1963

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# CONCEPTUAL PERFORMANCE OF SCHIZOPHRENIC AND NON-PSYCHIATRIC SUBJECTS ON STIMULUS MATERIALS VARYING IN EXTENT OF SYMBOLIC REPRESENTATION

GOLDSTEIN - 1963

# Conceptual Performance of Schizophrenic and Non-Psychiatric Subjects on Stimulus Materials Varying in Extent of Symbolic Representation

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B.B.A., 1959, The City College

Thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science

University of Massachusetts
Amherst

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## Introduction

The purpose of the present study was to investigate concept formation and its accompanying verbalization in good premorbid schizophrenics, poor premorbid schizophrenics and non-psychiatric subjects given different modes of stimulus representation which vary along a dimension of increasing symbolism.

### Schizophrenic Conceptual Performance

Several experimental investigators have demonstrated that schizophrenic subjects display a deficit on conceptual tasks. Bolles and Goldstein (1938) for example, using a number of conceptual tasks, among them the Object Sorting Test, found that schizophrenics were unable to assume what was termed the "abstract attitude." While the subjects were able to categorize the sorting materials, they did so in an idiosyncratic rather than in a more public manner.

Rapaport (1945) further investigated schizophrenic concept attainment through the use of the object sorting test, for which he devised a system of scoring. His results indicated that the schizophrenics displayed a conceptual deficit in comparison to a control group of normals especially when regard was taken of pathological verbalizations such as symbolic, syncratistic, fabulated and chain responses.

Later investigations have led to the suggestion that this apparent deficit is a variable one, depending in part on the nature of the experimental situation. While it is not the purpose of this introduction to present a complete review of the literature in this

area, certain relevant and representative studies illustrating this variability are germane.

Whiteman (1954) found that schizophrenics performed more adequately on formal conceptual tasks than on social conceptual tasks. Whiteman interpreted these results in terms of the effect of social disarticulation on the cognitive functions of the schizophrenic. In a more recent paper, Whiteman (1956) has described some of the qualitative differences between schizophrenic and normal functioning. The schizophrenics were more likely to give individualistic, physicalistic or descriptive responses, to reject more items or to be more generally vague in their conceptualizations. Webb (1955) found that schizophrenics who were told they had done poorly on a test of verbal concept attainment (Similarities) failed to improve with further testing, whereas a control group, not so censured, did improve their conceptual performance.

Cavanaugh (1958) tested both schizophrenics and normals on tests of formal and social concept formation under conditions of aversive stimulation (white noise). It was found that in conditions where escape from this stimulation was contingent upon successful performance, the schizophrenics' conceptual performance approximated that of the normals.

Schizophrenic Verbal Performance

In addition to the general conceptual deficit noted, any number of studies have consistently shown that in the specific area

of verbal concept formation, schizophrenics perform more poorly than do normals.

In a study by Wegrocki (1940), children, schizophrenics and normal adults were tested on a series of conceptual tests. It was concluded that the schizophrenics displayed an impaired ability to generalize when compared to the normal adults. However, when the schizophrenics were compared to the children, there were sufficient qualitative differences in the types of errors made to warrant refutation of the hypothesis that schizophrenia is a regression to a preconceptual level of thinking. In addition, it was found that under conditions of good rapport some schizophrenics could manipulate abstract materials in a manner that had originally seemed impossible for them.

Feldman and Drasgow (1951) investigated concept formation in schizophrenia through the use of a visual-verbal test. The task consisted of forming concepts to cards on which there were four pictures. A concrete performance was defined as merely an identification or description of the pictures while a performance was considered abstract if the four pictures were subsumed under a common conceptual category. The results indicated that a conceptual deficit existed in schizophrenia in that their mode of response was typically a concrete one when compared to the normal control group.

In a study with schizophrenics and normals, where a choice was necessary between a more abstract and a less abstract response word, Flavell (1956) found that the schizophrenics chose the less

abstract word more often than did the normal group. Interestingly enough, this was positively correlated with the social adequacy of the subject as measured by ward nurses ratings.

In an investigation on the acquisition of verbal concepts in schizophrenia, Baker (1953) used a number of sentences in which artificial words were placed. The task was to account for the meanings of these artificial words within the context of the sentences. The results indicated that the schizophrenics not only performed more poorly conceptually, but were more concrete in their language as well.

Complexity of response was found to be a factor in schizophrenia performance by Harrington and Ehrmann (1954). Using the Wechsler-Bellevue vocabulary subtest, the authors found that the schizophrenics gave fewer abstract definitions than did normals. On a multiple choice vocabulary test however, these significant differences disappeared. While complexity of response is, no doubt, a factor in conceptual performance, it should be noted that in a multiple choice test there is less opportunity for the intrusion of personalized, idiosyncratic material. Thus, the more adequate performance noted might be attributable to factors other than complexity.

Nature of the Conceptual Deficit: Communicative Ability vs. Categorization Ability

The question of what actually is the deficit in schizophrenia is a difficult one to resolve. Is it for example, a fundamental loss in the ability to form abstract concepts or is it rather a

function of disordered communication skills which do not of necessity involve a loss in conceptual ability?

The work of McGaughran and Moran (1956) has attempted to shed light on this problem. Their procedure involved using two subject groups--paranoid schizophrenics and non-psychiatric subjects. Both groups were tested on the Object Sorting Test to which two scoring methods were applied. The first of these was designed by Rapaport, aimed at assessing the conceptual level of the subjects. The second scoring system was designed to test the level of communicativeness of the subject's concepts. The results indicated that the schizophrenics demonstrated a loss in social communication abilities without evincing a corresponding loss of abstract conceptual abilities.

On the basis of the above study, the same authors (1957) performed another investigation. It was felt that the concepts of "abstract" and "concrete" as generally used represented a number of isolable variables, one of which was the communicativeness of the concepts. A second variable was felt to be the level of conceptualization--that is, whether abstract or concrete. Using the records of the previously tested schizophrenic group and an additional group of brain damaged patients, it was found that while both groups departed from normal conceptualization, they did so in opposite directions. That is, the brain damaged groups' concepts tended to be concrete but communicative, whereas the schizophrenics tended to be abstract but autistic.

These results would indicate that the conceptual deficit in schizophrenia is a deficit in communicativeness rather than a fundamental loss of abstract ability. There is, however, evidence for a categorization deficit as well as for the above noted communication deficit. This is pointed to by the often illustrated "overinclusiveness" of the schizophrenic.

Cameron (1939) for example has found that schizophrenics tend to include in their conceptual sortings much material related to their personal fantasies. Thus, their conceptual generalizations are typically too broad and complex. Epstein (1953) has supported the finding that the schizophrenic's thought processes are typically overinclusive. Epstein's task required that the subject select from a group of words those appropriate to a particular cue word. The results indicated that the schizophrenic group was more inclusive than was a normal control group.

Payne et al. (1959) see overinclusiveness as a fundamental aspect of schizophrenic thought. In an investigation aimed at determining whether schizophrenic thought was concrete or overinclusive, support was obtained for the latter interpretation. While not questioning the findings of the above authors, it would seem to the present writer that the categories of "overinclusive" and "concrete" are not mutually exclusive.

Chapman and Taylor (1957) while agreeing that overinclusiveness is a basic phenomenon in schizophrenic thought, see it not as a loss of conceptual ability, but rather as a result of an "over-

responsiveness" on the part of the schizophrenic to distracting stimuli. If these distracting stimuli are conceived of as including the phantastic productions of the schizophrenic, the essential agreement of Chapman and Taylor and Cameron may be noted.

Freeman, Cameron and McGhie (1958) have made an attempt to reconcile the apparently diverse theoretical formulations and experimental findings. These authors see schizophrenic symbolic thought as containing elements of normal conceptual thought. Whereas normal thought, however, is governed by the "secondary" processes of generalization and abstraction, schizophrenic thought is predominated by the "primary" processes of condensation and displacement, two more primitive mental mechanisms. This use of primary process, the authors continue, is associated with a lack of adequate differentiation between the ego and the external world. Under such circumstances, the thought processes will be concrete in nature. The reason posited by Freeman et al. for the concreteness of the schizophrenic is that "To think abstractly one must be able to discriminate clearly between the idea of an object as a <u>real</u> one and as a representation for thinking. It is this discrimination that ... patients with a gross disturbance of ego boundaries are unable to make" (p. 87). One important implication of this conception is that as objects become increasingly less "real" (i.e. more symbolically represented), difficulty in dealing with them conceptually should be directly related to severity of ego-disturbance.

The Nature of Concept Formation

Part of the difficulty in making broad yet effective generalizations regarding schizophrenic concept formation has already been hinted at in the section on the "Nature of the Conceptual Deficit." It was demonstrated that evidence could be supplied to support a communicative and/or a conceptual deficit depending on (1) the particular definition of "deficit" and (2) the cognitive task employed. Indeed, the definition of the deficit in many cases is contingent upon the test used. These have encompassed such apparently diverse tasks as tests of verbal concept ability, non-verbal concept ability (Block Designs), sorting behavior and paired-associates learning. While these have all been subsumed under the rubric "concept-formation tasks", they would seem to vary sufficiently in both level of abstraction required and degree of social communicativeness involved to make, strictly speaking, generalizations across studies not readily conclusive.

With this emphasis in mind, it is reasonable to present relevant ideas as to what comprises concept formation. Perhaps most important is the work of Rapaport (1945) which provided a rationale for the Object Sorting Test. For Rapaport, concept formation is "that aspect of thought processes which determines the 'belongingness' of our ideas to each other" (p. 387). Through an analysis of sorting behavior or the "putting together of objects which belong together" one is able to assess "how rigid and concrete or how fluid, vague and over-generalized the concept formation of the subject is" (p. 348).

Thus, as a result of its sensitivity to conceptual impairment, the Object Sorting Test is especially applicable to the investigation of pathological thought processes. A sorting test, as Rapaport as further stated, "deals with everyday objects usually known to the subjects; thus we gain insight into how the subject crystallizes the belonging-together of objects in his everyday world" (p. 392).

Bruner (1956) has also spoken of concept formation in terms of categorization tasks. Further, it may be thought of as "going beyond (the information given) by inference." The basis for this "going-beyond" is the isolating of a particular attribute and selecting from its range of values those which will serve as positive signals. Illustrative of this idea is Bruner's statement, "There are many discriminable hues that are 'acceptable' as signals that the round object before one is an orange and is thus discriminable from such other classes of things as lemons and grapefruits" (p. 26).

When this idea of going-beyond is taken in conjunction with previously discussed material, some interesting implications emerge. As the representation of objects becomes more symbolic, fewer of the object's attributes are specified. As the number of specified attributes decrease, there should be an increasing reliance on higher mental processes (i.e. generalization, abstraction) in order to select the common attribute appropriate to a group of objects. But as has been pointed out by Freeman et al. (1958), the analogs of higher mental processes in the schizophrenic (i.e. condensation, displacement) are of a primitive nature. Thus, as greater reliance

on these processes becomes necessary for successful performance, increasing deviancy from normal performance should be manifested by the schizophrenic.

An important distinction between types of symbolic representations has been discussed by Brown (1958) in his section on arbitrary and representational symbols. For Brown, a representational symbol, such as a pictogram, has certain of the attributes of its referent category. Thus, while it is not a member of that category, it does share points of physical resemblance with it. An arbitrary symbol such as a word, on the other hand, has no such immediate representational character. Thus, as Brown points out, "representation symbols can be more easily decoded than arbitrary ones" (p. 134).

As it is easier to decode with representational symbols than with arbitrary symbols, so it should be easiest to decode (i.e. interpret) concrete objects, which in effect are their own referents. Thus on a sorting task where the stimuli are presented as actual objects, as pictures of the objects (representational symbols) and as words denoting the objects (arbitrary symbols) inferences can be made regarding relative performances on each level. At the same time, schizophrenic subjects performing on these materials should have difficulties in conceiving of the symbols as representations to the extent that their ego-boundaries are disturbed. This difficulty should be manifested by inadequate sortings and pathological verbalizations.

Three Views of Schizophrenic Functioning

Goldstein (1941) has described the concrete attitude as being "realistic", binding the person to the immediate situation. The subject views the situation as a specific, discrete instance rather than being representative of a more general class as is characteristic of the abstract attitude. The schizophrenic, according to Goldstein (1943) is marked by his inability to assume the abstract attitude. The abstract attitude is comprised of the following abilities:

1) To assume a mental set voluntarily

2) To shift voluntarily from one aspect of a situation to another

3) To grasp the essentials of a given whole; to break up a whole into parts and to voluntarily isolate them

4) To keep in mind various aspects of a situation

5) To generalize and plan ahead ideationally

6) To maintain a discrimination for a length of time

In a more recent formulation Goldstein (1959) has expanded upon the psychological basis for concreteness in the schizophrenic. He speaks of it as being a "protective mechanism against anxiety ... it is not the effect of an organic deficit ... it is an expression of the restriction in the use of the highest mental capacity" (p. 147).

For Cameron (1947) schizophrenia is similarly marked by a predominance of autistic conceptualizations. Cameron's analysis however, stresses the schizophrenic's withdrawal from interpersonal relations as a result of his inability to play the various roles required of him. One result of this inability is the inclusion of the schizo-

phrenics' fantasy productions into his social relationships. In stressful situations the schizophrenic becomes too threatened to test the reality of these productions and he withdraws into further autism.

Sullivan (1956) regards schizophrenia as being characterized by a loss of control over what he terms the "early referential processes" with their subsequent domination of consciousness. These processes are fundamentally autistic and uncommunicative and in normal development they are superseded by the more consensually validated and logical modes of thinking. One result of this loss of control is that the schizophrenic often displays an inability to perform adequately on tasks where there is a need for conventional conceptual processes.

Premorbidity and Schizophrenia

It has previously been stated that schizophrenics should display a difficulty in dealing with conceptual materials in accordance with their degree of ego disturbance. As a diagnostic entity however, schizophrenia is generally regarded as being a heterogeneous group. There have been any number of attempts to break it down into more homogeneous subgroups so that more effective generalizations may be made regarding behavior, conceptual performance, susceptibility to therapeutic intervention and so on. One approach holds that there are two broad types of schizophrenia--the first represented by a chronic inability on the part of the person to make an adequate social adjustment, the second as a relatively sudden reaction to a trauma or series of traumas. These have been differentiated in the literature

by such descriptive terms as process-reactive, chronic-episodic, evolutionary-reactive etc.

Apart from its classificatory usefulness such a distinction has important theoretical implications. Social conceptualization should not develop properly if there has been much behavioral withdrawal as evidenced by poor premorbid schizophrenics. By the same token, good premorbid schizophrenics should not show as great a loss in conceptual ability relative to the poor premorbids because they are more articulated in their social world. Thus, the concepts of the good premorbids are more likely to receive consensual validation.

Recently a scale has been devised which allows a separation of schizophrenics into groups based upon the adequacy of their premorbid adjustment. This scale (Phillips Scale of Premorbid Adjustment) provides for ratings in five areas of prepsychotic life. Under each area heading are descriptive statements of various possible levels of adjustment. Scores from 0-6 are assigned according to the particular level of adjustment on each criterion, as assessed from the patient's case history. Good and poor premorbids are obtained by a division at some point on the scale, usually the upper and lower thirds.

Premorbidity and Conceptual Performance

That such a scale has value is pointed to by a number of investigations. In a study by Dunn (1954) it was indicated that schizophrenics were less able to perform adequately on conceptual tasks that involved visual cues of censure than they were on tasks that did not have such cues. Rodnick and Garmezy (1957) re-evaluating the Dunn

study found that schizophrenics with poor premorbid history accounted for the significant differences noted between the normals and the schizophrenics.

Developing the view that task cues are a relevant variable in schizophrenic concept attainment, Rodnick and Garmezy (1957) completed a program of research. As in the Dunn study, the cues were related to the schizophrenics assumed experience with censure. It was found that schizophrenics with poor premorbid histories (hence greater assumed experience with censure) displayed a greater conceptual ineptitude than did schizophrenics with good premorbid histories.

The finding that both social censure and premorbid adjustment are relevant variables in schizophrenic conceptual behavior has been reflected in a number of recent studies.

Hellman and Bates (1961) using the Object Sorting Test with good and poor premorbid schizophrenics (separated on the basis of the Phillips Scale) found no significant differences between groups under a no-censure condition. When a mild verbal censure was introduced the poor premorbid group was distinguished from the good premorbid group by the formers' gross behavioral withdrawal. While there were no significant differences in conceptual performance between the two groups, there were trends in the expected direction. It was felt that with greater opportunity for verbalization on the part of the Ss, significance would have been obtained. Preliminary reports from a later investigation appear to confirm this contention.

In a study by Buck (1960) it was found that good premorbids

could not be distinguished from normals by their responses to scenes depicting love. On scenes depicting anger (analogous to censure) however, the normals performed significantly better than did the good premorbids. In a later study (1962) which in part replicated the previous investigation but which also added a poor premorbid group it was found that poor premorbids differed significantly from both normals and good premorbids on the love scenes, but only from the normals on the scenes depicting anger.

A recently completed study by Moriarty and Bates (1962) where good premorbid, poor premorbid and normal subjects were compared on conceptualizations relating to social materials, indicated that despite being matched with the normals on formal tasks of conceptual ability, the schizophrenics manifested an impairment in concept attainment on the social materials. Within the schizophrenic group itself, it was found that the poor premorbids performed less adequately than did the good premorbids.

The above data would seem to imply that there is an interaction between premorbid level of adjustment and conditions relating to social censure. Under no-censure conditions, however, there have not been a sufficient number of investigations to warrant a generalization. While the work of Bolles and Goldstein (1938) and Rapaport (1945) indicates that a conceptual deficit exists in schizophrenia even with no ostensible censure, their groups were not separated on the basis of premorbid adjustment. The Hellman study, however, previously cited, has indicated that a significant difference does not exist between

good and poor premorbid schizophrenics when censure is not involved.

Statement of the Problem

One principal problem of this study is to determine if schizophrenic patients are less able than non-psychiatric subjects to adequately group together objects, pictures of the objects and words referring to those objects, when no experimentally induced censure is introduced. The impetus for this problem springs from the various theories of schizophrenic functioning (Goldstein, Cameron, Sullivan, Greeman et al.) stressing the regressive, autistic, primary process nature of the schizophrenic's thought processes.

A second question is concerned with how adequately schizophrenic patients verbalize the reasons for their respective groupings when compared to non-psychiatric subjects, when no experimentally induced censure is introduced. This problem finds its source in the experimental studies pointing up the communicative deficit of the schizophrenic as well as from the specific studies of Cameron and Sullivan which stress the social disarticulation of the schizophrenic.

Finally, the extent to which poor premorbid schizophrenics, good premorbid schizophrenics and non-psychiatric subjects show increasing difficulty in categorization and verbalization behaviors is investigated when the task involves grouping together objects, pictures of the objects and words denoting the objects, and verbalizing the reasons for the respective groupings under no-censure conditions.

This last major question arises from the theoretical contentions of such as Brown and Bruner concerned with the nature and development

of concept formation, the theories of schizophrenic functioning stressing the ego-boundary disturbance and the experimental evidence pointing up the usefulness of the good premorbid-poor premorbid dichotomy as a means of differentiating schizophrenics.

Finally it should be noted that the present study overcomes a serious difficulty in that while three levels of a task are involved, the referents in each case remain constant. Thus the problem of making generalizations across levels is greatly diminished. Also, while the categorization task is basically non-verbal so as to enable assessment of conceptual difficulties, a scoring system for the verbalizations allows assessment of communicative difficulties.

Hypotheses

1. Poor premorbid schizophrenics will be significantly inferior to good premorbid schizophrenics who in turn will be significantly inferior to non-psychiatric subjects in the combined measures of sorting and verbalization adequacy for all three tasks.

2. When their categorization and verbalization performances (combined) are compared on objects, pictures of the objects and words denoting the objects:

a) The poor premorbids will show significant differences between their performances on each task, the best performances being evinced with objects, the least with words.

b) The good premorbid group will display a rank ordering with the most adequate performances being evinced with objects, the least with words.

c) The non-psychiatric subjects will show no significant differences between their performances on each of the tasks.

3. On each of the three tasks (objects, words, pictures) the non-psychiatric subjects will have significantly more adequate sortings and verbalizations (combined) than the good and poor premorbids.

4. Combining all tasks, the non-psychiatric subjects will be significantly better than goods who in turn will be significantly better than poors on:

a) number of adequate verbalizations

b) number of formal verbalizations

c) number of adequate sortings

d) number of idiosyncratic verbalizations

## Method

### Subjects

There were three groups of subjects--a normal group, a good premorbid group and a poor premorbid group--at each of three levels of a task. There were thus nine groups with ten subjects in each group making a total of 90 subjects. The groups were matched on age, intelligence (Wechsler Vocabulary Subtest), educational level, absence of organic involvement and reasonable capacity for cooperation. In addition, they were matched on a non-verbal test of conceptual ability. The means and standard deviations for the various matching criteria may be examined in Table 1.

Sixty schizophrenics were selected from the Northampton Veterans Administration Hospital, Northampton, Mass. on the basis of premorbid histories in accordance with the criteria posited by Phillips (1953). Twenty records were selected at random and rated by a second clinical psychologist in order to determine the reliability of the subjects' assignment. There was total agreement between the two raters as to whether a particular subject should have been included in the good premorbid or poor premorbid categories.

Non-psychiatric subjects were selected from the Albany Veterans Hospital, Albany, New York and were being treated for general medical, non-psychiatric disorders. The subjects were arranged according to the research design presented in Table 2.

Table 1

Means and Standard Deviations for Matching Criteria

| Criteria | | Group | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Non-Psychiatric | | | Goods | | | Poors | | |
| | | O | W | P | O | W | P | O | W | P |
| Age | Mean | 39.0 | 42.2 | 39.9 | 39.7 | 35.8 | 37.0 | 37.0 | 38.7 | 37.8 |
| | SD | 4.4 | 3.6 | 6.0 | 7.4 | 6.1 | 5.1 | 4.5 | 6.7 | 5.4 |
| Educa | Mean | 10.0 | 10.3 | 10.2 | 11.2 | 11.1 | 10.7 | 10.4 | 10.5 | 10.6 |
| | SD | 2.4 | 2.6 | 2.1 | 2.9 | 2.0 | 2.4 | 3.0 | 2.0 | 2.9 |
| BD | Mean | 9.1 | 9.1 | 9.3 | 9.5 | 9.4 | 9.7 | 9.3 | 9.2 | 9.5 |
| | SD | 1.9 | 1.3 | 1.7 | 2.3 | 1.9 | 1.9 | 2.9 | 2.2 | 2.3 |
| Vocab | Mean | 9.7 | 9.9 | 9.4 | 9.2 | 9.9 | 10.0 | 9.4 | 9.1 | 9.2 |
| | SD | 1.6 | 2.7 | 1.7 | 2.7 | 1.7 | 1.6 | 1.5 | 2.1 | 1.6 |

Table 2

Research Design

| Subjects | Tasks | | |
|---|---|---|---|
| | Objects | Pictures | Words |
| Non-Psychiatric | Ss 1-10 | Ss 11-20 | Ss 21-30 |
| Goods | Ss 31-40 | Ss 41-50 | Ss 51-60 |
| Poors | Ss 61-70 | Ss 71-80 | Ss 81-90 |

Apparatus

A. Object Sorting Test

The Rapaport modification (1945) of the Goldstein-Gelb-Weigl Object Sorting Test was used. This test is composed of 33 common objects. The objects listed by Rapaport are as follows: a real knife, fork and spoon; a miniature knife, fork and spoon; a real screwdriver and pair of pliers; a miniature screwdriver, pair of pliers, hammer and hatchet; two metal nails, a block of wood with a nail in the center of it; two corks; two sugar cubes; a pipe; a real cigar and cigarette; a miniature cigar and cigarette; a matchbook; a red rubber ball; a rubber eraser; a rubber sink stopper; a white filing card; a green cardboard; a red paper circle; a lock and a bicycle bell.

The active phase of the sorting was employed. In this phase the S forms groups of objects that "belong together" using as a basis a sample object presented by the E as a representative item in a class of items. From the objects available in the materials, the S proceeds to group items with the sample item.

B. Modified Sorting Test (Pictures of Objects)

The objects in the Object Sorting Test were individually photographed with color film. They were photographed so that there was a uniform scale of size. The procedure was the same as that employed with objects.

C. Modified Sorting Test (Words Denoting Objects)

Words denoting the objects were lettered in black India Ink on 3 X 5 index cards. If an object was in miniature it was so labelled.

The procedure was the same as in the other two conditions.

Procedure

Each subject was individually tested. The same procedure was followed for all three tasks (objects, pictures, words). Each task consisted of nine different sorts. The appropriate sets of materials (objects, words, or pictures) was spread out on a table before the subject. A sample item was removed by E and placed apart from the remaining items. The S was then instructed, "Now pick out all the objects (pictures, words) that belong with this and tell me when you have finished." As the sorting was completed the S was asked, "Now tell me why these go together." In the event of vague statements, failures to sort or confusing sorts, further inquiry was made. The particular sample item was then placed back in the pool of items and another sample selected. This was continued until all nine sorts were completed. The nine sample objects in their order of presentation were:

1. Pliers
2. Large fork
3. Pipe
4. White card
5. Rubber disc
6. Toy hatchet
7. Rubber ball
8. Bicycle bell
9. Red paper circle

Written records were taken of the materials sorted and the reasons for the sorting as stated by the subjects. All three conditions (objects, words and pictures) were scored according to three broad areas designated by Rapaport (1945) and modified by Kates, Kates and Michael (1960). The areas are as follows:

1. Adequacy of Categorization
2. Adequacy of Verbalization
3. Type of Verbalization

1. Adequacy of Categorization
   a) Adequate
      1. All the objects included are relevant to each other and no irrelevant objects are included or relevant objects excluded. The adequacy of sorting is to be determined as independently as possible, without taking into account the nature of the verbalization.
   b) Inadequate
      1. All objects are relevant with the exception of one object which does not belong.
      2. All objects included are relevant, but one relevant object is not included.
      3. The objects are predominately irrelevant to each other or more than one object has been excluded that is relevant or more than one object has been included that is irrelevant, or any combination of the above.

2. Adequacy of Verbalization
   a) Adequate
      1. An adequate verbalization is one which covers correctly and completely the objects sorted.
   b) Inadequate
      1. A verbalization is inadequate if it is too inclusive. That is, it is inadequate because it covers correctly the objects sorted in that particular grouping, but refers as well to other objects not included in the grouping but present in the overall sampling of objects. It includes more objects than are present in the sorting.
      2. The verbalization is exclusive; that is, it excludes one or more of the objects grouped.
      3. A verbalization is inadequate if it is false.
      4. Any idiosyncratic verbalization (to be described below) is inadequate.
      5. A verbalization is inadequate if it is both inclusive and exclusive.

3. Type of Verbalization
   a) Formal Verbalization
      1. The criteria for membership in these categories or the defining attributes are properties inherent in the objects themselves. There are several types of formal categories but the type we are concerned with is predominately the formal conjunctive category. The conjunctive category is defined by the joint presence of the appropriate value of one or several attributes. All of these objects are red: is an example of a formal conjunctive category.
   b) Idiosyncratic Verbalization
      1. Affective
         The verbalization groups together the objects because they elicit a common emotional response. This is the only case in which the adequacy of categorization is not independent of the verbalization. If an affective verbalization is given, the categorization for which it was given is automatically judged inadequate.
      2. Syncretistic
         A syncretistic verbalization is one which is extremely vague and general and applies almost to the whole set of objects as well as the class for which it is used.
      3. Fabulated
         A fabulated verbalization starts out with one attribute of an object which serves as a basis for a story which includes other objects in the grouping.
      4. Symbolic
         In the symbolic verbalization the meaning of the objects is changed. The meaning of the object is reinterpreted and a grouping is made on the basis of this reinterpretation.
      5. Chain-Definitions
         The verbalization moves from object to object as the example below will indicate. The subject moves from a red ball to an object with a red handle, then on the basis of some other attribute to another object and so on.
      6. Split-Narrow
         This categorization is marked by dividing the grouping into two or more subgroups and subsuming each group under a different concept.

Twenty-five scored records were selected at random and re-scored by a second clinical psychologist. The correlation coefficients obtained were as follows:

Adequate Sortings----------.91
Adequate Verbalizations--------.87
Formal Verbalizations----------.93
Idiosyncratic Verbalizations---.91

## Results

The analysis of variance technique (a three X three treatments by levels design) was employed to assess the differences between groups (good premorbid schizophrenics, poor premorbid schizophrenics, and non-psychiatric subjects), tasks (objects, pictures, words), and the interaction (groups X tasks) on the dependent variable of combined verbalization and sorting adequacy. Simple randomized analyses of variance were utilized to assess the differences between groups across all tasks on the dependent variables of adequate sorting, adequate verbalization, formal verbalization and idiosyncratic verbalization. In addition, simple randomized analysis of variance techniques were used to assess the task effect for each subject group.

Analysis of the results supported the first hypothesis. It stated that there should be significant differences between each group with the non-psychiatric subject displaying the most adequate performances and poor premorbid schizophrenics the least. As predicted, there was a significant difference between subject groups in the expected direction on the measure of combined sorting and verbalization adequacy across all three tasks. This effect was significant at better than the .001 level (Table 3). Duncan range tests indicated that on this measure non-psychiatrics differed significantly (at the .05 level) from both good premorbid and poor premorbid schizophrenics (Table 4). In addition, the good premorbid and poor premorbid schizophrenics differed significantly from each other ($p = .05$). The means and standard deviations may be examined in Table 12.

Table 3

Analysis of Variance for Adequate Sortings and Verbalizations

| Source | df | SS | MS | F ratio | P value |
|---|---|---|---|---|---|
| Total | 89 | 1245.60 | | | |
| Groups | 2 | 262.87 | 131.43 | 11.44 | .001 |
| Tasks | 2 | 7.40 | 3.70 | .32 | ---- |
| G x T | 4 | 44.93 | 11.23 | .98 | ---- |
| Error | 81 | 930.40 | 11.49 | | |

Table 4

Duncan Range Tests for Main Effect of Groups

(Non-Psych., Good Premorbids and Poor Premorbids)[a]

Combined Verbalization and Sorting Adequacy Scores

| | Non-Psych. | Goods | Poors[b] |
|---|---|---|---|
| Means | 8.6 | 6.8 | 4.4 |

Code: a. Duncan's New Multiple Range test applied to the differences between means, K = 3. (From Edwards, 1960, pp. 136-140, p. 373.)

b. Treatment means not underlined are significantly different. Treatment means underlined by the same line are not significantly different. The .05 level of significance was utilized.

Part "a" of the second hypothesis was not confirmed. With respect to the measure of sorting and verbalization adequacy, there were no significant differences between the performances of the poor premorbid schizophrenics on objects, pictures, or words (Table 5). The results, however, were in the predicted directions with the best performances being displayed on objects, the worst on words. The means and standard deviations are presented in Table 12.

Part "b" of hypothesis two was confirmed. The good premorbid schizophrenics displayed, as predicted, a rank ordering of their performances with the best performance evinced on objects, the worst on words when the measure utilized was combined sorting and verbalization adequacy (Table 6). The means and standard deviations are in Table 12.

Part "c" of hypothesis two, stating that there should be no significant differences between non-psychiatric subjects performance on objects, pictures or words, using the dependent variable of sorting and verbalization adequacy, was confirmed. No statistical analysis was necessary because of the close similarity of the means. While the non-psychiatric subjects performed slightly better on words than on pictures, with their worst performances occurring on objects, no hypothesis regarding rank ordering of performance was posited for this group. The means and standard deviations are presented in Table 12.

Hypothesis three, stating that on each of the three tasks the non-psychiatric subjects would have significantly more adequate sortings and verbalizations than the good premorbid and poor premorbid

Table 5

Analysis of Variance for Adequate Sortings and Verbalizations for the Poor Premorbid Group Across Tasks

| Source | df | SS | MS | F ratio | P value |
|---|---|---|---|---|---|
| Total | 29 | 213.20 | | | |
| Task | 2 | 8.60 | 4.30 | .5674 | ----- |
| Error | 27 | 204.60 | 7.58 | | |

Table 6

Analysis of Variance for Adequate Sortings and Verbalizations for the Good Premorbid Group Across Tasks

| Source | df | SS | MS | F ratio | P value |
|---|---|---|---|---|---|
| Total | 29 | 414.17 | | | |
| Task | 2 | 40.27 | 20.13 | 1.45 | ----- |
| Error | 27 | 373.90 | 13.85 | | |

schizophrenics, was in part, confirmed. On the objects task there were no significant differences between goods, poors and non-psychiatric subjects. There was, however, a trend in the expected direction ($p = .10$) with the non-psychiatric subjects displaying the best performances and the poor premorbid schizophrenics the worst (Table 7). The means and standard deviations may be found in Table 12.

On the pictures task the differences between the subject groups were significant at the .05 level (Table 8). Duncan range tests performed on the measure of sorting and verbalization adequacy indicated that the non-psychiatric subjects performed significantly better (at the .05 level) than the poor premorbid schizophrenics. They did not however, differ significantly from the good premorbid schizophrenics nor did this latter group significantly differ from the poor premorbids (Table 9). The means and standard deviations are presented in Table 12. These results substantially confirm hypothesis three.

On the words task, hypothesis three was confirmed. The differences between groups were significant at better than the .005 level (Table 10) with the non-psychiatric subjects displaying the most adequate sortings and verbalizations and the poor premorbid schizophrenics the least. Duncan range tests indicated that the performance of the non-psychiatric subjects was significantly superior ($p = .05$) to that of both the good premorbid and poor premorbid schizophrenics. The difference between the good premorbid and the poor premorbid schizophrenics was not significant (Table 11). Table 12 presents the means and standard deviations.

Table 7

Analysis of Variance for Adequate Sortings and Verbalizations on the Objects Task Across Subject Groups

| Source | df | SS | MS | F ratio | P value |
|---|---|---|---|---|---|
| Total | 29 | 391.87 | | | |
| Groups | 2 | 64.07 | 32.03 | 2.64 | .10 |
| Error | 27 | 327.80 | 12.14 | | |

Table 8

Analysis of Variance for Adequate Sortings and Verbalizations on the Pictures Task Across Subject Groups

| Source | df | SS | MS | F ratio | P value |
|---|---|---|---|---|---|
| Total | 29 | 437.37 | | | |
| Groups | 2 | 89.87 | 44.93 | 3.49 | .05 |
| Error | 27 | 347.50 | 12.87 | | |

Table 9

Duncan Range Tests for Groups on Pictures Task

(Non-Psych., Good Premorbids, Poor Premorbids)[a]

Combined Verbalization and Sorting Adequacy Scores

| | Non-Psych. | Goods | Poors[b] |
|---|---|---|---|
| Means | 8.70 | 7.10 | 4.50 |

Code: a. Duncan's New Multiple Range test applied to the differences between means, K = 3. (From Edwards, 1960, pp. 136-140, p. 373.)

b. Treatment means not underlined are significantly different. Treatment means underlined by the same line are not significantly different. The .05 level of significance was utilized.

Table 10

Analysis of Variance for Adequate Sortings and Verbalizations on the Words Task Across Subject Groups

| Source | df | SS | MS | F ratio | P value |
|---|---|---|---|---|---|
| Total | 29 | 396.97 | | | |
| Groups | 2 | 141.87 | 70.93 | 7.51 | .005 |
| Error | 27 | 255.10 | 9.44 | | |

Table 11

Duncan Range Tests for Groups on Words Task

(Non-Psych., Good Premorbids, Poor Premorbids)[a]

| | Combined Verbalization and Sorting Adequacy Scores | | |
|---|---|---|---|
| | Non-Psych. | Goods | Poors[b] |
| Means | 8.9 | 5.3 | 3.7 |

Code: a. Duncan's New Multiple Range Test applied to the differences between means, K = 3. (From Edwards, 1960, pp. 136-140, p. 373.)

b. Treatment means not underlined are significantly different. Treatment means underlined by the same line are not significantly different. The .05 level of significance was utilized.

Table 12

Means and Standard Deviations
for Adequate Sortings and Verbalizations

(For each subgroup N=10)

| Group | | Objects | Pictures | Words |
|---|---|---|---|---|
| Non-Psych. | Mean | 8.10 | 8.70 | 8.90 |
| | SD | 3.27 | 3.29 | 3.70 |
| Goods | Mean | 8.10 | 7.10 | 5.30 |
| | SD | 3.83 | 4.20 | 2.24 |
| Poors | Mean | 5.00 | 4.50 | 3.70 |
| | SD | 2.72 | 2.50 | 2.61 |

Hypothesis four stating that on all tasks non-psychiatric subjects would be significantly better than goods who in turn would be significantly better than poors on the number of adequate verbalizations, the number of formal verbalizations, the number of adequate sortings, and the number of idiosyncratic verbalizations was, in part, confirmed. Analysis of variance on the number of adequate verbalizations indicated that significant differences existed between groups at better than the .001 level (Table 13). Duncan range tests indicated that this significance is a result of the superior performance of the non-psychiatric and good premorbid groups when compared to the poor premorbid group. While both the non-psychiatric and good premorbid groups differed significantly from the poor premorbid group (at the .05 level), the non-psychiatric subjects did not differ significantly from the goods (Table 16). These results substantially confirm part "a" of hypothesis four. Means and standard deviations are presented in Table 18.

On the number of formal verbalizations the differences between groups were significant at better than the .025 level (Table 14). Duncan range tests indicated that the difference between goods (3.77) and non-psychiatric subjects (3.67) was insignificant. Both groups, however, were significantly superior to the poors (2.77) at the .05 level. These results partly confirm part "b" of hypothesis four.

On the number of adequate sortings hypothesis four was confirmed. The differences between groups were significant at better than the .001 level (Table 15) with non-psychiatric subjects displaying the

Table 13

Analysis of Variance for Adequate Verbalizations Across Subject Groups

| Source | df | SS | MS | F ratio | P value |
|---|---|---|---|---|---|
| Total | 89 | 361.60 | | | |
| Groups | 2 | 56.87 | 28.43 | 8.12 | .001 |
| Error | 87 | 304.73 | 3.50 | | |

Table 14

Analysis of Variance for Formal Verbalizations Across Subject Groups

| Source | df | SS | MS | F ratio | P value |
|---|---|---|---|---|---|
| Total | 89 | 484.10 | | | |
| Groups | 2 | 42.20 | 21.10 | 4.15 | .025 |
| Error | 87 | 441.90 | 5.08 | | |

Table 15

Analysis of Variance for Adequate Sortings Across Subject Groups

| Source | df | SS | MS | F ratio | P value |
|---|---|---|---|---|---|
| Total | 89 | 376.00 | | | |
| Groups | 2 | 75.27 | 37.63 | 10.89 | .001 |
| Error | 87 | 300.73 | 3.46 | | |

most number of adequate sortings and poors the least. Duncan range tests indicated that the non-psychiatric subjects' performance was significantly superior ($p = .05$) to that of both good premorbid and poor premorbid schizophrenics. In addition, the good premorbids were significantly superior, at the .05 level, to the poor premorbids. These results confirm part "c" of hypothesis four. Table 16 presents the data for the Duncan range tests and the means and standard deviations may be examined in Table 18.

With respect to the measure of idiosyncratic verbalizations there were no significant differences between the performances of the goods, poors or non-psychiatric subjects. While the hypothesis was not supported a trend was noted at the .10 level with the poor premorbid schizophrenics manifesting the greatest number of idiosyncratic responses (Table 17). The good premorbid schizophrenics and the non-psychiatric subjects, however, gave the same number of idiosyncratic verbalizations. Table 18 presents the means and standard deviations.

Table 16

Duncan Range Tests for Main Effect of Groups

(Non-Psych., Good Premorbids, Poor Premorbids)[a]

Adequate Sortings

| | Non-Psych. | Goods | Poors[b] |
|---|---|---|---|
| Means | 4.73 | 3.76 | 2.50 |

Adequate Verbalizations

| | Non-Psych. | Goods | Poors[b] |
|---|---|---|---|
| Means | 3.83 | 3.07 | 1.90 |

Formal Verbalizations

| | Goods | Non-Psych. | Poors[b] |
|---|---|---|---|
| Means | 3.77 | 3.67 | 2.27 |

Code: a. Duncan's New Multiple Range Test applied to the differences between means, K = 3. (From Edwards, 1960, pp. 136-140, p. 373.)

b. Treatment means not underlined are significantly different. Treatment means underlined by the same line are not significantly different. The .05 level of significance was utilized.

Table 17

Analysis of Variance for Idiosyncratic Verbalizations Across Subject Groups

| Source | df | SS | MS | F ratio | P value |
|---|---|---|---|---|---|
| Total | 89 | 389.60 | | | |
| Groups | 2 | 24.20 | 12.10 | 2.88 | .10 |
| Error | 87 | 365.40 | 4.20 | | |

Table 18

Means and Standard Deviations for Number of Adequate Sortings, Adequate Verbalizations, Formal Verbalizations and Idiosyncratic Verbalizations

(For each subgroup N=10)

| Group | | AS | AV | FV | IDIO |
|---|---|---|---|---|---|
| Non-Psych. | Mean | 4.73 | 3.83 | 3.67 | 1.90 |
| | SD | 1.98 | 1.85 | 2.41 | 1.49 |
| Goods | Mean | 3.77 | 2.10 | 3.77 | 1.90 |
| | SD | 1.96 | 3.07 | 2.29 | 1.90 |
| Poors | Mean | 2.50 | 1.90 | 2.27 | 3.00 |
| | SD | 1.50 | 1.54 | 1.91 | 2.52 |

Code: AS--Adequate Sortings
AV--Adequate Verbalizations
FV--Formal Verbalizations
IDIO--Idiosyncratic Verbalizations

## Discussion

### Hypothesis One

The first hypothesis dealing with the notion that there exist levels of conceptual functioning corresponding to levels of premorbid social adjustment was confirmed. The underlying assumption is that the greater the social disarticulation of the person from his community the less will he be able to think in conventional terms or to communicate his thoughts in a public manner. Significant differences between all groups were predicted and support was obtained in that non-psychiatric subjects achieved significantly more adequate sortings and verbalizations than goods who in turn achieved more adequate sortings and verbalizations than poors. It should be taken note of that both categorization and verbalization are being considered so that the total process of conceptual performance as indicated by Rapaport (1945) is under discussion.

The findings thus indicate that when overall performance is considered, a normal group displays greater conceptual adequacy than does either a good premorbid or a poor premorbid schizophrenic group. In addition, significant differences between goods and poors were expected and found.

### Hypothesis Two

Part "a" of the second hypothesis was not confirmed. The poor premorbid schizophrenics did not display significant differences between their performances on objects, pictures or words.

The process of sorting, it should be noted, involves the

abstraction of relevant attributes from a sample stimulus and the use of these abstractions as a basis for generalization to other stimuli possessing the same relevant attributes. Since with concrete objects, the similarity of perceptual characteristics is obvious, it was expected that reliance on mental processes other than abstraction and generalization would be relatively unnecessary.

Pictures, as representational symbols demand that additional mental processes be made use of before sorting behavior can be initiated. These processes are aimed at adequately identifying the referents for each symbol, processes which are not necessary when dealing with objects.

Words, to even a greater extent than pictures demand the use of additional mental processes. As arbitrary symbols, words have no a priori relationship to their referents as do pictures; thus an even greater reliance on "decoding" mental processes is necessary.

The results indicate that poors, because of their greater social disarticulation are relatively unable to categorize and verbalize adequately even when the stimuli do not require the extensive application of processes other than abstraction and generalization.

Part "b" of hypothesis two was confirmed. The lesser social disarticulation of the goods was revealed in their more adequate performances on each of the three tasks. Despite the lack of significance, objects seemed easier to group and verbalize about than pictures which in turn were easier to deal with than words.

Part "c" of hypothesis two, dealing with the performance of the

non-psychiatric subjects, was confirmed. While the non-psychiatric subjects performed slightly better on words than on pictures, with the worst performances occurring on objects, no hypothesis regarding rank ordering of performance was posited. The relatively more adequate social adjustment of the non-psychiatric subjects is thus seen to be reflected in their performances.

Hypothesis Three

Part "a" of hypothesis three was not confirmed. On the objects task there were no significant differences between goods, poors and non-psychiatric subjects, although there was a trend at the .10 level. It would seem that because of their relatively adequate social articulation, the goods are able to perform as adequately as the non-psychiatric subjects. Apparently on concrete tasks the goods are able to categorize on the basis of essential characteristics and then adequately verbalize their reasons for doing so. It would seem that on such concrete tasks their conceptual abilities have developed to an extent which enables them to perform as well as non-psychiatric subjects. Since these results are only at the .10 level, however, this interpretation should be viewed with caution.

Part "b" of hypothesis three was confirmed with significant differences occurring on the pictures task at the .05 level. While the non-psychiatric subjects performed significantly better than poors, they were not significantly differentiated from the goods. The social disarticulation of the poors is again evidenced by their significant inferiority on this task on grouping and verbalization activities.

Apparently, it is more difficult for the poors to abstract and generalize as the materials become more representational and less concrete.

The goods were intermediate between the non-psychiatric subjects and the poors. This would seem to indicate that their relatively greater prepsychotic adequacy enables them to attain a higher level of conceptual development than the poors, though not as high as non-psychiatric subjects.

On the words task the differences between groups were significant at better than the .005 level. The greater conceptual inadequacy of both schizophrenic groups was revealed. Apparently words, as arbitrary symbols demand a greater reliance on complex mental processes. This level of conceptual development seems not to have been attained by the goods to the extent that they can effectively deal with this more arbitrary symbolic task. Hence their performance is statistically indistinguishable from the poors.

Hypothesis Four

Adequate Verbalizations

On the measure of adequate verbalizations hypothesis four was confirmed. The non-psychiatric subjects and the goods were not statistically differentiated although both groups were significantly superior to the poors. Adequate verbalizations are those which correctly and completely account for the materials sorted. These results would indicate that in the verbalizations describing their groupings the poors make more frequent use of verbalizations which embrace irrelevant objects. It would seem that this dissociation

between categorization and communication is directly related to the inferior prepsychotic adequacy of the poors.

Formal Verbalizations

Part "c" of hypothesis four was confirmed. Significant differences were predicted and found between groups. The goods and the non-psychiatric subjects, however, were not differentiated; only the poors differed from the non-psychiatric subjects and the goods. Formal verbalizations refer to the specification of a property or group of properties common to the materials sorted. To be classified as a formal verbalization, these groups must allow inclusion of other objects or events which possess the same shared attributes. Apparently, poor premorbid schizophrenics show a marked deficit in their ability to verbalize reasons for their sorting behavior based on a commonality of elements when compared to either a good premorbid or a non-psychiatric group.

Idiosyncratic Verbalizations

With respect to the variable of idiosyncratic verbalizations, significance was not obtained. Examination of the means, however, indicates that this is almost wholly due to the performance of the non-psychiatric group, who, somewhat surprisingly, gave as many idiosyncratic responses as did the good premorbid schizophrenics. While there was no significance it should be pointed out that a trend was noted at the .10 level, with the poors displaying the greatest number of idiosyncratic responses. Idiosyncratic responses include a) the affective reaction, a response to an item involving a description of

an emotional reaction, b) the fabulated verbalization, a story linking the various materials, c) the symbolic verbalization, a reinterpretation of the materials and their classification on the basis of this reinterpretation and d) the split-narrow verbalization, the inability to group together the materials on some single shared combination of qualities.

The poors performed in the predicted manner showing more idiosyncratic verbalizations than did the other two groups. While this was only a trend ($p = .10$) it was, however, in accordance with the hypothesis. It seems reasonably clear that poors make more use of verbalizations that fall outside the realm of formal, adequate responses than do either goods or non-psychiatric subjects.

As regards the performance of the non-psychiatric subjects the possibility emerges that hospitalization has an adverse effect on the level of verbalization. Such an explanation seems, at the least, tentatively reasonable, in light of the surprisingly poor performance of the non-psychiatric subjects.

Adequate Sortings

With respect to the measure of adequate sortings, the hypothesis was confirmed. The results indicated that all groups differed significantly in the directions predicted; that is, non-psychiatric subjects showed the significantly greatest number of adequate sortings and the poors the least. In order to sort adequately it is necessary to abstract relevant attributes from the target object and use these attributes as the basis for grouping other appropriate objects. The

possibility exists that the ability to categorize apparently diverse materials as members of an appropriate class may be a necessary condition of adjustment. Where a severe deficiency exists in the ability to group and categorize objects a corresponding deficiency may be expected in real-life situations.

Implications and Suggestions for Further Research

The overall findings of the present study pose a number of interesting implications. The first of these is that pronounced pre-psychotic social inadequacy is directly correlated with inferior conceptual performance. The findings thus evince support for the contention that as the person becomes increasingly isolated from his community the less will he be able to conceptualize and communicate in conventional terms. Further, there are indications that as the stimulus materials demand more complex conceptual processes, the conceptual deficit will become more apparent. This, however, seems contingent upon the level of conceptual development reached by the schizophrenics; poors do not display the effect to the same extent as the goods.

The second major area of interest which emerges deals with the relative performances of the goods and the non-psychiatric subjects, specifically on the measures of verbalization. Of the seven comparisons between goods and non-psychiatric subjects on verbalization measures, the two groups were statistically indistinguishable on five. In only two comparisons did the non-psychiatric subjects perform significantly better than the goods. Specifically, the groups were not significantly differentiated on the number of adequate verbalizations,

the number of formal verbalizations, the number of idiosyncratic verbalizations and the number of combined adequate sortings and verbalizations for both the objects and the pictures tasks. This raises a number of important questions as to why non-psychiatric subjects, with assumed greatest social adequacy do not manifest it in superior communication skills. While further research is deemed necessary, a number of tentative speculations may be presented.

The first area of analysis, it would seem, would concentrate on the composition of a normal group with the aim of hopefully sharpening the criteria for selection and inclusion in such a group. It seems evident that merely because one has not been hospitalized for mental illness is not the same as stating that mental illness is not present. For research purposes, at the least, criteria additional to that of non-hospitalization may be necessary for definition of normality.

A second area of analysis would reasonably deal with the effects of hospitalization on a normal population. To the present writer there exist two broad possibilities. The first of these is that hospitalization represents a removal from the community and as such brings about transient communicative deficits not unlike those manifested by socially disarticulated schizophrenics.

The second possibility deals with an analysis of the "type" of person that chooses hospitalization as a potential solution to any number of problems brought about by physical disabilities. It may be that such people lack emotional resources characteristic of people who seek other alternatives.

It should be made clear that the above represent speculations, rather than explanations. Before more unequivocal statements can be made, further research must be accomplished. One possible direction might involve the examination of two groups of "normal" subjects, one a hospitalized, non-psychiatric group as used in the present study and a second, "fully-functioning" normal group. On the basis of the present study differences in conceptualization, and especially in communication would be expected.

Summary

The purpose of the present study was to investigate concept formation and its accompanying verbalization in good premorbid schizophrenics, poor premorbid schizophrenics and non-psychiatric subjects, under no censure conditions, given stimulus materials which varied along a dimension of increasing abstraction.

There were three sets of stimulus materials based on the Rapaport (1945) modification of the Goldstein-Gelb-Weigl Object Sorting Test. The stimulus sets were actual objects, pictures of the objects and words denoting the objects.

Three groups were formed at each of the three levels of adjustment (goods, poors, non-psychiatric subjects). One group received the objects task, the second the pictures task and the third the words task. There were thus a total of nine groups of 10 subjects each. These groups were matched on age, educational level, intelligence, capacity for cooperation, absence of organic involvement and a non-verbal test of conceptual ability. The groups were compared on sorting and verbalization behaviors when a) all tasks were combined and b) when each task was treated separately. Further, each group's performance was evaluated across all tasks. In addition all groups were compared on the specific measures of number of adequate verbalizations, number of adequate sortings, number of formal verbalizations and number of idiosyncratic verbalizations.

The results supported hypothesis one, indicating that significant differences existed between the three subject groups' overall

performance. The underlying notion here is that there exists homogeneous levels of functioning characteristic of various levels of premorbid adequacy.

Hypothesis two was partly supported. While the poors did not display significant differences between their performances on each of the three tasks, non-psychiatric subjects and goods displayed differences in the expected directions, with the best performances being evinced on objects, the worst on words.

Hypothesis three was supported in part. On the objects task there were no significant differences between groups; on the pictures and words tasks however, significance was obtained with the non-psychiatric subjects displaying the best performances, the poors the worst.

Hypothesis four was partly confirmed. On the number of adequate verbalizations the groups were found to be significantly different. In addition, the goods and the non-psychiatric subjects were found to be significantly superior to the poors, although the two former groups were not statistically distinguishable.

With respect to the number of formal verbalizations hypothesis four was confirmed; the non-psychiatric subjects displaying the most number of formal verbalizations, the poors the least. The goods and non-psychiatric subjects, however, were not statistically distinguishable from each other, although both groups were significantly superior to the poors.

In regard to the number of adequate sortings, significance was

obtained with non-psychiatric subjects showing the best performances and poors the worst. In addition, all groups differed significantly from each other.

With respect to the number of idiosyncratic verbalizations the hypothesis was not confirmed, although a trend was noted. While the poors produced the most idiosyncratic responses, the non-psychiatric subjects produced as many as the goods.

These results led to the following major conclusions:

1. There exist levels of conceptual and communicative functioning, under no-censure conditions, which are directly related to premorbid social adequacy. The less adequate the social adjustment the more likely are there to be disorders manifested in conceptual and communicative processes.

2. That, under no-censure conditions, as stimulus materials demand more complex conceptual processes, the conceptual deficit will become more apparent. This however, seems contingent upon the level of conceptual development attained by the schizophrenic; poors do not display the effect to the same extent as do the goods.

3. When experimentally induced censure is not involved hospitalized normals (non-psychiatric subjects) display a deficit in their communicative processes to the extent that they are statistically indistinguishable from the good premorbid schizophrenics on a majority of verbalization measures.

In addition to the above conclusions, speculations regarding the findings and suggestions for further research were posited.

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## Appendix A

### Number of Responses for Each Scoring Criterion for Each Subject

| Subject | Scores AS | AV | TASAV | FV | IDIO |
|---|---|---|---|---|---|
| Poors-Objects | | | | | |
| 1 | 2 | 4 | 6 | 5 | 3 |
| 2 | 4 | 2 | 6 | 0 | 3 |
| 3 | 4 | 0 | 4 | 0 | 8 |
| 4 | 6 | 5 | 11 | 6 | 1 |
| 5 | 2 | 0 | 2 | 0 | 9 |
| 6 | 2 | 2 | 4 | 4 | 0 |
| 7 | 2 | 1 | 3 | 0 | 2 |
| 8 | 1 | 0 | 1 | 0 | 8 |
| 9 | 3 | 3 | 6 | 4 | 3 |
| 10 | 3 | 4 | 7 | 2 | 3 |
| Poors-Pictures | | | | | |
| 1 | 2 | 2 | 4 | 4 | 3 |
| 2 | 5 | 5 | 10 | 6 | 0 |
| 3 | 2 | 2 | 4 | 2 | 4 |
| 4 | 3 | 0 | 3 | 1 | 6 |
| 5 | 4 | 0 | 4 | 0 | 7 |
| 6 | 2 | 1 | 3 | 3 | 4 |
| 7 | 4 | 1 | 5 | 1 | 4 |
| 8 | 0 | 1 | 1 | 2 | 0 |
| 9 | 1 | 2 | 3 | 2 | 2 |
| 10 | 4 | 4 | 8 | 2 | 0 |
| Poors-Words | | | | | |
| 1 | 2 | 1 | 3 | 1 | 2 |
| 2 | 1 | 2 | 3 | 6 | 0 |
| 3 | 5 | 4 | 9 | 1 | 2 |
| 4 | 1 | 1 | 2 | 4 | 3 |
| 5 | 2 | 1 | 3 | 2 | 6 |
| 6 | 4 | 4 | 8 | 1 | 1 |
| 7 | 2 | 2 | 4 | 2 | 2 |
| 8 | 0 | 0 | 0 | 3 | 2 |
| 9 | 1 | 2 | 3 | 0 | 1 |
| 10 | 1 | 1 | 2 | 4 | 1 |

Appendix A (continued)

| Subject | Scores AS | AV | TASAV | FV | IDIO |
|---|---|---|---|---|---|
| Goods-Objects | | | | | |
| 1 | 5 | 5 | 10 | 6 | 1 |
| 2 | 6 | 4 | 10 | 4 | 0 |
| 3 | 4 | 2 | 6 | 0 | 4 |
| 4 | 3 | 1 | 4 | 0 | 3 |
| 5 | 4 | 2 | 6 | 5 | 1 |
| 6 | 4 | 5 | 9 | 5 | 1 |
| 7 | 0 | 0 | 0 | 1 | 6 |
| 8 | 6 | 7 | 13 | 6 | 1 |
| 9 | 8 | 3 | 11 | 3 | 1 |
| 10 | 5 | 7 | 12 | 4 | 1 |
| Goods-Pictures | | | | | |
| 1 | 5 | 5 | 10 | 6 | 1 |
| 2 | 6 | 4 | 10 | 4 | 0 |
| 3 | 4 | 2 | 6 | 0 | 4 |
| 4 | 3 | 1 | 4 | 0 | 3 |
| 5 | 4 | 2 | 6 | 5 | 1 |
| 6 | 4 | 5 | 9 | 5 | 1 |
| 7 | 0 | 0 | 0 | 1 | 6 |
| 8 | 6 | 7 | 13 | 6 | 1 |
| 9 | 8 | 3 | 11 | 3 | 1 |
| 10 | 5 | 7 | 12 | 4 | 1 |
| Goods-Words | | | | | |
| 1 | 3 | 2 | 5 | 4 | 2 |
| 2 | 4 | 3 | 7 | 5 | 1 |
| 3 | 4 | 3 | 7 | 7 | 0 |
| 4 | 2 | 2 | 4 | 3 | 2 |
| 5 | 4 | 4 | 8 | 4 | 3 |
| 6 | 0 | 0 | 3 | 2 | 2 |
| 7 | 3 | 0 | 3 | 6 | 0 |
| 8 | 5 | 4 | 9 | 5 | 1 |
| 9 | 1 | 1 | 2 | 3 | 0 |
| 10 | 3 | 2 | 5 | 1 | 4 |

Appendix A (continued)

| Subject | Scores AS | AV | TASAV | FV | IDIO |
|---|---|---|---|---|---|
| Non-Psychiatric-Objects | | | | | |
| 1 | 4 | 5 | 9 | 1 | 3 |
| 2 | 8 | 7 | 15 | 7 | 1 |
| 3 | 7 | 3 | 10 | 5 | 4 |
| 4 | 5 | 4 | 9 | 4 | 2 |
| 5 | 4 | 3 | 7 | 2 | 1 |
| 6 | 6 | 4 | 10 | 4 | 2 |
| 7 | 2 | 3 | 5 | 3 | 2 |
| 8 | 6 | 1 | 7 | 3 | 5 |
| 9 | 2 | 5 | 7 | 2 | 0 |
| 10 | 1 | 1 | 2 | 0 | 3 |
| Non-Psychiatric-Words | | | | | |
| 1 | 7 | 4 | 11 | 2 | 4 |
| 2 | 5 | 4 | 9 | 7 | 0 |
| 3 | 3 | 3 | 6 | 4 | 2 |
| 4 | 3 | 1 | 4 | 1 | 2 |
| 5 | 8 | 8 | 16 | 4 | 0 |
| 6 | 5 | 4 | 9 | 7 | 1 |
| 7 | 6 | 5 | 11 | 5 | 0 |
| 8 | 1 | 2 | 3 | 1 | 0 |
| 9 | 6 | 6 | 12 | 8 | 0 |
| 10 | 5 | 3 | 8 | 1 | 1 |
| Non-Psychiatric-Pictures | | | | | |
| 1 | 5 | 5 | 10 | 4 | 1 |
| 2 | 5 | 4 | 9 | 3 | 3 |
| 3 | 2 | 1 | 3 | 0 | 1 |
| 4 | 3 | 2 | 5 | 0 | 4 |
| 5 | 6 | 6 | 12 | 6 | 3 |
| 6 | 6 | 4 | 10 | 6 | 2 |
| 7 | 6 | 2 | 8 | 1 | 5 |
| 8 | 8 | 6 | 14 | 7 | 1 |
| 9 | 3 | 2 | 5 | 6 | 3 |
| 10 | 5 | 6 | 11 | 6 | 1 |

Acknowledgements

I would like, at this time, to express my thanks to the members of my thesis committee, Drs. S.L. Kates, C.C. Neet and T.O. Wilkinson for their help in planning and expediting this study.

A special note of gratitude is due Dr. S.L. Kates, who as major thesis advisor provided constant support, encouragement and opportunity for consultation.

Also, I would like to extend my thanks to Dr. I.W. Scherer of the Northampton Veterans Hospital, Northampton, Mass. and Dr. M. Aronson of the Albany Veterans Hospital, Albany, New York for their cooperation in making available the facilities of their respective installations.

Finally, I should like to express my appreciation to the friends, fellow-students and staff personnel who tendered many valuable comments and suggestions.

APPROVED:

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Date: March 13, 1963