

The Measurement of Personality and Behavior Disorders by the I. P. A. T. Music Preference Test

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On the wide research front which is roughly designated by "projective tests," but perhaps more accurately by "misperception tests" (1), few recent advances have been so promising as that connected with music perception. The powerful and immediate connection of musical stimulation with emotional experience, and the many indications that unconscious needs gain satisfaction through this medium, have long pointed to measures of musical preference as effective avenues to deeper aspects of personality. Moreover, the lack of verbal content is itself, on general principles, a promise that the verbal, cognitive defenses of the censor may be by-passed and the emotional needs probed more directly without distortion by defense elaborations.

The Music Preference Test

Personality tests which proceed from the esthetic reactions of the subject, or from likings and dislikings which cannot be based on logical, explicit relationships to the subject's purposes and sentiments, occupy an area intermediate between that of projective tests and that of other objective personality tests. For the liking or disliking is evidently due to characteristics imported or projected into the physical sounds by the listener, yet the "projections" are not so explicit as in the imagery evoked by the Rorschach or the interpretive stories which the subject is asked to weave around the T.A.T. It is possible, therefore, that further research and clinical experience with this relatively unexplored class of tests (which may be called tests of "affective misperception") will show them to have certain advantages over the standard projective or misperception tests. For sophisticated subjects intuitively realize that their *cognitive* projections stand in need of defensive disguise, whereas their likings and dislikings make no more sense to them than they do to

the psychologist—before his statistical analyses are made.

As in all test construction involving "items," it would be foolish here to design psychological measures hinging on the luck of a single response and to attempt to relate such a single response to personality dimensions. Instead we first seek reliability in the test measurement itself by composing it of scores on several items, thereby diminishing the effects of chance and specific historical associations. This may be conceived as discovering the dozen or more "items" that can *be validly added together to give a score on some single dimension of emotional quality or musical-emotional reactivity*. Attempts to find these groupings by introspection or by psychiatric judgments must be set aside, for they are shown by preliminary research to be highly unreliable and to constitute an amateurish approach to the problem. Instead it is necessary to find the dimensions of musical choice by submitting a number of musical excerpts to a large population and correlating the responses, thereby discovering empirically which responses "go together." This first stage of research in the area has already been carried out by Cattell and Saunders (4) using 120 half-minute musical excerpts under conditions described elsewhere.

The psychologically interesting and reassuring thing about this factor analysis of a matrix couched in a new variety of response correlations, namely, in music preference responses, is that simple structure was as definitely obtained here as with ability tests, and that a comparison of two factorizations revealed a very gratifying degree of invariance of the factors. With this assurance from an initial study it is to be hoped that psychologists will be encouraged to face the vast amount of exacting work required by this approach instead of being beguiled by merely esthetic intuitions in test construction.

The two dovetailed factor analyses yielded eleven stable factors (4). But before these basic findings could become a practical foundation upon which further "applied" research could readily go forward, in clinics and guidance centers generally, it was first necessary to construct out of the above research findings a convenient routine instrument. This was done under the auspices of the Institute for Personality and Ability Testing by the senior author and has issued in a 12-inch long-playing record, reproducing 100 half-minute music excerpts (50 on one side, Form A, and an equivalent 50 on the other, Form B). Except for the first and the last three factors in this test there are ten items provided to measure each factor. These items were chosen from the 120 factorized, according to the usual test construction principles; a significant loading on the factor concerned; a balancing (suppression) of loadings on factors not concerned; a balancing of "like" and "dislike" responses in the score for any one factor; no use of any item for more than one factor. A cyclical order of sampling of items from the various factors is used in the test as finally presented.

The test so constructed, when cross validated on a new population, was found to have consistency (split-half reliability) and equivalence (Form A vs. Form B) reliability coefficients (2) that were adequate on only seven or eight of the eleven factors. See Table 1. This inadequacy arises largely from some factors being measured on a bare minimum of 3 or 4 items in one form. Accordingly it is advocated that only seven or eight independent factors be routinely measured in standard clinical use and that the remaining three or four measures serve an exploratory purpose, as "located nuclei" from which further research can, by extension into new items, build up better factor scales.

Meanwhile the test has been initially standardized for every factor on a normal population of 380 student and non-student adults ranging from 18 to 68 years of age. The instructions, which are given in standard form by the voice on the record, are set out below. The I.P.A.T. Music Preference Test of Personality (3) is thus normally presented simply

as a test of musical preferences, but the implication that we were psychologically interested in the results from the standpoint of personality measurement was realized, at least by the normal group, in this particular experiment.

First Issues Needing Research

Now that such a measuring instrument is available, a number of researches immediately suggest themselves, especially in applied psychology. Concerning its promise as a personality test it is at once apparent from inspection of the actual musical excerpts found to be highly loaded in the various factors, that these factors are not merely culturally-determined groupings, corresponding to musical "schools" or periods (with one possible exception among the eleven factors: F 1). With this superficial interpretation rejected we may next examine the hypothesis that these factors correspond to what have been called major "hidden premises" in the logic of personal preference (1). For these hidden premises of choice decision, according to our hypothesis as stated elsewhere (1), should be temperamental and early-environment-determined dimensions of personality itself.

If this is correct, there should be some substantial correlations between these factors and the factors on the *16 Personality Factor Questionnaire* or any other measure of the primary personality factors. This at least is the hypothesis upon which the whole of the present investigation has been carried forward. If the musical choices are determined by personality factors, i.e., by emotional needs and constitutional tempers, we should expect, further, that various neurotic and psychotic syndromes, which are themselves explicable in terms of combinations of personality factors, and sometimes in terms of single personality factors, should show correlations with the musical choices. The immediately needed investigations, therefore, seem to be: (1) a study correlating the music factors with primary personality factors, in a normal group; and (2) a comparison of psychotics and normals in terms of musical preference factor profiles.

The hypotheses that the music factors cor-

respond to needs or to temperamental factors can be tested by this design, but one should also recognize that a third possibility exists—namely that the discovered music factors represent affective mood states, temporary dynamic stimulus conditions, physiological influences, etc. This alternative, however, need not be investigated unless the present search for stable personality associates proves abortive. Some “function fluctuation” associated with mood will almost certainly exist and it will attenuate our correlations. But if our hypothesis is correct that the major associations will be found in relation to relatively stable personality structures, then it could seem better to track down this residual, “fluctuation” variance later. At that point not only the associations of the music factors with mood, but also the individual tendencies to high or low fluctuation on the music factors will bring in relationships of further importance for understanding musical preference and personality.

A fourth design of research which is also immediately needed is a factorization of a population of psychotics, to see whether the *structure* of factors is the same there as in a normal group. Unless there is some fairly close resemblance of the factor structure in the two groups, it would indeed be illogical to measure psychotics on the same dimensions as those found among normals. Accordingly, we have also gathered data for factorization of the same 120 excerpts on a population of 100 psychotics, and this will be intercorrelated and factorized if statistical man-hour resources can be provided by the Music Research Foundation.

The general reaction of cultivated listeners to the above propositions has been that our hypotheses neglect the role of intellectual and cognitive functions in musical appreciation. Our argument is that these functions are not primary but are only means to ends—technical rationalizations of the aesthete, perhaps changing superficially with cultural climate—for satisfactions which are deeper and more stable. Initial experimental support for our position is given by the fact that the music factors do not apparently correspond in content to

cultural or technical dimensions. A research designed to tackle this question more positively has meanwhile been set in motion. It consists of an experiment in which fifty choices in pictorial art, thirty choices in architecture, and forty choices in sculpture are intercorrelated and also correlated with the factors in musical choice. If the same factorial dimensions appear here, aligning themselves with the music factors, and cutting across periods and cultural integrations, there will be additional evidence that we are proceeding beyond technical, cultural or historical patterns.

Design of the Experiment

The first part of our investigation, that with normal subjects, called for the administration of the Musical Preference Test to a normal population which should be : (1) well varied in personality; and (2) simultaneously measured on a sufficiently reliable and valid measure of the primary personality factors. The main contribution to the test population consisted of 102 male and female subjects, 76 of whom were University of Illinois students, ages 18 to 29, and 26 of whom were “general adults,” ages 30 to 81. The remainder were tested in a second sub-group consisting of 55 students, both male and female, ages 17 to 28. Since we needed to apply a personality test which deals with primary and independent personality dimensions of known associations we employed the I.P.A.T. *16 Personality Factor Questionnaire*, which is also convenient for group administration with reasonably literate populations. The 16 P.F. includes intelligence as one dimension. Each of the 157 subjects, therefore, took a one-hour music preference test in which both forms A and B of the music test were administered, and a half-hour silent session in which Form A of the 16 P.F. Test was administered. The instructions in the Music Preference Test are on the beginning of the record, and are as follows:

“This is a test of your likings and dislikings in music. Your score has nothing to do with how much you agree or disagree with popular tastes, but only with how much you agree with yourself;

that is, with how consistent¹ you are. So try to say, as each piece is played, whether you yourself like it; whether it is pleasant, so that you would like to hear more of it, or whether you would just as soon have it switched off.

"On the score sheet before you are numbers for the fifty pieces that will be played, each for less than half a minute. As each comes to an end, underline L, I, or D, opposite that number, indicating you like it, or have an intermediate, indifferent reaction, or dislike it. Dislike does not mean that you hate it, but only that you don't particularly like that kind of music. In fact you should aim to have just as many D's as L's underlined when you get to the end. Try not to use I for intermediate more than you need. In fact, you should expect to end up with very roughly one-third L's, one-third I's and one-third D's. But don't bother about that too much. Just give your reactions as truthfully as possible. . . ."

The administration of the Music Preference Test to a group of psychotics took place at Kankakee State Hospital, Kankakee, Illinois. In this case the subjects were taken in small groups of three or four at a time, in order that it might be ascertained that they were appropriately responding on the answer sheets to every piece of music. It is well known that diagnoses in different mental hospitals do not agree very highly (as shown on the individual cases transferred from hospital to hospital), and that the very proportions of manic-depressives, schizophrenics, hysterics, and other psychotic syndromes, as diagnosed in different institutions, may vary considerably. As usual a good deal of difficulty was experienced in obtaining a sufficient sample of some psychiatric syndrome groups. In accepting the group divisions finally used the criterion for classification was naturally the hospital diagnosis as reached in case conferences. A total group of 98 psychotic patients was obtained consisting of 36 alcoholics, 22 schizophrenics of mixed types, 10 manics, 7 paranoids, and 23 of other categories each not sufficient in number for separate use in our study. The subjects were both male and female, the age range being approximately 25 to 60 years.

¹ This obviously asks the person to be "true to himself" and to give his considered judgment; with advanced music students on the other hand it might be interpreted as being consistent with regard to musical "schools," but our subjects were not music students.

Results for the Normal Personalities

The findings for the normal group will first be described. Our initial interest turns on the reliabilities, a minority of which, as mentioned above, were low enough to suggest dropping certain factors. These correlations are presented first as consistency (split-half) coefficients in Table 1, Part A and secondly as coefficients of equivalence (correlation of Form A with Form B) in Part B of Table 1.

The equivalence coefficients perhaps do not do justice to the tests because the highest loaded items were in every case put in the A form, since, when psychometrists are unable to use the full length test, it is the A form that they will use. This reduces the equivalences (columns 5 and 6) below the consistency coefficients (columns 2 and 4) which more truly represent the internal consistency, and are defective—for a 10-item length of scale—only on factors 3, 9 and 10, recommended to be dropped.

The correlations between the sixteen factors of the *16 P. F. Test* and the eleven factors of the *Music Preference Test* were worked out separately for the two populations, as a mutual check. For economy of representation the values in Table 2 are blanks except where the correlations on the two samples are of the same sign and both beyond the 1% level of significance. Then a single value—the mean correlation (Fisher's *z*)—has been corrected for attenuation, by the given reliabilities of the *Music Preference* and *16 P. F. Test* measures, and recorded in Table 2.

None of the correlations is large enough to demonstrate a one-to-one relation between the music factors and the personality factors. But the set of *16 P. F. Test* factors associated with any one music factor has a psychologically consistent and compatible character among the members in every case. For example, the personality factors correlating significantly with music factor No. 1 are dominance, surgency, toughness, radicalism and self-sufficiency—all possibly related to some second-order, comprehensive factor of temperamental toughness. Furthermore (and alternatively) the relative magnitudes of the correlations are such as *could* be compatible

ent factor scales. Meanwhile, however, this explanation rests on the indication that the highest correlation for a given music factor with any personality factor is also the highest correlation for the personality factor with any music factor. For example, factor 2 has its highest r with Q4, which r is also Q4's highest r with anything; factor 3's highest is with H, which is also H's highest; the factor 4 column has its highest with M, which is also the highest in the M row, and so on, with very few exceptions (notably factor 8).

As to the consistency of psychological meaning among personality factors associated with a given music factor we may mention, in addition to factor 1 above, that factor 2 correlates negatively both with paranoid tendency and nervous tension, which tendencies have been previously found, associated by Darling (2); and that factor 4, which correlates essentially with M ("Unconventionality vs. Practical Concernedness"), also has some association with Q2 ("Independent Self-sufficiency"). The alternative possibility is thus indicated, as suggested above, that where a music factor does not align itself with a first-order personality factor it may prove on further research to correspond to a second-order factor uniting the personality factors in some underlying common influence. For this reason music factor 1 has been called "Tough Sociability vs. Tenderminded Indi-

viduality," which contingently restricts the meaning pretty closely to the psychological bi-polarity of personality factor I, with which it is most associated, but also suggests features of the other factors with which it has some degree of association. The over-all description of the personality dimension associated with this particular music factor thus becomes remarkably similar to the Tender-vs. Tough-minded continuum described by William James (6).

Results for the Abnormal Personalities

As stated above, in the account of design, the test was administered to 98 hospitalized psychotics, divided into those four major syndrome groups which had each a sufficient number of well-diagnosed cases to promise some significance of differences, if such should exist.

The means and sigmas on all 11 factors are shown for normals, for abnormal as a whole, and for the four abnormal syndrome groups, in Table 3.

The differences are examined below by the t test, first with respect to the differences between the main psychotic group and the psychotic sub-groups, on the one hand, and the normal group on the other, with results as shown in Table 4. Nothing below a 10% probability is recorded in the P column.

Table 3
Scores of Normal and Abnormal Groups

Factor	Normals $n = 369$		Abnormals $n = 98$		Alcoholics $n = 36$		Schizophrenics (D-P) $n = 22$		Manics $n = 10$		Paranoids $n = 7$	
	Mean	Sigma	Mean	Sigma	Mean	Sigma	Mean	Sigma	Mean	Sigma	Mean	Sigma
1	13.6	5.7	14.5	4.1	15.1	3.7	13.4	3.7	15.8	4.6	12.4	6.3
2	10.7	4.1	8.7	4.7	6.4	4.4	10.0	4.7	10.2	3.6	12.1	4.6
3	9.6	2.7	8.9	2.4	9.0	2.1	8.6	2.3	9.0	1.4	9.4	1.7
4	6.8	3.3	4.8	2.4	4.1	3.0	5.5	2.5	8.2	2.6	5.4	2.1
5	12.2	2.8	11.6	2.7	12.2	2.3	11.5	3.0	12.7	2.3	10.4	1.2
6	8.4	3.1	10.8	2.8	11.4	2.7	10.7	2.8	10.2	2.2	9.4	2.6
7	8.3	3.2	7.0	2.6	5.8	2.4	7.8	2.6	7.2	1.6	7.1	2.5
8	8.0	2.6	7.9	2.2	7.3	2.1	8.4	1.9	9.1	2.6	8.4	2.7
9	7.3	3.0	9.2	2.1	9.0	2.1	9.4	2.0	9.0	2.2	8.1	1.4
10	5.6	2.1	5.9	2.0	5.5	1.9	6.0	1.7	5.9	2.1	6.6	1.5
11	6.1	2.1	5.6	2.9	6.6	2.5	5.4	3.0	3.6	2.4	3.4	2.4

Table 4
Significances of Differences of Abnormal Groups from Normals

Factor	Total Abnormal		Alcoholics		Schizophrenics		Manics		Paranoids	
	<i>t</i> (% lev. sig.)	P	<i>t</i> (% lev. sig.)	P	<i>t</i> (% lev. sig.)	P	<i>t</i> (% lev. sig.)	P	<i>t</i> (% lev. sig.)	P
1	1.7	5-10	2.0	2-5	0.3		1.4		0.5	
2	3.9	-1*	5.6	-1	0.7		0.4		0.8	
3	2.4	1-2	1.5		1.8	5-10	1.1		0.2	
4	6.7	-1	5.1	-1	2.3	2-5	1.6		0.2	
5	2.0	2-5	0.2		1.1		0.6		3.6	-1
6	7.3	-1	6.2	-1	3.7	-1	2.4	2-5	1.0	
7	4.3	-1	5.8	-1	0.9		2.0	5-10	1.2	
8	.1		2.0	5-10	1.0		1.2		0.3	
9	8.0	-1	4.8	-1	4.7	-1	2.4	2-5	1.5	
10	1.2		0.4		0.9		0.4		1.6	
11	1.7	5-10	1.0		1.2		3.1	1-2	2.7	2-5

* This indicates "beyond the 1% level."

The psychotics differ, beyond the 1% level, in being lower on factor 2, lower on 4, higher on 6, lower on 7, and higher on 9. These differences similarly characterize the alcoholics, who happen to be the largest group, though still constituting only 36 out of 98 psychotics. The schizophrenics differ at the 1% level only by being higher on 6 and 9. The manics have similar tendencies on these factors (2-5% level), but also come up with a new difference

(1-2%), by being lower on factor 11. The paranoids have no resemblance to the alcoholic and schizophrenic majority, but share the manic's lower score on 11 and show a new pattern in being lower (1% level) on 5.

Before commenting on these findings let us examine, finally, the capacity of the test to discriminate among various psychotic syndrome groups themselves. The test examination is presented in Table 5.

Table 5
Significances of Differences of Syndrome Groups, from Total Psychotic Group and One Another†

Factor	Psychotics vs. Alcoholics <i>n</i> = 98 & 36		Psychotics vs. Schizophrenics <i>n</i> = 98 & 22		Psychotics vs. Manics <i>n</i> = 98 & 10		Psychotics vs. Paranoids <i>n</i> = 98 & 7		Manics vs. Schizoids <i>n</i> = 10 & 7	
	<i>t</i> (% lev. sig.)	P	<i>t</i> (% lev. sig.)	P	<i>t</i> (% lev. sig.)	P	<i>t</i> (% lev. sig.)	P	<i>t</i> (% lev. sig.)	P
1	0.7		1.2		0.8		0.8		1.4	
2	2.6	1-2	1.1		1.2		1.8		0.6	
3	0.2		0.5		0.2		0.7		0.5	
4	1.2		1.2		3.8	-1	0.7		2.6	1-5
5	1.2		0.1		1.3		2.1	5-10	1.2	
6	1.1		0.1		0.8		1.3		0.5	
7	2.5	1-2	1.3		0.4		0.1		0.8	
8	1.4		1.3		1.3		0.5		0.7	
9	0.3		0.4		0.2		1.7		0.4	
10	1.0		0.2		0.0		1.1		0.1	
11	2.0		0.3		2.3		2.1	5-10	1.7	

† Only the noteworthy levels of significance (beyond 10%) are entered.

It will be seen that the schizophrenics above have no significant differences and comprise, as it were, the prototype of psychosis. The alcoholics, in spite of being the largest group contributing to the "mean psychotic," differ very significantly by being lower on 2 and 7.

Manic-depressives show a distinct, characteristic pattern which, in spite of the small numbers, is statistically significant, both in relation to general psychotics and to schizophrenics. From both of the latter they differ by being higher on factor 4, and from the total psychotics by being lower on factor 11. With respect to factor 4 the manic-depressives and the schizophrenics fall on opposite sides of the normal mean, which suggests that this factor has close connection with the dimension envisaged by Bleuler, Kretschmer, and others. It is interesting to note that the paranoids share some of the characteristic differences of both schizophrenics and manics, but have one additional divergent factor and finish with a uniquely characteristic profile.

These results, if confirmed on another sample, indicate that the test is a powerful means of psychiatric diagnosis, for if differences on single factors exist at such levels of statistical significance the prediction from the combination of factors in this pattern should yield substantial separation of the two groups. For example, since the factor measures are in principle independent, the difference of the normals and abnormals would be significant approximately at the $(1/100)^5$ level, and the resulting absence of any substantial overlap between the two distributions should make prediction even on the *individual* case highly reliable. As far as an exploratory study permits we can roughly indicate the diagnostically useful patterns as follows: (1) to distinguish psychotics from normals: low 2, low 4, high 6, low 7, high 9; (2) alcoholics should be similarly distinguished, but also by being especially low on 2 and 7, which pattern should further distinguish them from other psychotics; (3) paranoids distinguish from normals by low 5 and low 11; and so on for other pairs of groups.

Examined in terms of the meanings of the correlations found between these music factors and normal personality factors these psy-

chotic patterns are psychologically consistent and recognizable. But the psychotic associations also throw further light on the psychological meaning assigned to the music factors. Thus, in terms of the labels now assigned to the music factors in the handbook (3) the paranoid pattern combines the factor of "Paranoid Imperviousness vs. Overt Anxiety" (Low 5) and "Schizothymia" (Low 11). The alcoholics combine "Frustrated Emotionality" (Low 2) and "Withdrawn Schizothymia" (Low 7), incidentally corresponding to the 16 P. F. Test factors (see Table 2) known as Q_4 (Nervous Tension), and H- (Withdrawn Schizothymia), which pattern well fits the published descriptions and analyses of the dynamics of alcoholism. The manics distinguish from normals by being high on the factor of Eccentricity, on Dominance, and on Frustrated Emotionality (i.e. on music factors 6, 9, and 11 [-], corresponding to 16 P. F. factors C[-] [with others], E and Q_4). The original general interpretation of the Q_4 factor of "Jitteriness" or "Somatic Anxiety" as "Frustrated Emotionality" is strengthened by this association of the factor with both alcoholism and mania, and by its absence from the schizophrenic profile. Similarly light is thrown mutually on the alternative escapes of alcoholism and manic excitement, by the association of the "Withdrawn Schizothymia" (16 P. F. factor H[-]) with the former, and of "Eccentricity" and "Dominance" with the latter. With increasing investigation of the physiological, social and dynamic meaning of such unitary, measurable factors, as established in normal populations, the way toward causal explanation of the psychoses could become much more clear.

Space does not permit here any extensive discussion of the relation of the personality associations of the music factors to the character of the music *per se*, in the factor items. However, one may note that the psychotic group seems to prefer, according to the musical items in factors 2, 3 and 4, music that is relatively slow and simple (and also relatively "sad"). Further, from the difference on factor 7 it can be added that they tend to avoid brightly colored (harmonically and

texturally) music in favor of clear harmonic progressions, sweet melodies and subordinate accompaniment. The exception to this pattern is the manic group, which, on its distinguishing factor (No. 4), prefers fast, exhilarating, stimulating pieces with textural complication, rhythmic variation and less obvious melodic outlines. These associations might roughly be explained in terms of empathy, but as more evidence accumulates they should receive more direct research investigation, especially in the light of such research approaches as those of Rigg (7, 8).

Summary

1. A previously completed factor analysis of 120 very diverse musical excerpts was used as a basis for construction of a Music Preference Test of Personality, set up to measure eleven factors by 100 items on two sides of a long-playing (33 $\frac{1}{3}$ R.P.M.) record. As the equivalence of the A and B forms is inadequate for three or four of the factors, it is recommended that these be reserved for research improvement, by item analysis, and that the remaining seven or eight factors alone be used as internally valid measures in routine applied psychology, notably in seeking external validities by predictions in clinical and guidance psychology.

2. Since the established groupings of items do not correspond to musical schools or periods (though possessed of some consistency of musical character) it is hypothesized that they represent dimensions of personality (especially of temperament) determining taste. Correlation with the *16 Personality Factor Questionnaire Test*, on normal populations of 102 and 71, confirmed this by yielding many significant correlations.

A one-to-one relation of music preference and personality factors cannot be proven by these results, since both measures of factors are imperfect. But the correlations, corrected for attenuation, are at least consistent with the hypothesis that, but for contamination, the same personality dimensions determine, in all but two cases, both the verbal and the

music preference factors. Contingent titles have been given to the music preference factors in accordance with the personality associations. These titles proceed on the probability that most music factors are primary personality factors though some may be second-order personality factors.

3. Application of the Music Preference Test to 98 patients in mental hospitals revealed several factor measure differences, significant at the 1% level, between psychotics and normals and between various psychotic syndrome groups. If confirmed on further samples, these pattern differences are so marked as to make the test a valuable adjunct to psychiatric diagnosis. The meaning of the music factors as indicated by the personality factor correlations agrees well with the meaning as found independently in terms of the associations with psychotic syndrome groups. These scales might therefore have value in throwing further light on individual psychotic syndromes.

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