SOME SIMPLE MEASURES OF SCHIZOPHRENIC DETERIORATION

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I. Introduction

"Dementia Praecox" was discarded when it became apparent that a true dementing process was not present in schizophrenia. Most writers agree with the view put forward by French authors that the deterioration in schizophrenia is not the same as that seen in the organic psychoses (Lehrmann, 1940). Experimental work has indicated that intellectual deterioration in schizophrenia is more apparent than real, and that as it appears most when sustained effort and co-operation are required, any changes in co-operativeness and ability to maintain sustained effort invariably affect intelligence test scores (Kendig and Richmond, 1940; Sheldon Rappaport, 1951). The concept of schizophrenic deterioration employed in this article refers to a deterioration of behaviour in general, and to a deterioration of a patient's ability to look after himself in particular. With increasing interest in methods of treating deteriorated schizophrenic patients, we need reliable measures of deterioration in order to compare the effects of treatment in different groups. At present discrepancies in results are frequently due to some groups of schizophrenics being more deteriorated than others. For example Layman (1940) demonstrated that sodium amytal speeded up the psychomotor performances of schizophrenic patients, but subsequent work by Ogilvie (1953) did not confirm this finding. This discrepancy may have been due to the fact that Layman's schizophrenic group contained patients who were more deteriorated than the patients in Ogilvie's study. If a scale indicating the degree of schizophrenic deterioration could be devised, future researches into the treatment of deterioration in schizophrenia would benefit. There are a number of rating scales already available of which the best is probably the Fergus-Falls (Lucero *et al.*, 1951). All of these scales have several common defects. They contain a number of items which are very subjective in nature and dependent more on the rater than the patient. Many are also of such length that they are too time-consuming to complete, particularly in the case of patients on long-stay wards where the nursing staff are invariably overworked already.

II. Method

The problem of measuring schizophrenic deterioration has been approached in two ways, firstly by means of a standard interview, and secondly by means of a rating scale. These will be dealt with separately.

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(i) *The Standard Interview*

The Ward Sister is instructed to bring a patient to the ward office and send her into the room saying "Go and talk to doctor". The doctor sits behind a desk with a vacant chair on the other side. The doctor says "Hallo", and waits for the response, then says "Please sit down", and indicates the chair. He then says in turn, "Please tell me your full name". "How long have you been here in hospital?" "Is there anything you particularly like to eat?" and then "Is there anything you wish to ask me?" He then offers the patient a peppermint from a 2d. roll, and accidentally knocks a book, previously positioned on the desk, to the floor. Lastly he says "You may go now". The response to these stimuli are scored either "passed" or "failed". A tenth item called "irrelevancies" scores where the patient adds irrelevant remarks, mutterings, or gestures, during the interview. Thus we have a test which can be shown as follows:

	Pass	*Failure*
1. Hallo.	Answers relevantly.	No answer or irrelevant reply.
2. Please sit down.	Sits.	Refuses to sit, or sits on floor.
3. What is your full name?	Name.	Irrelevant answer.
4. How long have you been here in hospital?	Gives number of years.	Inaccurate or irrelevant.
5. Is there anything you like to eat?	Gives a food.	Irrelevant or non-foodstuffs.
6. Is there anything you wish to ask me?	Relevant question.	No reply, or "don't know", or irrelevant.
7. Please take one peppermint.	Takes and eats one.	Does not take or does not eat.
8. Book falls.	Picks up.	Does not pick up.
9. You can go now.	Goes.	Stays.
10. Irrelevancies.		Mutters when not spoken to, or gets up and walks about, i.e. responses not relevant to situation or stimulus.

From the psychiatric point of view a schizophrenic patient who fails every item in this interview can be said to be more deteriorated than a patient passing every item, and hence the scoring system is a simple count of the number of items failed. Scores will thus range from 0–10. This is a relatively crude measure and it can be refined by scoring for partial failure or complete failure, thus, when the patient is asked for her full name she will be scored as partial failure if she gives only her christian or surname and full failure if her reply is nonsensical. Full records of all the patient's remarks have been kept in some of our tests and it is remarkable that many deteriorated patients' interviews will be identical word for word and gesture for gesture on re-test several months later.

(ii) *The Behaviour Rating Scale*

This rating scale has its origins in a research already reported (Baker and Thorpe, 1956), the present version containing the best features of the old.

Ten items of behaviour (Figures 1 and 2) were selected on the basis of their

FIGURE 1

A.	Awake and noisy all night.	Noisy at intervals at night.	Restless several times.	Restless or awake once.
B.	Motionless.	Occasional movement.	Very retarded.	Slightly retarded.
C.	Wildly excited—needs isolation all day.	Needed isolation for a short period.	Restless all day.	Restless for a short period.
D.	Tube fed.	Spoon fed.	Eats only with persuasion.	Finicky with food.
E.	Mute.	Occasional word with persuasion.	Speaks only if spoken to.	Occasional spontaneous remark.
F.	Needs dressing fully.	Needs help in dressing.	Dresses self but needs adjustment.	Dresses self but untidy.
G.	Does no work.	Works with supervision in ward.	Works with supervision outside ward.	Works without supervision.
H.	Doubly incontinent several times.	Doubly incontinent once.	Incontinent of urine several times.	Incontinent of urine once.
I.	Aggressive several times without provocation.	Aggressive once without provocation.	Aggressive several times when approached.	Aggressive once when approached.
J.	Has no friends.	Friendly towards one of staff.	Friendly towards one patient.	Friendly towards two people.

apparent relation to schizophrenic deterioration, and patients rated 0–4 on each item, a score of 0 representing behaviour which requires no nursing supervision. This scale has been chosen deliberately to provide a few items each of which is immediately relevant to the amount of care the patient needs from the nursing staff. This could be described as the amount he has regressed. We have chosen items about which the nurses will have acquired information in the ordinary course of their duties and will not require special observation to obtain. The grades of severity for each item have been chosen for the accuracy with which they can be noted by the nursing staff rather than because each is an equal sub-division. The intention was to provide a scale which could be completed very quickly and accurately as this means that nursing staff can record patients' behaviour daily without feeling they are neglecting other duties on a busy ward.

Again, from the psychiatric point of view, a schizophrenic patient rated 4 on each of the ten items can be said to be more deteriorated than a patient rated 0 on each item. The rating scale score is thus the sum of the ten ratings, and scores can vary from 0–40.

III. STATISTICAL CONSIDERATIONS

We need to know the reliability and validity of both the standard interview and the rating scale. That is we need to know whether a patient's behaviour is going to be the same from day to day, and whether it matters who carries out the interview or who does the ratings. Unless a patient's behaviour is

FIGURE 2

RATING SCALE

INSTRUCTIONS

The patient's full name and number should be entered at the top of each sheet, together with the dates for which it is being completed, whether this is to be for one day, only or for a period of a week.

The sheet should be completed by filling in the appropriate column, i.e.:

Tube fed	*Spoon fed*	*Eats with persuasion*	*Finicky*	*Normal*
	Monday			
		Tuesday		
		Wednesday		
				Thursday
	Friday			

means that the patient needed spoon feeding on Monday and Friday, ate with persuasion on Tuesday and Wednesday and normally on Thursday. In general the lowest level of behaviour would be the one recorded.

Further Explanations

A. The Night Nurse should be asked to complete this and in the left hand margin a note should be made of any sedation the patient had at night.

B. *Motionless* means that patient only goes to meals if taken and otherwise stands or sits in one place all day.
Occasional Movement means that patient only goes to meals if reminded and although staying in same place, does move limbs or head occasionally.
Very Retarded means that patient occasionally moves from one place to another, but slowly and cannot be hurried.
Slightly Retarded means that patient's movements are much slower than those of normal people, but she can be hurried on occasions.

C. The amounts of sedation given on any day should be recorded in the left hand margin.

D. *Finicky with Food* means that an occasional meal may be rejected or that some items are usually left on the side of the plate.

E. and F. are self-explanatory.

G. (1) *Works with Supervision in Ward* means that patient has to be supervised constantly or ceases to work.
(2) *Works with Supervision Outside Ward* means that patient can be trusted to go to work on another ward or in the corridors, laundry, etc. A good worker in the ward who does *not* need supervision would come under the same rating.
(3) *Works without Supervision* means that the patient can be sent to do a job and will complete it, but the standard of work would not be good enough for a patient living outside hospital. If any patient works well enough so that the standard would be sufficient for them to be self-supporting outside hospital, no rating would be given under G. as this is a normal level.

H. Self-explanatory, but should be rated for 24 hours. The Night Nurse should complete it in red ink and the Day Staff in blue ink so that incontinence during the night appears as a red record and day-time incontinence in blue.

I. (1) *Aggressive* means either physical attack, verbal abuse, or threats whether the attack is successful or not.
(2) *Aggressive when Approached* means that patient is being addressed, or being taken to toilet, fed, dressed, or otherwise in contact with someone else.

J. *Friendly* means that the patient shows some evidence of a friendly approach to the person concerned and not merely that they tolerate the approach of the other person.
In the case of mute patients, friendly gestures still show evidence of the intention.

reasonably constant no matter who carries out the interview or the ratings, and unless different hospital staff give the same scores in both the interview and in the ratings to any one patient, then the two measures will have little practical value.

Secondly, even if the behaviour of patients is reasonably constant from day to day, and even if different members of the hospital staff can agree on the interview and the rating scale results, we still need to know whether the scores have any validity. That is, do they in fact measure deterioration? In order to answer this problem independent estimates of deterioration are required.

If the reliabilities and validities of these measuring instruments can be shown to be high, then we shall have produced two measures of schizophrenic deterioration for future use.

IV. Results

(i) *Reliability*

(a) *Constancy of Behaviour.* One of the authors (A.A.B.) administered the standard interview and carried out ratings on sixteen deteriorated schizophrenic patients. Seventeen weeks later this procedure was repeated on the same patients. The correlation between the initial and final standard interview scores was ·97, and between the scores on the initial and final rating scales was ·94. In neither case was there a significant change in mean scores. These figures are remarkably high, are statistically significant beyond doubt, and indicate extreme consistency of behaviour even over a period of as long as seventeen weeks.

(b) *Agreement Between Interviewers and Raters.* The same sixteen patients were also interviewed and rated by a ward sister independently of the assessment by A.A.B. Correlations between the two interviewers worked out at ·84 for the initial scores and ·86 for the final scores. For the corresponding initial and final ratings, correlations between raters worked out at ·90 and ·89 respectively. The mean scores obtained on either the rating scale or the interview were almost identical.

These correlations are especially high when it is realized that the two interviewers comprised a psychiatrist who saw the patients comparatively infrequently, and a ward sister who saw the patients all day and every day. Further, the psychiatrist was male, and the ward sister female. The statistical significance of these correlations is again beyond doubt and the conclusion must be that there is exceedingly high agreement between different members of the hospital staff on both interview and rating scale scores.

In subsequent investigations test-retest and inter-rater/interviewer correlations worked out as follows:

Test-retest

10 patients interviewed by A.A.B.— Interview repeated 3 weeks later.	Correlation = ·89	Mean 1 = 5·7 Mean 2 = 5·9
10 patients rated by Ward Sister. Repeated after 1 week.	Correlation = ·93	Mean 1 = 12·2 Mean 2 = 12·2

Inter-Examiner

10 patients rated by 2 Ward Sisters independently.	Correlation = ·81	Mean 1 = 12·3 Mean 2 = 12·1
10 patients interviewed by A.A.B. and Ward Sister independently.	Correlation = ·87	Mean 1 = 5·5 Mean 2 = 5·4

These results add further weight to the above conclusions.

(ii) *Validity*

The external criterion for both instruments was obtained in the following manner. Two Ward Sisters from the same long-stay ward were asked to select twenty patients from the ward of 80 patients and to rank them in order of

deterioration. They had to be in complete agreement regarding the rankings of these twenty patients. The twenty patients were then given the standard interview and were also rated on the rating scale.

Correlations between the interview scores and the external criterion (the rankings) and between the rating scale scores and the external criterion worked out at ·78 and ·96 respectively. These figures, their statistical significance being beyond doubt, indicate that both the standard interview and the rating scale are extremely good measures of schizophrenic deterioration as assessed by the Ward Sisters. The correlation between the rating scale and the standard interview worked out at ·79.

Further Analysis of the Rating Scale

Having shown the rating scale to be an extremely good measure of schizophrenic deterioration it seemed to be important to go one step further and analyse it statistically by factor analysis.

Forty-four patients were rated on the scale, and correlations calculated between the items. As the items were originally selected on the grounds that they appeared to be associated with schizophrenic deterioration, one would expect that they should all intercorrelate positively and hence generate a general factor of deterioration. The correlation matrix (Table I) indicates that

TABLE I

Correlation Matrix (decimal points omitted)

	A	B	C	D	E	F	G	H	I	J
A.	( )	081	118	007	−129	102	−006	−131	296	079
B.		( )	−229	381	595	638	397	495	119	487
C.			( )	−010	−115	109	179	093	158	−032
D.				( )	375	416	208	290	029	257
E.					( )	685	571	399	−136	629
F.						( )	429	662	146	582
G.							( )	331	236	449
H.								( )	165	247
I.									( )	150
J.										( )

this expectation is fulfilled. Out of forty-five correlations only eight are negative and none of these significantly so. A centroid analysis was carried out on this matrix which yielded two significant factors, a general factor accounting for 33 per cent. and a bipolar factor accounting for 10 per cent. of the total variance. A diagrammatic representation of the two factors is given in Figure 3. This figure will assist the reader to understand the nature of the factors involved.

The first (general) factor is clearly a factor of schizophrenic deterioration, the majority of scales having correlations of ·5 or more with this factor. The second (bipolar) factor contrasts two groups of symptoms, the first group comprising restlessness, excitement and aggressiveness, and the second group comprising feeding and dressing difficulties and mutism. This factor might therefore reasonably be named retardation-restlessness. It is interesting to note that items G and J (i.e. work ability and sociability) are almost pure measures of the general factor, while items A and C (night and day restlessness) are almost pure measures of the second factor. These factors are, of course, completely independent of one another.

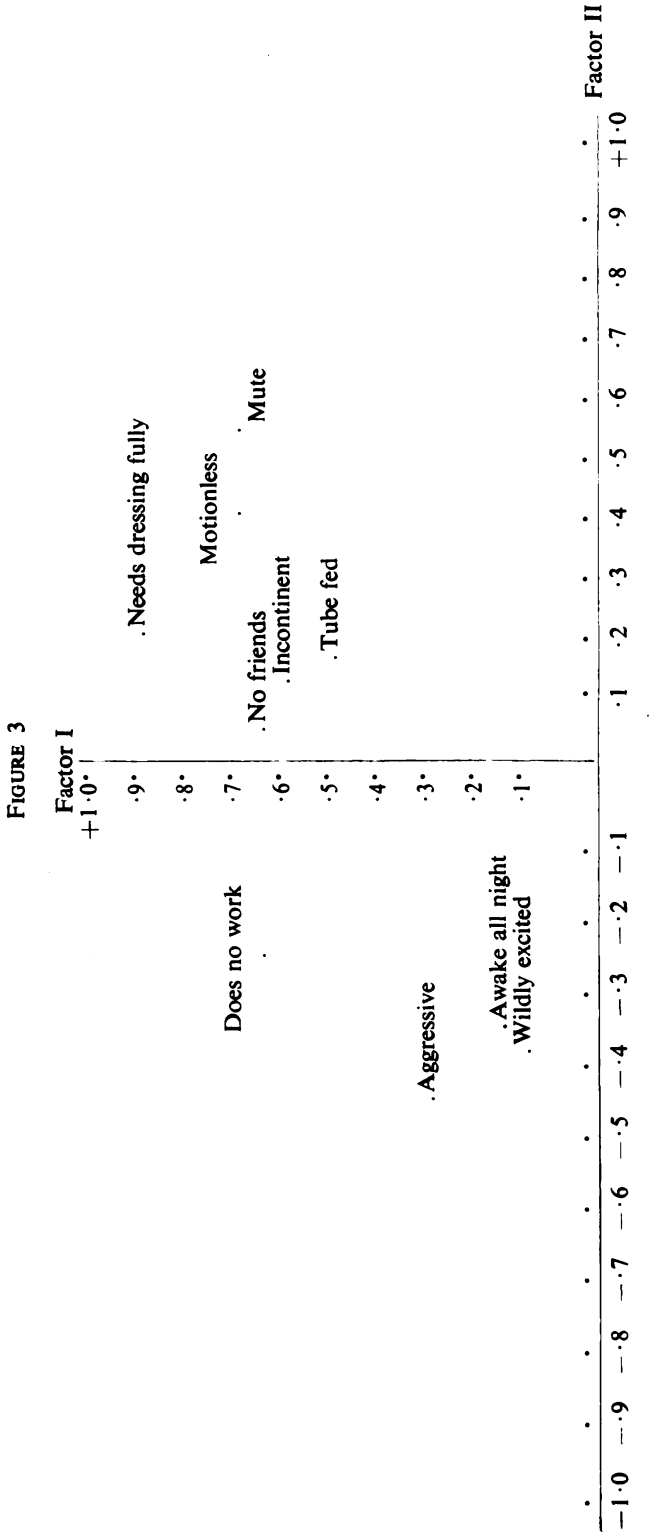

FIGURE 3

The present rating scale therefore can be resolved into two independent components. First is a general factor of schizophrenic deterioration, and secondly a bipolar factor contrasting retardation with restlessness. Though the first factor is the one made use of in the present study, a knowledge of the second factor may prove useful in future work.

V. Standardization for the Two Instruments

The mean scores for patients in long-stay wards on both instruments have already been indicated. In a typical long-stay ward in this hospital the interview scores range from 0–10, with a mean score of around 5, while the rating scale scores have a mean of about 12 and range from 0–24. From the nature of the test material it can easily be seen that only patients who are without doubt to some extent deteriorated will score at all highly on these scales. This is in fact the case.

VI. Additional Data

(i) *The Relation of Rating Scale Scores to Length of Illness*

This relationship is best indicated by the following table:

	Length of Hospitalization (in years)					
	0–5	6–10	11–15	16–20	21–25	26–30
Number of patients ..	7	2	15	10	8	3
Mean rating	9·7	12·0	10·9	10·9	14·7	12·7

Analysis of variance applied to these data gives an "F" of 1·572 which is not statistically significant. This means that there is no significant relationship between amount of deterioration and length of hospitalization.

(ii) *The Conversion of Interview Scores into Rating Scores*

As the interview scores correlate highly with those obtained on the rating scale, it is fairly easy to predict by the use of regression equations, a patient's score on either of these measures knowing his score on the other. The simplified formulae for these conversions are as follows:

Predicted Score on Rating Scale = 1·3 (Score on Interview)+6

Predicted Score on Interview = ·5 (Score on Rating Scale)−1

A patient's true score on the rating scale is not likely to be more than about 2½ points away from his predicted score (σ est=2·68) nor his score on the interview more than 1½ points away from that predicted (σ est=1·59).

VII. Discussion

It would appear from the above data that the two methods of measuring schizophrenic deterioration introduced in this paper can be relied upon to do the job which was intended for them. Both show extremely high reliability and validity, and it may be well to pause here for a moment to consider the reasons for this.

First and foremost the elements of behaviour which have to be assessed are exceedingly simple and unequivocal. In the interview situation a patient either sits down when instructed to, or he does not, and a patient may have in the ward one friend, two friends, or no friends at all. Behaviour which is broken down into elements as simple as these can be recorded fairly objectively, and this objectivity is no doubt the keynote for the success of the two scales.

Secondly, all the above correlations are exceedingly high. This is due in large measure to the simplicity of the scale items as well as to the objectivity of recording. It is also due to the fact that in each of the experiments reported the groups were deliberately chosen to be as heterogeneous in respect of deterioration as possible. With more homogeneous groups the correlations will, of course, be lower. Nevertheless, scales which do not show high correlations within heterogeneous groups can have little practical value.

The main advantage in using the two scales, apart from their high reliability and validity, lies in their ease of administration. Neither interview nor ratings take more than a few minutes to carry out, and large numbers of patients can be assessed in a relatively short time.

It is of interest to note that there is no significant relationship between length of stay in hospital and deterioration score. This is in accord with clinical experience, as paranoid patients often deteriorate very slowly, while other patients show evidence of advanced deterioration even on admission.

Summary

Two simple methods of measuring schizophrenic deterioration have been introduced. Each has been shown to have satisfactory reliability and validity, and any patient can be assessed on *both* scales in a few minutes. It is suggested that the two scales will be of use in assessing the effects of treating deteriorated schizophrenics as well as in matching schizophrenic groups for research purposes.

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