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Conceptual Performance of Schizophrenic and Non-Psychiatric Subjects on Object Sorting Materials with Increasingly Symbolic Sample Items

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A dissertation submitted in partial

fulfillment of the requirements

for the degree of

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Introduction

The purpose of the present study is to investigate concept formation and its accompanying verbalization in two groups of schizophrenics and two groups of normals on Object Sorting Materials with increasingly symbolic sample items.

Schizophrenic Conceptual Performance

Several experimental investigators have demonstrated that schizophrenics 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 formation through the use of an object sorting test for which he devised a system of scoring. His results indicated that schizophrenics displayed a conceptual deficit in comparison to a control group of normals especially when regard was taken of pathological verbalizations such as symbolic, syncretistic, 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. Certain relevant and representative

studies illustrating this variability follow.

Whiteman (1954) found that schizophrenics performed more adequately on formal conceptual tasks than on social conceptual tasks. He 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. Schizophrenics, he states, are 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. These results have been confirmed by Hill (1962).

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 schizophrenic's conceptual performance approximated that of the normals.

Schizophrenic Verbal Performance

In addition to the general conceptual deficit noted, many 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 tasks. 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 difficult 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 a mere 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 the schizophrenic's mode of response was typically concrete as 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 word choice 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 schizophrenic 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 materials. 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 necessarily 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 apparently evincing a corresponding loss of abstract conceptual abilities as defined by the Rapaport criteria.

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. In 1959, Leventhal, McGaughran and Moran, using a Similarities test showed that schizophrenics tended in their conceptual performance toward "over-abstraction", that is, abstraction in an autistic manner.

These results would indicate that the conceptual deficit in schizophrenia includes a deficit in communicativeness. 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 "overresponsiveness" 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. The 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 the severity of ego-disturbance.

Categorization and Concept Formation

For Bruner, Goodnow and Austin (1956) categorization represents "one of the most elementary and general forms of cognition" (p.2). As they put it, "To categorize is to render discriminably different things equivalent, to group the objects and events and people around us into classes and to respond to them in terms of their class membership rather than their uniqueness." (p. 1).

With this emphasis in mind, it is reasonable to present relevant theories which stress the role of categorization in conceptual processes. Among the most important for our purposes 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. 287). 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 overgeneralized 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 has 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).

Categorization with materials at different symbolic levels 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, "representational symbols can be more easily decoded than arbitrary ones" (p. 134). He goes on, "When a name or symbol is representational it is possible to translate (even) when one has not been given the specific rule of this translation." (p. 284). It follows that the ability to translate on specific word-referent

linkages when the names do not present concepts in any kind of fixed relationship should be appreciably more difficult.

This hypothesis was the subject of an investigation by the present author (Goldstein, 1963). Using three levels of the Object Sorting Test based on object-referent linkage, picture-referent linkage and word-referent linkage, three groups of subjects (good premorbid schizophrenics, poor premorbid schizophrenics and normals) were assessed on their categorization and verbalization behaviors. The results indicated that on the Objects Task there were no significant differences between the groups (although there was a trend at $p = .10$). On the pictures and words tasks, however, the three groups were significantly differentiated with p values of .05 and .005 respectively.

Thus, the nature of the referent linkages appears to be a critical factor in assessing conceptual performance. As Bruner has pointed out, "Grouping entities is not sufficient evidence that a subject has a concept." The development of these linkages is discussed in a section to follow. (See section on Language and Concept Formation.)

Language and Concept Formation

The relationship between language and concept formation is, indeed, a complex one. Vygotsky (1962) has pointed out that while thought and speech have different genetic roots, they nonetheless should not be regarded as two unrelated processes. At about the age of two, the heretofore independently developing lines of

thought and speech converge with the result that thought becomes verbal and speech rational.

The critical unit of verbal thought for Vygotsky is word meaning (italics supplied). It is among his most important discoveries that word meanings evolve. They change as the child develops and with the various ways in which thought functions. As Vygotsky states, "While verbal thought rises from the most primitive generalizations to the most abstract concepts, it is not merely the content of the word that changes--it is the way in which reality is generalized and reflected in a word." And again, "The new significantive use of the word, its use as a means of concept formation, is the immediate psychological cause of the radical change in the intellectual process that occurs on the threshold of adolescence." (p. 59). Thus it is clear that for Vygotsky, the relation of word to thought is an ongoing process. As he states, "This relationship, constantly undergoing change and modification may in a functional sense be regarded as development. Thus, thought is not merely expressed in words, it comes into existence through them" (p. 125).

This relationship is made clearer in Vygotsky's discussion on the development of concept formation. For Vygotsky, concept formation is divided into three broad stages, each of which is served by a different level of language ability. The first stage is characterized by the child's grouping items into unorganized congeries or heaps. These syncretic conglomerations of individual

objects are characterized by a sign or word that randomly embraces these unrelated objects. The second stage is characterized by thinking in complexes and includes concrete groupings based on subjective impressions as well as on bonds actually existing between the objects. Types of complexes range from the associative, a low level grouping based on a loose bond to the pseudo-concept which approaches true abstraction. The verbal symbols for these groupings embrace objects that do not share any essentially important and conventionally acceptable attributes. The third developmental level is characterized by groups based on rough similarities and, by what are termed, potential concepts, where objects are grouped according to common attributes. It is in this stage that one sees the mastery of abstraction and advanced complex thinking which results in genuine concept formation. The immediate psychological cause of this radical change in the intellectual processes that occurs on the threshold of adolescence is, for Vygotsky, the significative use of the word as a means of concept formation. As Vygotsky states, "Learning to direct one's mental processes with the aid of words or signs is an integral part of the process of concept formation." This ability--to regulate one's actions by using auxillary means reaches full development only in adolescence.

From this scheme, it becomes clear that the ability to communicate through language is directly related to the differentiation of word meanings in one's speech and consciousness. Speech

structures become, in Vygotsky's terms, "tools of thought." Continuing his discussion, Vygotsky dwells upon the structure of word meanings. Briefly, Vygotsky points out that in the semantic structure of the word there is a distinction between referent and meaning. Signification independent of meaning and meaning independent of referent are relatively advanced phenomena. In a real sense, he goes on, the child's and the adult's words coincide in their referents, but not in their meanings. Such an approach, it may be pointed out, has import for an investigation of concept formation. As the child, the schizophrenic may have the words, but lack appropriate meanings.

Much work on the relationship between language and concept formation has been done by Brown (1958). For Brown, speech development is a social process as well as a motor one. Meaning is established when utterances are coordinated with what is termed non-linguistic reality (referential categories). Through what Brown terms the "Original Word Game", the child learns to speak by forming hypotheses about non-linguistic categories eliciting particular utterances, and testing these by attempting to produce the utterance in the appropriate circumstances. Essentially, the model here may be seen to be one of discrimination learning. While Brown does not present his scheme as a "stage" theory, nonetheless, three broad stages may be explicated from his discussion. First, the child learns to make various speech sounds. Second, he learns to categorize non-linguistic

reality and third, the linkage between a particular word and the appropriate non-linguistic category is established. Treated in this manner, an essential similarity may be noted between Brown and Vygotsky.

A point of importance for Brown is that names themselves may be regarded as categories--"categories of sounds." A particular name is held to be an attribute of a non-linguistic category as much as more palpable attributes since the occurrence of the category will evoke the name.

The previously mentioned non-linguistic reality is, in itself, quite complex. It may be categorized on the basis of many attributes, only one of which is the name. The critical role of speech in concept formation, for Brown, (as compared to Vygotsky) is to reduce the complexity of categorizing the non-linguistic world. Brown declares that the recurrence of the name category informs us which non-linguistic entities go together. When this name is not evoked by the non-linguistic stimulus then the latter does not belong in the referent category. The speech utterances, made up of a small number of attributes, are much easier to categorize than non-linguistic reality with its large number of attributes. The recurring speech utterance, then, makes it easier to organize non-linguistic reality into equivalent and non-equivalent categories.

In light of the above discussion, further reference to the Goldstein, previously cited, is appropriate. In that study, there

were three tasks, each designed to investigate the effects of a different symbol-referent linkage. However, in each task the sample item and the remaining pool of items were represented in the same manner (i.e., all objects, all pictures, all words). It would seem that in a more stringent study only the representation of the sample objects would be varied. In this way differences in performance (within a particular subject group) could be attributed to the differing representations of the sample items; the materials to be sorted would be the same in every case.

This approach has certain theoretical implications as well. When only the sample items are varied, one can assess the effects of more and less complex symbol-referent linkages. Stated otherwise, the question of whether meanings change as symbol-referent linkages become more complex is open to investigation. One will recall that Brown and Vygotsky have indicated that categorization alone does not indicate concept. In both theories it is the linkage between referent and symbol that is critical, regardless of how this linkage is described. A sorting test is especially appropriate for an investigation of this nature.

Some 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. 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).

While Arieti (1959) finds Goldstein's concept of schizophrenia as an expression of the concrete attitude acceptable, he feels it does not encompass the whole process of concretization of concept. This process involves, not only a withdrawal from the abstract into the concrete, but additionally, what he terms "active concretization." As Arieti describes it, "The patient still experiences abstract conceptualizations because to some degree they continue to exist for him ... the abstract level is impaired, but not completely lost. Feelings cannot be sustained or coped with in the impaired abstract level and are immediately channeled into lower levels where they acquire a different representation" (p. 476).

For Cameron (1947) schizophrenia is marked by a predominance of autistic conceptualizations. These generally arise as a result of the schizophrenic's withdrawals from interpersonal relations because of his inability to play the various roles required of him. This withdrawal has direct manifestations in the language and thought of the schizophrenic, and Cameron (1939) lists seven

major characteristics of schizophrenic speech:

1. asyndetic--lacking essential connectives
2. metonymic--lacking precise definitive terms
3. interpretive--parts of a theme appear as interpretive fragments
4. overinclusive--including remotely related material
5. non-correspondence--lacking relationship between what is done and what is said
6. transformations--in the rules of procedure to justify failures
7. shifting verbal generalizations

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 supercoded 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. Sullivan adds that these patterns are most likely to appear in social situations which the schizophrenic perceives as threatening his interpersonal security.

Premorbidity and Schizophrenia

As a diagnostic entity, schizophrenia is generally regarded as being a heterogeneous group. There have been many 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. Conceptualization should not develop properly if there has been much behavioral withdrawal as evidenced by the chronic schizophrenic. As Arieti (1959) points out in his discussion on desymbolization and desocialization, during childhood the individual introjects symbols and roles from surrounding adults. During psychosis he tends to lose these introjected symbols and roles. Thus, desocialization or withdrawal in the schizophrenic means much more than being physically distant from the interpersonal environment. For the schizophrenic, desocialization implies a change in the process of symbolizing, changes which will permit the loss of introjected symbols which originate from others and replacement of them with more primitive ones.

Rapaport also comments on the relationship between maladjustment and concept formation. Concept formation, for Rapaport is a balance between inductive and deductive processes. Maladjustment upsets this balance and the more disturbed the individual the more disturbed will be his conceptual processes. Rapaport

suggests that the schizophrenic is unable to achieve the necessary balance between induction and deduction so that his generalizations do not fit the objects they encompass; further his inductions generalize about peripheral and non-conventional attributes.

Vygotsky (1962) too, has made comments relevant to this relationship. For Vygotsky, thought development is determined by language, i.e., by the linguistic tools of thought and the sociocultural experience of the child. Essentially the development of logic in the child is a direct function of his socialized speech. The child's intellectual growth is contingent upon his mastering the social means of thought--that is, language. It follows that the more withdrawn the child, the less likelihood there is that he will master these means of thought and his conceptual processes should suffer accordingly.

Recently a scale has been devised which allows a separation of schizophrenics into groups based on the adequacy of their premorbid adjustment. This scale (Phillips Scale of Premorbid Adjustment), essentially a measure of social-sexual withdrawal 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 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 histories accounted for the significant differences noted between the normals and the schizophrenics.

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

Both social censure and premorbid adjustment are relevant variables in schizophrenic conceptual behavior. Hellman and Kates (1961) using the Object Sorting Test with good and poor premorbids (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 former's gross behavioral withdrawal. While there were no

significant differences in conceptual performance between the two groups, there were trends in the expected directions. Results of a later investigation (Hellman, 1962) have confirmed the contention that good and poor premorbids are differentiated on conceptual performance.

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 Kates (1962) where good premorbid, poor premorbid and normal subjects were compared on conceptual tasks 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 a relation between premorbid level of adjustment and conceptual performance. However, there has not been a sufficient number of investigations

to warrant a firm generalization. Even among the studies that have been done the results have been inconsistent. While the work of Bolles and Goldstein (1938) and Rapaport (1945) indicates that a conceptual deficit exists in schizophrenia their groups were not separated on the basis of premorbid adjustment. The first Hellman (1961) study, however, has indicated that a significant difference does not exist between good and poor premorbid schizophrenics when censure is not involved.

In the study by the present author, previously cited, it was found that when overall conceptual performance was considered, there were significant differences between good premorbids, poor premorbids and non-psychiatric subjects. When each of the three tasks (Objects, Pictures, Words) was treated separately, it was found that on none of these did the overall performance of the goods and poors differ significantly. When measures of verbalization were treated separately, however, it was found that on five of seven comparisons, good premorbid schizophrenics and non-psychiatric subjects did <u>not</u> differ significantly.

These findings raised a number of questions, particularly with regard to the composition of a "normal" group. A discussion regarding this is to be found in the next section.

<u>The Problem of Normality</u>

While the criteria for the selection of schizophrenic groups is specified, the same attention is not usually directed to the question of what comprises a "normal group." The most often used

criteria seems to be merely the absence of mental disease. This somewhat amorphous requirement, further, is generally assumed to be satisfied if there has been no record of mental illness or hospitalization. While this may be an operational definition of normality, a number of criticisms have been directed to it.

As Jahoda (1958) points out, "...the apparent difficulty in clearly circumscribing the notion of mental disease makes it unlikely that the concept of mental health can be usefully defined by identifying it with the absence of disease. It would seem, consequently, to be more fruitful to tackle the concept of mental health in its more positive (emphasis supplied) connotation, noting however, that the absence of disease may constitute a necessary, though not a sufficient criterion for mental health."

In addition to Jahoda's comments, two recent studies have raised some doubts as to the practical value of such definition as well as to its logical bases.

Hill (1962) while finding significant differences between hospitalized normals and schizophrenics with regard to the number of idiosyncratic responses given, nonetheless felt that the normals gave a surprising number of such responses. It should be noted that the idiosyncratic response, regarded as a pathological indicator, was the most clearcut index of schizophrenic conceptualization used in the study.

In the previous study of the present author (1963), the rather surprising finding was noted that there were no significant

differences between the number of idiosyncratic responses expressed by hospitalized normals and good premorbid schizophrenics. In fact, both groups gave the same number of such responses. In addition, it was found that these two groups were not differentiated on five of seven measures dealing with their verbalizations.

Two tentative possibilities were offered by Goldstein as potential explanation for these findings. First, it was felt that hospitalization might represent a removal from the community and as such bring about transient conceptual-communicative deficits not unlike those manifested by socially disarticulated good premorbid schizophrenics and second, that the "type" of person who chooses hospitalization as a potential solution to problems brought about by physical disabilities lack emotional resources characteristic of people who choose other alternatives.

In any event, two questions emerge as of utmost importance when dealing with the question of normality. First, what are the criteria to be used for the selection of a normal group and second, what group of normals would be an appropriate set of controls for a schizophrenic group.

With reference to the first question, a number of criteria may be offered. Lazarus (1961) posits psychological comfort, work efficiency, physical symptomatology and social acceptability as dimensions on which "normality" may be examined. Operationally, the factor of psychological comfort may be evaluated by responses to a standardized questionnaire on personality adjustment which

has shown itself to be both reliable and valid. Such a questionnaire is the California Test of Personality. Further information relevant to the factor of psychological comfort may be gleaned from an informal interview. With respect to work efficiency, the second factor offered by Lazarus, it seems that this may best be judged by current performance on a job at a level deemed adequate by the employer. For purposes of this study, freedom from physical symptomatology is taken to mean that the bases for such symptoms, if they exist, are reasonably adjudged to be non-emotional or non-psychosomatic. The final factor deemed criterial for normality is social acceptability of behavior. By this is meant stability in interpersonal relationships specifically with regard to marriage and familial behaviors where the individual takes responsibility for the welfare of others.

The second question dealing with suitable controls for a schizophrenic group is a difficult one to resolve. Ordinarily, hospitalized "normals" have been used in an attempt to control for the factor of hospitalization. There is little information, however, on the effects of hospitalization on cognitive processes--a question of vital importance for this study. What little information there is seems primarily applicable to children. Even the material which is appropriate to adults seems more vaguely descriptive and theoretical than specific in its treatment of the effects of hospitalization upon functioning (Bloom 1958, Gellert 1958, Chapman 1957, Charen 1956). A typical example is that of

Barker et al. (1953) who view illness and confinement as narrowing the interests of the sick person. As they state, "...fewer stimuli will exist for him and he will respond perceptually to fewer of them. This follows from the reduced scope of his objective psychical and social world and the great potency of a few internal stimuli ... behavior is both descriptively and dynamically regressive."

However, as the studies of Goldstein (1963) and Hill (1962) have indicated, an unspecified group of hospitalized "normals" are an inadequate control group. To make reasonably valid inferences about the effects of hospitalization would require, first, a more stringent selection of hospitalized patients and second, a control group of non-hospitalized normals. Such a group may be obtained on the basis of Lazarus' criteria. By thus establishing a continuum of "mental health" ranging from the socially withdrawn and disarticulated poor premorbid schizophrenic up through the relatively well functioning non-hospitalized normal, with all groups being matched on relevant variables, more stringent inferences may be made regarding not only the schizophrenic process, but the effects of adjustment level in "normals" as well.

Statement of Problem

One principal problem of this study is to determine if schizophrenic subjects are less able than non-psychiatric subjects to adequately group together objects when the sample items are (1) actual objects and (2) words denoting these objects. The

impetus for this problem springs from the various theories of schizophrenic functioning, especially those of Cameron, Rapaport and Arieti, stressing the relationship between social maladjustment and cognitive performance.

A second question deals with how adequately schizophrenic subjects (good and poor premorbids) verbalize the reasons for their respective groupings when compared to non-psychiatric subjects (hospitalized and non-hospitalized normals). This problem finds its source in the experimental studies pointing up a communicative deficit in the schizophrenic as well as those theories which stress the relationship between social withdrawal and cognitive ineptitude. (See Arieti, Rapaport, Cameron and others.)

A third problem, coordinated with the study of verbalization involves the investigation of meaning as reflected through word-referent and object-referent linkages. This problem arises from the theories of Brown and Vygotsky, pointing up that meanings develop and change, and further that such meanings are the tools of conceptual thought.

On the basis of the foregoing discussion the following hypotheses were formulated.

Hypotheses

1. Combining both the Objects and the Words tasks, the non-hospitalized normals will be significantly superior to the hospitalized normals who will be significantly superior to good premorbids who in turn, will be significantly superior to poor premorbids

on:

a) number of adequate sortings

b) category width for adequate sortings

c) category width for inadequate sortings

d) percentage of adequate verbalizations

e) percentage of formal verbalizations

f) number of relevant verbalizations

g) number of idiosyncratic verbalizations

2. On each of the tasks, the non-hospitalized normals will be significantly superior to the hospitalized normals who will be significantly superior to good premorbids, who in turn, will be significantly superior to poor premorbids on:

a) number of adequate sortings

b) category width for adequate sortings

c) category width for inadequate sortings

d) percentage of adequate verbalizations

e) percentage of formal verbalizations

f) number of relevant verbalizations

g) number of idiosyncratic verbalizations

Method

Subjects

There were four groups of twenty subjects each:

1. Poor Premorbid Schizophrenics

The first group consisted of twenty schizophrenic patients from the Northampton Veterans Administration Hospital, Northampton, Mass. who had made a poor premorbid social adjustment. Their assignment to this group was based on their receiving scores of twenty or above on the Phillips scale of Premorbid Adjustment.

2. Good Premorbid Schizophrenics

Twenty good premorbid schizophrenics were selected from the Northampton Veterans Administration Hospital, Northampton, Mass. by their scores on the Phillips scale. Patients who received scores below fifteen were assigned to this group.

Twenty records were selected at random and independently scored by two clinical psychologists to determine the reliability of each subject's placement. There was agreement between the two raters on the categorization of 19 of the 20 subjects. The extent of agreement may thus be seen to be highly significant. Previous studies have also pointed up the reliability of the Phillips scale; among these are the studies of Hill (1962, 1963), Buck and Kates (1963) and Goldstein (1963).

The criteria used in the selection of the schizophrenic patients were as follows: (1) cooperative, white males,

(2) between the ages of 20 and 45, (3) not currently hallucinating, (4) absence of complicating pathology such as organicity, alcoholism, mental retardation, etc., (5) no record of ECT during the past year.

3. Hospitalized Normals

The third group was composed of twenty normal subjects who were hospitalized at the Albany, New York, Veterans Administration Hospital for general medical, non-psychiatric disorders. The principal criterion for their selection was hospitalization on the basis of physical illness. It was assumed that the factors of physical illness and hospitalization would be associated with tendencies toward regressive behavior and that these normals would exhibit a relatively low level of positive mental health.

The normal hospitalized Ss were selected according to the following criteria: (1) cooperative, white males, (2) between the ages of 20 and 45, (3) no obvious, severe or disabling emotional disturbances such as psychosis, incapacitating neurosis, organic involvement, etc.

An informal interview was conducted with these subjects to ascertain (1) work efficiency prior to hospitalization, (2) job satisfaction, (3) marital and familial relationships, and (4) the nature of their physical symptomatology. In addition, to assess their psychological comfort and their feelings about themselves and others the California Test of Personality Adjustment was administered. On the basis of previous evidence (Goldstein 1963) which

questioned the level of adjustment of hospitalized normals this information was gathered so as to evaluate the level of mental health of the Ss before hospitalization. In addition to their current medical problems this group was found to have relatively poor work efficiency, poor marital relationships, and considerable psychological discomfort before hospitalization. A brief description of this group may be found in Appendix B.

4. Non-Hospitalized Normals

The fourth and final group of subjects, selected from the Newington Veterans Administration Hospital, Newington, Conn. was composed of twenty non-hospitalized, normal subjects who fulfilled as best as possible the following criteria of positive mental health: (1) work efficiency, indicated by being employed and functioning adequately according to standards set by the employer. This was ascertained through responses to a series of relevant questions. (2) Psychological comfort with regard to feelings about oneself and others. This was measured by the subjects scoring in at least the upper 50th percentile of the California Test of Personality. (3) Absence of physical symptoms for which there was no apparent organic base. This criterion was evaluated by the subjects' responses to a series of relevant questions. (4) Socially acceptable and stable behavior as reflected by the Ss' responses to questions regarding their marital and family relationships. In addition, these subjects were (1) cooperative, white males and (2) between the ages of 20 and 45. A description of this group

may be found in Appendix B.

Matching

The four subject groups were matched on the following variables: (1) age--an analysis of variance showed no significant differences existing between the four subject groups with regard to age. All subjects were between the ages of 20 and 45. (2) Sex--all subjects were males. (3) Intelligence--all groups were matched on the Vocabulary and Block Design subtests of the Wechsler Adult Intelligence Scale (Wechsler 1955). An analysis of variance indicated no differences between the groups. The range of scores for Vocabulary was from 7 to 16; for Block Design from 7 to 15. These two subtests are highly correlated with the Full Scale IQ on the WAIS. The Block Design subtest correlates .67; the Vocabulary .83. (4) Education--analysis of variance indicates that there were no significant differences between groups on educational level. (5) Socio-economic status--Myers and Roberts (1959) have described the use of an index of social position developed by Hollingshead and Redlich (1958). This index is composed of the factors of (1) area of residence, (2) occupational level and (3) educational level. Since matching on place of residence was not feasible in this study it was felt that the groups could be assumed to be matched on socio-economic status if a close matching on education and occupation could be demonstrated. As has been already indicated there were no significant differences between groups on years of education completed. On occupation, the

subjects were matched on a 7 point scale described by Myers and Roberts. This scale is a modification of the Alba Edwards system of classifying occupations into socio-economic groups used by the United States Bureau of the Census. No significant differences were found between groups with regard to their occupational level. The range of occupational class was from 3 to 7.

Test Materials

California Test of Personality

The California Test of Personality, according to the manual, "is organized around the concept of life adjustment as a balance between personal and social adjustment. Personal adjustment is assumed to be based on feelings of personal security and social adjustment to feelings of social security (Thorpe et al. 1953).

The test is divided into two halves, the first of which is designed to measure personal security, the second social security. Each half, in turn, is divided into six components. The Personal Adjustment scale consist of the following six components: (a) self-reliance, (b) sense of personal worth, (c) sense of personal freedom, (d) feeling of belonging, (e) withdrawal tendencies and (f) nervous symptoms. The social adjustment scale is composed of (a) social standards, (b) social skills, (c) anti-social tendencies, (d) family relations, (e) occupational relations, and (f) family relations. Reliability coefficients for the scales (based on the Kuder-Richardson formula) were presented as r = .93 for Personal Adjustment, r = .93 for Social Adjustment and

Table 1

Means and Standard Deviations for Subject Groups on Matching Criteria

		Poors		Goods		Hosp.		Non-Hosp.	
		Obj.	Wds.	Obj.	Wds.	Obj.	Wds.	Obj.	Wds.
Age[a]	Mean	35.9	39.6	33.8	37.9	38.2	35.3	38.6	37.2
	SD	4.3	3.1	4.0	4.5	5.1	4.6	4.3	4.8
Ed.[b]	Mean	11.0	10.7	11.8	11.7	10.8	10.5	11.0	11.3
	SD	2.3	2.2	2.1	2.6	2.4	1.8	2.0	2.1
BD[c]	Mean	9.6	9.8	10.6	9.5	10.1	9.8	10.4	10.4
	SD	1.8	1.8	2.2	1.6	1.7	1.6	1.3	3.0
Vocab.[d]	Mean	10.0	9.5	10.3	10.2	10.4	10.5	10.4	10.6
	SD	1.8	1.8	2.7	1.7	2.2	1.7	2.2	1.5

(continued)

Table 1 (continued)

		Poors		Goods		Hosp.		Non-Hosp.	
		Obj.	Wds.	Obj.	Wds.	Obj.	Wds.	Obj.	Wds.
Socio-Economic Status[e]	Mean	5.6	5.5	5.2	5.1	5.0	5.3	5.0	5.0
	SD	1.8	1.6	1.6	1.4	1.7	1.8	1.6	1.3

Code:
a. Age in years
b. Education in years
c. Block Design--Standard Scores from WAIS
d. Vocabulary--Standard Scores from WAIS
e. Socio-economic status--based on a 7 point scale of occupational classification

Table 2

Research Design

		Group			
		Schizophrenics		Normals	
		Poors	Goods	Hosp.	Non-Hosp.
Task	Objects	Ss 1-10	Ss 21-30	Ss 41-50	Ss 61-70
	Words	Ss 11-20	Ss 31-40	Ss 51-60	Ss 71-80

r = .95 for Total Adjustment.

Interview Questions

Questions about Job Satisfaction

1. How do you like your job?

2. How interesting is it?

3. How do you feel about the people you work with?

Questions about Physical Symptoms

1. How are you feeling today? How do you usually feel?

2. Do you have any medical problems for which you see a doctor regularly?

Questions about Marital and Familial Relationships

1. How do the members of your family get along? How do they compare with most families you know?

2. Does your family do things together? How do they feel when they do things together?

Sorting Test (Object Samples)

The Rapaport modification 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; an imitation cigar and cigarette, a matchbook; a red rubber ball; a rubber eraser; a rubber sink stopper;

a white filing card; a green cardboard square; a red paper circle; a lock and a bicycle bell.

The active phase of sorting was employed. In this phase the S forms groups of objects that "belong together" using as a basis a sample item presented by the E as a representative item in a class of items. From the objects available the S proceeds to group items with the sample item. There were nine sample items. They are listed below in their order of presentation.

1. Large Pliers
2. Large Fork
3. Pipe
4. Rectangular White Card
5. Red Paper Circle
6. Toy Hatchet
7. Red Rubber Ball
8. Bicycle Bell
9. Red Rubber Eraser

Sorting Test (Word Samples)

Words denoting the nine sample objects were lettered in black india ink on 3 x 5 index cards. Each card described a different sample object. The cards read as follows:

1. Large Pliers
2. Large Fork
3. Pipe
4. Rectangular White Card

5. Red Paper Circle
6. Toy Hatchet
7. Red Rubber Ball
8. Bicycle Bell
9. Red Rubber Eraser

The procedure was the same as with the object samples except that for the second task the word samples were substituted for the corresponding object samples.

Procedure

Sorting Test (Object Samples)

Each subject was individually tested. The complete set of 33 objects was spread out on a table before the S in a predetermined order (See Appendix A). The first sample item (large pliers) was removed from the pool of items by the E and placed to one side. The S was then instructed, "Now pick out all the objects that belong with this. Put with this (E pointing to sample) all those that belong with it and tell me when you have finished." When the S indicated that he had completed the sorting he was asked, "Why did you put all those together? Why do they belong together?" In the event of vague statements, failures to sort or confusing sorts, further inquiry was made. The particular sample was then returned to its place in the pool of items and the second sample selected. This procedure was followed until all nine items had been presented and nine sorts had been completed by the S.

Sorting Test (Word Samples)

The procedure for this task was essentially the same as with the object samples. The set of objects was spread out on a table before the S with the exclusion of the object for which the samplo word was to be substituted. The E then placed the corresponding sample word to one side and as with the object samples, instructed the S to "put with this all those that belong with it." At the completion of the sort, the object which had been removed prior to the sort was returned to its place in the pool of items. Apart from removing the object for which the word sample was to be substituted before the sort and replacing it after the sort, the procedure was the same as in the previous task.

Scoring Procedure

The procedure used in scoring the records and the responses may be outlined as follows: (a) a table of random numbers was consulted and each record assigned a number, (b) all other identifying information was removed from the record, (c) a large cardboard mask that completely covered the record was made and used in such a way that only one response could be seen at a time, (d) a second clinical psychologist rescored half (40) of the records for various response categories. The reliability coefficients obtained are as follows:

1. Adequate Sortings----------r = .92
2. Adequate Verbalizations-------r = .87

3. Formal Verbalizations---------r = .85

4. Idiosyncratic Verbalizations--r = .89

Scoring Categories

Four broad areas designated by Rapaport (1945) and modified by Kates, Kates and Michael (1960) served as the bases for scoring. A total of seven scoring measures were subsumed under these four areas. The areas and scoring measures are as follows:

1. Adequacy of Categorization

   Number of Adequate Sortings

2. Category Width

   Category Width of Adequate Sortings

   Category Width of Inadequate Sortings

3. Adequacy of Verbalization

   Percentage of Adequate Verbalizations

4. Type of Verbalization

   Percentage of Formal Verbalizations

   Number of Relevant Verbalizations

   Number of Idiosyncratic Verbalizations

1. Adequacy of Categorization

   Number of Adequate Sortings

The number of adequate sortings for each subject was tabulated. A sorting was considered adequate if all the objects included were relevant to each other and no irrelevant objects were included or relevant objects excluded. The adequacy of sorting was determined as independently as possible without taking into account the nature of the accompanying verbalization. A

sorting was considered inadequate if (a) all objects were relevant with the exception of one or more objects which did not belong, (b) all objects were relevant but one or more relevant objects were excluded, (c) the objects were primarily irrelevant to each other.

2. Category Width

Category Width for Adequate Sortings

The number of items sorted with the sample item (excluding the sample item) were tabulated for each sort that had been scored adequate and an average for each subject obtained.

Category Width for Inadequate Sorts

The number of items sorted with the sample item (excluding the sample item) were tabulated for each sort that had been scored inadequate and an average for each subject obtained.

3. Adequacy of Verbalization

Percentage of Adequate Verbalizations

The ratio--number of adequate verbalizations accompanying adequate sorts/total number of adequate sorts--was compiled for each subject. This measure gave the ratio of responses for which there was both an adequate sorting and an adequate verbalization to the total number of adequate sortings. A verbalization was considered adequate if it covered completely and correctly the realm of objects sorted. A verbalization, then, would be considered inadequate if (a) it was too inclusive; that is, it covered correctly the objects sorted in the particular grouping

but referred as well to other objects not included in the grouping but present in the pool of items, (b) it was too exclusive; that is, excluding one or more of the objects grouped, (c) it was false, (d) it was idiosyncratic, (e) it was both inclusive and exclusive.

4. Type of Verbalization

Percentage of Formal Verbalizations

The ratio--number of formal verbalizations accompanying adequate sorts/total number of adequate sorts--was compiled for each subject. This measure gives the ratio of responses for which there was both an adequate sorting and a formal verbalization to the total number of adequate sortings. The criteria for membership in the formal category is that the criterial attributes are properties inherent in the objects themselves. There are several types of formal categories but we are most concerned with the formal conjunctive category. The conjunctive category is defined by the joint presence of the appropriate value of one or several attributes. Both formal abstract and formal primary verbalizations are subsumed under the conjunctive category. Formal abstract verbalizations are defined as concepts that share a complex set of attributes. These concepts are very "open" in the sense that new instances of the concept may be admitted, (e.g., these are all tools). Formal primary verbalizations are defined as those that deal with qualities of shape, size, form, texture, color etc. "All these objects are red" is an example of a formal

primary response.

Number of Relevant Verbalizations

The number of relevant verbalizations for each subject was tabulated. The relevant verbalization, as used here, is a measure of total verbalization adequacy, independent of sorting adequacy. It consists of adequate verbalization plus those verbalizations which despite being scored inadequate, are nonetheless appropriate to the materials sorted. A subject who groups together all the tools but one, for example, and gives as his reason for grouping, "these are all tools" would rate a score of an inadequate, inclusive verbalization. The quality of this verbalization, however, demands that it be distinguished from the more pathological forms of inadequate verbalizations. The measure of relevant verbalizations accomplished this.

Number of Idiosyncratic Verbalizations

The number of idiosyncratic verbalizations for each subject was tabulated. The idiosyncratic verbalization is composed of the following sub-types:

(a) Affective--this verbalization groups the objects together 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 to which it is given is automatically scored inadequate.

(b) 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.

(c) Syncretistic--a syncretistic verbalization is one which is extremely vague and general and applies almost to the whole set of objects as well as to the grouping for which it is used.

(d) 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.

(e) Chain Definition--the verbalization moves from objects to object as the example below will indicate. The subject sorts a red ball, then a red paper, then a paper matchbook, then a pipe and so on.

(f) Split-Narrow--This categorization is marked by dividing the grouping into two or more subgroups and subsuming each under a different concept.

Results

An analysis of variance technique (a four by two treatment by levels design) was employed to assess the differences between groups (poor premorbid schizophrenics, good premorbid schizophrenics, hospitalized normals and non-hospitalized normals), tasks[a] (Object Samples and Words Samples) and the interaction (groups by tasks) on the following seven measures:

a) number of adequate sortings

b) category width for adequate sortings

c) category width for inadequate sortings

d) percentage of adequate verbalizations

e) percentage of formal verbalizations

f) number of relevant verbalizations

g) number of idiosyncratic verbalizations

In addition, simple randomized analyses of variance were utilized to assess the differences between groups on each of the tasks on the above seven measures.

On the two measures involving proportions, the percentage of adequate verbalizations and the percentage of formal verbalizations, the data were transformed by an arc sin transformation as

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a. On those measures where significance was obtained further analysis was undertaken to assess the relative performance of each subject group on both tasks. As this area was in large part exploratory, no specific hypotheses were formulated. The analyses, however, may be examined in Appendix D.

suggested by Walker and Lev (1953, p. 423). The analyses presented with reference to these measures are based on the transformed data. The raw data, however, may be examined in Appendix C.

Hypothesis One

Sorting Adequacy

Part "a" of hypothesis one was partly confirmed. On the number of adequate sortings the differences between groups were significant at better than the .001 level (Table 3). As predicted, the poors displayed the least number of adequate sorts, the non-hospitalized normals the most. Somewhat unexpectedly, the good premorbids produced a greater number of adequate sorts than the hospitalized normals. Further tests, however, indicated that this difference was not significant. Additionally, it was indicated that the poor premorbids gave significantly fewer adequate sorts than any of the other subject groups. While the non-hospitalized normals were not significantly differentiated from the good premorbids, they did produce significantly more adequate sorts than either hospitalized normals or poor premorbid schizophrenics (Table 4).

Category Width for Adequate Sortings

Part "b" of hypothesis one was confirmed. The results, however, just reached the .05 level of significance (Table 5). While the groups differed in the expected direction with non-hospitalized normals producing the widest categories and poor

Table 3

Analysis of Variance for Number of Adequate Sortings

Source	df	SS	MS	F ratio	P
Total	79	434.19			
Groups	3	130.94	43.65	11.98	.001
Tasks	1	27.61	27.61	7.58	.01
G x T	3	13.14	4.45	1.22	----
Error	72	262.30	3.64		

Table 4

Duncan Range Tests for Main Effect of Groups (Non-Hospitalized Normals, Hospitalized Normals, Good Premorbids and Poor Premorbids)[a]

	Number of Adequate Sorts			
	Poors	Hosp.	Goods	Non-Hosp.
Means[c]	2.4	4.1	4.4	5.9[b]

Code: a. Duncan's New Multiple Range Test applied to differences between means, K = 4 (From Edwards, 1950, 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.

c. Based on Raw Data

Table 5

Analysis of Variance for Category Width--Adequate Sortings

Source	df	SS	MS	F ratio	P
Total	79	152.94			
Groups	3	14.00	4.67	2.75	.05
Task	1	10.51	10.51	6.19	.025
G x T	3	6.21	2.07	1.21	----
Error	72	122.21	1.70		

premorbids the narrowest, further tests failed to significantly differentiate the groups (Table 6).

Category Width for Inadequate Sortings

Part "c" of hypothesis one was not confirmed (Table 7). With reference to inadequate sortings poor premorbids and hospitalized normals produced the widest categories while good premorbids and non-hospitalized normals produced the narrowest. The differences between all groups, however, were slight (Table 17).

Percentage of Adequate Verbalizations

Part "d" of hypothesis one was substantiated at better than the .005 level (Table 8). As predicted, results were in the expected direction with the non-hospitalized normals displaying the highest percentage of adequate verbalizations and poor premorbid schizophrenics the lowest (Table 16). Duncan range tests indicated that significance was wholly attributable to the inadequate performance of the poor premorbid schizophrenics. While goods, hospitalized normals and non-hospitalized normals did not differ among themselves, the poor premorbids had a significantly lower percentage of adequate verbalizations than any of these three groups (Table 9).

Percentage of Formal Verbalizations

Part "e" of hypothesis one, stating that there should be significant differences between all groups with the non-hospitalized normals producing the highest percentage of formal verbalizations and poor premorbids the lowest was confirmed at better

Table 6

Duncan Range Tests for Main Effect of Groups (Non-Hospitalized Normals, Hospitalized Normals, Good Premorbids and Poor Premorbids)[a]

	Category Width for Adequate Sortings			
	Poors	Goods	Hosp.	Non-Hosp.
Means[c]	2.2	2.8	3.0	3.4[b]

Code: a. Duncan's New Multiple Range Test applied to differences between means, K = 4 (From Edwards, 1950, 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.

c. Based on Raw Data

Table 7

Analysis of Variance for Category Width--Inadequate Sortings

Source	df	SS	MS	F ratio	P
Total	79	111.70			
Groups	3	1.23	.41	.31	----
Task	1	9.25	9.25	7.02	.01
G x T	3	6.45	2.14	1.63	----
Error	72	94.80	1.32		

Table 8

Analysis of Variance for Percentage of Adequate Verbalizations Transformed Data

Source	df	SS	MS	F ratio	P
Total	79	11.21			
Groups	3	2.10	.70	5.73	.005
Task	1	.20	.20	1.60	----
G x T	3	.14	.005	.38	----
Error	72	8.78	.12		

Table 9

Duncan Range Tests for Main Effect of Groups (Non-Hospitalized Normals, Hospitalized Normals, Good Premorbids and Poor Premorbids)[a]

Percentage of Adequate Verbalizations--Transformed Data

	Poors	Goods	Hosp.	Non-Hosp.
Means[c]	1.40	1.85	2.11	2.36[b]

Code: a. Duncan's New Multiple Range Test applied to differences between means, K = 4 (From Edwards, 1950, 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.

c. Based on Arc Sin Transformation of Data

than the .005 level (Table 10). Further tests indicated that while the poors did not differ from the goods nor the hospitalized normals from the non-hospitalized normals, the two latter groups were significantly superior to the two former groups (Table 11).

Number of Relevant Verbalizations

Part "f" of hypothesis one was confirmed at better than the .005 level (Table 12). As predicted the non-hospitalized normals produced the greatest number of relevant verbalizations, the poor premorbids the least, with goods and hospitalized normals performing intermediate. Duncan range tests indicated that while the poors gave significantly fewer relevant verbalizations than either of the two normal groups, they were not significantly differentiated from the good premorbids. In addition, the good premorbids, while not differentiated from the hospitalized normals, did perform significantly more poorly than the non-hospitalized normals (Table 13).

Number of Idiosyncratic Verbalizations

Part "g" of hypothesis one dealing with the differences between groups on the number of idiosyncratic verbalizations was substantiated at better than the .001 level (Table 14). While results were in the expected direction with poors producing the most idiosyncratic responses and non-hospitalized normals the fewest, the two normal groups did not significantly differ nor did the two schizophrenic groups differ. The schizophrenic groups, however, gave significantly more idiosyncratic responses

Table 10

Analysis of Variance for Percentage of Formal Verbalizations Transformed Data

Source	df	SS	MS	F ratio	P
Total	79	70.21			
Groups	3	12.13	4.04	5.04	.005
Task	1	.01	.01	.12	----
G x T	3	.17	.006	.007	----
Error	72	57.81	.80		

Table 11

Duncan Range Tests for Main Effect of Groups (Non-Hospitalized Normals, Hospitalized Normals, Good Premorbids and Poor Premorbids)[a]

Percentage of Formal Verbalizations--Transformed Data

	Poors	Goods	Hosp.	Non-Hosp.
Means[c]	1.11	1.40	1.88	2.10[b]

Code: a. Duncan's New Multiple Range Test applied to differences between means, K = 4 (From Edwards, 1950, 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.

c. Based on Arc Sin Transformation of Data

Table 12

Analysis of Variance for Number of

Relevant Verbalizations

Source	df	SS	MS	F ratio	P
Total	79	577.49			
Groups	3	106.14	35.38	5.88	.005
Task	1	32.51	32.51	5.41	.025
G x T	3	5.94	1.98	.33	----
Error	72	432.90	6.01		

Table 13

Duncan Range Tests for Main Effect of Groups (Non-Hospitalized Normals, Hospitalized Normals, Good Premorbids and Poor Premorbids)[a]

Number of Relevant Verbalizations

	Poors	Goods	Hosp.	Non-Hosp.
Means[c]	3.0	4.5	5.4	6.1[b]

Code: a. Duncan's New Multiple Range Test applied to differences between means, K = 4 (From Edwards, 1950, 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.

c. Based on Raw Data

Table 14

Analysis of Variance for Number of

Idiosyncratic Verbalizations

Source	df	SS	MS	F ratio	P
Total	79	585.80			
Groups	3	139.60	46.53	7.96	.001
Task	1	9.80	9.80	1.67	----
G x T	3	15.60	5.20	.89	----
Error	72	420.80	5.84		

than either of the two normal groups (Table 15).

The means and standard deviations for the various scoring measures may be examined in Table 16. Table 17 presents a summary of the results for hypothesis one.

Hypothesis Two

Sorting Adequacy

Part "a" of hypothesis two was confirmed. On both the Objects and the Words tasks there were significant differences between the subject groups with reference to the number of adequate sorts. On the Objects task p was greater than .001; on the Words task better than .025 (Table 18). Duncan range tests for the Objects task indicated that the poor premorbids differed significantly ($p = .05$) from all other subject groups, while the good premorbids differed from neither the hospitalized nor the non-hospitalized normals. The non-hospitalized normal, however, produced significantly more adequate sorts than the hospitalized normals. Although it should be noted that the goods performed somewhat better than the hospitalized normals, this difference was not significant (Table 32).

On the Words task, the significance obtained proved to be attributable to the marked superiority of the non-hospitalized normals. While they gave significantly more adequate sortings than either poors, goods or hospitalized normals, these latter three groups were not significantly differentiated from each other (Table 33).

Table 15

Duncan Range Tests for Main Effect of Groups (Non-Hospitalized Normals, Hospitalized Normals, Good Premorbids and Poor Premorbids)[a]

	Number of Idiosyncratic Verbalizations			
	Poors	Goods	Hosp.	Non-Hosp.
Means[c]	5.2	4.2	2.9	1.7[b]

Code: a. Duncan's New Multiple Range Test applied to differences between means, K = 4 (From Edwards, 1950, 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.

c. Based on Raw Data

Table 16

Means and Standard Deviations on the

Seven Scoring Measures

Group		AS	CW/AD	CW/IN	AV	FV	RV	ID
Non-Hosp. Normals	Mean	5.9	3.4	1.9	2.36	2.10	6.1	1.7
	SD	2.7	2.3	1.1	1.5	1.4	1.6	.8
Hosp. Normals	Mean	4.1	3.0	2.1	2.11	1.88	5.4	2.9
	SD	2.3	1.1	1.9	.9	1.5	2.0	2.0
Good Premorbids	Mean	4.4	2.8	1.9	1.85	1.40	4.5	4.2
	SD	3.0	1.4	1.1	1.2	1.2	2.7	2.7
Poor Premorbids	Mean	2.4	2.2	2.1	1.40	1.11	3.0	5.2
	SD	1.6	1.9	1.4	1.2	1.0	3.8	2.0

Code: AS--Number of Adequate Sorts
CW/AD--Category Width for Adequate Sortings
CW/IN--Category Width for Inadequate Sortings
AV--Percentage of Adequate Verbalizations (Transformed)
FV--Percentage of Formal Verbalizations (Transformed)
RV--Number of Relevant Verbalizations
ID--Number of Idiosyncratic Verbalizations

Table 17

Summary of Analyses of Variance for Hypothesis One

(Groups Across Tasks)

Measure	Level of Sign.	Group Means			
		Poors	Goods	Hosp.	Non-Hosp.
AS	.001	2.4	4.4	4.1	5.9
			P<G,H,NH; H<NH		
CW/AD	.05	2.2	2.8	3.0	3.4
			No significant variation		
CW/IN	----	2.1	1.9	2.1	1.9
AV	.005	1.40	1.85	2.11	2.36
			P<G,H,NH		
FV	.005	1.11	1.40	1.88	2.40
			P<H,NH; G<H,NH		
RV	.005	3.0	4.5	5.4	6.1
			P<H, NH; G<NH		
ID	.001	5.7	4.2	2.9	1.7
			P<G,H,NH; G<H,NH		

Code: AS = Number of Adequate Sorts
CW/AD = Category Width for Adequate Sortings
CW/IN = Category Width for Inadequate Sortings
AV = Percentage of Adequate Verbalizations
FV = Percentage of Formal Verbalizations
RV = Number of Relevant Verbalizations
ID = Number of Idiosyncratic Verbalizations

P = Poor Premorbids
G = Good Premorbids
H = Hospitalized Normals
NH = Non-Hospitalized Normals

Table 18

Analysis of Variance for Number of Adequate Sorts Across Subject Groups On Each Task

Objects Task

Source	df	SS	MS	F ratio	P
Total	39	210.97			
Groups	3	93.27	31.09	9.51	.001
Error	36	117.70	3.27		

Words Task

Source	df	SS	MS	F ratio	P
Total	39	195.60			
Groups	3	51.00	17.00	4.23	.025
Error	36	144.60	4.01		

Table 19

Means and Standard Deviations for

Number of Adequate Sortings

		Poors	Goods	Hosp.	Non-Hosp.	Total
Objects	Mean	2.4	5.6	4.6	6.5	4.8
	SD	2.2	1.7	1.9	1.4	2.3
Words	Mean	2.3	3.2	3.5	5.4	3.6
	SD	1.3	2.0	2.7	1.7	2.2

Category Width for Adequate Sortings

Part "b" of hypothesis two was not confirmed. On neither the Objects nor the Words task were there significant differences between the groups (Table 20). On the Objects task, however, a trend was noted with $p = .10$. While poors produced the narrowest categories, the hospitalized normals produced the widest. Good premorbids and hospitalized normals performed intermediately (Table 21). On the Words task non-hospitalized normals produced the widest categories and poor premorbid schizophrenics the narrowest. Hospitalized normals, however, were slightly narrower in their sortings than good premorbid schizophrenics (Table 21).

Category Width for Inadequate Sorts

Part "c" of hypothesis two was not confirmed. On neither the Objects nor the Words tasks were significant differences between the groups obtained (Table 22). Similarly, on neither of the tasks were the results in the expected direction. On the Objects task the widest categories for inadequate sortings were produced by the hospitalized normals; the goods produced the narrowest categories (Table 23). It should be noted that there was a trend apparent in these results with $p = .10$.

On the Words task, goods produced the widest categories for their inadequate sorts, hospitalized normals the narrowest. These results may be examined in Table 23.

Percentage of Adequate Verbalizations

Part "d" of hypothesis two was partly confirmed. On the

Table 20

Analyses of Variance for Category Width of Adequate Sortings Across Subject Groups on Each Task

Objects Task

Source	df	SS	MS	F ratio	P
Total	39	75.12			
Groups	3	12.86	4.29	2.47	.10
Error	36	62.27	1.73		

Words Task

Source	df	SS	MS	F ratio	P
Total	39	67.30			
Groups	3	7.35	2.45	1.47	----
Error	36	59.95	1.67		

Table 21

Means and Standard Deviations for Category Width on Adequate Sortings

		Poors	Goods	Hosp.	Non-Hosp.	Total
Objects	Mean	2.4	3.0	3.8	3.6	3.2
	SD	2.2	.8	.8	1.0	1.4
Words	Mean	2.0	2.5	2.1	3.1	2.4
	SD	1.7	1.5	1.0	.7	1.4

Table 22

Analyses of Variance for Category Width of Inadequate Sortings Across Subject Groups on Each Task

Objects Task

Source	df	SS	MS	F ratio	P
Total	39	287.37			
Groups	3	51.07	17.02	2.59	.10
Error	36	236.30	6.56		

Words Task

Source	df	SS	MS	F ratio	P
Total	39	257.60			
Groups	3	61.00	.42	.49	----
Error	36	196.60	.85		

Table 23

Means and Standard Deviations for Category Width on Inadequate Sortings

		Poors	Goods	Hosp.	Non-Hosp.	Total
Objects	Mean	2.6	1.9	2.8	2.0	2.3
	SD	1.8	.8	1.6	.9	1.2
Words	Mean	1.6	1.9	1.4	1.7	1.7
	SD	.7	1.3	.5	1.0	.9

Objects task significance was noted between the groups at better than the .01 level with non-hospitalized normals having the greatest percentage of adequate verbalizations and poor premorbid schizophrenics the lowest (Table 24). While significance was not obtained on the Words task the results were similarly in the expected direction with non-hospitalized normals performing the best and poor premorbids the worst (Table 25).

For the Objects task, Duncan range tests indicated that the two schizophrenic groups did not differ from each other; neither did the two normal groups differ from each other, nor did the goods and hospitalized normals differ. The poor premorbids, however, differed from both normal groups and the non-hospitalized normals from both schizophrenic groups (Table 32).

Percentage of Formal Verbalizations

Part "e" of hypothesis two was not confirmed. On neither the Objects nor the Words task did the subject groups differ significantly from each other. On both of these tasks, however, there were trends in the expected direction ($p = .10$) with non-hospitalized normals displaying the best performances and poor premorbid schizophrenics the worst (Table 26).

Number of Relevant Verbalizations

Part "f" of hypothesis two was partly confirmed. While on the Objects task significance between groups was not obtained, on the Words task there were significant differences between the groups at better than the .025 level (Table 28). There was a

Table 24

Analyses of Variance for Percentage of Adequate Verbalizations Across Subject Groups on Each Task

Objects Task

Source	df	SS	MS	F ratio	P
Total	39	29.53			
Groups	3	8.37	2.79	4.74	.01
Error	36	21.15	.59		

Words Task

Source	df	SS	MS	F ratio	P
Total	39	37.77			
Groups	3	4.40	2.79	1.58	----
Error	36	33.37	.59		

Table 25

Means and Standard Deviations for Percentage of Adequate Verbalizations--Transformed Data[a]

		Poors	Goods	Hosp.	Non-Hosp.	Total
Objects	Mean	1.34	1.79	2.27	2.54	1.99
	SD	1.0	.72	.84	.31	1.6
Words	Mean	1.45	1.85	1.94	2.17	1.86
	SD	1.24	1.04	.99	.31	1.9

Code: a. Based on Arc Sin Transformation of Data

Table 26

Analyses of Variance for Percentage of Formal Verbalizations Across Subject Groups on Each Task

Objects Task

Source	df	SS	MS	F ratio	P
Total	39	33.95			
Groups	3	6.30	2.10	2.74	.10
Error	36	27.64	.77		

Words Task

Source	df	SS	MS	F ratio	P
Total	39	36.20			
Groups	3	6.00	2.00	2.38	.10
Error	36	30.20	.84		

Table 27

Means and Standard Deviations for Percentage of Formal Verbalizations--Transformed Data[a]

		Poors	Goods	Hosp.	Non-Hosp.	Total
Objects	Mean	1.15	1.39	2.00	2.09	1.66
	SD	.97	.90	.98	.60	1.51
Words	Mean	1.07	1.40	1.77	2.10	1.59
	SD	1.1	1.2	.88	.20	1.26

Code: a. Based on Arc Sin Transformation of Data

Table 28

Analyses of Variance for Number of Relevant Verbalizations Across Subject Groups for Each Task

Objects Task

Source	df	SS	MS	F ratio	P
Total	39	287.37			
Groups	3	51.07	17.02	2.59	.10
Error	36	236.30	6.56		

Words Task

Source	df	SS	MS	F ratio	P
Total	39	257.60			
Groups	3	61.00	20.33	3.73	.025
Error	36	196.60	5.46		

trend however, on the Objects task ($p = .10$) in the predicted direction with the non-hospitalized normals displaying the best performances and poor premorbid schizophrenics the worst (Table 28).

The significance on the Words task was found to be generally superior performance of the two normal groups. While they were not significantly differentiated from each other, both normal groups performed significantly better than either of the two schizophrenic groups, who in turn were not significantly differentiated from each other (Table 33).

Number of Idiosyncratic Verbalizations

Part "g" of hypothesis two was confirmed as predicted. On both the Objects and the Words tasks, significance was obtained with $p = .025$ and $p = .01$ respectively (Table 30). On the Objects task, in addition, the results were in the expected direction with poor premorbid schizophrenics producing the greatest number of idiosyncratic responses and non-hospitalized normals the least (Table 31). Duncan range tests indicated that goods, hospitalized normals and non-hospitalized normals did not significantly differ in the number of idiosyncratic responses produced. Poor premorbid schizophrenics, however, while not being significantly differentiated from the goods were significantly inferior to the two normal groups (Table 32).

On the Words task the non-hospitalized normals produced the fewest idiosyncratic responses, as expected. The good premorbid schizophrenics, however, performed slightly more poorly than the

Table 29

Means and Standard Deviations for Number of Relevant Verbalizations

		Poors	Goods	Hosp.	Non-Hosp.	Total
Objects	Mean	3.5	5.6	5.9	6.5	5.4
	SD	2.9	2.6	2.3	1.6	2.6
Words	Mean	2.5	3.4	4.8	5.7	4.1
	SD	3.0	2.3	1.8	1.8	2.5

Table 30

Analyses of Variance for Number of Idiosyncratic Verbalizations Across Subject Groups on Each Task

Objects Task

Source	df	SS	MS	F ratio	P
Total	39	307.60			
Groups	3	77.60	25.87	4.05	.025
Error	36	230.00	6.39		

Words Task

Source	df	SS	MS	F ratio	P
Total	39	268.40			
Groups	3	77.60	25.87	4.88	.01
Error	36	190.80	5.30		

Table 31

Means and Standard Deviations for Number of Idiosyncratic Verbalizations

		Poors	Goods	Hosp.	Non-Hosp.	Total
Objects	Mean	5.3	3.1	2.5	1.5	3.1
	SD	3.4	2.6	2.4	1.1	2.8
Words	Mean	5.0	5.2	3.2	1.8	3.8
	SD	3.3	2.4	2.0	1.6	2.6

Table 32

Duncan Range Tests for Groups on Objects Task (Non-Hospitalized Normals, Hospitalized Normals, Good Premorbids and Poor Premorbids)[a]

Number of Adequate Sorts

	Poors	Hosp.	Goods	Non-Hosp.
Means[c]	2.4	4.6	5.6	6.5[b]

Percentage of Adequate Verbalizations--Transformed Data

	Poors	Goods	Hosp.	Non-Hosp.
Means[d]	1.34	1.79	2.27	2.54[b]

Number of Idiosyncratic Verbalizations

	Poors	Goods	Hosp.	Non-Hosp.
Means[c]	5.3	3.1	2.5	1.5[b]

Code:

a. Duncan's New Multiple Range Test applied to differences between means, K = 4 (From Edwards, 1950, 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.

c. Based on Raw Data

d. Based on Arc Sin Transformation of Data

poor premorbid schizophrenics. This latter difference was not significant, however. While the non-hospitalized normals performed significantly better than the two schizophrenic groups, they did not differ from the hospitalized normals (Table 33).

A summary of the results of hypothesis two is presented in Table 34.

Table 33

Duncan Range Tests for Groups on Words Task (Non-Hospitalized Normals, Hospitalized Normals, Good Premorbids and Poor Premorbids)[a]

Number of Adequate Sorts

	Poors	Goods	Hosp.	Non-Hosp.
Means[c]	2.3	3.2	3.5	5.4[b]

Number of Relevant Verbalizations

	Poors	Goods	Hosp.	Non-Hosp.
Means[c]	2.5	3.4	4.8	5.7[b]

Number of Idiosyncratic Verbalizations

	Goods	Poors	Hosp.	Non-Hosp.
Means[c]	5.2	5.0	3.2	1.8[b]

Code: a. Duncan's New Multiple Range Test applied to differences between means, K = 4 (From Edwards, 1950, 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.

c. Based on Raw Data

Table 34

Summary of Analyses of Variance for Hypothesis Two

(Groups on Each Task)

Measure	Signif. Level	OBJECTS Group Means				Signif. Level	WORDS Group Means			
		Poors	Goods	Hosp.	Non-Hosp.		Poors	Goods	Hosp.	Non-Hosp.
AS	.001	2.4	5.6	4.6	6.5	.025	2.3	3.2	3.5	5.4
			P<G,H,NH; H<NH						P,G,H<NH	
CW/AD	.10	2.4	3.0	3.8	3.6	---	2.0	2.6	2.1	3.1
CW/IN	.10	2.6	1.9	2.8	2.0	---	1.6	1.9	1.4	1.7
AV	.01	1.34	1.79	2.27	2.54	---	1.45	1.85	1.94	2.17
			P<H,NH; G<NH							
FV	.10	1.15	1.39	2.00	2.09	.10	1.07	1.40	1.77	2.10
RV	.10	3.5	5.6	5.9	6.5	.025	2.5	3.4	4.8	5.7
								P<H,NH; G<H,NH		

(continued)

Table 34 (continued)

Measure	Signif. Level	OBJECTS Group Means				Signif. Level	WORDS Group Means			
		Poors	Goods	Hosp.	Non-Hosp.		Poors	Goods	Hosp.	Non-Hosp.
ID	.025	5.3	3.1	2.5 P<H,NH	1.5	.01	5.0	5.2	3.2 P<NH; G<NH	1.8

Code: AS--Number of Adequate Sortings
CW/AD--Category Width for Adequate Sortings
CW/IN--Category Width for Inadequate Sortings
AV--Percentage of Adequate Verbalizations
FV--Percentage of Formal Verbalizations
RV--Number of Relevant Verbalizations
ID--Number of Idiosyncratic Verbalizations

P--Poor Premorbid Schizophrenics
G--Good Premorbid Schizophrenics
H--Hospitalized Normals
NH--Non-Hospitalized Normals

Discussion

Hypothesis One

Sorting Adequacy

Part "a" of hypothesis one was essentially supported by the results. As predicted, the greatest number of adequate sorts were produced by the non-hospitalized normals, the fewest by the poor premorbid schizophrenics. A bit unexpectedly, the good premorbids produced slightly more adequate sorts than the hospitalized normals. This difference, however, was not significant.

The process of sorting, it should be noted, involves the examination of the sample object with the aim of selecting from it an attribute which may then be used as a basis for grouping other objects. There are thus two major points at which distortions in the conceptual process may lead to distorted or inadequate sortings. The first lies in the initial selection of, in Bruner's terms, the "criterial attribute." If the attribute selected as the basis for grouping is personalized, tangential or in some other way inadequate, it follows that the sorting must accordingly be inappropriate.

Selecting an appropriate attribute, however, will not insure an adequate sort. The second point at which a cognitive disturbance may intervene, so to speak, and distort the sorting lies in the generalization of the selected attribute to the realm of objects under consideration. An inability to judge whether a

particular item adequately fulfills the criteria necessary for inclusion in a particular class may similarly lead to an inadequate sorting. Hanfmann and Kasanin (1938) seem to favor the first possibility as an explanation of the behavior of the schizophrenic as evidenced by their statement to the effect that the schizophrenic is unable "to grasp certain principles and frequently develops other principles and other classifications than those which the average person adopts." Since to ascertain the point at which the disturbance intrudes demands an examination of accompanying verbalizations, direction to this question will be made in later discussion. Disregarding the cause of an inadequate sort for the moment, however, it appears clear that there is a substantial relationship between level of premorbid adjustment and cognitive performance. The poor premorbid schizophrenics, having the most inadequate personal and social adjustment produce significantly fewer adequate sorts than any of the three remaining groups. By the same token, non-hospitalized normals with the most adequate personal and social adjustment produce significantly more adequate sorts than any of the other groups. Thus, the relationship between premorbid adjustment and cognitive performance, documented by Arieti, Cameron, Sullivan, Goldstein and others finds support here and indicates that where there is a deficiency in the ability to categorize and group objects in an experimental situation a correlated deficiency may be expected in real-life situations.

Category Width for Adequate Sortings

Part "b" of hypothesis one was just supported at the .05 level. Although the results were in the expected direction with the non-hospitalized normals producing the widest categories and the poor premorbid schizophrenics the narrowest, further tests failed to significantly differentiate the various groups.

The measure of category width directs itself to the size of the categories; that is, the number of items included in each sorting. Since for the adequate sorts, at least, the size of the categories is directly related to the criterial attributes selected from the sample item, attention to this measure may yield relevant information on the types of criterial attributes chosen. It would seem from the present results that the more adequate the social and personal adjustment of the individual the more will he be able to choose criterial attributes that encompass a larger number of objects of the realm. Conversely, the more disturbed his adjustment the more likely it will be that his categories encompass fewer objects. These results are especially interesting in light of the oft-noted overinclusiveness of the schizophrenic. They would seem, at first glance, to refute such overinclusiveness. It should be noted, however, that only adequate sorts are being considered here. When schizophrenics are able to perform adequately, they apparently are more constricted and discrete in their conceptualizations than more normal subjects. Normal subjects, on the other hand, seem more

unencumbered in the use of conceptual processes in the sense that their categories are able to encompass a wide number of objects without becoming syncretistic. These results would appear to confirm quite well Rapaport's contention that concept formation is a balance between inductive and deductive processes. The normal subjects with their more adequate personal and social adjustment seem to have achieved a more delicate balance with the result that they can be more receptive to the demands of their environment. Schizophrenics, on the other hand, in order to function adequately apparently must block-off and constrict. Since these results were just significant, however, they should be viewed with more caution than if they had been supported at a more stringent level.

Category Width for Inadequate Sorts

Part "c" of hypothesis one was not supported. With reference to inadequate sortings poor premorbids and hospitalized normals produced the widest categories while good premorbids and non-hospitalized normals produced the narrowest. The differences between all groups, however, were slight.

It would appear from these results that there are numerable heterogeneous influences contributing to inadequate sorts so that at least when overall performance is considered few reliable inferences can be made.

Percentage of Adequate Verbalizations

The notion under investigation in hypothesis one--that there

exist levels of conceptual functioning corresponding to levels of premorbid adjustment finds further support with reference to the percentage of adequate verbalizations. As predicted, poor premorbids had the lowest percentage of adequate verbalizations among the four groups. While their performance was significantly inferior to the other three groups, it is interesting to note that there were no significant differences between these latter groups. Adequate verbalizations, it will be recalled, are those which cover completely and correctly the materials sorted and further only those adequate verbalizations which accompanied adequate sortings are considered in this measure. In terms of the question previously raised, namely, at what point does the cognitive disturbance intrude--it may be said that at least for the poors there is a substantial difficulty with verbalizing the reasons for their groupings in addition to whatever difficulties they may experience with sorting. The present results would indicate that in the verbal representations of their groupings the poor premorbids are more likely to use verbalizations that embrace irrelevant objects or in some other way fail to account for the materials sorted than any of the other three groups. This is so even when the sortings themselves contain no extraneous objects.

Both Brown (1956) and Vygotsky (1962) have indicated that categorization alone does not indicate concept. It is the linkage between the referent (category) and its symbol (word)

that is critical. As will be recalled, for Brown the role of speech is to reduce the complexity of, what he terms, the non-linguistic world. It would seem, on the basis of the present results, that even when poor premorbids are able to categorize adequately they lack the verbal labels necessary to reduce the complexity of their categorizations and to provide appropriate meanings. The prerequisite of a relatively undisturbed socialization process, not having been fulfilled by the poors finds its manifestation in their inadequate verbal representations, even when they have managed to categorize adequately. By the same token, the relatively less disturbed premorbid adjustment of the other subject groups is found not to have a significantly differentiating effect on their ability to match adequate sortings with adequate verbalizations.

Percentage of Formal Verbalizations

Part "e" of hypothesis one was largely supported by the results. As predicted, the non-hospitalized normals produced the greatest percentage of formal verbalizations, the poor premorbid schizophrenics the least. While the poors and goods were not significantly differentiated from each other both groups were significantly inferior to the two normal groups. The measure of adequate verbalizations previously discussed, it should be noted, takes no account of the level of the verbalization--whether it be abstract or concrete. The formal verbalization, on the other hand, is a high level response. It is the mark of a differentiated

and relatively mature conceptual process and corresponds, in Vygotsky's scheme, to the mastery of abstraction and advanced complex thinking. The use of this level enables the individual, in Bruner's (1956) language, "to go beyond the information given." Instead of being limited to the palpable characteristics of the objects, the individual is able to group on the basis of general ordering principles deduced from properties inherent in the objects. In addition, the formal response is an open one--that is, allowing for the inclusion of a large number of objects which possess the criterial attributes.

With regard to this measure it becomes clear that neither of the schizophrenic groups can match the performance of the two normal groups. The theory of Vygotsky (1962) is relevant here, especially with regard to his pointing out that a distinction exists between meaning and referent. Different meanings, in effect, may be applied to the same referent, and refined meanings develop only as the child masters the social means of thought. Full conceptual development, contingent on a relatively mature differentiation of word meanings, arrives only at adolescence and corresponds to the individual's learning the significative use of the word. The relatively greater social disarticulation of the schizophrenics finds its manifestation in their inability to match adequate sortings with verbalizations based on general ordering principles, which in turn are dependent on this significative use of the word. Further, the fact that the two

schizophrenic groups are not differentiated on this measure indicates that the goods, despite their producing more adequate verbalizations than the poors are, nonetheless, as concrete. In general, applying these results to larger populations, it appears that schizophrenics are less able than normal subjects to use general principles as an aid for ordering and classifying events and accordingly their verbal representations are apt to be less abstract.

Relevant Verbalizations

Part "f" of hypothesis one was essentially supported by the results. As predicted the non-hospitalized normals produced the greatest number of relevant verbalizations, the poor premorbids the least, with goods and hospitalized normals performing intermediate. While the poors gave significantly fewer relevant verbalizations than either of the two normal groups, they were not significantly differentiated from the good premorbids. In addition, the good premorbids, while not differentiated from the hospitalized normals, did perform significantly poorer than the non-hospitalized normals. The number of relevant verbalizations, as used here, is a measure of total verbalization adequacy. It includes not only adequate verbalizations for adequate sorts but those verbalizations for inadequate sorts which were nonetheless appropriate to the materials sorted. The results would indicate that even when verbalization is considered independently of the sorting, the schizophrenic groups fail to match the performance

of the normal groups. It thus appears clear that schizophrenics display communication deficits apart from and in addition to whatever deficits they may experience in categorization. The social disarticulation of the schizophrenics is once again seen by their use of verbal symbols which apparently lack sufficient consensual validation. Where there has been relatively greater articulation within the social community, as with the two normal groups, more adequate, relevant and appropriate means of verbal communication may be expected.

Idiosyncratic Verbalizations

Part "g" of hypothesis one was highly significant. As predicted, the performances of the various groups were in the expected direction with non-hospitalized normals displaying the fewest idiosyncratic responses and poor premorbid schizophrenics the most. The performance of the poors was such that they produced significantly more idiosyncratic responses than either of the normal groups. The good premorbid schizophrenics also produced significantly more of such responses than either of the two normal groups, although they were not differentiated from the poors. The idiosyncratic response is the most potent indicator of pathology used in the present study. It includes such verbalizations as the affective, the fabulated, the syncretistic, the symbolic, chain definitions and the split-narrow. The idiosyncratic response, in its many forms, indicates that the subject is unable to abstract on the basis of shared attributes. The

elements of normal conceptual thought, generalization and abstraction, have been subordinated to the processes of condensation and displacement, two more primitive mental mechanisms. The verbal derivatives of this primary process thought are likely, if not assuredly, to be idiosyncratic responses. From the present results it may reasonably be inferred that these responses are directly related to the personal and social adjustment of the subject. The greater the social inadequacy of the individual the more frequent will be his use of idiosyncratic and highly personalized responses.

Many theoretical investigators have commented on the relationship between premorbid adjustment and idiosyncratic level responses. Cameron (1947), as previously indicated, has postulated a basic withdrawal tendency in the schizophrenic which is manifested in disarticulated thought and speech. In Sullivan's (1953) scheme this disarticulation is manifested by a lack of congruence between the schizophrenic's personal thought patterns and more public modes of communication. These distorted patterns come into prominence in the schizophrenic's course of becoming increasingly more isolated from others in his social environment. As consensually validated means of communication decrease, a progressive trend toward disruption of thought and verbalization occurs. Arieti (1959) also commenting on this relationship, points out that during psychosis the individual loses previously introjected symbols and roles. Desocialization or withdrawal,

then, implies a change in the process of symbolizing--changes which enable the loss and replacement of introjected symbols which originate from others with more primitive, personalized ones. The present results, with poors and goods producing more idiosyncratic responses than either of the normal groups, confirm these contentions.

Conclusions and Implications: Hypothesis One

The notion underlying hypothesis one--that there exist levels of conceptual functioning corresponding to levels of premorbid adjustment--was in large part supported by the results of hypothesis one. On each of the seven measures non-hospitalized normals displayed the best performances and poor premorbid schizophrenics the worst. On six of these measures differences between these two groups were significant. It may be recalled that the non-hospitalized normals were assumed to have the most adequate personal and social adjustment on the basis of their scoring above the 50 percentile on the California Test of Personality (See Appendix B). In addition, they were assumed to have fulfilled the criteria of positive mental health. These criteria were, to review, (1) adequate work efficiency, (2) psychological comfort in their feelings about themselves and others, (3) absence of physical symptoms for which there was no organic base and (4) socially acceptable and stable behavior with regard to marital and familial relationships.

The poor premorbid schizophrenics were assumed to have had

the poorest personal and social adjustment as adjudged by their scores on the Phillips scale of Premorbid Adjustment.

The groups of good premorbid schizophrenics and hospitalized normals have been more difficult to differentiate. While they have generally been regarded, and have performed, as intermediates between the poors and non-hospitalized normals, it has been difficult to formulate more specific hypotheses regarding their functioning. This is so because in certain aspects of their personal-social life these groups are not dissimilar. The good premorbids, while classified as schizophrenic, nonetheless display substantially more positive social-sexual relationships than poor premorbids. The hospitalized normals, by the same token, manifest considerably more personal-social difficulties than non-hospitalized normals (See Appendix B). The oft-noted similarities between these two groups may be viewed again here. Of the seven measures under consideration in hypothesis one these two groups differed significantly from each other on only two--idiosyncratic and formal verbalizations. One will note, however, that these two responses represent, in a sense, extremes. The idiosyncratic response is most typical of pathological conceptions, the formal most characteristic of mature, reality-based conceptions. On the basis of these results, <u>at least when overall performance is considered</u>, goods and hospitalized normals may be differentiated in terms of what most distinguishes normal from schizophrenic thought. As a result of their social

disarticulation experiences the good premorbid schizophrenics do not quite reach the levels of formal thought achieved by the hospitalized normals. Similarly, because of their relatively better social-personal adjustment the hospitalized normals do not as frequently produce idiosyncratic responses characteristic of social disarticulation. The four remaining measures apparently are not as sensitive to differences between good premorbids and hospitalized normals. The view may possibly be taken that the differences in adjustment level between good premorbids and hospitalized normals are not reflected in differences in adequate sorts, adequate verbalizations and so on.

Hypothesis Two

Sorting Adequacy

Part "a" of hypothesis two was confirmed. On both the Objects and the Words task poors produced the fewest adequate sorts and non-hospitalized normals the most. On the Objects task poors produced significantly fewer adequate sorts than any of the other three groups; on the Words task the non-hospitalized normals produced significantly more. Further, the hospitalized and non-hospitalized normals were significantly differentiated on the Objects task.

In addition to the essential notion under investigation in hypothesis one--that there exist levels of conceptual functioning corresponding to levels of premorbid adjustment--hypothesis two attempts to assess the performances of the subject groups on more

and less symbolic tasks. With reference to the number of adequate sorts it appears clear that the relative performances of the subject groups varies as the sample items become more symbolically represented. When the samples are presented as actual objects the significance is largely attributable to the inferior performance of the poors. While the hospitalized normals perform less adequately than the non-hospitalized normals it is the poors who are inferior to all groups. On the Words task, however, there are no significant differences between poors, goods and hospitalized normals. The significance noted is due to the superiority of the non-hospitalized normals.

It would seem on the basis of these results that when presented with an actual object which will serve as a basis for a grouping, it is relatively easier to select an appropriate criterial attribute than when the sample item is presented as a word. In addition to complex general ordering principles (formal abstract), more simple general ordering principles (formal primary) may be deduced from the palpable attributes of the objects; that is, size, color, shape, etc. These primary criterial attributes are not as immediately apparent with word samples.

The present results would indicate that the personal and social adjustment of the poor premorbid schizophrenics is such that they perform uniformly poorly on both the Objects and Words tasks. They seem less able to grasp general principles and use

them as a basis for categorization than any other group--even when these principles may be based on what is perceptible. The good premorbids and hospitalized normals, however, do seem able to make use of these palpable attributes in their categorizations with the result that they perform essentially as adequately as non-hospitalized normals. When there are few palpable attributes, however, as occurs when the sample item is a word, the ability of the goods and hospitalized normals to produce adequate sorts becomes impaired and they appear statistically indistinguishable from the poors. Only the non-hospitalized normals seem able to maintain their relative effectiveness.

The lack of palpable attributes offered by the word samples should not be taken as the sole explanation for the performance of the various groups. In addition, the word sample represents a symbol--a linkage to particular referents--that has developed and become increasingly more refined through the child's process of social development. To adequately deal with the word sample, the subject must be aware that it "stands for something" by selecting a criterial attribute from this "something" for which it stands. This treatment of an item as a representation for thinking rather than as an end in itself seems to epitomize an essential requirement for a successful sort. Directing themselves to this question, Freeman, et al (1958) point out that it "is this discrimination that ... patients with a gross disturbance of ego boundaries are unable to make."

In this light, it would seem that poors are apparently unable to adequately use either objects or words as representations for thinking. Goods and hospitalized normals seem better able to deal with objects; with words they emulate the poors. Non-hospitalized normals, despite showing a greater facility with objects are nonetheless able to perform more adequately with words than any of the other groups.

Category Width for Adequate Sortings

Part "b" of hypothesis two was not supported. On the Objects task, however, a trend was noted at the .10 level with poor premorbids producing the narrowest categories. Hospitalized normals produced slightly wider categories than non-hospitalized normals but as these results were not significant few reliable inferences can be made. Similarly, significance was not obtained on the Words task. Poors produced the narrowest categories and non-hospitalized normals the widest as expected, though good premorbids produced somewhat wider categories than hospitalized normals.

Category Width for Inadequate Sortings

Part "c" of hypothesis two was not supported. There was a trend on the Objects task, however, at the .10 level with the narrowest categories being produced by the goods, the widest by the normals. Since these results do not support the hypothesis as formulated nor suggest any reasonable alternatives it will be assumed that they are the result of a number of heterogeneous

influences which contribute to inadequate sorts.

On the Words task as well, the results failed to confirm the hypothesis. The widest sorts were displayed by the goods, the narrowest by the hospitalized normals. It will be noted that these results reverse those of the Objects task. Here too, as no reasonable explanation is apparent these results will be assumed to reflect a number of heterogeneous influences.

Percentage of Adequate Verbalizations

Part "d" of hypothesis two was partly confirmed. While differences between the groups on the Objects task were highly significant, significance was not obtained on the Words task. On the Objects task the results were in the expected direction with non-hospitalized normals having the highest percentage of adequate verbalizations, poor premorbids the lowest. The poor premorbids, however, while differing from both normal groups were not significantly differentiated from the goods. Further, the goods while differentiated from the non-hospitalized normals, were not significantly inferior to the hospitalized normals. These results would indicate that where the sample items are presented as objects, the poors are able to match adequate sortings with adequate verbalizations on a par with the goods.

It should be noted that this does not imply that poors are able to produce as many adequate sorts as goods. The previously discussed measure indicated that poors produced less adequate sorts on the Objects task than any other group. The ratios of

adequate verbalizations accompanying adequate sorts to total adequate sorts produced, however, are not significantly different for the two groups. Similarly, while the non-hospitalized normals produced significantly more adequate sorts on the Objects task than did hospitalized normals, the percentage of adequate verbalizations produced by the two groups did not differ. Thus, not only do poor premorbids perform on a par with good premorbids, but hospitalized normals match adequate sortings with adequate verbalizations to the extent that they are equivalent to non-hospitalized normals.

Percentage of Formal Verbalizations

Part "e" of hypothesis two was not confirmed. On neither the Objects nor the Words tasks was significance between the groups found to exist. On both these tasks, however, the results were in the expected direction with poors displaying the lowest percentage of formal verbalizations and non-hospitalized normals the highest. While these results were not significant there was a trend noted on both tasks at the .10 level.

On the basis of these results, it would appear that schizophrenics are less able than normals to use high-order generalizations in describing their adequate sorts. Once again, this may be related to the relatively poorer personal-social adjustment of the schizophrenics. These interpretations, however, being based on results significant at only the .10 level should be viewed with caution.

Relevant Verbalizations

Part "f" of hypothesis two was partly supported. While significance was not obtained on the Objects task (although a trend was noted with p = .10), the groups were significantly differentiated on the Words task with poors producing the fewest relevant verbalizations and non-hospitalized normals the most. In addition, the poors, while not differentiated from the goods, gave significantly fewer relevant verbalizations than either of the normal groups. Goods, similarly, were inferior to these two latter groups. These results would seem to indicate that the significance noted on this measure for hypothesis one is, to a large extent, a result of the groups' performance on the Words task. It would seem that where the sample items are presented in a sufficiently concrete manner the groups do not differ on a measure of total verbalization appropriateness. On a task, however, where the sample items are presented in a more symbolic manner, the groups' varying levels of premorbid adjustment becomes manifested through significantly different total verbalization performances.

Idiosyncratic Verbalizations

Part "g" of hypothesis two was confirmed. On both the Objects and Words tasks the fewest idiosyncratic responses were produced by the non-hospitalized normals. On the Words task the goods produced slightly more idiosyncratic responses than the poors; this difference, however, was not significant. On the Objects task poors and goods were not differentiated. The poors,

however, did produce significantly more idiosyncratic responses than either of the two normal groups. In addition, goods, hospitalized normals and non-hospitalized normals were not differentiated. On the words task goods, poors and hospitalized normals did not differ. While the two normal groups similarly did not differ the non-hospitalized normals produced significantly less idiosyncratic responses than either of the schizophrenic groups.

It is interesting to note that the poor premorbids produce nearly the same number of idios yncratic responses irrespective of the task at hand; the non-hospitalized normals do likewise. In effect, these results indicate that non-hospitalized are uniformly able to maintain a level of "secondary-process" thought even when the sample items do not readily yield palpable attributes on which to base a grouping. By the same token, poor premorbids maintain their more primitive modes of thought and communication even when the sample items do present these palpable attributes. It would seem that these modes of thought have become so ingrained over the years of social disarticulation that the poor premorbids are unable to hold them in abeyance even when the conditions are relatively favorable for doing so.

It is similarly interesting to note that the two intermediate groups--good premorbids and hospitalized normals--find the Words task more conducive to the production of idiosyncratic responses than they do the Objects task. It would seem that as the linkage between the symbol and its referent becomes more

distant, as on the Words task, the performance of the hospitalized normals and the good premorbids, at least with regard to the present measure, becomes more deficient.

Conclusions and Implications: Hypothesis Two

In addition to the notion under investigation in hypothesis one--that there exist levels of conceptual functioning corresponding to levels of premorbid adjustment--hypothesis two attempted to assess the performance of the subject groups on more and less symbolic tasks. Since a relatively complex relationship is involved it is not surprising that the interpretations are not as clear-cut as in the previous hypothesis. Nonetheless, the results, in large part, have substantiated the second hypothesis.

On the five measures where significance was obtained on at least one of the tasks, the results were in the expected direction on four, with the best performances evinced on Objects, the worst on Words. Only with regard to the number of relevant verbalizations, a rather heterogeneous measure, was a higher level of significance obtained on the Words tasks.

In addition, the various subject groups performed on each of the tasks largely as predicted. Disregarding the more exploratory measure of category width, for the ten conditions where all four groups were compared the relative standings were precisely in the direction predicted on fully nine of the ten. Only on the measure of idiosyncratic verbalizations for the Words task

did the order of poors, goods, hospitalized normals, and non-hospitalized normals vary. It will be recalled that here the goods produced slightly more idiosyncratic responses than the poors--a difference, it may be noted, which was statistically insignificant.

Summary

The purpose of the present study was to investigate concept formation and its accompanying verbalization in two groups of schizophrenics (good and poor premorbids) and two groups of normals (hospitalized and non-hospitalized) on Object Sorting Materials when the sample items were presented as actual objects and as words denoting the objects.

The test used was the Rapaport Object Sorting Test. The first task consisted of grouping together objects that belonged with a particular sample object and verbalizing the reason for the grouping. For the second task, a sample word was substituted for the corresponding sample object.

Two groups were formed at each of the four adjustment levels. The first group received the Object samples, the second the Word samples. There were thus a total of eight groups of ten subjects each. These groups were matched on age, educational level, intelligence, socio-economic status and a non-verbal test of concept formation. In addition, they all displayed a reasonable capacity for cooperation and as far as could be ascertained were free from organic brain pathology. The subject groups were compared on both tasks combined and each task separately on the following seven measures:

a) number of adequate sortings

b) category width for adequate sortings

c) category width for inadequate sortings

d) percentage of adequate verbalizations

e) percentage of formal verbalizations

f) number of relevant verbalizations

g) number of idiosyncratic verbalizations

Hypothesis one holding that there exist levels of conceptual functioning corresponding to levels of personal-social adjustment was largely supported by the results. On only one of the measures--category width for inadequate sortings--was significance not obtained. Further, on each of the seven measures non-hospitalized normals displayed the best performances and poor premorbid schizophrenics the worst. The essential notion underlying hypothesis one was thus seen to be substantiated.

Hypothesis two stated that there should be significant differences between the four subject groups on each of the tasks. In addition to the notion under investigation in hypothesis one, hypothesis two attempted to assess the performance of the subject groups when the sample items were represented in different manners--objects as opposed to words. In large part, this hypothesis was supported as well. Of the five measures where significance was obtained on at least one of the tasks, the results were in the expected direction on four. Only with regard to the number of relevant verbalizations, a somewhat heterogeneous measure, were more adequate performances noted on the Words task. Further, when the more exploratory measures of category width were not considered

the groups performed in the precise order predicted on nine of ten comparisons.

After discussing and interpreting these results in terms of various theories, the conclusions and implications for each hypothesis were noted.

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Appendix A

Standard Arrangement of Objects

Subject

Toy Screwdriver	Cork	Toy Cigar	Toy Knife	Real Pliers	Real Cigar
Toy Hatchet	Rubber Ball	Bell	White Card	Real Knife	Cork
Toy Fork	Nail	Sugar Cube	Matchbook	Lock	Red Circle
Rubber Stopper	Real Fork	Toy Hammer	Sugar Cube	Pipe	Nail
Real Spoon	Toy Spoon	Real Screwdriver	Toy Pliers	Toy Cigarette	
Block of Wood	Green Square	Rubber Eraser	Real Cigarette		

Examiner

Appendix B

A Descriptive Comparison of Hospitalized and Non-hospitalized Subjects

In order to assess the mental health of the two normal groups two kinds of data were gathered. The first consisted of responses to a series of questions regarding work efficiency, physical symptomatology and marital and familial relationships. The second consisted of responses to the California Test of Personality.

A comparison of the two normal groups with regard to these measures is presented below:

Questions Regarding Job Satisfaction

Non-hospitalized normals answered questions in this area in a manner that indicated they were relatively satisfied with their jobs. While few expressed any special enthusiasm there was, likewise, little expression of open dissatisfaction. The hospitalized normals were far less uniform in their responses to these questions. Several of these veterans indicated they had not been working prior to hospitalization, and a few stated they had held their present jobs less than a year. About a quarter of the hospitalized normals felt their lack of advancement on the job was a direct result of unfair treatment on the part of their employer. Another quarter stated they were happy with their jobs.

Questions Regarding Physical Complaints

The health of the non-hospitalized normals, as assessed from

their responses, seems reasonably good. Most of these subjects stated that they rarely saw physicians except for check-ups or occasional transitory illnesses. A few indicated they were under a physician's care for such things as a "heart condition" or "back trouble" for which there was a direct organic base.

The hospitalized normals expressed far more physical complaints than did the non-hospitalized group. These ranged from general fatigue to rashes and assorted aches and pains. Most of these subjects indicated that they had previously been hospitalized in a general medical hospital. A few of the hospitalized normals stated that they had been in excellent health prior to their current hospitalization.

Questions Regarding Marital and Familial Relationships

On the whole, non-hospitalized normals seemed more contented in their marital and familial relationships than hospitalized normals. Of the non-hospitalized normals, only one subject indicated he was separated from his wife; seven hospitalized veterans indicated they were either divorced or separated. The non-hospitalized normals also seemed to enjoy their families more than the hospitalized normals. Several of the former group spoke proudly of their children's accomplishments; few of the latter group did. There were, however, some hospitalized normals who seemed satisfied and contented in their roles as husbands and fathers.

California Test of Personality

On the score of Total Adjustment the mean of the hospitalized normals was at the 49th percentile. The non-hospitalized normals scored at the 74th percentile. While all the non-hospitalized normals scored above the 50th percentile only seven of the hospitalized normals scored above this point.

These results would indicate that, on the whole, hospitalized normals display greater psychological discomfort than do non-hospitalized normals.

Appendix C

Responses on Scoring Measures for Each Subject

Subject	AS	Transformed Data		RV	ID	CW/AD	CW/IN	FV	Raw Data	
		%AV	%FV						%AV	%FV
Poors-Objects										
1	6	1.571	1.224	3	4	3.7	1.0	2	.500	.333
2	3	2.824	2.824	5	3	4.7	1.2	5	1.000	1.000
3	2	1.571	1.571	1	8	6.5	5.1	1	.500	.500
4	5	2.824	2.214	8	1	2.6	2.0	6	1.000	.800
5	3	1.224	.318	5	7	2.5	1.8	1	.333	.000
6	4	2.094	2.094	7	1	2.5	1.0	6	.750	.750
7	0	.318	.318	0	9	0.0	5.8	0	.000	.000
8	1	.318	.318	0	2	0.0	4.3	6	.000	.000
9	0	.318	.318	6	9	1.0	2.5	0	.000	.000
10	0	.318	.318	0	9	0.0	1.7	0	.000	.000
Poors-Words										
11	2	.318	2.824	0	6	1.0	1.0	0	.000	1.000
12	2	.318	.318	0	7	1.0	0.9	0	.000	.000
13	2	.318	.318	1	9	1.0	1.2	0	.000	.000
14	4	2.824	.318	3	2	2.5	2.6	5	1.000	.000
15	2	1.571	.318	0	1	1.0	1.1	7	.500	.000
16	2	.318	1.571	1	8	2.0	1.1	1	.000	.500
17	2	2.824	1.571	6	2	1.5	1.6	5	1.000	.500
18	5	2.824	.318	9	1	4.2	2.8	4	1.000	.000
19	0	.318	2.824	0	9	0.0	1.6	0	.000	1.000
20	2	2.824	.318	5	5	5.5	2.0	4	1.000	.000

Appendix C (continued)

Subject	AS	Transformed Data %AV	Transformed Data %FV	RV	ID	CW/AD	CW/IN	FV	Raw Data %AV	Raw Data %FV
Goods-Objects										
21	5	2.824	2.824	5	1	3.6	3.3	2	1.000	1.000
22	8	1.834	1.834	8	1	2.6	2.0	5	.625	.625
23	8	2.434	2.434	8	2	3.3	1.0	7	.875	.875
24	6	1.571	.927	5	4	1.5	1.2	5	.500	.200
25	5	2.214	1.430	7	1	2.2	2.5	5	.800	.600
26	7	2.375	1.571	9	1	4.0	2.0	4	.857	.428
27	4	1.571	.318	2	7	3.3	1.4	2	.500	.500
28	3	1.224	1.918	2	6	3.7	1.3	0	.333	.000
29	6	1.571	.318	8	1	3.0	3.0	5	.500	.667
30	4	.318	.318	2	7	2.3	1.2	1	.000	.000
Goods-Words										
31	0	.318	.318	0	5	0.0	4.9	0	.000	.000
32	5	2.824	2.824	6	2	4.0	1.3	5	1.000	1.000
33	2	.318	2.214	1	5	1.0	0.9	2	.000	.800
34	6	1.918	.318	6	5	4.8	2.3	4	.666	.000
35	5	2.824	.318	6	1	4.4	1.3	5	1.000	.000
36	3	.318	.318	2	8	1.7	0.8	0	.000	.000
37	1	.318	2.824	0	9	3.0	1.1	0	.000	1.000
38	2	1.571	1.772	4	5	2.5	1.6	4	.500	.600
39	5	2.214	.318	5	5	3.0	3.5	3	.800	.000
40	3	1.224	2.824	4	7	2.0	1.2	0	.333	1.000
Hosp.-Objects										
41	2	2.824	1.571	5	3	4.5	2.4	2	1.000	.500
42	6	1.918	2.094	4	3	3.7	1.3	5	.666	.750

Appendix C (continued)

Subject	AS	Transformed Data %AV	Transformed Data %FV	RV	ID	CW/AD	CW/IN	FV	Raw Data %AV	Raw Data %FV
Hosp.-Objects										
43	4	.318	.318	1	8	3.0	1.0	0	.000	.000
44	2	2.824	.318	6	2	3.5	1.0	2	1.000	.000
45	7	2.824	2.824	9	0	4.6	4.0	9	1.000	1.000
46	7	2.824	2.824	9	0	5.0	5.5	8	1.000	1.000
47	6	2.824	2.824	8	1	3.3	2.0	8	1.000	1.000
48	5	2.824	2.824	7	1	4.4	4.0	5	1.000	1.000
49	4	1.571	2.214	5	4	3.4	2.5	4	.500	.800
50	3	1.918	2.094	5	3	2.6	4.3	2	.666	.750
Hosp.-Words										
51	3	2.824	2.824	5	3	2.0	2.0	4	1.000	1.000
52	3	1.918	1.918	6	2	2.0	2.5	3	.666	.666
53	1	.318	.318	3	3	1.0	0.8	3	.000	.000
54	8	2.094	2.094	7	3	3.1	1.0	6	.750	.750
55	4	2.824	2.094	7	0	2.0	1.2	6	1.000	.750
56	8	1.328	1.328	4	6	3.5	1.0	3	.375	.375
57	0	.318	.318	1	7	0.0	1.4	7	.000	.000
58	3	2.824	1.918	4	2	2.3	1.8	3	1.000	.666
59	1	2.824	2.824	6	2	3.0	1.1	4	1.000	1.000
60	4	2.094	2.094	5	4	2.3	1.2	4	.750	.750
Non-Hosp. Objects										
61	6	2.824	2.824	8	1	5.3	3.0	7	1.000	1.000
62	7	2.824	2.375	8	0	3.4	2.5	7	1.000	.857
63	5	2.824	.927	5	3	2.4	1.5	1	1.000	.200
64	8	2.214	2.824	7	0	2.8	3.0	8	.800	1.000

Appendix C (continued)

Subject	AS	Transformed Data %AV	Transformed Data %FV	RV	ID	CW/AD	CW/IN	FV	Raw Data %AV	Raw Data %FV
Non-Hosp.-Objects										
65	6	2.292	1.570	5	3	3.8	1.0	3	.833	.500
66	7	2.165	2.375	9	2	4.3	2.0	6	1.000	.857
67	9	2.346	1.691	7	2	2.2	0.0	5	.777	.555
68	7	2.824	2.375	7	1	3.6	2.5	7	.851	.857
69	5	2.824	1.772	4	2	4.4	1.8	4	1.000	.600
70	5	2.824	2.214	5	1	3.6	2.4	5	.800	.800
Non-Hosp.-Words										
71	7	1.897	2.375	6	1	4.0	1.5	7	.657	.857
72	4	2.094	2.094	3	2	2.3	1.0	5	.750	.750
73	5	2.214	2.214	4	2	2.8	2.5	5	.800	.800
74	8	2.434	2.434	8	1	4.3	4.0	7	.875	.875
75	6	2.292	1.918	6	2	3.0	1.0	4	.833	.666
76	7	2.004	2.004	7	3	3.0	1.0	5	.714	.714
77	3	1.918	1.918	5	2	3.0	1.2	3	.666	.666
78	6	2.292	1.918	7	2	2.5	2.0	4	.833	.666
79	3	2.824	1.918	6	1	3.3	1.6	4	1.000	.666
80	5	1.772	2.214	5	2	2.3	1.2	4	.600	.800

Code

AS--Number of Adequate Sorts
%AV--Percentage of Adequate Verbalizations
%FV--Percentage of Formal Verbalizations
RV--Number of Relevant Verbalizations
ID--Number of Idiosyncratic Verbalizations
CW/AD--Category Width for Adequate Sorts
CW/IN--Category Width for Inadequate Sorts
FV--Number of Formal Verbalizations

Appendix D

Summary of Analyses of Variance for Task Effect

Measure	Level of Sign.		Poors	Goods	Hosp.	Non-Hosp.
AS	.001	Objs.	2.4	5.6	4.6	6.5
		Wds.	2.3	3.2	3.5	5.4
				.01		
CW/AD	.025	Objs.	2.4	3.0	3.8	3.6
		Wds.	2.0	2.6	2.1	3.1
					.001	
CW/IN	.01	Objs.	2.6	1.9	2.8	2.0
		Wds.	1.6	1.9	1.4	1.7
			.10		.025	
AV	----	Objs.	1.34	1.79	2.27	2.54
		Wds.	1.45	1.85	.99	.31
FV	----	Objs.	1.15	1.39	2.00	2.09
		Wds.	1.07	1.40	1.77	2.10
RV	.025	Objs.	3.5	5.6	5.9	6.5
		Wds.	2.5	3.4	4.8	5.7
				.10		

(continued)

Appendix D (continued)

Measure	Level of Sign.		Poors	Goods	Hosp.	Non-Hosp.
ID	----	Objs.	5.3	3.1	2.5	1.5
		Wds.	5.0	5.2	3.2	1.8

Code: AS = Number of Adequate Sorts
CW/AD = Category Width for Adequate Sorts
CW/IN = Category Width for Inadequate Sorts
AV = Number of Adequate Verbalizations
FV = Percentage of Formal Verbalizations
RV = Number of Relevant Verbalizations
ID = Number of Idiosyncratic Verbalizations

Appendix D (continued)

Analyses of Variance for Each Subject Group on the Number of Adequate Sortings Across Tasks

Poor Premorbids

Source	df	SS	MS	F ratio	P
Total	19	58.50			
Task	1	.005	.005	.002	---
Error	18	58.50	3.25		

Good Premorbids

Source	df	SS	MS	F ratio	P
Total	19	90.80			
Task	1	28.80	28.80	8.36	.01
Error	18	62.00	3.44		

Hospitalized Normals

Source	df	SS	MS	F ratio	P
Total	19	104.95			
Task	1	6.05	6.05	1.01	---
Error	18	98.49	5.49		

Appendix D (continued)

Non-Hospitalized Normals

Source	df	SS	MS	F ratio	P
Total	19	48.95			
Task	1	6.05	6.05	2.54	---
Error	18	42.90	2.38		

Appendix D (continued)

Analyses of Variance for Each Subject Group on Category Width for Adequate Sortings Across Tasks

Poor Premorbids

Source	df	SS	MS	F ratio	P
Total	19	69.37			
Task	1	.72	.72	.19	---
Error	18	68.65	3.81		

Good Premorbids

Source	df	SS	MS	F ratio	P
Total	19	26.87			
Task	1	.48	.48	.33	---
Error	18	26.39	1.47		

Hospitalized Normals

Source	df	SS	MS	F ratio	P
Total	19	29.13			
Task	1	14.11	14.11	16.92	.001
Error	18	15.02	.83		

Appendix D (continued)

Non-Hospitalized Normals

Source	df	SS	MS	F ratio	P
Total	19	13.56			
Task	1	1.40	1.40	2.08	---
Error	18	12.16	.68		

Appendix D (continued)

Analyses of Variance for Each Subject Group on Category Width for Inadequate Sortings Across Tasks

Poor Premorbids

Source	df	SS	MS	F ratio	P
Total	19	37.88			
Task	1	5.51	5.51	3.07	.10
Error	18	32.37	1.80		

Good Premorbids

Source	df	SS	MS	F ratio	P
Total	19	21.82			
Task	1	.001	.001	.008	---
Error	18	21.82	1.21		

Hospitalized Normals

Source	df	SS	MS	F ratio	P
Total	19	34.42			
Task	1	9.80	9.80	7.16	.025
Error	18	24.62	1.37		

Appendix D (continued)

Non-Hospitalized Normals

Source	df	SS	MS	F ratio	P
Total	19	16.35			
Task	1	.37	.37	.41	---
Error	18	15.98	.89		

Appendix D (continued)

Analyses of Variance for Each Subject Group on the Number of Relevant Verbalizations Across Tasks

Poor Premorbids

Source	df	SS	MS	F ratio	P
Total	19	182.00			
Task	1	5.00	5.00	.51	---
Error	18	177.00	9.83		

Good Premorbids

Source	df	SS	MS	F ratio	P
Total	19	149.00			
Task	1	24.20	24.20	3.49	.10
Error	18	124.80	6.93		

Hospitalized Normals

Source	df	SS	MS	F ratio	P
Total	19	92.55			
Task	1	6.05	6.05	1.26	---
Error	18	86.50	4.81		

Appendix D (continued)

Non-Hospitalized Normals

Source	df	SS	MS	F ratio	P
Total	19	47.80			
Task	1	3.20	3.20	1.29	---
Error	18	44.60	2.48		

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