A PRELIMINARY EXPERIMENT ON PARANOID DELUSIONS

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The Essential Requirements of Experimental Investigation*

The object of the experiment to be described in this paper, was to find out if it was possible to develop a systematic experimental investigation of paranoid delusions.

There are many psychologists who believe that it is not possible to apply, directly, the methods of natural science to the investigation of complex psychological disorders such as paranoid delusions. It is always easy to win a round of applause at a psychological meeting by asserting that the human mind is quite capable of comprehending, directly, its own subtle manifestations, and by asserting that the findings of experimental psychologists are too trivial to provide useful leads for the understanding of the more complex aspects of human behaviour.

This hostility to experimental method would not be supported by an impartial examination of the experimental literature. There are, however, some defects in the methods of experimental clinical psychologists, which provide some basis for this hostility.

These defects seem to arise from the fact that the essential requirements of experimental method have not been rigorously enough fulfilled. Paradoxically enough, these requirements would not be acceptable to the anti-experimentalist, though it is the failure to fulfil them which gives him some grounds for his dissatisfaction.

What are these requirements, and how do they affect the investigation of paranoid delusions? The first requirement is that of experimental control. In the case of paranoid patients this means that the method of enquiry should consist of the systematic changing of the situation of paranoid patients in such a way that the strength and quality of their delusions can be made to vary in accordance with these changes. Changes, both in the situation and in the delusions, should be clearly identifiable, and if possible, measurable. The situation which is being changed is usually called the "independent variable" and the phenomenon which is being altered as a consequence (in this case the delusions), is usually called the "dependent variable".

The second requirement of experimental method is that the experiments should have the aim of explanation. If possible, the changes in the independent

* The first author is solely responsible for the methodological discussion and particularly for sections 1 to 5 of this paper.

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variable should be those required by a particular explanation, and the consequent changes in the dependent variable, in this case the delusions, should be predictable from that explanation.

The Choice of Phenomenon for Investigation

The research work of experimental clinical psychologists usually fails to fulfil these requirements in at least one of three ways. The first kind of failure consists of the fact that the phenomena which are chosen for investigation appear, at first sight, to have little relationship to the disorders which bring psychiatric patients into hospital. Psychiatric patients suffer from a variety of disorders of affect, cognition, and volition. A large number, if not the majority, of papers published by psychologists do not deal with these phenomena. Instead they report upon the performance, by psychiatric patients, of a variety of tasks which might be described, without much loss of accuracy, as puzzles and indoor games. Examples are such tests as the pursuit rotor, the mirror drawing test, the block design test, the Rorschach Test and the thematic apperception test, and the rotation effect (13). For purposes of discussion this approach will be referred to as the *indirect approach*. If we were to apply the indirect approach to the problem of paranoid delusions, we would have to find some task which at least some paranoids did differently from all other subjects, including normals and psychiatric patients. Having succeeded in finding such a task, we would proceed to investigate it.

Several arguments are advanced in defence of the indirect approach. The first argument is that the scientist must take as his starting point those forms of behaviour which are amenable to experimentation. Such an argument would really only hold water in the investigation of delusions if a direct experimental attack upon them had failed. To our knowledge, no such an attack has ever been made.

The second argument which is put forward in favour of the indirect approach is that the scientist can deal with only a limited aspect of any phenomenon which is under investigation, and that the findings which emerge should be used to throw light on other and perhaps more important aspects of the same phenomenon. This argument has force in so far as it implies that the experimentalist might be restricted at first to the investigation of those manifestations of delusions which are more easily measurable. This does not mean, however, that the psychologist is forced to investigate some quite different function like, for example, mirror drawings. He is only forced to do the latter if he has failed in his attempt at the direct experimental manipulation of delusions, or if he is, in fact, more interested in the psychomotor functions involved in mirror drawing than he is in delusions.

A third argument advanced in favour of the indirect approach is that the investigation of any single function is bound to throw light on other functions. If paranoids have a way of doing a puzzle which is peculiar to them, then the investigation of the way they do this puzzle may well throw light on the nature of paranoid delusions. Admitting that this might be the case, it would still be necessary to devise experiments on paranoid delusions directly, before we could accept the theories which had been suggested by the indirect investigation. It would, therefore, seem to be more reasonable if it is desired to investigate paranoid delusions, to start by trying to investigate some direct manifestations of these delusions.

Finally, it should be pointed out that the indirect approach has a general disadvantage. Successful research depends on close attention to detail, upon

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knowing a tremendous amount about all the factors affecting the appearance of the phenomena under investigation. If one uses, say, a perceptual test to investigate deluded patients, one would have to learn a great deal about perception in general, and the particular aspect of it which one was investigating. In the meantime one would have learnt very little about the nature of delusions, and, therefore, it would be very difficult to make discoveries of an inductive character. A method of work which restricts the possibilities of systematic induction would seem to be faulty.

The direct systematic investigation of some aspect of delusions might at least lead to some generalizations of limited applicability, and of some practical use in the management of patients who suffer from them.

In view of all these considerations, it was decided to try to investigate some direct manifestation of delusions.

The Choice of Methods of Investigation

The second way in which experimental clinical psychologists often fail to fulfil the essential requirements of experimental investigation is in their choice of methods of research. They tend to concentrate upon the statistical description and manipulation rather than on experimental manipulation. Current procedures often consist of obtaining a large number of test scores from various nosological groups. The psychologist then determines the way in which these test scores differentiate between groups and the way in which they intercorrelate.

The dependent-independent variable relationship is, of course, a kind of correlation. The essence of the method of experimental control, however, is that the phenomenon under investigation is made to change in a given individual or group in accordance with controlled changes in circumstances. In this way causal elements can be more unequivocally identified, and processes are more directly observed.

The Attitude to Theory

The third way in which the experimental clinical psychologist tends not to fulfil the basic requirements of experimental method, is in his attitude to theory. This is exemplified especially by those psychologists who express allegiance to various forms of the hypothetico-deductive method. Their work is directed mainly at proving or disproving certain theories rather than at explaining and controlling certain phenomena which have excited their interest. In fact it sometimes seems as if some psychologists look upon experimental method merely as the most convincing method of persuading people to accept their ideas. It thus ceases to become a method of determining the actual state of affairs, independently of a priori conceptions.

Actually, the main advances in biological science seem to come from men with a different approach. Darwin was mainly interested in co-adaptation. An example of co-adaptation is the fact that the "feet, tail, beak, and tongue of the woodpecker are so admirably adapted to catch insects under the bark of trees" (2, p. 32). Sherrington was interested in the fact that the spinal nervous system behaved in an apparently purposive and adaptive manner, and Pavlov in the fact that the higher nervous centres showed the ability to make and unmake connections with relative ease. The generalizations they developed arose mainly from the results of the active manipulation of the phenomena which interested them.

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In developing an explanation of delusions we would, if we were "theory-oriented", write down all the theories which important people had uttered about delusions and proceed to do experiments to test them. We would not care much about the kind of phenomena we observed in doing so, so long as they lent themselves to our purpose. Unfortunately, as far as we have been able to gather, all the current "explanations" of delusions are related only to observations of an anecdotal character. The theories then have limited immediate scientific value. Even the supposed most important characteristic of the delusions, the relative lack of modifiability, has, as far as we have been able to ascertain, been described only in an anecdotal manner. We could find no record, for instance, of someone having tried to "talk a patient out of" a delusion over a definite number of hours, using a certain approach and certain measures of the strength of the delusions concerned. Not only are the available theories of limited usefulness; but we have no experimental observations of the phenomena concerned.

The Need for a Balanced Approach

It is not being argued here that the indirect approach, or the studies of individual and group differences, or the interest in theory, are all useless. The facts clearly indicate the contrary. For example, it is of considerable interest that schizophrenics, in two out of three independent experiments, have been found to produce errors in their judgment of size which deviate more from "retinal" size than do the judgments of normals (4, 6, 7). Likewise the United States Employment Service (16), in arriving at a relatively stable factorial description of human ability, helps us make a relatively organized and streamlined description of the cognitive efficiency of an individual, and sets clear problems for further research into the nature of human ability. Finally, Hull's attempts to formulate a theoretical system have stimulated a considerable amount of systematic research into the nature of the learning processes. In fact, any method of systematic observation of behaviour is likely to be useful, and might even result in important discoveries. All that is being argued here is that there is a dearth of direct experimental enquiries into the nature of psychological abnormalities. It is time that this deficiency was corrected.

With all these considerations in mind we turned to the investigation of delusions. We decided to carry out our first study on a single paranoid patient. We have discussed elsewhere the methodology of the single case (11). All we can say here is that there is some evidence that the single case investigation is an economic and speedy method of opening up a new field. The senior author and various colleagues have developed three lines of investigation on psychiatric patients in this way: one on the block design rotation effect (9, 10), one on slowness of psychological function (12), and one on reading disability (1). An additional reason for using the single case investigation is that we were interested in trying to develop methods combining clinical and fundamental research.

The Subject

The subject on whom we decided to carry out our first investigation was a thirty-eight year old male who was diagnosed as a paranoid schizophrenic. As a young man he had been studious and interested in amateur dramatics. During the second world war he had been a pacifist and a conscientious objector. Since then he had maintained a preference for the "simple life" on a farm.

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He had worked as an agricultural labourer without advancement. His Full Scale Wechsler I.Q. was 126, with a Verbal I.Q. of 130 and a Performance I.Q. of 118. In conversation he gave the impression of being extremely economic and clear in self expression. During his stay in hospital he experienced an acute depression which cleared up after 8 doses of E.C.T. administered over a period of 41 days. The patient's paranoid illness appeared to have been of about five years' duration.

The patient's main delusions consisted of the belief that there was an association of people who were trying to change him and punish him. They were doing so, he believed, on account of his defects. These defects were his pacifism during the last war, his sexual misdemeanours which he reported as consisting of a few homosexual episodes, six episodes of bestiality, and his sexual and moral inadequacy as a husband.

The patient had not, for 21 years at least, been a member of any political organization. He was an ordinary citizen whose life was taken up by his work and by his family.

His "persecutors" were watching him constantly, either by direct surveillance or by microphones placed in his home. They had immediate knowledge of the most intimate details of his behaviour, and could possibly influence his thoughts.

In addition to these beliefs about the "organization" the patient believed that his wife had been unfaithful to him, with the result that his five children were not his own. He believed that he himself was illegitimate. The patient appeared to be suffering from no other psychological abnormalities.

Formulation of the Problem

This was based on the outcome of discussions held with the patient by Mr. Patten.

The following statements could be made about the patient's beliefs. Firstly, the patient could be said to have a number of palpably false beliefs of a paranoid character. For example, in our society, there are no groups of politicians aiming at obtaining political power through the modification and punishment of ordinary citizens like our patient. Not all of the patient's beliefs which gave him cause for concern were palpably false, e.g. the belief in his wife's unfaithfulness.

Secondly, it appeared that the paranoid beliefs were abnormally resistant to the usual processes of modification.

Thirdly, it could be argued that the paranoid beliefs were not in the interests of the patient or of society, because they might result in his committing acts of violence against his family and himself, in his relationships with his fellow men being ruined, and in giving him unnecessary misery.

This formulation does not imply that there might not be people, outside the mental hospital, who have beliefs concerning which the same three observations could not be made. We were mainly concerned with this particular individual as we found him, and those features of his condition which appeared to require help, and hence merited research by the clinical psychologist.

The statement that the patient's paranoid beliefs were abnormally resistant to modification is, as we stated above, a statement that required confirmation. It seemed therefore that, at the risk of looking foolish, we had to begin with the systematic observation of the reaction of the patient's beliefs to such processes of modification. The process which could be provided by us most easily was the

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process of discussion. It was, therefore, decided to hold a series of discussions with the patient.

General Plan of the Investigation

In planning these discussions we at first made an attempt to deduce, from some of the usual explanations of paranoid delusions, the kind of discussion which should be held. For the reasons stated above we did not pursue this approach too rigorously. Our final plan of discussion, therefore, was arrived at somewhat arbitrarily. First of all, we had to have some essentially rational discussions aimed at demonstrating to the patient the palpable falseness of his persecutory delusions, and aimed at supplying him with possible explanations of how he might have come to have such delusions. Secondly, we thought it necessary to have, as a control, discussions of another kind. For this purpose we decided to have discussions of guilt, with the aim of modifying guilt feelings where they appeared to be unwarranted, and of facilitating the handling of the issues which arose. We were quite aware that the guilt feelings might also have a delusional quality, though this was not as yet as clear to us as the delusional quality of the persecutory beliefs.

Because the patient's length of stay in hospital was uncertain, we decided to have as many discussions as we could manage per week. Neither of the authors had the time to do this alone, so it was decided to involve both of the authors in the discussions.

In these decisions we were operating the independent-dependent variable model. The independent variable consisted of the discussion produced by the two authors. As part of the independent variables we were ourselves reproducible in so far as we were available to take part in further experiments. This reproducibility was limited by the possibility that our experience of the discussion might change our behaviour. Ideally, we, as discussers, should have been described in quantitative terms, so that other discussers similar to, or definably different from, ourselves could be found for further experiments. We should have been described in terms of our impact on other people and particularly upon the patient. We felt, however, that we knew too little to begin this kind of experimentation. We felt it was better to go into a period of relatively uncontrolled observation of both the patient and ourselves in this kind of discussion before trying to quantify ourselves.

For similar reasons we decided not to lay down rules about how the discussion should be tackled and what topics should be raised. It was left to each experimenter to conduct the discussion in the manner he thought best. The only restrictions were related to (*i*) the topic, which was either that of guilt or paranoid delusions, and (*ii*) the commitment to discuss these topics on as rational grounds as we could muster. All one could say, therefore, is that the two discussers provided two complex forms of stimulation, the content of which could be identified as the rational and humanist approach to problems arising from intense guilt and from palpably false beliefs about the actions of other people. Both of the discussers were verbally fluent people who normally enjoyed a rational and friendly argument.

The dependent variable presented an easier problem. One of the main ways of finding out about a subject's beliefs and feelings is to ask him about them. It was decided, therefore, to use a questionnaire method. This decision is justified by an examination of the relevant literature which indicates that answers to questionnaires have some relationship to the variables which they

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appear to measure. This statement is exemplified by findings which show consistent and appropriate relationships between questionnaire responses and the following groups of observations:

(*i*) the diagnosis of neurosis and schizophrenia (17)
(*ii*) psychological functions such as perceptual threshold and memory efficiency (15)
(*iii*) physical conditions like gastric ulcer (16)
(*iv*) concrete behaviour such as delinquency (3).

It was decided to use four questionnaires. The first was to measure paranoid belief, the second to measure guilt, the third hostility, and the fourth depression. The depressive questionnaire was decided on because Mr. Patten noticed in his interviews that the strength of the patient's paranoid beliefs and his depression appeared to vary concomitantly. The hostility questionnaire was added because of the current notion concerning the relation of hostility and paranoia. The four questionnaires are given in Table I.

TABLE I

The Questionnaire

		Score on First Occasion	*Score on Last Occasion
Depression (*D*)			
1	It is harder for me to be cheerful than it is for most people	1	0
2	I find it difficult to have any sort of pleasurable feeling	1	0
3	I feel I have a heavy burden to bear in life	0	0
4	I sometimes feel dead inside	0	0
5	On the whole I do not look forward to the future with pleasure	4	0
6	I feel that life for me is full of misery, pain, hardship and very little besides	1	0
7	I can't seem to get any satisfaction out of the things that I do	1	0
8	I feel now that life is just not worth living	0	0
9	I feel so depressed that concentration is difficult	3	0
10	I feel miserable today	0	0
Guilt (*G*)			
1	I feel that I am an unworthy man	4	4
2	I have every reason to feel guilty	4	4
3	I feel that some of the things that go wrong are my own fault	4	4
4	I experience strong pangs of conscience	4	4
5	People would despise me if they really knew me	4	4
6	I have the feeling that some part of me is wicked	4	4
7	I feel I am a bad person	3	4
8	I feel remorse when I think of some of the things I have done	4	4
9	I believe that my sins will find me out	4	4
10	I feel ashamed of myself	4	4
Hostility (*H*)			
1	I find myself irritable without any real cause	0	0
2	I find myself aggressive without any real reason	0	0
3	People seem to try to pick quarrels with me	1	0
4	I get a sneaking feeling of pleasure when people I dislike get into trouble	1	0
5	I carry a "chip on my shoulder"	0	0
6	I am very touchy	3	0
7	Unimportant things irritate me	3	0
8	I am impatient with others	3	0
9	I feel I get a raw deal out of life	1	0
10	"Never trust strangers" is my motto	0	0

* This is the last occasion of the actual experiment.

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Table 1—continued

		Score on First Occasion	*Score on Last Occasion
Paranoid Beliefs			
1†	I believe that a minority group is secretly organizing a campaign against me	1	0
2	I believe "they" could be more powerful than any government or nation in the world	4	3
3	I believe "they" want to influence me	3	3
4	I believe "they" use microphones and electronic devices to keep a record of my every move	3	3
5	I believe "they" observe me everywhere I go	4	3
6	I believe "they" will keep watch over me in the future	4	3
7	I believe that "they" are trying to retard the growth of my children	3	2
8	I believe that "they" may be working to further eugenic ends, e.g. to eliminate an undesirable strain	2	3
9	I believe "they" are using methods of non-violence	4	3
10†	I believe that by a subtle use of the law "they" have put me "inside"	4	0
11	I believe that I cannot escape from "them"	4	3
12	I believe that I am not the true father of my children	2	0
13	I believe that my wife has been unfaithful to me	2	0
14	I believe that I am not the son of my supposed parents	2	2
15	I believe that one reason for "them" getting at me is my pacifism	4	3
16	I believe that one reason for "them" getting at me is my failure as a man	4	3
17	I believe that one reason for "them" getting at me is my failure as a husband and father	4	3
18	I believe that my children are physically retarded	2	2
19	I believe that I have physical abnormalities	3	2
20	I believe that dope has been put into my food to make me irritable	3	0

* This is the last occasion of the actual experiment.
† These items were eliminated from the statistical analysis.

The items for the paranoid questionnaire were made up specially on the basis of Mr. Patten's interviews with the patient. The remaining items were drawn from Sandler's questionnaire (8) but modified for use with a five point scale.

To sum up, we had the following main questions:

(*i*) Would the rational discussion of paranoid delusions make any difference to their strength?

(*ii*) Would the rational discussion of beliefs of guilt make any difference to the strength of delusions?

(*iii*) Would changes in the strength of paranoid beliefs be related to changes in the strength of feelings of guilt, depression and hostility?

Plan of Investigation

The procedure operated is illustrated in Table II. An attempt was made to balance, in relation to other commitments of the two authors, the discussion of guilt and paranoid beliefs. The questionnaires were administered once per interview, half of the time before, and half after each interview. The aim of this balanced order was to enable us to get some kind of measure of the actual effect of the interview itself. The questionnaires measuring paranoid belief, guilt, and depression were shown to the patient before the experiment began.

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He accepted them as being appropriate and understandable. The hostility items were, by accident, not shown to him.

Sixteen interviews, each of about one hour's duration, were held at the rate of four a week, on Monday, Tuesday, Wednesday and Thursday of each week. The first two interviews were held on a Wednesday and Thursday. It was felt that if this amount of work produced no changes of interest, then we would have to reconsider the value of this approach. These decisions were based on practical considerations only.

A method of exact recording was not used. The authors took brief notes during each interview, and immediately afterwards wrote a summary of what they thought had transpired. The authors have very little confidence in the value of these reports. A summary of the arguments presented to the patient are, however, given below.

Each question was written on an index card 5 inches by 3 inches, resulting in a pack of 50 cards. These were shuffled before each interview, and the subject was required to place each card under one of five headings: "This is definitely the case", "This may be the case", "I am not sure", "This may not be the case", and "This is definitely not the case". For purposes of quantitative analysis, to the first heading was arbitrarily assigned a score of 4, the second 3, the third 2, the fourth 1 and the last 0.

On the whole the patient appeared to be very co-operative and glad to talk. Sometimes the pressure of his talk was so great that it was difficult to break off the interview. The demeanour of the patient appeared to change over the course of the interviews. At the beginning he appeared to be positively hostile. In fact, as he admitted later, he was on the verge of assaulting the psychologist on two occasions, each author being once threatened in this way.

Dr. Mallett, the registrar in charge of the case, decided to continue to see the patient twice a week throughout the experiment. In these interviews the registrar continued to take his usual neutral attitude to the delusions and avoided associating himself directly with the experiment being carried out by the psychologists.

Summary of the Content of the Arguments Presented to the Patient

(i) *Paranoid Beliefs*

There were three aims in these discussions. The first was to demonstrate the palpable falsehood of the patient's paranoid delusions whenever the opportunity offered. The second aim was to prove to the patient that his entertainment of such false beliefs was a proof of illness. The third aim was to show that it is possible to advance explanations of how an intelligent man could come to have such an illness. It was, of course, made clear that no such explanations could, at the moment, be proved.

Three examples of our approach to specific paranoid delusions must suffice. The belief that a political organization was persecuting him was tackled by pointing out that a serious political organization in Great Britain would want to gain political power, and that it would be a ludicrous waste of time for such an organization to involve itself in the elaborate spying upon and persecution of an ordinary individual.

The belief that he was being watched was shown to the patient as not being supported by a single clear incident which he could recall. The belief was then reduced to the fact that he *felt* he was being watched, a feeling which need not necessarily have a real cause to be experienced.

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His belief that his children were not his own was discussed by pointing out that each of his five children had been born in different parts of England and over a period of 18 years. This probably meant that a number of men would have had to be involved. Despite this possibility, the patient had never seen anything or been told anything that could plausibly be regarded as evidence of his wife's unfaithfulness.

The more general approach consisted of our initiating discussions on such topics as the relation between belief and impression. For example, the patient seemed to be impressed by the argument that interpretation of "appearances" could be affected by previous belief, and these appearances could in turn act as reinforcers for such beliefs. The attitude of the authorities in the 15th century to the first statements of the Copernican theory was given as an example.

Another example of this kind of discussion was the suggestion that the patient might in effect be having hallucinations of belief. Experimental work on sensory hallucinations was quoted, especially that of Penfield on the direct stimulation of the exposed cortex. It was then suggested that the spontaneous excitation of the arrangements underlying the verbal system might produce "hallucinations" of belief which, it was suggested, any man would find it difficult to withstand. This explanation was related to his own reported experiences which were analogous to the primary delusions described by Mayer-Gross, Slater and Roth (5). Discussion of this kind was, of course, undertaken in terms which the patient could understand.

(ii) *Guilt*

As with persecutory delusions, guilt was attacked both specifically and generally. One of the specific points discussed was the patient's pacifism. It was pointed out that pacifism probably created a dilemma for him in that, while his community was fighting for its existence he had been doing nothing, yet at the same time he had accepted the benefits from that community, and from the successful prosecution of the war. Nevertheless, in standing by his beliefs against the current of opinion, he had shown moral qualities of which he could be proud, and which were valued by many individuals who did not in fact share his views.

A second example was the guilt he felt over his emotional outbursts. It was argued that these were aspects of behaviour which might be open to explanation and possible modification.

The main general issue discussed with the patient was the impact upon the individual of the conflict between necessary and rational requirements of society on the one hand, and forceful vagaries of human nature on the other. The psychologists maintained that it was necessary for man to combine an aspiration towards the highest personal standards with an understanding of his own and other people's failures in reaching them. The formulation which appeared to have the most force with the patient was that there was a difference between the forgiveness and the condoning of an offence. The senior author occasionally experienced some difficulty in discussing guilt because of his own feelings that the patient's feelings of guilt were on the whole quite justified on the evidence as presented.

Quantitative Results

(*i*) Affect Scales

(a) *Depression and Hostility*

On the basis of our arbitrary scoring system the maximum score possible

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for the ten Depression Items and ten Hostility Items was, in each case, 40 points. Superficially the scores, as tabulated in Table II, suggest a progressive reduction and eventual disappearance of depression and hostility. These results cannot, however, be accepted at face value. We took the precaution, at the end of the experiment, of discussing each of the items of the questionnaires with the patient. We found that six of the depression items and seven of the hostility items had been rejected by the patient because he had come to believe that the wording was inappropriate. He therefore rejected them though he would have accepted them if the wording had been slightly changed. For example he rejected the Depression Item 8 "I feel now that life is not worth living", because he thought that the word "existence" should have been substituted for the word "life". If that had been done he would have sorted the item under the heading "definitely the case". It seemed to us that the patient, despite his high intelligence and apparent lack of impairment on formal tests of thought disorder, had some difficulties of thinking when the material was concerned with depression and hostility. We did not have the time to investigate this

TABLE II
Main Results

Content of Discussion	Guilt				Belief								Guilt				No Discussion		Guilt	
Interviewer	R		S		R		S		S		R		S		R		R	S	S	S
Before/After interview	B	A	A	B	B	A	A	B	B	A	A	B	A	B	B	A				
Depression	11	19	11	15	10	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Guilt	39	36	32	40	40	36	40	40	36	40	40	40	38	38	36	40	40	40	36	35
Hostility	12	14	16	10	7	8	6	4	3	9	9	6	0	0	0	0	8	3	9	9
Paranoid*	57	46	52	54	54	53	48	50	50	47	39	41	40	40	44	41	37	43	39	42
Day of the week ..	W	Th	M	T	W	Th	M	T	W	Th	M	T	W	Th	M	T	1+	2++	3+++	

R = Ravenette S = Shapiro 1+ 14 days later 2++ 36 days later 3+++ 46 and 47 days later
* Based on 18 items Total scores for each scale for each occasion

observation, so there is no point in discussing the matter further in this paper. It was clearly impossible to draw any conclusions, from this material, about his fluctuations in hostility and depression. We therefore made no further analysis of the data.

(b) *Guilt*

The maximum score possible for the ten items was 40 points. In contrast to the hostility and depression scales, no items on the Guilt Scale were rejected in our final discussion with the patient. An examination of Table II and of the graph will show that these fluctuations were not very large, though, on the whole, the strength of guilt was deemed to be weaker during the guilt discussions than during the discussions of persecutory beliefs. An analysis of variance was carried out which gave an F ratio of 3·28. An F ratio of 3·92 is necessary if the 5 per cent. level of significance is to be reached. We can only conclude that there might have been a small but real weakening of the feelings of guilt in response to the discussion of guilt.

(*ii*) PARANOID SCALES

Twenty items had been initially made up for these scales. In the last interview only two of these were rejected by the patient on grounds similar to those

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which caused the rejection of the depression and hostility scales. We were thus left with eighteen items for which the possible maximum total score was 72 points.

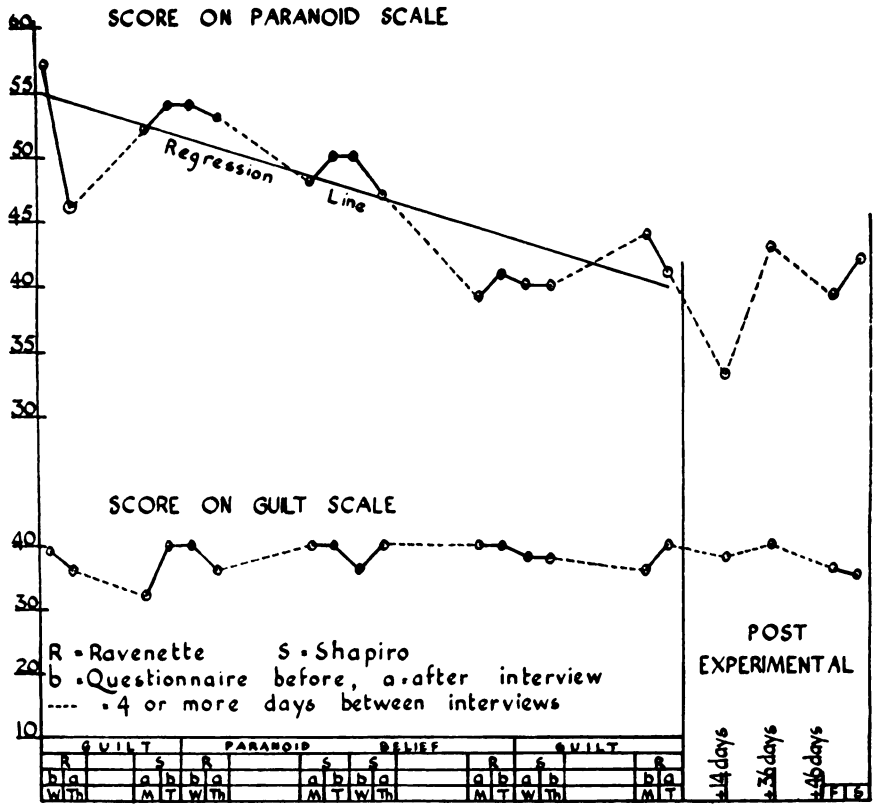


FIG. 1.—Changes in Paranoid and Guilt Scores.

An examination of Table I and of the Graph shows that there is an apparent fall in the strength of the paranoid delusions with an occasional fluctuation. An analysis of variance was carried out which resulted in the differences between the 16 occasions giving an F ratio of 5·74 which is significant at beyond the ·001 level. This result indicates that the downward trend is probably significant. The difference between items gave an F ratio of 24·82 which is also significant at beyond the ·001 level. This finding indicates that though the total scores for each of the occasions differed significantly from each other, the *relative* strength of belief for each of the 18 items tended to remain the same on all occasions, i.e. the patient showed relative consistency of response (see Table III).

TABLE III
Overall Analysis of Variance

Source	d.f.	S of S	M.S.	F Ratio	P
Between items	17	139·875	8·288	24·82	<·001
Between occasions	15	28·944	1·929	5·74	<·001
Residual (error)	255	85·181	·334		
Total	287	253·500			

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To check the downward trend more precisely, a regression line was fitted, giving the regression of paranoid delusional strength upon occasions. This line is shown as a straight line in the Graph. The variance accounted for in this way gave an F of 19·3 which was significant at beyond the ·001 level (see Table IV). The residual variance was, however, significant between the ·01 and ·05 level. This implies that the fluctuations in delusional strength around the regression line are still significant.

TABLE IV

Analysis of Variance Assuming One Regression Line

Source	d.f.	S of S	M.S.	F Ratio	P
Accounted for by regression	1	19·336	19·336		<·001
Residual variance for occasions ..	14	9·608	·686	2·055	0·1<P<·05
Total variance between occasions* ..	15	28·944			
Residual (error)*	255	85·181	·334		

* From Table II.

(It should be pointed out here that regression lines on these data are not statistically beyond reproach. Regression on time implies equal units of time but with our data "occasions" are not separated by equal units of time.)

Two explanations of these fluctuations can be advanced. The first is that the discussion of paranoia had a more powerful influence than the discussion of guilt, as an inspection of the Graph seemed to show. To check this suggestion, we carried out an analysis of variance in which it was assumed that no changes occurred during the discussion of guilt, and that the only changes occurred during the discussion of delusions. In effect two straight horizontal lines were drawn, one for each of the two periods of guilt discussion, and one regression line to cover the period of discussion of paranoia. The residual variance, as consultation of Table IV will show, was significant between the ·10 and the ·05 level. We, therefore, could not be satisfied that this hypothesis fully accounted for the fluctuations.

The second explanation, suggested by Mr. P. Slater, was that all changes, for the worse or the better, only occur during the week-ends. An examination of the graph will show that the four questionnaire measures during each of the three groups of midweek discussions, produce an approximate plateau every time. The largest changes, except one, took place over the week-ends. An analysis of variance (see Table V) was then carried out in which this pattern was assumed, there being straight horizontal lines joining each set of midweek discussions. In addition, straight lines were drawn for the first two and the last two discussions. The residual variance failed to reach significance at the ·20 level. The second explanation therefore accounts for the fluctuations more efficiently than the first. The design of the experiment does not, however, enable us to make a clear choice between the two explanations. It should be noted, as inspection of the graph will show, that the paranoid delusions became *stronger* in the week-ends succeeding the discussion of guilt, and *weaker* on those week-ends succeeding the discussion of delusions. This interpretation is given added interest by the observation, reported above, that there was a slight tendency for the feelings of guilt to be weakened by the discussion of guilt, though that tendency did not quite reach an acceptable level of significance.

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TABLE V

Analysis of Variance Assuming: (1) *All Change Occurs at Week-Ends;* (2) *All Change Occurs During Belief Discussions*

Source	d.f.	S of S	M.S.	F Ratio	P
Total variance between week-ends ..	4	24·694			
Residual variance between occasions ..	11	4·250	·3864	1·157	P> ·20
Due to mean differences, Weeks 1 and 4, and regression in Weeks 2 and 3 ..	4	22·561			
Residual variance between occasions ..	11	6·383	·5803	1·737	·10>P >·05
Total variance between occasions* ..	15	28·944			
Residual variance*	255	85·181	·334		

* From Table II.

(*iii*) EFFECT OF THE INTERVIEW ITSELF

As was reported above, the questionnaire was given before each interview on 8 occasions and after each interview on the remaining 8 occasions. A balanced order of "before" and "after" interviews was operated. The total scores of the 8 "after" questionnaires were only slightly lower than the total scores of the 8 "before" questionnaires. The difference was 1·42. A difference of 3·49 would have been necessary to reach the 5 per cent. level.

These results are consistent with the possibility that there was on the whole, no immediate reaction to the interview, and that the discussions have their effects in the periods of no discussions.

(*iv*) EFFECT OF INTERVIEWER

Here, the order of placing the interviewer was confounded so that there is an overall bias in favour of the junior author. Analysis of any differences between interviewers is not possible however since the "before" and "after" arrangement of the questionnaires precludes isolating any one interviewer's effect. Such a measure could only be obtained if questionnaires were given before the first and after the second of the interviews consistently throughout the experiment. It might be argued that administration of the questionnaires by different interviewers might give rise to difference in scores. Analysis of the differences between the means of questionnaires given by the respective interviewers shows that these means differ only by ·028 whereas a difference of 3·49 would be necessary for the 5 per cent. level of significance, on a "t" test of the difference between total scores.

FURTHER OBSERVATIONS

A period of digestion and discussion of results ensued. Because of lack of time and the difficulty of some of the problems which arose, a few weeks were spent in this way. Exactly two weeks after the end of the experiment the patient was given the questionnaire again. Consultation of Table II and the Graph shows a further fall in the patient's strength of persecutory beliefs and still no change in his guilt.

Approximately seven weeks after the end of the first experiment another experiment was begun. It was intended to investigate the relative influence of the pause and the week-end. By this time the patient's co-operative attitude had evaporated and, after two discussions he pressed for their termination.

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It was decided, on clinical grounds, to comply with this request. There are obvious lessons to be drawn from this failure. The results of the two questionnaire measures taken during this period are given in Table II and the Graph. The two interviews were directed at the discussion of guilt.

Clinical Outcome

It was not possible to carry out measures of overall behavioural changes during the course of the experiment. All that can be said is that, about two months after the end of the experiment, an improvement in the patient's mood and behaviour had been noted by Dr. Mallett. Dr. Mallett reports that the persecutory delusions were held less vehemently and less firmly than before. He was finally discharged three months after the last interview with the psychologists, as "much improved".

At the end of the experiment arrangements were made for the patient to work in the hospital gardens, and this he appeared to do very energetically. Arrangements were also finalized for the patient to go to an Industrial Rehabilitation Unit to train as a brick-layer. Dr. Mallett reported that the patient received these suggestions with "quiet enthusiasm".

Dr. Mallett had, of course, been seeing the patient twice a week regularly throughout his stay in the hospital. There is no way of determining the relationship of all these activities and of the experiment to the patient's clinical improvement. All one can say is that the discussions did not do him immediate obvious harm, and might have done him some good.

The patient was asked by Dr. Mallett, just after the cessation of the second experiment, whether he felt that the psychologist had been able to help him in any way. His reply was, "Yes, well, it did help to get rid of a lot of superfluous hate. I don't know where it came from, but it seemed to be there and it's better out". Towards the end of his stay in hospital he indicated that his delusions of persecution did not bother him greatly, and he said, "People have been working so hard to help me, I just can't believe there is any plot against me." These responses underline the necessity for developing measures of the patient's view of the experimenters and the total situation.

Qualitative Changes in the Paranoid Questionnaire Items

In view of the uncertainty surrounding the reactions to the depression and hostility items, and the lack of definite change on the guilt items, it is only worth while reporting on the qualitative changes in the paranoid items. The first time he was tested the patient sorted eight of the items under "definitely the case" (Category 4), five of the items under "may be the case" (Category 3) and five of the items under "not sure" (Category 2). The first group consisted of Nos. 2, 5, 6, 9, 14, 15, 16 and 17. These, with one exception, refer to the aims and activities of the persecutors. The third group, the "not sures", consisted of items 8, 12, 13, 14 and 18. These refer mainly to biological beliefs such as his own and his children's illegitimacy and his physical condition (see Table I).

On the sixteenth occasion of testing the patient sorted no items under Category 4, sorted items 7, 14, 17 and 19 under Category 2, and items 12, 13 and 20 under Category 0. This last category was sorted under the heading "definitely not the case". The Category 2 items refer to "biological beliefs". Of the Category 0 items, 12 and 13 refer to the wife's unfaithfulness and the children's illegitimacy. No. 20 refers to dope being put in the patient's food.

In terms of the questionnaire responses, the patient lost all tendencies towards the unqualified acceptance of his persecutory delusions which he

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previously possessed, and ended up by rejecting 3 beliefs, of which 2 had, from the beginning, been sorted under "not sure".

Discussion and Conclusions

First of all, it seems unlikely that the patient's questionnaire responses were deliberately contrived by the patient. The motive for such contrivance would presumably be to obtain a discharge from the hospital. For this purpose it would be necessary for the patient to pretend that the discussions were modifying his beliefs in the desired direction. If this were the case it would be difficult to explain why his persecutory beliefs became stronger after the discussion of guilt. It would also be difficult to explain why guilt was so little affected by direct discussion. The fact that the senior author felt himself relatively ineffective, at times, in the discussion of guilt is not a sufficient explanation. The patient would, if he were merely trying to satisfy us, have made some concessions. In fact, if out-argued, he often came back on the next session with a new and improved argument.

Secondly, it is possible that the overall downward trend might have occurred because the patient was becoming better for some reason completely unrelated to the discussions, or that he was merely reacting to the kind of social contact which the discussion provided. The fluctuations around the regression line might have been due to a peculiar concomitance of factors which might never again come together, and which had no relation at all to the content of the discussions. In fact the implications of our result could not be accepted without further experiment.

The results from an experiment on a single subject can only be accepted with confidence if they give rise to generalizations which enable one to make new and valid predictions about the behaviour of that subject. Such predictions must be about situations which the subject has not yet experienced. Unfortunately the patient's eventual attitude prevented us from doing this.

Thirdly, it is worth mentioning some of the ideas which do arise if we take at face value the explanation which provides the best fit for our results. One implication is that a series of discussions has to be followed by a period of no discussions if the full impact of the discussions is to be felt. An alternative implication is that the week-end is, for a complex of reasons, the period of psychological development, and that this effect is quite independent of whether or not discussions are taking place during the week-end. Our aborted experiment had been in fact devised to indicate which of these implications was the correct one. Another implication is that the activation of guilt feelings can result in the increase in the strength of paranoid delusion.

It is further appropriate now to recall that our original aim was to investigate the idea that the patient's paranoid beliefs would be abnormally resistant to the normal processes of modification. The results of the present experiment, if taken at their face value, do not give a clear-cut answer to this question. Only eight of the interviews were directed at the paranoid beliefs themselves. One is forced to wonder whether passionately held beliefs of any kind would have shown as much change in eight interviews as our patient appeared to show. Their abnormality, therefore, might lie more in their content rather than in their resistance to modification. This matter cannot be settled without further investigation and appropriate controls.

Fifthly, we should mention the fact that the patient, under the impact of the discussions, offered additional information of interest. The most unexpected item was his statement that his persecutory feelings were most intense after

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breakfast. He said he was extremely irritable at this time and this was the time when people seemed to be trying their hardest to get at him. A second admission of interest was that he felt much better after hard exercise in the open air. If we had had more time at our disposal we would have carried out an experimental investigation of these two assertions of the patient. We were not in principle confined to the investigation of the effects of rational argument upon persecutory beliefs: we were only committed to the bringing of these beliefs under experimental control, and in the pursuit of such a purpose we would always be thoroughly opportunist.

Finally, it should be pointed out that the findings reported in this paper do not warrant any conclusions about the nature of paranoid delusions. At best they can only be regarded as a starting point for further research. Our first objective is to put forward a point of view on research method. The experiment we carried out, with all its weaknesses, serves to illustrate the point of view which is being advanced. In addition the results warrant the conclusion that the continued development of the direct experimental investigation of psychological disorders might produce useful results. It would seem to be worth our while, therefore, to carry out further experiments on paranoid delusions in which more attention were paid to the details of planning and of quantifying all the relevant variables.

Summary

This paper advances the view that the experimental clinical psychologist should concern himself, more than he has done hitherto, with the direct experimental manipulations of the psychological disorders which bring patients into the mental hospitals. As an illustration of this point of view an account is given of a preliminary experiment, with a patient diagnosed as a paranoid schizophrenic, on the effect of rational discussions upon persecutory delusions and feelings of guilt. The outcome of the experiment was consistent with the following conclusions:

(*i*) The rational discussion of paranoid beliefs diminished their strength.
(*ii*) The discussion of guilt had little effect on the strength of guilt feelings but increased the strength of persecutory beliefs.
(*iii*) The effects of a series of discussions were delayed and appeared only after a period in which there was no discussion.

It is made clear that further experimentation is necessary before the generalizations described above could be accepted with any confidence, and that the results serve, primarily, to indicate that the direct experimental analysis of psychological disorder might lead to useful results.

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