE items rated have equal diagnostic weight. Once the cluster program has been selected, it is possible to classify a series of patients without recourse to any clinical judgements whatsoever. Various methods of clustering are discussed in Chapter 12. McKeon's technique was chosen for extensive application and the clusters thus derived were compared with Centre diagnosis, on the one hand, and CATEG0 class on the other.

If diagnostic or CATEG0 groups are considered in terms of a profile of clusters, they appear to have little homogeneity or substance. Paranoid schizophrenia, for example, which looks so solid and stable in the profiles of Chapter 10 and appears to be confirmed as the central schizophrenic group by CATEG0 analysis in Chapter 11, more or less disappears when considered in terms of the McKeon clusters. This is presumably because clustering criteria give the same weight to a symptom such as worrying as to a symptom such as thought insertion. The clusters, therefore, are quite different from diagnoses, although clinically recognizable syndromes do occur. Clus-
ter analysis also has the limitation that it does not produce a definitive classification of patients in any one output since the assignment of patients to clusters is always rather dependent on the particular series of cases in the population being evaluated. Nevertheless, of the three classification methods applied in this study cluster analysis is the only one capable of directly suggesting new possibilities of classification based on weighing the data from the entire series. It is also the only one capable of directly suggesting groups of patients that differ from the traditional ones: schizophrenia, mania, and depression. For example, the technique was able to separate 28 patients from the Agra Centre having particularly florid and bizarre symptoms from the rest of the series of 1202 patients.

The cluster analysis also gave some support to the validity of two of the schizophrenic subgroup diagnoses, catatonic and hebephrenic schizophrenia, since patients assigned these diagnoses by Centres tended to be concentrated in particular clusters. Although Chapter 10 provided some evidence that selected schizophrenic subgroups as diagnosed clinically have particularly high scores on specific symptoms, neither the profile descriptions of the diagnostic groups presented in that chapter nor the CATEGO procedure described in Chapter 11 was able to produce further evidence for the validity of the schizophrenic subgroups.

The groups of patients derived by any diagnostic technique will ultimately stand or fall on their clinical usefulness and their ability to predict outcome or other variables that can serve to support their validity. Clearly, the cluster analysis approach can be taken much further, and Chapter 12 simply provides an introduction to what is bound to be a substantial line of research in the future.

14.5 Organization and Management of International Studies

The quality of the data supplied by the FRCs in the developing countries and their organization of research compared favourably with the data produced by the Centres in the developed countries. This phenomenon underscores the fact that good research can be done by research workers from developing countries provided the research potentials of such countries are properly organized. The use of workers from the countries in which the research is taking place is in fact essential to any kind of long-term work in all centres, developing or developed. With workers who are stable in location within the country and within the research centre, it is possible to follow up ideas generated in the course of a research project with continued or expanded studies. If research workers are brought in from outside, such continuity is unlikely, and valuable research opportunities may be lost.

Complications in communication among Centres that are widely distant from one another lead to many delays at all stages of the project. From the experience gained in the IPSS, it appears that the time required for a large scale international study is directly proportional to the distance between the centres. An essential factor in overcoming the problems of wide geographical separation of research workers is the provision for frequent meetings at which the field researchers can meet each other and headquarters staff face to face.
Perhaps the major long-term benefit of organizing a group of research centres within a number of widely separate and socioculturally different countries is the establishment of an international research network that can serve as a foundation for future international research projects and for the training of research workers.

14.6 Conclusions

The results outlined above indicate that schizophrenia, mania, and depressive psychoses and neuroses can indeed be found in the series of patients collected in the 9 Centres by the application of the procedures outlined in Chapter 1. This simple conclusion would not have surprised Kraepelin, but other systems of collecting information and other principles of classification might well have produced different results, much less favourable to the nosology in current use. In terms of the discussion in Chapter 2, what the IPSS has shown is that studies of schizophrenia in the more restricted sense of the term can be carried out in different parts of the world with the assurance that the results will be comparable, provided that techniques similar to those used here are adopted. This marks a considerable albeit limited advance. The broader concept of schizophrenia used (though probably in different senses) in Moscow and Washington need not, of course, be discarded, but whatever accounts for the difference between the narrow definition (now precisely specifiable) and the broad definition carries the same disadvantage as the whole concept of schizophrenia used to. Unless it can be defined in a practical and readily applicable way, and the definition communicated to others without difficulty, it cannot be studied with any hope of producing results that will be comparable in all centres of research. That does not mean that useful work is precluded. It does, however, mean that useful results are less likely. This, then, is a line of research that is urgently needed.

There is less controversy about mania and depressions but it is still encouraging to be able to identify these conditions reliably and to be able to separate them from schizophrenia. One point that the methods used do not evaluate as effectively as might be thought desirable is whether there are also considerable differences between patients who are given a common diagnostic label (schizophrenia, mania, or depressive disorder). Our techniques have mainly been designed to discover commonality, and this undoubtedly is present. However, cluster analysis suggests that there are also differences between patients given the same diagnosis in different Centres. Other systems of classification might also eventually be found useful in addition to the one in current use.

The followup phase of the IPSS will provide an opportunity to test various hypotheses derived from the analyses presented in this volume. For example, according to the hierarchical hypotheses incorporated in the CATEGO program, it would be expected that rather few patients in the affective groups would develop schizophrenic symptoms during the followup period, while many schizophrenic patients will probably do so. On the other hand, affective symptoms will occur commonly in both groups. Verifying these predictions is hardly a means of external validation; it is closer to a test of temporal
consistency. Social outcome may provide more of an external criterion. The
test of response to treatment is also available. These external criteria
can likewise be applied to clinical diagnoses, UAs, empirically-derived clus-
ters, and to the concordant group of schizophrenics described in Chapter 13.
The ability of each to predict course and clinical and social outcome will
give useful information as to their value.

The followup phase will also permit the straightforward description of
the clinical and social course of the various diagnostic groups in 9 dif-
ferent parts of the world. The results of these studies will be reported
in Volume II of this report.

Thus, in addition to the very specific questions for future investiga-
tion suggested by the IPSS results (why is mania so common in the Aarhus
series? why were catatonic and unspecified schizophrenia diagnosed so fre-
quently in Agra? what are the specifics of the "extra" schizophrenic cases
diagnosed in Moscow and Washington?), a number of general lines of work are
suggested as well.

Apart from the fairly clear cut answers that can be given to the four
main questions, the main value of the IPSS is the demonstration that it is
possible to apply techniques of describing and classifying clinical pheno-
mena in a standard way so that at least three main groups of diagnoses can
be identified within specified limits in many parts of the world. Genetic,
etiological, epidemiological, therapeutic, and prognostic studies should
benefit by the increased comparability that this implies. Above all, how-
ever, the status of psychiatry within the expanding public health programmes
being developed by WHO and national governments depends upon its having a
solid clinical groundwork on which planning and evaluation can be based. It
is felt that, as a result of the IPSS, this clinical psychiatric groundwork
is measurably firmer than it was before.
CHAPTER 15

SUMMARY AND CONCLUSIONS

15.1 Aims

The International Pilot Study of Schizophrenia (IPSS) is an international psychiatric study of 1202 patients carried out in nine countries—Colombia, Czechoslovakia, Denmark, India, Nigeria, China (Province of Taiwan), Union of Soviet Socialist Republics, United Kingdom, and United States of America. It was designed to lay scientific groundwork for future epidemiological studies of schizophrenia and other psychiatric disorders and to answer basic questions about the nature of schizophrenia.

In particular, the IPSS set out to develop standardized instruments and procedures for the valid and reliable evaluation in different countries of the clinical condition of patients suffering from functional mental disorders, especially schizophrenia, and to test whether teams of research workers could be trained to use such instruments so that comparable observations could be made both in developed and in developing countries. Another major aim of the study was to examine the psychopathological characteristics of groups of schizophrenic patients in different countries, with a view to determining in what sense it can be said that schizophrenic disorders exist in different parts of the world. The study was also intended to investigate the feasibility of coordinating and making operational a study involving the development and collaboration of psychiatric research centres in many different countries.

The study protocol provides for a detailed initial evaluation of each patient included in the study, and followup evaluations at one and two years. It is now six years since the preparations for the study began and four years since the first patient was examined. All initial evaluations and most of the followup evaluations have been completed. This volume reports the results of the analysis of data from the initial evaluation.

15.2 Major Conclusions

Although some of the conclusions that can be drawn at this stage of the IPSS are tentative pending completion of the analysis of followup data (which will be discussed in Volume II), the major questions central to the basic aims of the study can now be answered. On reviewing the five year experience of the IPSS to date, three conclusions stand out prominently. The first of these is that it has been possible to carry out a large scale international psychiatric study requiring the coordination and collaboration of psychiatrists and other mental health workers from different theoretical psychiatric backgrounds, and from widely separated countries with different cultures and socioeconomic conditions. The second major conclusion is that similar groups of schizophrenics can be identified in every one of the nine countries involved in the study. The third major conclusion of the IPSS is
that it is in fact possible to develop valid and reliable research instruments for practical use in international psychiatric studies.

15.3 Design

The IPSS evolved as part of the World Health Organization's long-term programme in psychiatric epidemiology and social psychiatry. This programme is divided into four parts. The first part, Programme A, is concerned with the standardization of psychiatric diagnosis, classification, and statistics. Programme B is concerned with the development of internationally applicable techniques for the evaluation of mental patients in epidemiological and other psychiatric studies. Programmes A and B are preparatory for Programme C, which will consist of comprehensive epidemiological studies of psychiatric disorders in geographically defined populations. The fourth part, Programme D, is an international training programme in psychiatric epidemiology and social psychiatry. Programmes A and B are very much interrelated. For example, it is considered essential to evaluate whether the psychiatric diagnoses and classifications worked out in Programme A are applicable in different countries of contrasting cultures, and one of the purposes of Programme B is to design and carry out such an evaluation.

The IPSS is the major vehicle of Programme B. Schizophrenia was chosen for the study because of its apparent universality, the seriousness of its effects, and the amount of work already carried out on its epidemiological aspects. Although the project deals specifically with schizophrenia, it is intended to answer questions and stimulate the formulation of hypotheses in the broad areas of transcultural and epidemiological psychiatry. It was hoped that parallel advantages of such a pilot study would be the development of a network of research centres in various countries that could serve as solid bases for future international work, and the training of a number of psychiatrists and other mental health workers in the field of cross-cultural psychiatric epidemiology.

Nine Field Research Centres (FRCs) were chosen — Aarhus, Agra, Cali, Ibadan, London, Moscow, Prague, Taipei, and Washington. It was felt that the Centres should represent several of the major contrasting cultures of the world, and if possible, be characterized by different levels of social and industrial development. Further criteria for the selection of FRCs included the availability of a well-trained psychiatrist with interest and experience in epidemiological research, the presence of other trained psychiatrists and supporting staff, and the existence of a network of services that would detect most of the likely and early cases of schizophrenia occurring in a population of approximately one-half to one million people. Other specifications were that the population of the Centre's catchment area should be as little mobile as possible and ethnically or culturally heterogeneous, that census data should preferably be available, and that the FRC should be in a strategically good position to exert a continuing academic and administrative influence on the future mental health services in the country. The Mental Health unit of WHO in Geneva was made the headquarters for the study, since it was well suited for the organization and coordination of research activities and data analysis.

398
In order to identify patients to be included in the study, all patients contacting each of the FRCs were put through two screens, a demographic screen and a psychotic screen. The screens were designed to select patients with functional psychoses who would be likely to be available for followup for a period of two years from the time of their initial evaluation.

The Demographic Screen identified those patients who contacted each Centre during the course of the year from 1 April 1968 to 1 April 1969 who (a) had resided or slept regularly in the catchment area for the last 6 months, and (b) were aged 15—44. It was decided to select only patients in this age range in order to avoid the inclusion of patients whose illness might be an early stage of presenile or senile psychosis at one end of the life-span, or childhood or juvenile schizophrenia at the other end. The residential requirement was designed to increase the likelihood of availability for followup.

The Psychotic Screen identified all of those patients who passed the Demographic Screen who did not fit any one of a number of exclusion categories, and who did fit at least one of a number of inclusion categories.

Exclusion categories were chosen to screen out (a) chronic patients and (b) patients whose condition may have been caused or significantly influenced by an organic factor.

Since diagnostic practices vary, the inclusion categories were symptoms rather than diagnostic labels. Inclusion categories were divided into those whose presence automatically qualified the patient for inclusion, regardless of degree of symptomatology, and those that were considered as a basis for inclusion only if present in severe degree. The first group consisted of delusions, hallucinations, gross psychomotor disorder, and quite mild inappropriate and unusual behaviour. The second group consisted of social withdrawal, disorders of thinking other than delusions, overwhelming fear, disorders of affect, self-neglect, and depersonalization. Provisions were made to allow the local psychiatrist to include a patient that he felt was definitely psychotic, even if he did not demonstrate one of the inclusion symptoms.

A trial registration indicated that in each Centre these screens would, in a one-year period, produce approximately 100 patients considered by the Centre to be schizophrenic, and 25 patients believed to be psychotic but not schizophrenic. In the course of the study some adjustments were made in the size of the catchment area, in the period of screening, and in sampling procedures, to attain these approximate figures. Later, in order to demarcate psychotic depression more sharply from neurotic depression, 10 neurotically depressed patients were added to the sample from each Centre. In all, the study population consists of 1202 patients, divided approximately equally over the 9 Centres. 811 of the patients have a Centre diagnosis of schizophrenia, 164 of affective psychosis, 29 of paranoid states, 73 of other psychoses, and 71 of neurotic depression; 54 have other diagnoses.

Every one of the 1202 patients received an intensive initial evaluation by the research team at the FRC. Each evaluation lasted about 5 hours and resulted in the accumulation of some 1600 items of information. At the initial evaluation, information was elicited and recorded about the patient's clinical condition at admission to the facility, the history of his mental illness, previous treatment, premorbid personality, and social functioning. A physical and neurological examination was performed on each patient.
15.4 Research Instruments

In order to obtain information about the patients in a systematic and
controlled manner, it was necessary to develop a standardized set of research
instruments. Eight instruments were used in the study. The three main in-
struments were the Present State Examination, the Psychiatric History Sche-
dule, and the Social Description Schedule.

The Present State Examination (PSE) was used as the instrument for eva-
luating the clinical status of the patients. The PSE is a guide to struc-
turing a clinical interview that was developed over 10 years ago. It was
chosen for several practical reasons: it had been extensively tested through
7 editions; one of the Centres (London) had extensive experience with it;
and there was some concurrent use of it in an international study — the
US/UK Diagnostic Project. However, the main reason for selecting the PSE was
that it seemed to be a developed instrument that very successfully combined
the features of a structured research interview and a clinical interview.

Basically, this schedule is a list of items to be rated on the basis
of observation and questioning of the patient. The items systematically
cover all of the phenomena likely to be considered during a comprehensive
examination of a patient's current mental condition. Instructions are in-
cluded on how these items should be coded.

Although the PSE provides for a structured interview, it can be admin-
istered in a flexible manner according to the clinical style of the inter-
viewer and the requirements of the clinical situation. The items are grouped
into sections to facilitate the conduct of the interview. However, the in-
terviewer is not obliged to follow the order of sections in the schedule.
If the patient mentions particular psychiatric symptoms at the outset of the
interview, the interviewer can start his formal questioning at the appro-
priate section in the schedule. A system of "cut-off" points was introduced
into the schedule so that if questioning in a particular section does not
appear to be yielding useful information, the interviewer can switch to
another section. On the other hand, if the initial questions in a particular
section are particularly productive, or if clues are elicited suggesting
that a more detailed exploration of that particular area of psychopathology
would be informative, there are provisions for making such further inquiries.

An initial test of the PSE was conducted at each Centre with a group
of patients, prior to the onset of the one-year registration of patients.
On the basis of their experiences during this phase, collaborating investi-
gators made suggestions about wording, ordering, additions, and deletions
that would make the schedule more applicable to the particular circumstances
of their Centres. These suggestions, together with those of the team work-
ing on the US/UK Diagnostic Project and of members of the Medical Research
Council Social Psychiatry Unit in London, were incorporated into the design
of the PSE schedule used in the main phase of the IPSS. The schedule's
layout is such that the ratings can be transferred directly to punch cards.

This schedule is thus an abbreviated and modified version of the 8th
edition of the PSE.

The development of standardized Psychiatric History and Social Descrip-
tion schedules was more difficult. In the first place, there were no previously well-tested schedules available for cross-cultural use. In the second place, it was necessary to construct the schedules in such a way that they could be used by different types of interviewers in different cultural settings. A third problem was that the sources of information for filling out these instruments varied.

Initial drafts of past history and social description schedules were prepared at Headquarters, discussed by the collaborating investigators, and tested in the FRCs. Following analysis of the data collected and a review of the suggestions of many consultants, the schedules were redrafted and re-tested before a final form was produced by Headquarters.

All of the schedules had to be translated from English into the 7 other languages used in the study. The translated schedules were then back-translated into English and the two versions compared to assess their equivalence. The schedules are thus available in 8 different languages.

Once the instruments had been developed, it was necessary to see if researchers could be trained to use them in a reliable and valid way. The collaborating psychiatrists from each Centre were trained in the use of the PSE at training seminars. Videotaped interviews were shown and rated, and members of the group discussed their ratings of each item in detail. This procedure was most effective for clarifying the meaning of questions and instructions, and making explicit those points that could not be spelled out in detail in the schedule. Coding problems were also identified and discussed. In another training procedure, the participants split into pairs in which each psychiatrist was asked to interview a patient "live" in the presence of another collaborating investigator, and also in the presence of an experienced user of the schedule. The groups then held individual discussions and afterwards met together to exchange views. The collaborating investigators then returned to their Centres to test the schedules under field conditions. Twenty-six interviews were carried out in each Centre, 8 simultaneous with another psychiatrist, 8 consecutive, and 10 single. These interviews were used both for assessment of the schedule under field conditions and for further training of the investigators.

Clinicians already familiar with the process of diagnostic evaluation needed to do about 20 interviews to become thoroughly familiar with the PSE. It was felt that at least 10 of these interviews should be done under supervision. Clearly, no matter how clear the instructions may be, it is impossible to carry out an interview adequately simply from reading the schedule instructions.

In order to maintain and improve the reliability of ratings, the psychiatrists at each Centre carried out simultaneous interviews at regular intervals throughout the study and discussed their ratings, particularly when they disagreed.

The nature of the Psychiatric History and Social Description schedules was different from that of the PSE. Information for filling out these schedules would be obtained from many different sources, and by different types of mental health workers. In addition, local conditions would have a major influence on the way in which the information could be obtained. Therefore, it was necessary to carry out the training in the use of these schedules
under the particular conditions at each FRC.

15.5 Reliability

As one of the major aims of the IPSS was to determine if standardized instruments for the evaluation of patients could be developed, an important part of the study was the analysis of the reliability of the data collected through the use of these instruments.

Two methods were employed to evaluate the reliability of the PSE. In order to test intracentre reliability, every sixth interview held in each Centre was simultaneously rated by two psychiatrists. The data were analysed for reliability on the basis of items, Units of Analysis, and Groups of Units. (see Section 15.6). To assess intercentre reliability, 21 interviews held in different Centres were rated live or from videotapes and films by psychiatrists from all the Centres.

The main conclusions from all the reliability investigations of the PSE data were that it was possible to achieve high reliability among interviewers, and that the PSE could be administered satisfactorily in all of the various cultures in the study. In general, the more reliable items and combinations of items were those rated on the basis of patients' reports, while the behavioural items rated from observation had lower reliability. The reliability of the Psychiatric History and Social Description schedules was investigated much less intensely, primarily because of the considerable theoretical difficulties of doing such analyses, and therefore no definite statements can be made at this time about the reliability of these instruments.

15.6 Condensation of Data

Very early in the course of the IPSS it became necessary to confront the problem of how to effectively handle and analyse the massive amounts of data accumulated through the application of these research instruments. The full set of instruments yields approximately 1600 items of information per patient which means that there are over 2,000,000 items of information accumulated for the 1202 patients in the study from the initial evaluation alone.

The need to devise methods of dealing with such a large amount of data illustrates one of the important findings of the IPSS — that in a study of this magnitude, involving so many interviewers, patients, and countries, operational problems inevitably arise, and the solution of these operational problems becomes in itself an important finding as well as one of the objectives of the study.

In order to condense the data into usable form for purposes of analysis, the concept of Units of Analysis was developed. Of the 360 PSE items, those that seemed to be facets of the same symptoms were grouped together. The initial decision about which items to group together was made on the basis of clinical judgement. This judgement was then tested by examining the material from the schedules. Association indices were calculated for the items that were hypothesized as belonging together to see if in fact they did occur together in the patients in the study. The results of this analysis were
used to re-form the Units of Analysis, and the process was repeated until
finally the Units contained items that statistically and clinically grouped
together. Once a Unit had been constructed in this way, the association be-
tween the items in it was further examined by determining the correlation
values in all patients examined by the same psychiatrist, all patients with
the same diagnosis, and all patients from the same FRC. This was done in
order to establish whether the composition of the Unit had stability regard-
less of who examined the patients, what kinds of patients were examined,
and from what Centre the patients came. The 129 resulting Units of Analysis
were then subjected to further analysis to check the correlation between all
possible pairs of Units, the correlation between each Unit and its component
items, and the correlation between all pairs of items.

An example of a Unit of Analysis is "delusions of persecution", which
includes items such as: Did you notice that they wanted to harm you? Did
you notice that some force was trying to act on you? to harm you? Did you
notice that somebody was following you around, or spying on you?

The Units of Analysis were further condensed into 27 Groups of Units
of Analysis. These are groups of Units that seemed to fall together into
broader categories of symptoms. An example of a Group of Units is "delu-
sions", which consists of the following Units of Analysis: delusions of
persecution, delusions of guilt, delusions of self-depreciation, nihilistic
delusions, delusions of grandeur, delusions of reference, presence of delu-
sional system, hypochondriacal delusions, delusions of special mission, reli-
gious delusions, fantastic delusions, sexual delusions, and delusions of im-
pending doom. Each patient can be given a percentage score for each Group
of Units, indicating the percentage of Units with the Group on which he rece-
vied a positive rating. For groups of patients, individual scores can be
averaged to yield an average percentage score for each Group of Units of
Analysis.

The effect of condensing the data in this way is that for each individu-
also, the items, Units of Analysis, and
Units of Analysis, or Groups of Units. Individual patients or groups of pa-
tients can then be compared with one another in terms of these profiles.
Such a comparison is illustrated in Fig. 15.1, which shows the profile of
the average percentage scores on 27 Groups of Units for the schizophrenic
group of patients contrasted with the profile for the patients with depres-
sive psychoses.

The handling of the data in this manner makes it possible to assess
several important questions. For example, the items, Units of Analysis, and
Groups of Units can be examined in order to assess whether the collaborating
psychiatrists in the study use the same diagnostic labels in the same way.
The overall psychopathological characteristics of groups of patients can be
studied by means of group profiles. The frequency of positive responses to
certain items, Units, or Groups of Units can be analysed in order to deter-
mine whether certain types of symptoms seem to be predominant in patients
in certain cultures.
FIG. 15.1
PROFILES OF AVERAGE PERCENTAGE SCORES (27 GUA)S
SCHIZOPHRENIC PATIENTS AND PATIENTS WITH PSYCHOTIC DEPRESSION

Psychotic depression group
(=CD Numbers 296.0, 296.2, 298.0) 99 patients

Schizophrenic group
(=CD Numbers 295.0 - 295.9)
811 patients

1. Quantitative psychomotor disorder
2. Qualitative psychomotor disorder
3. Quantitative disorder of form of thinking
4. Qualitative disorder of form of thinking
5. Affect-laden thoughts
6. Precedential signs
7. Experiences of control
8. Delusions
9. Neurasthenic complaints
10. Lack of insight
11. Distortion of self-perception
12. Derealization
13. Auditory hallucinations
14. "Characteristic" hallucinations
15. Other hallucinations
16. Pseudohallucinations
17. Depressed-elated
18. Anxiety, tension, irritability
19. Flatness
20. Incongruity
21. Other affective change
22. Indication of personality change
23. Disregard for social norms
24. Other behavioural change
25. Psychophysical disorders
26. Cooperation difficulties, circumstances related
27. Cooperation difficulties, patient related
15.7 Psychopathology of Patient Groups

In comparing the psychopathology of patient groups, it was decided to carry out the comparisons in terms of the rank order of frequency of symptoms, on the level of Groups of Units of Analysis, and in terms of the symptoms most frequently present among patients in each diagnostic group, on the level of Units of Analysis. Kendall’s Tau rank correlation coefficient was used to calculate the degree of concordance of rank order of average percentage scores on Groups of Units between pairs of symptom profiles.

When there is a high degree of concordance between the rank orders of two Centres, the symptom profiles are referred to as similar. Thus, it should be emphasized that the term "similarity of symptom profiles", as used throughout this volume, refers to concordance of rank order of frequency of symptoms.

When the average percentage scores on the 27 Groups of Units of Analysis for all schizophrenic patients within each Centre are examined, it is apparent that the rank order of the Groups of Units is very similar across Centres. The schizophrenic groups of all Centres have high scores on lack of insight, delusional signs (such as delusional mood, ideas of reference, perplexity), flatness of affect, auditory hallucinations (except Washington), and experiences of control. Centre scores are also high on delusions, de-realization, and disturbances of mood, although these are not uniformly as high as for the first-mentioned groups of symptoms. Scores are relatively low across Centres in the areas of qualitative psychomotor disorder (negativism, compliance, mannerisms, and similar abnormal behaviour), pseudo-hallucinations, and affective changes other than incongruous affect.

Of the 36 possible comparisons between schizophrenic profiles of pairs of Centres, in 32 there was a significant degree of concordance of rank order of frequency of Groups of Units of Analysis. Concordance was not significant for the pairs Agra-London, Agra-Taipei, London-Washington, and London-Prague. These analyses indicate that, with these few exceptions, the psychopathological characteristics of schizophrenic patient groups are similar in the different Centres when the basis for comparison is rank order of frequency of Groups of Units of Analysis.

Comparison of the 15 most frequently positive Units of Analysis supports this conclusion, since there is a high degree of similarity among the Centres with regard to the symptoms that occur most frequently in their schizophrenic groups of patients. The most frequently positive Units of Analysis for all Centres combined, in decreasing order of frequency, are lack of insight, inadequate description of problems, suspiciousness, unwillingness to cooperate, ideas of reference, flatness of affect, delusions of persecution, delusions of reference, delusional mood, poor rapport, presence of auditory hallucinations, presence of verbal hallucinations, voices speaking to the patient, thought alienation, and gloomy thoughts.

A similar analysis was done for the paranoid schizophrenia subgroup in the study, since it is sufficiently large (323) for such an analysis. The average percentage scores on Groups of Units indicate that these patients are mainly characterized by lack of insight, experiences of control, delusional signs, delusions, and flatness of affect. There were also high
ratings on auditory and "characteristic" hallucinations (such as voices discussing the patient and hallucinations from the body), although the ratings were lower in Washington than in the other FRCs. All Centres had low scores on psychomotor disorders and disorders of form of thinking, all except London and Moscow rated low on pseudohallucinations, and all but Washington had low scores on affective change other than incongruity of affect.

When the symptom profiles of the groups of paranoid schizophrenic patients are compared Centre by Centre in terms of concordance of rank order of Groups of Units of Analysis, the profiles of 8 of the 9 Centres show a significant degree of concordance with one another. The profile of the other Centre, Washington, has a significant degree of concordance with 4 of the other Centres but not with the remaining 4. It can be concluded that, with these few exceptions, the psychopathological characteristics of the groups of paranoid schizophrenic patients are similar in the different Centres when the basis of comparison is rank order of frequency of symptoms.

This conclusion is supported by comparison among the Centres of the most frequently positive Units of Analysis, which indicates that there is a high degree of similarity among the Centres with regard to the symptoms occurring most frequently in their paranoid schizophrenic groups of patients. The most frequently positive Units of Analysis for all Centres combined, in decreasing order of frequency, are lack of insight, suspiciousness, delusions of persecution, delusions of reference, ideas of reference, unwillingness to cooperate, inadequate description of problems, delusional mood, flatness of affect, and presence of auditory hallucinations.

A similar analysis can be done for the IPSS patients diagnosed as having psychotic depression. When the profiles of these patients, expressed in average percentage scores on the 27 Groups of Units, are examined, they are found to show a high degree of similarity. Positive scores are high across all Centres in the groups of affect-laden thoughts, neurasthenic complaints, lack of insight, depressed mood, and psychophysiological complaints. On the other hand, they are generally low on hallucinations, pseudohallucinations, and incongruity of affect, groups in which positive scoring would suggest schizophrenia.

When the symptom profiles of the groups of psychotically depressed patients are compared Centre by Centre, for the 4 Centres with more than 10 such patients, there is a high degree of concordance for all comparisons, indicating that the psychopathological characteristics of this diagnostic group are similar in these 4 different Centres.

Analysis of the frequency of positive scores on the Units of Analysis for all psychotically depressed patients reveals that there is a great similarity among the Centres. It also indicates that the most frequently positive Units apparently coincide with the generally recognized symptoms of psychotic depression. The most frequently positive Units of Analysis for all Centres combined, in decreasing order of frequency, are depressed mood, gloomy thoughts, hopelessness, early waking, feeling worse in the morning, sleep disturbances, delusions of self-deprecation, anxiety, lack of insight, retardation, lack of concentration, inadequate description of problems, decreased energy, diminished appetite and weight, delusions of guilt, and tension.
The Units of Analysis and Groups of Units can be analysed further to examine the similarity and dissimilarity between the clinical conditions of those patients diagnosed as schizophrenic and those diagnosed as psychotically depressed. When the profiles of Groups of Units are compared for the two groups, it is noted that although there are some areas of similarity, as would be expected since both groups are composed of psychotic patients, there are major differences. Experiences of control, which rank 6th in the schizophrenic group, rank 21st in the depressive group; auditory hallucinations rank 4th and 18th respectively in the two groups, while incongruity of affect ranks 10th among schizophrenics and 25th among depressives. Psychophysiological disorder ranks 5th among the depressed patients and 17th among the schizophrenics. The degree of concordance between profiles, in terms of rank order of frequency of Groups of Units, is low. These findings suggest that the differences between patients diagnosed as schizophrenic and patients diagnosed as psychotically depressed justify classifying them in different categories.

Analysis of those Units of Analysis showing a significant difference in frequency of positive ratings between schizophrenia and depressive psychosis in each Centre suggests that the symptoms that differentiate between the two conditions may vary from Centre to Centre.

In addition to the comparisons of scores on GUAs among patient groups described above, analysis of variance and discriminate function analysis were performed and preliminary results suggest similar conclusions.

Thus, when patients are grouped together according to clinical diagnosis, an analysis of psychopathology indicates that there is a high degree of similarity among the groups of schizophrenic patients in the different Centres. However, until criteria specified in advance have actually been used to allocate patients successfully to the diagnostic groups used by the various clinicians taking part in the study, it cannot be claimed that their diagnostic rules have been fully examined. To further examine this question, two additional techniques were investigated, each of which allocated patients to a category on the basis of the PSE data. The first of these was a computer simulation of the diagnostic process and the second was a statistical clustering technique.

15.8 Computer Simulated Diagnosis

A set of diagnostic rules, based on those ordinarily used by a clinician, was formulated in such a way that it could be applied by means of a computer program (CATEGO) to data compiled from the PSE and the Psychiatric History Schedule. Once the data have been fed to the computer the process of categorization is completely standard, so that patients examined in the 9 Centres can be classified in precisely the same way.

There was a high level of agreement (87%) between a diagnosis by the Centre psychiatrist of schizophrenia, mania, or depression and the classification made by the computer. The results of CATEGO classification indicate that there are schizophrenic patients with similar patterns of symptomatology in all 9 Centres. It also seems probable, as far as these functional psychoses are concerned, that the rules laid down in the CATEGO program are similar to, or can be simply transformed into, the rules used by clinicians in
making a diagnosis. This process appears to be hierarchical, in the sense that not all symptoms are treated as being of equal value. Certain symptoms are very highly characteristic of schizophrenia. For example, if a patient experiences delusions of control, or thought transfer or hallucinatory voices discussing him in the third person, the chance of a diagnosis of schizophrenia being made is 95%. There are of course many other schizophrenic symptoms present as well but the "first-rank" symptoms seem to be very highly discriminatory.

Analysis of the discrepancies between computer classification and diagnosis and the cases where the computer classification remained uncertain has yielded information that will be useful in making the interview, rating, and diagnostic procedures even more reliable in the future. In addition, there were also cases that were simply difficult to diagnose and others, such as states of excitement and overactivity, that did not fit very easily into the existing international classification and deserve further investigation. On the whole, however, such discrepancies and uncertainties were few, and the major finding of the CATEGO analysis is that the conditions met in the IPSS series can be rather accurately classified as schizophrenia, mania, or depression by a computer procedure and that these clinical groups are represented in each of the series of patients from the 9 Field Research Centres.

15.9 Cluster Analysis

Clinical diagnosis based on observation and information accumulated in a standardized fashion and computer simulated diagnosis are two ways of classifying patients. A third method is cluster analysis, an empirical method differing from CATEGO and clinical diagnosis in that groups are defined by the similarities found in the data, each piece of information is given the same weight, and the rules of classification are purely mathematical. The method finds those individuals within a large population who will have most features in common, as determined by the cluster program, and who are generally different from other groups in that population whose members have other features in common. According to this theory, the similar individuals in these groups will be the ones most likely to have in common any other characteristics that might be evaluated. For example, if patients who have many symptoms in common are considered together, the theory states that it is probable that they will also have a similar genetic or environmental background, and a similar course of illness and response to drugs. If, on the other hand, only a few key symptoms are used as criteria for classification, the predictability of other variables will be lessened, according to the theory.

Several methods of cluster analysis were applied to IPSS data. With McKeon's method, the 1202 patients of the IPSS were grouped into 10 clusters. This grouping again allows for many possible comparisons. For example, the profiles of patients classified as schizophrenic by both clinical and computer diagnosis can be broken up into groups depending on which McKeon's cluster they fall into, and these groups can then be compared for various clinical characteristics.
15.10 A Concordant Group of Schizophrenics

Using three separate methods of classification — original clinical diagnosis, CATEGO diagnosis, and cluster analysis — it is possible to define a concordant group of schizophrenics. For the purpose of testing whether there are similar groups of schizophrenics in all centres, such a concordant group was defined as consisting of all patients whose original clinical diagnosis was schizophrenia, who fell into CATEGO Class S, and who also belonged to one of those McKeon's clusters that contained a statistically significantly higher number of schizophrenics than would have been expected by chance. There are 306 such concordant schizophrenics in the study.

Such a concordant group has the advantage of being comprised of patients who have been diagnosed in a standardized fashion according to clinical assumptions, and who belong to clusters that statistically select out schizophrenic patients, regardless of clinical assumptions. The desirability of defining such a concordant group of schizophrenics is three-fold. First, it permits the identification and description of a group of schizophrenic patients that excludes many patients diagnosed as schizophrenic because of lack of standardization of the diagnostic process, variation in clinical assumptions, or culture-bound factors. Second, it makes it possible to examine the question of whether there are representatives of such a group in all centres. Third, it identifies a group of patients to whom particular attention may be given during the follow up phase of the study, to determine whether their course of illness differs from that of other schizophrenic patients. If it can be shown that such a group of patients exists in all countries and has a specific clinical picture and course of illness differentiating it from other groups of schizophrenic patients, then the characteristics of this group can be described, and this description may serve as a beginning for a transculturally applicable definition of schizophrenia.

The psychopathological characteristics of the concordant group were examined in two ways: in terms of the profiles of 27 Groups of Units and in terms of frequency of Units of Analysis. Analysis of the 27 Groups of Units indicates that the most prominent symptom in this group is lack of insight. The other Groups of Units on which the concordant group has high scores are auditory hallucinations, flatness of affect, experiences (including delusions) of control, and predelusional signs. Poor rapport and other circumstances that might make it difficult to obtain information in the interview also have high scores.

When the frequency of positive ratings on Units of Analysis are examined, the following psychopathological characteristics are noted: 97% of patients have lack of insight, 74% have auditory hallucinations, 70% verbal hallucinations, 70% ideas of reference, 67% delusions of reference, 66% suspiciousness, 65% flatness of affect, 65% voices speaking to the patient, 64% delusional mood, 64% delusions of persecution, 64% inadequate description, 52% thought alienation, and 50% thoughts spoken aloud. There are no other symptoms that were present in 50% or more of the patients, although some symptoms were present almost as frequently — delusions of control (48%), hearing voices speak full sentences (44%), and poor rapport (43%).
Comparison of the psychopathology of concordant schizophrenics and discrepant schizophrenics (patients with the clinical diagnosis of schizophrenia, but neither in CATEGO Class S nor in McKeon's Cluster 4, 5, or 7), indicates that they differ markedly with regard to hallucinations, delusions, flatness of affect, and depressive symptomatology. The concordant schizophrenics score much higher on delusions, hallucinations, and flatness of affect, while the discrepant schizophrenics score higher on depressive symptomatology.

When the psychopathological characteristics of the concordant group are compared to those of the group of psychotically depressed patients, it is found that the concordant group of schizophrenics shows even less similarity to the psychotically depressed patients than does the group of all schizophrenics.

There are concordant schizophrenics in every one of the FRCs. When the average percentage scores on Groups of Units of Analysis for concordant groups of individual Centres are compared Centre by Centre, using an analysis of variance, there are no significant differences between any pair of Centres. Thus it can be concluded that it is possible to identify a concordant group of schizophrenic patients that has a distinctive pattern of symptoms, that this pattern is consistent across Centres, and that there are patients belonging to this group in every Centre in the study.

15.11 Significance of results

In summary, the IPSS has developed standardized, reliable, and internationally applicable instruments for psychiatric assessment, has demonstrated the feasibility of large-scale international transcultural psychiatric studies, and has provided management and operational methodology for carrying out such studies. Statistical and data analysis methods to handle large amounts of data have been devised, and procedures for training investigators in the use of standardized procedures have been developed. Basic knowledge about the nature of schizophrenia and other functional psychoses has been acquired. The information obtained in the initial evaluation, together with information from the follow-up investigations, will enable the validity of current diagnostic classification and concepts to be tested. A large patient sample has been assessed in standardized fashion in 9 countries and this population can serve as a reference group for future studies.

The IPSS has also resulted in the creation of a network of research centres in economically and socioculturally very different countries. In these centres there are trained and experienced transcultural psychiatric workers who have established working relationships with one another and who have indicated their desire to continue studying together transcultural psychiatric questions of mutual interest.

It has often been said that transcultural studies cannot be done effectively because differences in diagnostic practices are irreconcilable. The question has also often been raised whether there would be similar groups of patients in all cultures. What is striking about the IPSS experience is that, with a relatively small amount of training, psychiatrists from 9 countries could examine patients in a standardized manner for research purposes and
find similar groups of schizophrenics in all of these countries.

13.12 Future Work

The design of the IPSS has included one-year and two-year followup evaluations of patients. These followup investigations will extend the use and assessment of standardized transcultural instruments and the comparative analysis of the psychopathological characteristics of schizophrenia and other psychoses. This material will make it possible to investigate the relationship of diagnosis, symptomatology and sociocultural factors on initial evaluation to course and social outcome.

Using data from the followup studies, it will be possible to compare how particular symptoms change in different diagnostic groups and in different Centres over two years. The one- and two-year outcome of illness can be compared among diagnoses and Centres. Followup data can be used to test the diagnostic validity of clinical concepts by examining whether such classifications have any prognostic value across many different countries and by determining whether theoretical assumptions about the course of schizophrenia are confirmed by what is seen.

In addition to providing a general methodological basis for future epidemiological studies, the IPSS has suggested several specific lines of research for the future. Many of these can be pursued by using the data already accumulated in the study, while others would require extensions of the IPSS or new studies. An example of an investigation that could utilize data already collected in the IPSS is a study to compare the clinical picture of patients who have been diagnosed as schizophrenic by clinical diagnosis and computer and who differ by McKeon grouping. This would show if McKeon clustering detects important differences among patient groups that are not reflected in current clinical concepts. As the purpose of this first volume is to report basic findings that might serve as foundations for future work, the analyses presented here did not utilize a great deal of data accumulated in the study which did not directly pertain to this purpose. However, studies based on these additional data will be carried out concurrently with the two-year followup phase of the IPSS.

The IPSS also brings into focus certain areas of study and certain hypotheses that could be further investigated and tested either by expanding the IPSS or by initiating new studies. For example, the fact that a high percentage of the schizophrenics in Agra were diagnosed as catatonic schizophrenic, when considered in the light of many recent reports in the literature that catatonia is now very rare, suggests that it would be fruitful to examine why catatonia is so prominent in one series and so rare in others. Further studies of specific groups of patients such as schizo-affective schizophrenics can also be undertaken.

A number of such special studies, aimed at elucidating hypotheses and problems raised by the IPSS, are already underway in IPSS and associated research centres, and will be discussed in Volume II.

The findings of the IPSS suggest that the important differences of diagnostic practice across countries and cultures can be controlled and that similar groups of patients can be identified in all of the countries of the
study. Such similar groups of patients can be studied in terms of a large number of variables, e.g., biochemical, ecological, genetic, and psychodynamic. Further investigations into the nature of the diagnostic process and into the applicability of epidemiological research instruments and techniques, are also possible.

This reference to possible future projects is not in any sense intended to be an exhaustive list, as clearly many more such studies have been suggested by the data and the operational experience of the IPSS. Rather, they are mentioned in an attempt to convey the feeling of virtually all the IPSS collaborators of the wealth of possibilities opened up by the study.

To end this report on an optimistic note, those who have participated in the study have all expressed the feeling that the IPSS has developed new ways of approaching research problems within their own cultures, and of conducting meaningful comparative work, and the intention to continue their collaborative efforts.
LIST OF REFERENCES


Bleuler, M. and Angst J. (eds.)(1971) *Die Entstehung der Schizophrenie*, Berne, Stuttgart and Vienna, Huber


Cohen, J. (1968) Weighted Kappa: Nominal scale agreement with provision for scale agreement or partial credit, *Psychological Bulletin*, 70, 213


Dembowitz, N. (1945) Psychiatry amongst West African troops, Journal of the Royal Army Medical Corps, 84, 70


Edwards, D. A. W. (1971) Discriminative information in diagnosis, Proceedings of the Royal Society of Medicine, 64, 676


Everitt, R. (1970) Personal communication


Fleiss, J. L. Unpublished data


Hare, E. H. (1956) Mental illness and social conditions in Bristol, Journal of Mental Science, 102, 349


Joos, M. (1962) The five clocks, Indiana University Research Center in Anthropology, Folklore and Linguistics, Publication 22

Kasanin, J. (1933) The acute schizo-affective psychoses, American Journal of Psychiatry, 13, 97


Kendell, R. E. (1971) Psychiatric diagnosis in Britain and the United States, British Journal of Hospital Medicine, 7, 147


Kendell, R. E., Everitt, B., Cooper, J. E., Sartorius, N. and David, M. E. (1968) Reliability of the Present State Examination, Social Psychiatry, 3, 123


Lambo, T. A. (1955) The role of cultural factors in paranoid psychoses among the Yoruba tribe, Journal of Mental Science, 101, 239


Langfeldt, G. (1937) The prognosis in schizophrenia and the factors influencing the course of the disease. A katamnestic study, including individual re-examinations in 1936, Copenhagen, Munksgaard, Acta Psychiatrica et Neurologica, Supplement 13

Langfeldt, G. (1939) The schizophreniform states, Copenhagen, Munksgaard

418


Lemkau, P., Tietze, C. and Cooper, M. (1941) Mental hygiene problems in an urban district, Mental Hygiene, 25, 624

Lewis, A. J. (1953) Health as a social concept, British Journal of Sociology, 4, 109

Lin, T. Y. (1953) A study of the incidence of mental disorders in Chinese and other cultures, Psychiatry, 16, 313


Lin, T. Y. (1969) Reducing variability in international research, Social Psychiatry, 47, 47


Longacre, R. E. (1958) Items in context - their bearing on translation theory, Language, 34, 482

Lorr, M. Personal communication


419


Malzberg, B. (1940) *Social and biological aspects of mental disease*, Utica, New York, State Hospital Press


420


Nida, E. A. (1964) Toward a science of translating with special reference to principles and procedures involved in Bible translating, Leiden, E. J. Brill


Ødegaard, Ø. (1946) Marriage and mental disease, Journal of Mental Science, 92, 778

Ødegaard, Ø. (1952) The incidence of mental disease as measured by census investigations versus admission statistics, Psychiatric Quarterly, 26, 212


421


Rubin, J. and Friedman, H. P. (1967) A cluster analysis and taxonomy system for grouping and classifying data, New York, IBM Corporation, New York Scientific Center


422


Spilka, Irene V. (1968) On translating the mental status schedule, Meta, 13, 4


Spitzer, R. L., Endicott, J. and Fleiss, J. L. (1967b) Instruments and recording forms for evaluating psychiatric states and history, Comprehensive Psychiatry, 8, 321

Stein, L. (1957) "Social class" gradient in schizophrenia, British Journal of Preventive and Social Medicine, 11, 181

Strömgren, E. (1938) Beiträge zur psychiatrischen Erblehre, Copenhagen, Munksgaard


United Nations (1951) Application of international standards to census data on the economically active population. Population Studies No. 9, New York, United Nations

Vaillant, G. E. (1962) The prediction of recovery in schizophrenia, Journal of Nervous and Mental Disease, 132, 534


Venables, P. and Wing, J. K. (1962) Level of arousal and the subclassification of schizophrenics, Archives of General Psychiatry, 7, 114


Wing, J. K. (1970b) Standardisation of psychiatric classification, Proceedings of the Royal Society of Medicine, 64, 673


Yap, P. M. (1967) Classification of the culture-bound reactive syndromes, Australian and New Zealand Journal of Psychiatry, 1, 172