THE RELATION BETWEEN NEUROSIS AND PSYCHOSIS: A RE-ANALYSIS

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Introduction

Recently D. S. Trouton and A. E. Maxwell (7) reported the results of a factorial analysis of 45 variables derived from an Item Sheet used at the Bethlem Royal and Maudsley Hospitals. Their sample consisted of 819 male hospitalized patients aged 16–59 having non-organic psychiatric disorders. The variables included the major symptoms and past history notations of psychotic and neurotic patients. Their analysis yielded six factors, the first two of which were identified as "psychoticism" and "neuroticism". The authors conclude that their findings support the view that the varied symptom patterns of mental illness can be accounted for by these independent components.

An examination of the two-dimensional plots of the orthogonally rotated factors indicated that a much better fit to the data could be obtained if the axes were oblique rather than orthogonal. On *a priori* grounds it would seem plausible to expect that the underlying dimensions isolated in this domain would be correlated. Moreover, there is considerable supporting empirical evidence for this belief in the studies of psychotic and neurotic symptoms reported by Degan (1), Lorr, Jenkins and O'Connor (3), and Lorr and Rubinstein (4).

The goal of the Trouton and Maxwell rotations was to find a transformation "which would yield factors conforming as far as possible to present psychological knowledge and psychiatric practice and at the same time aim at economy of description". The purpose of this study was (*a*) to re-rotate the original data to a position that would more closely approximate simple structure, and (*b*) to suggest alternative interpretations of the rotated factors.

Procedure and Findings

The rotational procedures used were a combination of single plane and ordinary graphical methods. To remove investigator bias the rotations were conducted blind, that is to say, without knowledge of the defining variables.

Table I, the oblique factor matrix, presents the results of the rotations performed. The transformation matrix and the correlations between the first order factors are shown in Tables II and III respectively. For the most part only variables with correlations of ·35 or higher with a reference axis will be used in interpretations of the factors.

The first factor, A, is best defined by the following items: motor disturbances, schizophrenic type of thought disorder, delusions (other), hallucinations, thought or memory impairment, socially withdrawn, retarded activity, ideas of reference, mood disturbances (inappropriate or changing), gross disturbances

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of weight and food intake, constitutional causes, and denial of symptoms. The dichotomous variable psychotic versus non-psychotic has a correlation of ·42 with A. The prominence of the schizophrenic symptoms and the high positive weight of the psychotic notation on A indicate a broad underlying schizophrenic reaction. Moreover, the varied character of the symptoms defining the factor strongly suggest that we have here a second order factor appearing at the first order level. Certainly previous studies have established such distinguishable factors as motor disturbances, paranoid projection, perceptual distortion, and conceptual disorganization (2).

Can factor A be identified with "psychoticism" in general? We may rule out this possibility on a number of counts. A schizophrenic reaction is surely not synonymous with psychoticism. Then, too, there are other parameters implied in the factor matrix that clinicians would contend to be psychotic. Thirdly, two or more second order psychotic factors have been repeatedly identified (1, 2). Fourthly, the correlation of the psychotic variable with factor A accounts only for about 17 per cent. of the total variance. Apparently factor A comprises only a fraction of the total variance of the psychiatric construct of psychoticism.

Factor B represents in part the psychiatrists' concept of psychoneurosis as evidenced by a correlation of $-\cdot 52$ of variable No. 2 with this reference axis. Other defining notations are the following: symptoms of over 12 months duration, neurotic traits in childhood, obsessional symptoms (lifelong or episodic), unsatisfactory early life, mood variations before present illness, family history of abnormal personality, anxiety symptoms (lifelong or episodic), compulsive acts and/or obsessive thoughts, work position falling or frequently unemployed, energy output low, and gradual onset of illness. Hysteric symptoms (lifelong or episodic) has a lesser relation to factor B.

Factor B is one of two psychoneurotic factors in the matrix. The presence of such varied symptoms as obsessions, mood variations, anxiety, and hysteria suggest that factor B, like A, is most likely a second order factor at the first order level. The common element that results in factor B seems to be primarily historical; emphasis is on long duration, gradual onset, and family abnormality.

Is factor B synonymous with a general "neuroticism" component? The presence of another psychoneurotic factor in the matrix, factor F, a hypochondriacal reaction, suggests that such an identification is not plausible. The absence of marker or reference variables (through no fault of the author) from other known neurotic syndromes (5, 6) would also preclude the isolation of a central neuroticism factor. Finally, it is known, from at least two reported similar studies, that there are several, rather than one, second order factors. It is assumed here that "neuroticism", if it existed, would appear as a second order factor. There remains the possibility that a third order neurotic factor can be isolated.

The third factor, C, appears to represent an acute situational depression in younger patients (less than age 40). It is best described by severe insomnia (any time during illness); compulsive acts and/or obsessive thoughts; gross disturbance of weight and food intake; suicidal feelings, intentions, or attempts; a family history of psychosis; and judgment that constitutional causes are important or dominant. Other symptoms correlated with C (less than ·35) are agitated; depressed; and delusions of guilt, self-reproach, and unworthiness. The negligible correlation of the psychotic versus non-psychotic dichotomy with factor C suggests that the examining psychiatrist was uncertain how to classify such patients.

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The notations characterizing factor D are irritable, impulsive and/or aggressive, mood variations before present illness, suspicious, anxiety symptoms (lifelong or episodic), overactive or excited, agitated. The correlation of ·20 of the psychotic versus non-psychotic dichotomy suggests that this pattern is likely to be labelled "psychotic". The underlying parameter is not too clear but it is similar to the Lorr, Jenkins, O'Connor (3) belligerence factor and the Degan irritability factor (1).

Factor E is clearly a retarded depression. Defining E are notations of socially withdrawn, depressed, delusions of guilt and self reproach, lacks self confidence when in society, retarded activity, and compulsive acts and/or obsessive thoughts. Variables showing lesser correlations with E are suicidal feelings, anxious, unsatisfactory adolescent adjustment, and absence of overactivity. It is also of interest to note that variable No. 45, recovered or much improved at discharge, has a positive correlation of ·21 with E. As in the case of C, acute situational depression, the interviewer is ambivalent as to whether the patient is psychotic or psychoneurotic.

The last factor, F, represents a hypochondriacal reaction. Correlated with F are hypochondriacal attitude toward illness, other functional disturbances, anxious, hysterical symptoms (lifelong or episodic). Other variables showing minor correlations with F are consistent in suggesting an anxious preoccupation with somatic complaints.

The correlations between the factors are shown in Table III. Because the planes were ill-defined in a number of places the correlations cannot be supported with much confidence. However, two independent second order factors, shown in Table IV, were extracted by the multiple group method. Both are bipolar. The first is defined by the schizophrenic reaction (A) and belligerence (D) at one pole and by acute situational depression (C) and hypochondriasis (F) at the other pole. It is very similar to Degan's factor Y, which he calls paranoid-depressive. Factor Y is defined by his first order factors neurasthenia and depression versus hyper-irritability and hyper-projection. This suggests that two opposing defence mechanisms are in operation; i.e. projection versus introjection.

The second bipolar factor opposes the psychoneurotic factor B to retarded and acute depression (E and C). Perhaps this represents the opposition of an illness of long duration and one of short duration.

TABLE I

Oblique Factor Matrix

(Decimal points are omitted)

Item	Description	Factors					
		A	B	C	D	E	F
1	Age (16–39) vs. (40–59)	−16	−05	50	−14	−21	−21
2	Psychotic vs. non-psychotic	42	−52	06	20	−01	−08
3	Family history of psychosis	19	16	35	05	18	−18
4	Family history of neurosis	01	18	−18	−01	26	30
5	Family history of abnormal personality	−02	42	11	17	00	01
6	Unsatisfactory early life	−03	45	04	20	15	11
7	Unsatisfactory adolescent adjustment	11	30	−30	21	32	27
8	Work position falling/frequently unemployed	17	38	−10	05	−06	17
9	Lacks confidence when in society	19	24	−19	05	52	19
10	Unsatisfactory home life as an adult	−21	27	32	05	−23	−05
11	Neurotic traits in childhood	16	46	07	11	−04	27

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TABLE I—*continued*

Item	Description	Factors A	B	C	D	E	F
12	Hysterical symptoms, lifelong or episodic	−12	32	−11	17	−18	38
13	Obsessional symptoms, lifelong or episodic	28	46	14	19	14	−01
14	Anxiety symptoms, lifelong or episodic	−31	42	05	35	22	27
15	Mood variations before present illness	−18	45	23	43	14	−14
16	Energy output low	27	36	−13	−07	10	26
17	Symptoms of over 12 months' duration	01	55	−03	00	−04	09
18	Gradual onset of illness	02	35	18	18	21	−22
19	Constitutional causes important or dominant	39	33	35	−01	16	−07
20	Precipitative psychological and social causes unimportant	25	−07	25	−21	−01	−14
21	Other functional disturbances	−01	−02	−07	−08	−08	55
22	Retarded activity	47	−02	25	−03	54	−04
23	Overactive, excited	28	−17	20	32	−30	−02
24	Agitated	02	−08	33	35	02	13
25	Impulsive and/or aggressive	31	03	14	49	−07	−03
26	Socially withdrawn	54	00	−10	03	66	19
27	Compulsive acts and/or obsessive thoughts	30	43	44	05	37	14
28	Motor disturbances	73	05	04	06	04	09
29	Depressed	−10	01	29	21	61	00
30	Anxious	−23	−04	−09	16	31	43
31	Mood disturbances	45	01	−02	34	−06	09
32	Suspicious	28	−14	−02	43	16	08
33	Irritable	−04	03	−03	51	07	06
34	Suicidal feelings, intentions, attempts	05	09	39	30	32	−14
35	Schizophrenic type of thought disorder	68	−16	−11	00	11	−13
36	Thought or memory impairment	53	−05	09	09	17	19
37	Delusions of guilt, self-reproach	13	−09	28	30	56	04
38	Ideas of reference	40	−33	−28	17	29	08
39	Delusions (other than in Items 37 and 38)	55	−28	−02	15	15	16
40	Hallucinations	53	−29	−17	17	05	17
41	Severe insomnia any time during illness	05	00	49	24	07	11
42	Gross disturbance of weight, food intake	41	09	40	−08	20	05
43	Hypochondriacal attitude toward illness	03	−02	00	01	−06	60
44	Denial of symptoms	35	19	06	04	−22	−32
45	Recovered or much improved at discharge	−31	−28	16	−01	21	−18

TABLE II

Transformation Matrix

(Decimal points are omitted)

	A	B	C	D	E	F
I	38	−38	26	38	31	−20
II	−04	58	17	58	48	54
III	11	15	−48	24	−27	00
IV	58	02	−44	−66	27	51
V	67	10	50	−05	−66	20
VI	−23	70	48	−15	30	−60

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TABLE III
Correlations of Primary Factors

	A	B	C	D	E	F
A	1·00					
B	— ·02	1·00				
C	— ·43	— ·30	1·00			
D	·43	·02	— ·42	1·00		
E	·11	— ·29	·08	— ·10	1·00	
F	— ·37	— ·12	·50	— ·24	— ·00	1·00

TABLE IV
Second Order Factor Matrix F
(Decimal points are omitted)

	X	Y
A	64	−23
B	16	53
C	−72	−23
D	59	01
E	−02	−54
F	−62	01

DISCUSSION

As Trouton and Maxwell point out, the basic data are distinctly limited. The symptoms do not represent a description of the patient over a uniform period of time. The symptoms included do not adequately represent all of the major diagnostic categories. Some symptoms are combined with their opposites and few terms are defined. Finally, degree of rater agreement and systematic bias are unknown. To these limitations should be added the absence of sufficient reference variables to define other factors likely to be present. For example, in the absence of two or three distinctive variables to define a paranoid pattern, no common paranoid factor can appear, although one may be present; it is lost in the unique variance. Undoubtedly this is one reason for the appearance of second order factors at the first order level.

Is an orthogonal reference frame the most suitable approach to the isolation of such general parameters as "psychoticism" and "neuroticism"? In the cognitive domain the concept of a second order factor has been found to be fruitful in bringing together the Spearman notion of a general intellectual factor and the Thurstonian group factors. In the domain of psychopathology there is also evidence that second order factors isolated are meaningful and stable. There is substantial agreement between Degan (1) and Lorr *et al.* (3) despite differences in populations sampled and rating scales utilized. It would seem preferable to permit the data to dictate the angle between planes. An analysis of the correlations between the primary factors should then reveal any more general second order or third order parameters.

SUMMARY AND CONCLUSIONS

The centroid factor matrix reported by Trouton and Maxwell in a study of 45 variables taken from an Item Sheet used at the Bethlem Royal and Maudsley Hospitals was subjected to a re-analysis. The six factors were re-rotated obliquely with the object of attaining simple structure.

The first two rotated factors were interpreted as a broad schizophrenic reaction and a psychoneurotic factor with emphasis on long duration, gradual onset, and family abnormality. It was hypothesized that both are second order factors appearing at the first order level. The remaining factors were interpreted as an acute situational depression, a retarded depression, a hypochondriacal reaction, and a doubtful belligerence factor.

It is concluded that "psychoticism" and "neuroticism" factors have not been established.

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