Introduction

Many investigators have factor analyzed mental state ratings in order to identify and measure the dimensions of psychopathology (Costello, 1970). Two of the most important factor analyses are those of Lorr et al. (1962) and Spitzer et al. (1967). Although differences exist between their results, they agree in three important particulars. Both found depression and anxiety to merge into a single factor, named Anxious Intropunitiveness by Lorr, et al. and Depression-Anxiety by Spitzer, et al. Both found retardation and flat affect to merge into a single factor, named Retardation and Apathy by Lorr, et al. and Retardation-Emotional Withdrawal by Spitzer, et al. Finally, both found restlessness and manic behavior to merge into a single factor, named Excitement by Lorr, et al. and Agitation-Excitement by Spitzer, et al.

Fleiss, Gurland and Cooper (1971) applied a factor analysis to the mental state ratings made on 500 patients studied by the Cross-National Study of Diagnosis of the Mental Disorders (the Project). They found each of the three previously merged factors to be separated into its component dimensions. The project studied similarly a further sample of 366 patients. The purpose of the proposed investigation was to generalize to the new sample the results of the factor analysis found for the original sample.

Methods

The project consisted of two teams of psychiatrists and other social scientists, one based in New York and one in London. In its first study, the project examined two hundred and fifty consecutive admissions to a New York state mental hospital and 250 consecutive admissions to a London area
mental hospital. In its second study, the project examined a further sample of 366 patients, 192 from the nine State Hospitals serving the New York metropolitan area and 174 from nine of the 23 Area Mental Hospitals serving Greater London. All patients were aged between 20 and 59 years, but were otherwise unselected from all successive admissions.

A structured mental state interview was used in both studies. It consisted of some 400 questions related to current mental state, for each of which one or more items indicating the presence or absence of the psychopathology under examination were rated. There was a total of nearly 700 such items, 481 from the Present State Examination of Wing et al. (1967), and 197 from the Psychiatric Status Schedule of Spitzer et al. (1970). The mental state interview was administered within 72, and usually within 48 hours of admission.

Each selected patient was given a project diagnosis arrived at by consensus of two or more project psychiatrists after the completion of the mental state interview, plus further interviews with the patient and an informant covering underlying personality and past psychiatric history. The diagnoses were made using the eighth edition of the International Classification of Diseases, according to the rules of the United Kingdom Glossary of Mental Disorders (General Register Office, 1968). The major diagnostic results by the project have been reported by Cooper et al. (1972).

In order to provide an empirical identification of the various dimensions of psychopathology measured by the 700 mental state items, a factor analysis was undertaken on the total sample of 500 patients. The methods of analysis, the resulting factors, and some reliability and validity data are presented by Fleiss, Gurland and Cooper (1971). The major results were
the separation into two factors of depression and phobic anxiety; into three factors of retarded speech, retarded movement and flat affect; and into two factors of observed restlessness and hypomania. Each of these is a separation into its components of combined factors found by others (Lorr, et al., 1962; Spitzer, et al., 1967).

In order to determine the generalizability of these results, a cross-validation was undertaken on the second sample of 366 patients studied by the project. The first step in the generalization study was effectively a clerical one. A number of changes were made in the project's interview schedule between its first and second study. Some items were dropped, some were added, and some were reworded or reordered. The changes were not so numerous as to invalidate the comparability of the two schedules, but were frequent enough to require a careful review to determine which items in the original schedule were carried over unaltered to the new schedule and which were not. The next step was to score all 366 patients in the second study on each of the 25 factors found in the first study. The scores were based only on those items which were common, in terms of identical wording, to the two schedules. Each factor was scored simply as the number of its items rated in the direction of psychopathology.

Next, each item in the new schedule was correlated with each of the 25 factor scores. For an item contributing to a factor, its correlation with that factor score was corrected for the correlation between an item and a total to which it contributes. On the basis of these correlations, a number of items were dropped from some factors, and others were added.

An item was assigned to a given factor only if a) the item's highest correlation was with that factor; b) that correlation was at least .45; and c) the square of that correlation was at least twice the square of the
item's second highest correlation. By criterion b), an item was assigned to a factor only if the item and factor shared at least 20% of their variance. The purpose of criterion c) was to reduce the correlations between the factors.

The process of scoring the factors, examining the correlations between the items and factors, and revising the composition of the factors was repeated until no further revisions occurred. Six iterations were required to produce stability.

Results

Confirmation of Prior Results: Table 1 lists the 25 factors found in the first study, and those which were confirmed in the second. Three factors -- nondelusional suspiciousness, self-neglect, and bizarre behavior -- failed to be confirmed. The two original factors describing retardation -- retarded speech and retarded movement -- were merged into a single factor. The other twenty factors remained intact.

Table 2 lists the key items contributing to the 21 confirmed factors. A noteworthy feature of the first analysis was that two items describing nonspecific anxiety, "(Patient) admits that he is often anxious," and "(Patient) admits he feels anxious most of the time," correlated almost equally with the depression and phobic anxiety factors. The same result was obtained in the second analysis. The item, "Admits that he is often anxious," correlated .42 with the depression factor and .36 with the phobic anxiety factor in the second study. The other general item, "Admits he feels anxious most of the time," correlated .40 and .34 with the two respective factors.

The correlation among the 21 confirmed factors are presented in Table 3. As they did in the first analysis, the factors describing depression
and phobic anxiety share almost a quarter of their variance. These two factors, together with the factor describing reported restlessness, seem to comprise a cluster of related signs and symptoms describing different aspects of subjectively felt distress.

In the first analysis the flat affect factor correlated .43 with the factor for retarded speech and .14 with the factor for retarded movement. In the second analysis, flat affect correlated .29 with the combined retardation factor. It is uncertain whether this correlation reflects a real association between flat affect, and psychomotor retardation or, instead, reflects such difficulties as distinguishing between speech which is slow and speech which shows little variation in tone of voice.

In the first analysis, the observed restlessness factor correlated .15 with the hypomania factor; in the second analysis, they still correlated low: .19. Observed restlessness and observed belligerence correlate .37, and may constitute a cluster describing agitated belligerence exhibited during the interview. Hypomania and grandiose delusions correlate .32, and may constitute a cluster describing manic thoughts and behavior. These and other suggested clusterings of factors (e.g., paranoid with control delusions) are being tested by a second-order factor analysis.

The Independence of Depersonalization-Derealization: In the first study, the depersonalization-derealization factor was found to be virtually uncorrelated with the other factors, and to be independent of diagnosis. These findings were confirmed in the generalization study, and are described in detail in accompanying article no. 4.

Diagnostic Discriminations: Fleiss, Gurland and Cooper (1971) have described the diagnostic discriminations which were achieved by the factorial separations cited above. These discriminations have, by and large, been con-
firmed. Consider for example, the separation of flat affect from retarda-
tion. Psychomotor retardation -- the slowing down or even the cessation
of speech and voluntary movements -- may well be the single most important
symptom for distinguishing between psychotic and neurotic depressives
(Costello, 1970; Noble and Lader, 1972). Flat or blunted affect -- the
deCREASEd ability to experience such emotions as sorrow, hope and remorse
-- on the other hand, is a characteristic and perhaps even a pathognomonic
sign of schizophrenia (Mayer-Gross, Slater and Roth, 1955, p. 234; Noyes

Table 4 presents the mean standard scores on the flat affect and
psychomotor retardation factors for the patients diagnosed by the project
as either schizophrenic (all subtypes included) or depressive (including
manic-depressive, depressed). The raw factor scores were standardized to
have a mean of 50 and a standard deviation of 10 across the entire sample
of 366 patients in the generalization study. The difference between the
two groups on the psychomotor retardation factor is small (t = 1.10, n.s.).
The schizophrenics scored significantly higher than the depressives on the
flat affect factor, however (t = 3.35, p < .01). It is thus the flat af-
fect component of a picture of apathy and lethargy, and not the retarda-
tion component, which helps in distinguishing between schizophrenia and
depression.

Table 5 demonstrates that the retardation component is the important
one for separating depressives into the neurotic and psychotic (includ-
ing manic-depressive, depressed) subtypes. The psychotic depressives
scored significantly higher than the neurotic depressives on the psycho-
motor retardation factor (t = 3.07, p < .01), but were not significantly
different on the flat affect factor (t = 0.97, n.s.).
Further Work: Using programs already written, the ability of the 21 confirmed factors to make various diagnostic discriminations, both singly and as a set (using discriminant analysis), will be tested. Mention has already been made of a planned second-order factor analysis. These and other analyses which may suggest themselves to the scientists who worked on this grant are unlikely to call for additional NIMH support.

Reports Supported in Part by this Grant:


2. Fleiss, J.L. Measuring agreement between two observers on the presence or absence of a trait. Submitted to Biometrics.


References


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<tr>
<td>Incomprehensibility</td>
<td>Incomprehensibility</td>
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Table 2. Key Items in the 21 Confirmed Factors of Psychopathology

**Depression:**

'Has less interest than usual in things,'
'Has difficulty concentrating,'
'Admits he is often sad or depressed,'
'Has felt life wasn't worth living,' and
'Lacks self-confidence.'

**Phobic Anxiety:**

'Anxiety in crowds,'
'Panic attack,'
'Trembling; hand shaky; weak at the knees,'
'Sweating, clammy hands,' and
'Fear prevents participation in activities.'

**Retardation:**

'Frequently fails to answer,'
'Very slow to move (unusual for age),'  
'Almost no or no extra sentences,' and
'Shuffling gait (unusual for age).' 

**Reported Restlessness:**

'Exhausted during daytime,'
'Bothered by restlessness,'
'Has paced up and down a lot,' and
'Delays going to bed to avoid tossing and turning.'

**Observed Restlessness:**

'Marked agitation,'
'Fidgeting, pacing,'
'Scratches or picks at skin,'
'Gets up and moves about restlessly,' and
'Fidgets or squirms in seat.'

**Hypomania:**

'Pressure of speech,'
'Very rapid speech,'
'Elated, euphoric, perhaps changing to irritability or depression,'
'Flight of ideas,' and
'More ideas than other people have, or than he can manage.'

**Somatic Concerns:**

'Preoccupation with physical complaints,'
'Complains about physical condition,'
'Worried about physical health,'
'Incorrectly claims an organ system is diseased,' and
'Doctors find no basis for reported aches and pains.'
Table 2 (continued)

Reported Belligerence:

'Has had rages or fits of anger,'
'Has lost his temper,'
'Has hit, kicked, or thrown things,' and
'Gets into heated arguments.'

Observed Belligerence:

'Hostility manifested during interview,'
'Objects to interview,'
'Sarcastic, contemptuous or insulting towards interviewer,'
'Tries to start an argument,' and
'Keeps looking angry.'

Obsessions:

'Can't resist repeating some act,'
'Repetitive acts interfere with activities,'
'Worries about germs,'
'Takes precautions to protect himself from dirt,' and
'Rechecks things he has already done.'

Disorientation:

'Does not know name of president/prime minister,'
'Does not know name of hospital,'
'Does not know month and year,' and
'Can't remember when he was born.'

Lack of Insight:

'Denies psychiatric symptoms,'
'Says his problems are physical,'
'Denies sickness,' and
'Blames his illness on other,' and
'Is not convinced he is ill.'

Depersonalization-Derealization:

'Felt things were unreal,'
'Felt something about himself unreal,'
'Living in parallel existence,'
'People change their appearance,' and
'Felt part of body did not belong.'
Table 2 (continued)

Paranoid Delusions:

'Believes he has been attacked or cheated,'  
'Believes there is a plan to harm him,'  
'Feels he is singled out for persecution,'  
'Believes there is a conspiracy against him,'  
and  
'Believes people spread gossip about him.'

Grandiose Delusions:

'Believes he has special mission in life,'  
'Feels close to God,'  
'Claims incredible power,'  
'Believes he can read people's thoughts,'  
and  
'Assumes famous identity or claims personal fame.'

Control Delusions:

'Claims thoughts are put into his mind,'  
'Believes he is possessed by others,'  
'Feels his thoughts are broadcast to world,'  
'Thinks he is an automaton,' and  
'Thoughts stop unexpectedly, with mind completely blank.'

Visual Hallucinations:

'Sees strange shapes, odd things, or visions,'  
'Has visions others do not see,'  
'Has visions more than once,'  
'Thinks visions are real,' and  
'Has long-lasting visions.'

Auditory Hallucinations:

'Hears voices when alone,'  
'Noise is like a voice,'  
'Voice speaks directly to him,'  
'Voices come from people,' and  
'Says voices are genuine.'

Nonsocial Speech:

'Talks to self,'  
'Mutters to himself,'  
'Lips move soundlessly,' and  
'Repeats words mechanically.'
Table 2 (continued)

Flat Affect:

'Expressionless face,'
'Monotonous voice,'
'Talks of condition with no sign of emotion,'
and
'Pitch of voice shows no variation.'

Incomprehensibility:

'Loose associations,'
'Talks in obscure or cryptic fashion,'
'Answers are often irrelevant,'
'Sudden shifts from topic to topic,' and
'Speaks of odd matters as if listener understands.'
Table 3. Correlations Between 21 Factors Confirmed by the Generalization Study (n = 366)

<p>| Factor                        | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  |
|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1. Depression                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 2. Phobic Anxiety             | 48* |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 3. Reported Restlessness      | 49  | 40  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 4. Observed Restlessness      | -13 | -08 | 01  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 5. Retardation                | 14  | -06 | -01 | -01 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 6. Hypomania                  | -23 | -06 | 10  | 19  | -11 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 7. Somatic Concerns           | 24  | 08  | 08  | -05 | 01  | -15 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 8. Observed Belligerence      | -12 | -12 | -07 | 37  | 0   | 09  | -05 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 9. Reported Belligerence      | 27  | 15  | 32  | 04  | -14 | 19  | 07  | 12  |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 10. Obsessions                | 27  | 31  | 15  | 06  | -03 | -01 | 11  | -10 | 15  |     |     |     |     |     |     |     |     |     |     |     |     |
| 11. Disorientation            | -02 | -03 | -08 | 11  | 20  | -11 | 16  | -01 | -04 | 06  |     |     |     |     |     |     |     |     |     |     |     |
| 12. Lack of Insight           | -40 | -23 | -23 | 15  | -15 | 25  | -04 | 27  | 0   | -12 | 06  |     |     |     |     |     |     |     |     |     |     |
| 13. Depersonalization-        | 26  | 13  | 24  | -02 | 13  | 09  | 0   | -05 | 19  | 21  | -03 | -14 |     |     |     |     |     |     |     |     |
| Derealization                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 14. Paranoid Delusions        | 01  | 07  | 10  | 04  | -04 | 05  | -04 | 09  | 14  | -02 | 0   | 29  | 10  |     |     |     |     |     |     |     |
| 15. Grandiose Delusions       | -11 | -04 | -05 | 13  | -09 | 32  | -07 | 04  | 07  | 01  | 01  | 26  | 10  | 22  |     |     |     |     |     |     |
| 16. Control Delusions         | 05  | 04  | 08  | -02 | 01  | 02  | 06  | 0   | 07  | -06 | 02  | 11  | 23  | 45  | 30  |     |     |     |     |     |
| 17. Visual Hallucinations     | 08  | 14  | 04  | 04  | 03  | -01 | 12  | -06 | -03 | 18  | 11  | 05  | 16  | 17  | 21  | 17  |     |     |     |     |
| 18. Auditory Hallucinations   | 08  | 03  | 09  | -01 | -01 | -02 | -07 | 0   | 08  | 05  | 02  | 12  | 26  | 41  | 09  | 35  | 33  |     |     |     |
| 19. Nonsocial Speech          | -07 | 01  | -08 | 08  | 10  | -01 | 09  | 04  | -05 | -05 | -04 | 09  | 12  | -03 | 03  | 11  | 03  | 09  |     |     |
| 20. Flat Affect               | -02 | -05 | -11 | 03  | 29  | -08 | 0   | -03 | -15 | -05 | 09  | 05  | 09  | 08  | 13  | 25  | 08  | 14  | 0   |     |
| 21. Incomprehensibility       | -22 | -15 | -10 | 17  | 01  | 22  | -06 | 11  | -04 | -08 | 03  | 30  | 12  | 22  | 19  | 01  | 06  | 27  | 16  |     |</p>
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Table 5. Mean Standard Scores on Retardation and Flat Affect Factors of Patients Diagnosed by the Project as Neurotic or Psychotic Depressive

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