

The Reconstruction of Schizophrenic Speech

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SUMMARY A suggestion that schizophrenic speech may be harder to understand than normal speech was tested by a technique of reconstruction. Ten schizophrenic and ten normal passages were typed onto cards, one sentence per card. Each passage was then presented with the sentences in random order, and students were asked to reconstruct what they believed was the original order. Fewer correct strings of three or more sentences were achieved for the schizophrenic material than the normal material. It is concluded that there is a detectable abnormality in the structure of schizophrenic speech, but that it stems from the relationship *between* sentences rather than the content of individual sentences.

Introduction

Although it is sometimes asserted that schizophrenic speech is harder to understand than normal speech, there is as yet no firm support from experimental research. Most of the studies have used Cloze Procedure, in which an uninterrupted passage from each speaker is tape-recorded, and an unpunctuated transcript produced. Every fourth or fifth word is then deleted and replaced with a blank, and raters are asked to guess the missing words: the more blanks correctly filled, the more comprehensible the passage. Several comparisons between schizophrenic and normal speech have been made in the last decade or so, but no consistent pattern has emerged (Rutter *et al.*, 1977, 1978). However, since Cloze Procedure operates at a low level of context, four or five words, it is likely to detect only abnormalities within sentences and to miss any higher order disturbance, such as relationships between sentences. Might it be that there is a detectable abnormality in the structure of schizophrenic speech, but that it lies in the way sentences are sequenced one after another rather than in the content of individual sentences?

Method

To test this suggestion we used a technique of reconstruction. Uninterrupted speech samples

were tape-recorded from ten non-paranoid schizophrenic patients and ten psychiatrically normal orthopaedic patients. The schizophrenic patients had been recently admitted to psychiatric hospitals in and around Oxford, and the psychiatrically normal patients were recent admissions to the rehabilitation unit of a nearby orthopaedic hospital. The passages consisted of the patients' descriptions of why they had come into hospital, and were earlier used in Rutter *et al.* (1978) where the subjects were described in detail.

The twenty passages, in unpunctuated typescript, were punctuated into sentences by a graduate who had no training in psychology and was told only that the speakers were hospital patients. Her task was to listen to the tape-recordings, read the transcripts, and insert full stops where she believed they should be. As a reliability check, five other judges were later asked to do the same, but using only the transcripts and not the tape-recordings, to provide a stringent test. They were a secretary, a research student in psychology, an American teacher of English, a retired accountant and a stockbroker.

Two measures of reliability were taken: the mean number of full stops the five judges inserted which the original graduate had also inserted ('agreements'); and the mean number of full stops they inserted which she had not

('false positives'). The mean number of agreements out of a possible 10 was 7.4 (SD 1.6) for the schizophrenic passages, against 6.8 (SD 1.9) for the normal passages, a difference which was not significant. The mean number of false positives was 1.5 (SD 1.9) for the schizophrenic passages against 1.3 (SD 1.4) for the normal passages, a difference which again was not significant. Thus, there was good agreement with the original graduate and no difference between the two types of passage in either the extent or type of disagreements. The most common form of disagreement was to join together sentences which the original graduate had kept separate, as was to be expected since the five judges did not have the tape-recordings and so were denied any paralinguistic cues which signalled the ends of sentences.

Two further analyses were conducted in order to test whether the five judges were consistent one with another. A one-way analysis of variance on agreements with the graduate revealed a pattern of differences among the twenty passages which held almost consistently across the five judges ($F = 1.7$, $df 19, 80$; $P > 0.05 < 0.1$); and there was very marked consistency for false positives ($F = 8.3$; $df 19, 80$; $P < 0.001$). Thus, although the five judges were very different people, there was good agreement among them on which passages produced the greatest similarity and differences with the graduate's punctuation.

Once the graduate had completed her punctuation, the first ten sentences were typed onto uniform strips of card, one sentence per card. The mean length of sentences was 16.9 words (SD 3.0) for the schizophrenic patients and 15.4 words (SD 4.0) for the normals, a difference which was not significant. The ten cards for each passage were then placed in a bundle in random order, except that the first sentence appeared on the top, and psychology students were asked to put the sentences into what they believed to be the original order. The experiment was conducted in a series of practical classes in the Department of Psychology at the University of Warwick and each student was asked to reconstruct one passage which was randomly assigned to him. He was told only that the passage came from a hospital

patient in reply to an interview question about why he had come into hospital, and that the top card showed the first sentence. Five replications were run, so that each passage was reconstructed by five students. Since the numbers in the practical classes fell a little short of the required hundred a few more students were approached individually.

An example of each type of passage is given below and the punctuation is included. The schizophrenic passage was chosen as the one closest to the mean result reported later in the paper for the whole schizophrenic group and the normal passage was closest to the mean for the normal group.

Schizophrenic passage. You mean what class of amusements I would go for if I had the money though I never had any money in my life so therefore I would not know. They do not really bother me and never will bother me. Therefore I do not fit in this house at all. I should be led to the gate there by the elbow and given my jacket and coat and told to carry on the way I was carrying on because I never broke in you know. It was eighteen men that lived there the fairy told me and broke into that place themselves because its glass in that factory is exactly a thousand years old. Just the same as a castle now if you were paying rent for a castle for a thousand years you do not pay no more money for that castle it is your castle. That means everything within it is new over and over again. The only thing that you do pay for is you pay thirty-eight pound every week if you keep more than thirty-two full board lodgers paying five guineas each. That is the rules and laws of castledom. That form you gave me is excelsior form.

Normal passage. My wife and I actually we come to stay at Mary Marlborough Lodge this time for a new wheelchair which will have a reclining position. That will make it easier for my head because I suffer with a stiff neck in my old wheelchair without a head support. They are trying one or two various things arm rockers because I suffer with arm weakness. They think this will help me on drinking things like soup and sloppy

foods. This will help me to relax more when I am feeding because you kind of tense. You you tense up when one is trying to get your food to your mouth. You suddenly lose your peas or potatoes or whatever it may be. They try here to do all these type of things to make it easier for you and for the people such as my wife who are looking after who have to look after you. Myself at Mary Marlborough Lodge it is about six times I have been here. They have got me various forms of equipment such as electric hoist electric wheelchair which I have got at home.

It was predicted that (a) the schizophrenic passages would be reconstructed less accurately than the normal passages and that (b) the difference would be especially marked by a low frequency of correctly reconstructed long strings in the schizophrenic passages. The following system of scoring was devised. Each time a sentence was correctly placed after its predecessor, one point was scored. A string of two scored one, a string of three scored two, and so on up to a perfectly reconstructed passage which scored the maximum of nine. The categories were mutually exclusive so that, for example, a string of three did not also count as two strings of two.

To test prediction (a), the mean number of points was calculated for each passage, and, to

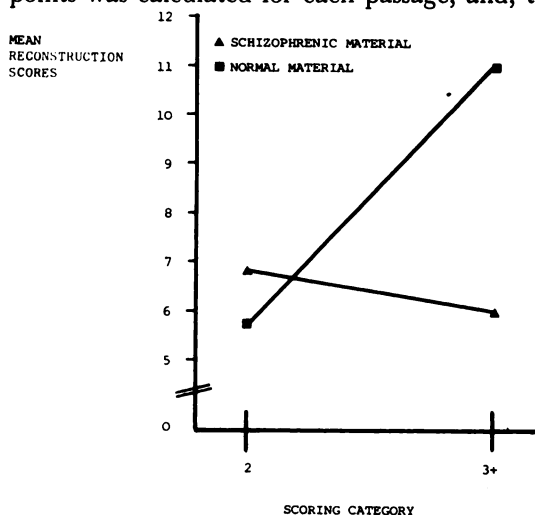


FIG 1.—Mean reconstruction scores: number of sequences of two sentences and three or more sentences correctly reconstructed for schizophrenic and normal material.

test prediction (b), the mean was broken down into the number of points which came from strings of two, and the number which came from strings of three or more. This particular cut-off point was chosen retrospectively as likely to be the most sensitive, since strings of four or more were relatively uncommon in either type of passage.

Results and Conclusion

The data were analysed by analysis of variance and the factors, subject groups (schizophrenic/normal) and scoring category (2/3+) were extracted. The findings are reproduced in Fig 1. Prediction (a) was not supported, in that the overall number of points for schizophrenic material (Mean 12.8; SD 3.4) was not significantly less than for normal material (Mean 16.7; SD 6.6). However, there was support for prediction (b). While the interaction between subject groups and scoring category fell short of significance ($F = 3.1$; $df 1, 18$; $P < 0.1 > 0.05$), planned comparisons (Winer, 1970, p. 207 ff.) showed that the number of points for strings of three or more sentences was significantly greater for normal (Mean 11.0; SD 8.3) than schizophrenic (Mean 6.0; SD 3.2) material ($t = 2.0$; $df 18$; $P < 0.05$), while there was no difference between the two types of material for strings of two sentences ($t = 0.6$; $df 18$; $P > 0.1$). That is, stringing together three or more sentences was much more difficult for schizophrenic than normal speech but there was no difference between the two types of material for strings of only two.

This is an important finding. It is the first time we have found a difference between schizophrenic and normal speech, and the magnitude of the difference is much greater than is generally found in comparisons between the two groups. Moreover, our scoring system is likely to have underestimated the difficulty in reconstructing schizophrenic speech since it assumes linearity; to reconstruct a string of three sentences may well be more than twice as difficult as stringing together two, but the scoring system assumes it is not. It is unlikely that this is a chance result, but we nevertheless intend to repeat the study on a larger sample.

If the findings are confirmed we shall have good evidence that there is a detectable abnormality in schizophrenic speech which affects its comprehensibility but that it stems from the relationships *between* sentences rather than the content of individual sentences.

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