The relations between decision making processes and delusions.

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THE RELATION BETWEEN DECISION MAKING PROCESSES AND DELUSIONS

A Thesis Presented
By
Dianne Christine Smith

Submitted to the Graduate School of the
University of Massachusetts in
partial fulfillment of the requirements for the degree of
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Major Subject Psychology
THE RELATION BETWEEN DECISION MAKING PROCESSES AND DELUSIONS

A Thesis

By

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(Member)

September 1971
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INTRODUCTION

The process of making judgments and formulating convictions is a vital function performed by all human beings. Successful accomplishment of such tasks usually involves the integration of interoceptive cues (i.e. past experience, feeling states, etc.) with exteroceptive, or objective, information. Often, personal idiosyncracies determine the relative amount of flexibility with which convictions or opinions are held, regardless of contradictory information.

One factor which often differentiates maladjusted individuals from normals is the inability of the former to correctly evaluate available information when making judgments. An immature or disturbed person, for example, may demonstrate unwillingness to postpone decision making until sufficient facts are established. This tendency is referred to by Frenkel-Brunswick (1948) as "intolerance of ambiguity."

In some instances, as in the case of the schizophrenic, an inability to tolerate ambiguous situations may result in delusional thought. According to McReynolds et al. (1964), unassimilable information is not only intolerable for the schizophrenic, but "anxiety provoking." The schizophrenic alleviates this anxiety by developing "a system of false beliefs which serves to reduce some of the intolerable inner tensions of the personality at the expense of reality distortion," (Jenkins, 1952). For example, a schizophrenic who observes two strangers involved in a serious conversation may become anxious if he is unaware of the topic which seems to have the others so concerned. Unable to ignore this ambiguity, the schizophrenic concludes that the strangers are talking about him, and is thus relieved of much of his anxiety. Indeed, Schwartz and Wolfe (1959)
have characterized schizophrenia as a "quest for certainty in unreality." It has been noted that "paranoid psychotics experience great relief when they first formulate their suspiciousness and anxiety in the form of organized delusions..." (Boszormenyi-Nagy & Frano, 1965).

This predisposition toward delusion formation, according to McReynolds, constitutes a "characteristic technique used by some individuals for dealing with all kinds of ambiguous stimulus inputs." In other words, delusional schizophrenics demonstrate a deficiency in sampling information from the psychological environment.

Delusional schizophrenics, moreover, often tend to adhere rigidly to conclusions once reached. In other words, once they have made some judgment about the nature of a stimulus, delusional schizophrenics seem to remain quite inflexible in their decisions and are slow to alter them in the face of additional pertinent information. This could be interpreted as a defense against the recognition of possible errors in their thinking, a factor which could cast doubt upon other decisions, and prove even more threatening than the original ambiguity. Though contradictory theories appear throughout the literature, it is generally agreed that "rigidity is a nonadaptive behavior," and that schizophrenics are more rigid than normals, (Adams, 1960). In 1937, Shakow and Rosenweig found paranoid schizophrenics to be more rigid than hebephrenics. Since paranoia and delusional systems are often closely related, it is not unreasonable to assume that delusional schizophrenics would exhibit a greater degree of rigidity than those not prone to delusions.

Factor analyses of the components of rigidity bring to light two points particularly relevant to the present study. According to the Elgin
Prognostic Scale, (Wittman, 1941), one characteristic of the rigid individual is that he is "stubborn and opinionated...refusing to alter his accustomed ways." This "rigid strength tends toward evolution of an organized paranoid psychosis," (Jenkins, 1952). Thurstone (1944) also investigated the factor components of rigidity and found the speed of closure (which is closely related to intolerance of ambiguity) to be one of these factors. If one component of rigidity is related to premature closure, delusional schizophrenics might be expected to be more rigid than other schizophrenics, as delusionals are also intolerant of ambiguity. Levitt (1953) also found experimentally positive correlations between the acceptance of popular misconceptions, (which is a form of cognitive and social rigidity), and intolerance of ambiguity.

In some of the studies of delusion formation (Draguns, 1963; McReynolds et al., 1964; Cashdan, 1966) this pattern of thinking has been investigated with reference to structuring of ambiguous visual stimuli. McReynolds presented delusional and non-delusional schizophrenics with the McGill Closure Test, allowing them the opportunity to attempt an identification of the stimuli or not, as they desired. His hypotheses that the delusionals would attempt more identifications and guess correctly more often were upheld, from which he concluded that delusional schizophrenics have a stronger tendency to structure ambiguous stimuli than do non-delusional schizophrenics.

The Cashdan study sought to define this tendency further by trying to determine whether delusional schizophrenics structure prematurely as well as more frequently. Cashdan employed a technique utilized by Draguns (1963) which made use of drawings of common, easily identifiable objects, presented in varying states of "blurredness" ranging from completely unrecognizable to
clearly distinct. Subjects were shown the figures, beginning with the most blurred and becoming increasingly clearer with each presentation, and asked to guess the identity of the object as soon as possible. The number of photographs presented before a subject attempted an identification was taken as a measure of the subject's intolerance of ambiguity. That is, the later the subject guessed, the more tolerant of ambiguity he was. Contrary to prediction, Cashdan's maximally and minimally delusional schizophrenic subjects did not demonstrate significant differences as regards premature structuring with the blurred photograph technique.

The results of the McReynolds and Cashdan studies, however, are not necessarily contradictory. The former author merely measured whether delusional schizophrenics would guess more often than non-delusional schizophrenics when given a choice to guess or not to guess. The larger number of correct identifications made by delusional schizophrenics is of course dependent on the fact that the number of correct guesses obtained could not exceed the number of guesses made altogether. Actually, according to McReynolds' figures, the proportion of correct guesses made by each group was roughly equal. Therefore, while delusional schizophrenics tend to structure ambiguous stimuli more frequently than non-delusional schizophrenics, it cannot be said that they do so more correctly. Thus, Cashdan's question of whether or not delusionals structure prematurely more often than non-delusionals is a valid one. In his study, all subjects were required to guess, and the variable observed was how much information needed to be sampled before a guess would be attempted. The fact that significant differences were not found in Cashdan's study may have been partially due to the fact that all his subjects were, to a greater
or lesser extent, delusional.

The first part of the present investigation replicates Cashdan's experiment in order to shed additional light on the connection between premature structuring and delusion formation. This is basically accomplished by including a group which is not currently delusional, although the subjects have a history of delusions. The other groups consist of clearly delusional and clearly non-delusional schizophrenics.

The second part of the experiment examines the question of rigidity in adhering to a decision once it has been made. In this study, the measure used to assess the amount of rigidity associated with the subjects' decisions is the number of increasingly clearer presentations of the test object necessary to produce a change in a subject's response, after he has been forced to make an early guess regarding the object's identity.

It is assumed that premature structuring and an associated rigidity are most markedly present in actively delusional schizophrenics, and to a lesser degree in schizophrenics who were at one time actively delusional but who, at the time of testing, had not been exhibiting delusional thought patterns. If this were the case, it could be attributed to a once habitual learning pattern, the residuals of which have been maintained over an extended period of time. Schizophrenics who had never demonstrated marked delusions in their thought patterns would, under the above criteria, be expected to perform most like normals. That is, of the three types of schizophrenics described, those who have never been delusional should be least likely to structure prematurely or to rigidly maintain an opinion once they have formulated it. It is nevertheless predicted that non-
delusional patients still will demonstrate more intolerance of ambiguity and rigid adherence than normals.

Taking all the above into account, the study's specific hypotheses could be phrased in the following manner:

1. Schizophrenics will require significantly fewer presentations of the stimulus pictures in order to attempt identification of the ambiguous stimuli than will normals. (Ambiguity hypothesis #1)

2. Actively delusional schizophrenics will require the fewest number of presentations in order to attempt identification of the experimental stimuli, while previously delusional and non-delusional schizophrenics will require proportionately increasing numbers of presentations. Normals will require the largest number of presentations before attempting identifications. (Ambiguity hypothesis #2)

3. Schizophrenics will differ significantly from normals in the number of additional stimuli presented before a change in their decision is indicated. (Rigidity hypothesis #1)

4. Actively delusional schizophrenics will require the largest number of additional presentations before they indicate a change in their decision, while normals will require the least. Previously delusional schizophrenics will change their responses with fewer additional presentations than those who are actively delusional, but will require more presentations than non-delusional schizophrenics. (Rigidity hypothesis #2)
METHOD

Subjects

Three experimental groups of schizophrenics and one control group of "long term" hospitalized patients with non-psychiatric diagnoses were included in the study. The three experimental groups consisted of 1) schizophrenics who were actively delusional at the time of testing (hereafter referred to as "Delusionals"), 2) schizophrenics who had a documented history of active delusions during some period of their illness, but who were not currently exhibiting delusions ("Past - delusionals"), and 3) schizophrenics who had never been noted to exhibit delusional thinking ("Non - delusionals"). These patients were drawn from the inpatient population of the Northampton State Hospital. All subjects were obtained on the basis of availability and willingness to cooperate. In the case of the experimental subjects, diagnoses and delusional criteria were determined from hospital records, and all categories of schizophrenia (eg. simple, chronic undifferentiated, paranoid, etc.) were represented among the groups, though not with equal frequency. Delusions, when noted either past or present, were usually of a fixed nature and included ideas of persecution, grandiosity, or self-referent beliefs.

Control subjects were inpatients at the Western Massachusetts Hospital and the Cooley Dickinson Hospital, and were selected on the basis of relatively long term hospitalization (two consecutive weeks or more where available), and non-psychiatric diagnoses. Tuberculosis, orthopedic problems, and other illnesses of long duration were included in this category. The element of long term hospitalization was considered desir-
able in order to partially control for the effects of extended institutionalization in the experimental patients.

Each of the four groups consisted of 15 patients (10 males and 5 females), yielding a total of 60 subjects in all. They ranged in age from 17 to 67 and were matched as closely as possible on variables such as age, IQ, amount of education, socioeconomic status, and amount of time spent in the hospital. Means and standard deviations of age, verbal IQ equivalent, and number of years of education were computed for each group and are presented in Table I. No significant differences were found in these factors, either between groups, or between the experimental group as a whole (i.e. all schizophrenics) and the control group.

Duration of current hospital stay was a more difficult factor to match, and because of the vast ranges within groups, median lengths of hospitalization were calculated. Median numbers of months in the hospital as well as ranges for each group are also shown in Table I. Even though the experimental groups had on the average been in the hospital for a considerably longer period of time than the control group, this difference did not seem to affect the experimental measures. Pearson r coefficients of .048 and .104 between the number of months in the hospital during the current admission and the two experimental measures corroborated this assumption.

Subjects were excluded from the experiment when organicity was diagnosed or suspected, or in cases of verbal IQ's below 80. Since the experimental tasks were visual ones, subjects needing eyeglasses were required to wear them.

Materials

The ambiguous stimuli used in the experiment consisted of nine line
drawings of common objects such as a dog, trees, a telephone, etc. Each drawing was sequentially blurred out of focus photographically until nine sets of 12 slides were obtained. These ranged from perfectly focused depictions of the object to unrecognizable representations. (Cf. Cashdan, 1966, for a more detailed description of the stimuli). The first slide (#1) of each series was the most blurred, and #12, the clearest. Slides were projected on a 4' x 5' ground glass screen in semi-darkened rooms, with the subject viewing from a comfortable chair about seven feet from the screen.

Procedure

Each subject was administered the Information subtest of the WAIS to determine his approximate verbal IQ level.

Task A. This part of the study was concerned with the factor of premature structuring. The following directions were read to each subject:

"I am going to project a series of slides on the screen for 10 seconds each. At first the picture will be very blurred, but it will get clearer as we go along. As soon as you feel you have any idea of what the picture is, tell me. Then we will repeat the procedure with the next picture. Do you have any questions?"

To avoid confusion, and because the objects were essentially unrecognizable for the first few presentations, the experimenter introduced the presentation of the second slide in series #1 with the comment, "This is the same picture, only a little clearer."

When the subject made an identification, both the identification and the number of the slide were recorded, and the first slide of the next series was presented with the introduction, "This is the next set." This
procedure was followed for the first eight sets of slides.

**Task B.** The second part of the study was concerned with the characteristic of rigidity in adhering to a decision. In order to investigate this phenomenon, the ninth series was introduced by the following instructions:

"This last one is something different. At a certain point, I'm going to ask you to guess. I know it will be very difficult, but please try."

(In certain cases, when a subject had been consistently making identifications at the first presentation, the last sentence of the instructions was modified to read, "So please wait until I ask you to guess." This was done so that forced guesses would be made at the same time for all subjects).

After the above instructions were read, slide #1 of series 9 was presented for the usual ten seconds. Then slide #2 was shown, and after five seconds of exposure, the examiner asked, "Now, what do you think it is?" Subjects were encouraged to attempt the identification, if necessary, or told that uncertainty should not deter them from guessing. One subject in each of two experimental groups refused to guess at this point, and were excluded from analysis on Task B, but all other subjects did attempt an identification when requested on the second slide. After a guess had been made, the identification was recorded, and the subject was read the second part of the instructions:

"Now I will show you the rest of the slides of this picture. They will get sharper as I go on, so you may feel you would like to change your guess. If you no longer feel that this is a picture of [_____] (here name of object guessed by subject was repeated), let me know right away."
As soon as the subject indicated that he no longer felt the object to be what he originally guessed it to be, the number of the slide was recorded and the task was completed. This procedure was followed regardless of whether or not the subject offered an alternative guess.

Subjects were given no feedback except to be told that their performance was satisfactory. Care was taken not to allow patients to see clearer slides of an object which they had already identified. These precautions were taken in order to prevent discouragement over incorrect identifications, and to avoid prejudicing subjects against making early identifications if this happened to be their inclination. Accuracy of identification was not a factor in this study. Only the amount of information sampled before identification in Task A, and spontaneous change in Task B, were investigated.
RESULTS

Task A

The mean recognition level scores (point at which the subject attempted an identification) are presented with their standard deviations in Table II. Since the distribution of group scores showed considerable deviation from normal distribution curves, non-parametric tests were used to determine differences between means. Wilcoxon's Composite Rank Test was employed for tests between individual groups, while the Mann-Whitney U Test, designed for groups with unequal N's, was used to compare the entire schizophrenic group with the normal controls.

As the table indicates, the Delusionals made identifications at a significantly earlier point than any other group. Though the difference between the schizophrenic group as a whole and the normal controls was not significant, the Mann-Whitney z score of 1.86 closely approaches significance (.10>p>.05), and is in the direction predicted by Hypothesis 1. No differences were found between other individual groups, but the direction of the score increments was as predicted by Hypothesis 2.

Task B

Table III represents the mean rigidity scores and their standard deviations for all groups. Rigidity scores were taken as the number of additional slide presentations necessary to bring about a spontaneous alteration of the forced identifications made on slide 2, series 9. Thus, lower scores indicate less rigidity in adhering to the decision originally made, while higher scores show greater rigidity.
Here again, distributions were markedly skewed, and the Median Test was used for intergroup comparisons. On the whole, the schizophrenics demonstrated significantly more rigidity in adhering to their original forced guesses than did the Normals. Also, both the Past-delusionals and the Non-delusionals had significantly higher rigidity scores than the Normals. However, no significant differences were found among separate schizophrenic groups. Thus, Hypothesis 3 was confirmed by the data, but only the relative position of the control group as the least rigid was upheld in Hypothesis 4.
CONCLUSIONS

Task A

The results indicate that delusional schizophrenics tend to structure ambiguous stimuli faster than do normals. If the mean score obtained by normals is taken to represent the optimal point for decision making, then delusional subjects can be said to structure prematurely, not sampling sufficient information before reaching a conclusion. However, there was no significant difference obtained between the total schizophrenic group and Normals. Even though significant differences were not found between the remaining two schizophrenic groups, the differences obtained were in the direction predicted, indicating that the tendency to structure prematurely may be related to history of delusional thinking in a manner approximating a continuum. In other words, as Hypothesis 2 predicted, actively delusional schizophrenics are most inclined to structure prematurely, while some vestiges of this tendency may remain in schizophrenics who at one time did exhibit active delusions, though no longer do so.

The fact that schizophrenics with no history of delusions whatsoever obtained almost the same mean score as normals lends credence to the belief that premature structuring is related more directly to the phenomenon of delusion formation than to schizophrenia itself. It is likely that the trend toward significance in the comparison between the combined schizophrenic group and Normals is in part attributable to the fact that the group is weighted 2:1 in favor of patients with records of delusional thinking at some period in their illness. Another factor is that premature structuring could be considered a maladaptive behavior, and would
therefore be more likely to appear in schizophrenics than in normals.

There is a possibility of course that within any group of past-delusional patients there are individuals who are still experiencing delusional thought patterns, but who have simply decided (or learned) that expression of these ideas only results in negative reinforcement from individuals in authority. It is pertinent to point out here, however, the statistically significant difference between active delusionals and past delusionals as regards premature structuring of ambiguous stimuli. If the assumption regarding expression of delusions is valid, it would only indicate that premature structuring is related in some way to the peculiar set of psychodynamics which results in an individual overtly demonstrating his delusions rather than keeping them exclusively to himself. Since this mechanism of verbalizing delusions would be found always and only in those patients noted to be "actively delusional," the relationship between premature structuring and active delusions would still hold.

Task B

As predicted in Hypothesis 3, schizophrenics as a group tend to adhere more rigidly to a decision than do normals once they have committed themselves to a particular stand. If schizophrenia is considered a result (or cause) of psychological stress, the above results uphold previous findings (Smock, 1955; Moffitt and Stagner, 1956; Adams, 1960) which correlate stress with rigidity. In general, then, it can be concluded that an individual experiencing an emotional disturbance such as schizophrenia would adhere more rigidly to doubtful beliefs or decisions than would a normal individual.
Since normals seem able to do without this defensive method of coping with the environment, rigidity can safely be considered somewhat maladjusted as an adaptive mechanism. It would seem logical, then, to assume, as in Hypothesis 4, that this rigidity factor would tend to increase as individuals become more seriously disturbed. If active delusion formation is considered a sign of severe psychological disturbance, then the prediction that delusional schizophrenics would demonstrate more rigidity than schizophrenics without this degree of disturbance, should be demonstrable.

As the data show, however, just the opposite occurs. No significant difference was found between Delusionals and Normals, nor were significant intergroup differences noted. According to the data, the supposedly better adjusted Past-delusionals showed more rigidity than normals. The Non-delusionals – assumed to be the most well adjusted of the schizophrenic groups – were even more rigid than the Past-delusionals, though not significantly so. Both groups differed from Normals with a probability of less than .02. Thus, Adams' observation (1960) that "some schizophrenics are much more rigid than others," apparently applies to those not currently exhibiting delusional thinking.

Perhaps the best way to interpret these seemingly inconsistent findings is not to look at rigidity solely as a maladaptive coping mechanism. Rather, it might be more appropriate to view it simply as a low level adaptive technique, one which requires a certain amount of stability to employ, as do most adaptive techniques. Boverman (1959) maintains that although the schizophrenic appears rigid, he also suffers from a lack of rigidity. If he is not completely isolated in his thought processes,
such things as gullibility and lability can create problems for him. The most disturbed schizophrenic, then, "suffers not from rigidity, but from a lack of ability to establish and maintain a strong sense of identity to which he uncompromisingly adheres." Fisher and Fisher (1950) obtained results which seem to support this position. In general, they found that schizophrenics who rely heavily on the defense mechanism of rigidity and "'self-sealing off boundaries' for personality protection seem to be clinically less disorganized than others in their respective diagnostic groups." They conclude from their investigation that a tendency toward an "isolating rigidity has a high protective value for seriously disturbed personality structures."

Normals, of course, do not need to make as much use of rigidity as a coping mechanism, since they have more effective psychological resources at their command. However, it must be pointed out that the entire concept of rigidity is a complex one, and still poorly defined. Its profitable use in future studies requires a more precise definition of rigidity, particularly whether it is being viewed simply as a maladaptive technique or as a defective but nevertheless adaptive mechanism.

In light of the findings in the present study, rigidity, as defined here, tends to be associated with a remission or lack of delusion formation, in what may be considered to be less maladjusted schizophrenics, i.e., Past-delusionals and Non-delusionals. Since no significant intergroup differences were found among schizophrenics on the basis of the rigidity trait, a distinct continuum cannot be assumed to exist between presence and total absence of delusions and amount of rigidity demonstrated. There does appear, however, to be an inverse relationship between the two
Taking into consideration the overall evidence, it seems reasonable to suggest that the unique combination of premature structuring and lack of effective use of the rigidity coping mechanism in the schizophrenic bears a strong relationship to the formation (or expression) of delusions. Since the direction of the trend seems to indicate a definite pattern, further study with larger groups might be beneficial. If delusional schizophrenics could be subdivided on the basis of the extent and complexity of their delusional systems, as well as the length of time for which they have held beliefs, the exact nature of the relationship between premature structuring, rigidity, and delusion formation might be formulated more clearly.
SUMMARY

In this study, the formation of delusions by schizophrenics was investigated in relation to the tolerance of ambiguity and rigidity in modifying conclusions. Schizophrenics were grouped according to the presence or absence of delusions during the course of their illness, and compared with hospitalized normals. Two tasks were administered to all subjects. Task A required identification of an ambiguous stimulus, and Task B allowed for spontaneous modification of a premature, forced identification. The entire schizophrenic group differed from normals on Task A and significantly so on Task B. Delusional schizophrenics were found to be significantly faster in attempting identification of ambiguous stimuli than either normals, schizophrenics with a past history of delusions, or non-delusional schizophrenics. Direction of intergroup differences were found to be opposite to those predicted for Task B regarding the relative amount of rigidity within the schizophrenic group. Results were interpreted in terms of a unique combination of a tendency toward premature closure (intolerance of ambiguity) and relative lack of rigidity as an important factor in the formation and expression of delusional thought patterns.
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Means and Standard Deviations of Age, Verbal IQ and number of years of education for all groups; Median number of months spent in hospital during current admission, and ranges for all groups.
### TABLE II

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<th>Group</th>
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<td>Combined Schizophrenics</td>
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<tr>
<td>Normal controls</td>
<td>6.5</td>
<td>2.8</td>
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Task A - Tolerance for ambiguity. Scores represent point at which identification was attempted. (* $p < .01$ for differences between Delusionals and other groups; ** $10 > p > .05$ for difference from Normals)
TABLE III

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
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<td>Non-delusionals</td>
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<tr>
<td>Combined Schizophrenics</td>
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<td>Normal controls</td>
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<td>1.05</td>
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</table>

Task B - Rigidity. Scores represent number of additional slide presentations necessary to produce spontaneous change in identification. (*** p < .02 for difference from Normals)
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