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Negative Transfer as a Measure of Thought Disorder in the Psychoses

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NEGATIVE TRANSFER AS A MEASURE OF
THOUGHT DISORDER IN THE PSYCHOSES

by

Eileen Sheila Trafimow

A Dissertation Submitted to the Faculty of the Graduate School
of Loyola University of Chicago in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

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1974

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To Bob and Herb and Bob --- but especially to Saul---
go my grateful thanks.

PREFACE

Schizophrenics have described their own thinking as follows:

My thoughts get all jumbled up. I start thinking or talking about something but I never get there. Instead I wander off in the wrong direction and get caught up with all sorts of different things that may be connected with the things I want to say but in a way I can't explain (McGhie and Chapman, 1961, p. 108).

My trouble is that I've got too many thoughts. You might think about something, let's say that ash tray, and just think, oh, yes, that's for putting my cigarette in, but I would think of it and then I would think of a dozen different things connected with it at the same time (ibid).

VITA

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Her elementary and secondary education was obtained in the public schools of Chicago, Illinois. She was graduated from the Nicholas Senn High School in 1957.

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CHAPTER I

INTRODUCTION

Associative Interference: History and Theory

In 1911, Bleuler coined the term "schizophrenia" in his classical work, Dementia Praecox or the Group of Schizophrenias.

He stated:

I called Dementia Praecox "schizophrenia" because the splitting of the different psychic functions is one of its most important characteristics...The psychic complexes do not combine...as they do in a healthy person; rather one set of complexes dominates the personality for a time, while other groups of ideas or drives are "split off" and seem partly or completely impotent...Thus the process of association often works with mere fragments of ideas and concepts...This results in associations which normals will regard as incorrect, bizarre, and utterly unpredictable (Bleuler, 1911, p. 8).

For Bleuler, then, the "connections" which normally organize and guide thinking have lost much of their influence for schizophrenics. Their verbalizations suffer from a kind of condensation, wherein crucial stages of the logical process are lost. Further, he felt that schizophrenic thinking appears more variable and haphazard than that of normals. Still further, he felt that the partial meanings retained by the schizophrenic are left to determine whole meanings, the result being what is often referred to as "overinclusion" or "underinclusion." That is, two distantly related ideas may be seen as synonymous or two closely related ideas as distant.

Cameron (1936) discussed schizophrenic thought from a slightly different point of view. He felt that loosely related thoughts exist within the normal individual much like atoms in a gaseous substance. Appropriate selection is learned and occurs out of the individual's wish to be understood. The schizophrenic, for Cameron, remains unintelligible to others because of his incorrect selection among the loosely related thoughts. He, unlike the normal, is satisfied with this state of affairs, and either does not care or does not realize that he is not understood. In this way, for Cameron, the schizophrenic remains socially isolated.

Von Damarus (Arieti, 1959) formulated his own principle to conceptualize the "paleologic" thought of the schizophrenic. He stated: "whereas the normal person accepts identity only on the basis of identical subjects the paleologist accepts identity based on identical predicates (Arieti, 1959, p. 678)."

In other words, two concepts may be considered identical for the schizophrenic on the basis of a single, common characteristic, that which Von Damarus calls the "identifying link." Examined within this context the "overinclusion" so often observed in schizophrenic speech once again becomes explicable. That is, ideas may be classified as one even if they bare only the slightest resemblance to one another. In this way, for example, a house, any room in the house, any people who live there, any feelings

toward them all become equivalent.

Mednick (1958) set forth a detailed theoretical explanation of the behavior of schizophrenics within which he, too, discussed schizophrenic thinking. Perhaps the most innovative aspects of his theory concern the process by which individuals become schizophrenic. He began with the assumption that potential candidates are chronically high anxious. As a result of this, such individuals are response prone, and react to stimuli more quickly and more intensely than do others. This reactivity appears as overgeneralization or undergeneralization. In complex learning situations, where many irrelevant and incorrect response tendencies are present and compete with the correct response tendencies, the pre-schizophrenic is at a particularly marked disadvantage. In him, the state of "high drive," acting impartially upon correct and incorrect response tendencies, will tend to push many irrelevant responses above the evocation threshold and increase the chances of an irrelevant or remote response. (Broen and Storms conceptualize this phenomenon in very similar terms. They state that appropriate response tendencies in normals are much stronger than their competing, inappropriate responses. In schizophrenics the "hierarchies tend to be partially collapsed...the strengths of dominant and competing responses are more nearly equal (Broen, 1968, p. 44; Broen, 1966; Storms, 1969; Storms, 1972))."

Some pre-schizophrenic individuals, according to Mednick, have

agree that a pathology of the associative process lies at the very core of the schizophrenic condition.

Recent Research

A proliferation of research on schizophrenic thought has appeared over the past twenty years. One major thread in the complex tapestry has consisted of the attempt to study schizophrenic language atomistically, using the single word as a meaningful unit. The task has been, essentially, to determine whether associations to single words are abnormal for schizophrenic populations (Gottesman, 1964; Higgins, 1965; Storms, 1967; Sommer, 1960). This research has proved problematic for a number of methodologic reasons which will be discussed later. Nonetheless the evidence does suggest that word associations produced by schizophrenics are indeed both different from and more variable than those of normals.

Another line of research has considered the possibility that social context (reward, punishment, level of motivation) may influence associational ability in schizophrenics (Atkinson, 1961; Higgins, 1966; Gladis, 1962; Spence, 1965; Irwin, 1969; Brenner, 1967; Schneid, 1966; Schooler, 1967). These findings, once again, must be evaluated in the light of methodological flaws which will be discussed shortly. Nonetheless they seem to indicate that schizophrenics are susceptible to the influence of social context and reveal more "normal" associational habits under conditions of mild punishment than under conditions of mild reward.

Still another attempt to study associative interference has involved the use of standardized projective tests such as the Proverb Test and the Rorschach as sources of data (Benjamin in Kasanin, 1944). Many investigators have used the Rorschach in particular (Rapaport, 1968; Beck, 1939; Powers, 1955; Bower, 1960; Dudek, 1969; Holt, 1956) to study facets of schizophrenic thought which are, perhaps, identical to associative interference (fabulation, autistic elaboration, intrusion of irrelevancy). Quinlan's (1944) overspecificity scale, a way of rating the degree to which personalized, idiosyncratic or irrelevant associations appear in or dominate the Rorschach response, is perhaps, of special interest among these studies (Quinlan, in Kasanin, 1944). In general, these studies are qualitative rather than quantitative, and suffer methodologic weaknesses as well. Nonetheless, several researchers have reported success in distinguishing schizophrenics from others.

Still another line of research has attempted to investigate disruption or interference in associational learning (Carson, 1958; Fliotsos, 1961; Lang, 1962; Spence, 1964; Altschuler, 1966; Kausler, 1964; Streiner, 1969; Gonen, 1970; Kapche, 1969) using various verbal learning methodologies. This line of research has produced such a plethora of contradictory findings that summarization is difficult. Suffice to say that some researchers have found schizophrenics more susceptible to disruption of the associational process while others have found them indistinguishable from normals or

organics. The lack of consistency is particularly disappointing in light of the fact that such designs presumably penetrate to the depths of current theoretical understanding concerning schizophrenic thought processes. That is, schizophrenics are thought to be highly susceptible to alternatives (or new stimuli). As they attempt to move from one idea to another, intervening processes or stimuli seem to alter their logical course. Interference paradigms, then, have been conceptualized as an artificial means of reproducing this presumed phenomenon.

Critique of Research

Perhaps the current impasse in the associative interference research can be understood by careful examination of the verbal learning techniques which have traditionally been employed. For example, the literature indicates that association processes have often been studied using words drawn from the norms of Kent and Rosanof (1910) or Russell and Jenkins (1954). The performances of schizophrenics have been measured in terms of those norms. The variations in associative behavior among normals, themselves, however, suggest that the Russell and Jenkins' norms may be a rather loose criterion. Further, it has been shown that various normal groups such as the highly creative habitually form so-called remote associates (Jacobson, 1969).

Another related difficulty stems from the fact that schizophrenics have been shown to have pathological and unstable associational habits (as reported above). That is, they do not so often

report the associations which are primary or common for normals. Much of the relevant research, however, has been designed on the assumption that the primary or common associates of normals are also primary or common for schizophrenics (Mednick, 1958; Spence, 1964; Spence, 1965; Fliotsos, 1961; Gladis, 1962; Higgins, 1966; Higgins, 1965). Only two studies, those of Hirsch, (1971) and Kausler, (1964) have eliminated this problem of "experimental manipulation of associative interference by means of word association norms (Hirsch, 1971, p. 5)" which has just been described. In both studies a transfer paradigm was used in order to be able to "rely on experimentally controlled manipulation of associative interference (Kausler, 1964, p. 585)." That is, subjects were trained to make certain associations directly within the experimental situation. Then a transfer task was administered to study the subjects' ability to rearrange the newly formed associations. By so doing, the experimenters retained rigorous control of the strength of original association as well as degree of interference.

Another methodological weakness which may have contributed to the contradictory findings currently in the literature concerns diagnostic and sampling procedures. Most researchers have compared schizophrenics, normals and medical patients; or regressed schizophrenics and partially remitted schizophrenics; or perhaps process schizophrenics and normals. The bases for these classifications,

however, have sometimes been loosely described. Where the criteria for diagnosis have been mentioned they have varied considerably. Chronic schizophrenics, for example, have been variously defined by WAIS score, current hospital stay of six months to ten years; current hospital stay of at least two years; etc. Acute schizophrenics have been variously defined as those having current hospitalizations of less than twelve months; no more than two previous admissions; no more than one total year of hospitalization; no more than thirteen and a half months of hospitalization; etc.

Other variables which have generally remained uncontrolled in the literature include history of shock or insulin therapy, IQ and diet, as well as ongoing types of therapy. Finally it is striking that almost all the schizophrenic populations studied have been drawn from Veterans' Administration Hospitals.

It seems clear from the extensive theoretical and descriptive writings on "schizophrenia" that there is not a single phenomenological entity which goes by that title. Schizophrenia is either a group of related psychoses or a single process marked by many different phases and symptom clusters. As a result, it should be optimal to be as selective as possible in choosing subgroups in some standardized fashion, so that an acute schizophrenic, for example, is likely to be defined similarly by all. That such care yields reward has already been demonstrated by experimenters such as Silverman (1964). He and others have already verified experimentally that paranoid schizophrenics are behaviorally differenti-

able from other types of schizophrenics.

The Present Study

Use of Verbal Learning Methodology: Verbal learning methodology was considered suitable for the study of associative interference for at least two reasons. Traditionally paired associate paradigms have been often used to study associative interference, thus setting a historical precedent. More importantly, the paired associate, transfer design lends itself readily to the phenomena of concern. That is, it is well documented that the A-B, A-C paradigm promotes a degree of negative transfer in normal subjects (Bruce, 1933; Underwood, 1951; Wiener, 1964). When presented with an A-B, A-C task, the subject must learn both A and B; then he must learn to associate A with B. Subsequently the subject must inhibit his response of B and learn C. He must then form a new association between A and C. While this process does require a degree of tolerance to associative interference, it is explained predominantly in terms of negative response transfer (Kausler, 1964; Hirsch, 1971). That is, the interference in the A-C paradigm probably results primarily from response competition and successful learning of List 2 pairs depends on the inhibition of List 1 response terms.

In the A-B, A-Br paradigm, a somewhat different situation obtains. Here, the subject is again initially required to learn both A and B; then he must again learn to associate A with B. Subsequently, however, he need only unlearn the previous associa-

tion between A and B and form a new association between A and Br. He is not required to inhibit B; nor is he required to learn a new set of responses. This process, theoretically, generates negative associative interference and positive response transfer. Due to the fact that responses were not highly meaningful, however, it can be assumed that the degree of R transfer was greater (Mandler, 1956). This paradigm, then, probably results in negative transfer due primarily to associative interference.

As a result, the use of the A-B, A-C and A-B, A-Br paradigm should theoretically yield negative transfer of two different types and information concerning the specific learning deficits of various types of subjects, if any. If associative interference is, indeed, the special problem of the schizophrenic, he should be most incapacitated by the A-Br task.

The Present Design

The present study, then, follows in the tradition of Kausler and Hirsch. The major departure from these, and other previous studies, is the comparison of many diagnostic groups in addition to comparisons between the actively acute and chronic schizophrenic subgroups. The rationale for this far more inclusive approach is as follows: Only by comparing associative interference in schizophrenics with associative interference in other types of patients can we learn whether, in fact, schizophrenics are, as a

group, inferior in transfer to normals. This cardinal question precedes the issue of differences among subcategories within the schizophrenic group, since the presence of thought disorder has been long used to differentiate all schizophrenics from other psychotics.

Another change from previous studies will be the use of nonsense syllables and digits as stimuli and responses. Although the elimination of dependency on extra experimental associational norms has already contributed an independency which had been lacking in the earlier literature, Leavitt (unpublished manuscript) has suggested that the use of still different materials would provide an additional improvement. He stated, "Speech habits are regarded as reflections of the basic pathology in associational processes, rather than as the social consequences of that pathology. If one is interested in studying the associational processes, themselves, then it might be better to use stimuli, familiarity with which is probably not directly influenced by prior experience (Leavitt, 1971, p. 35)." That is, the association process, conceptualized most "purely," is not a social or linguistic phenomenon alone. Associations can exist between sensations and affects for example as well as between words. In order, then, to produce an increased degree of independence from language, nonsense syllables and digits will be used as stimuli and responses.

Still further, the mixed list paradigm used by both Hirsch and Kausler will be bypassed following the suggestion of Battig, 1966; Postman, 1966; and Wickens, 1967, who found that correct responses become more likely in a mixed list design on the basis of chance alone.

Lastly, an attempt will be made to improve upon the sampling procedures used in previous studies. In this regard, the patient pool at the Illinois State Psychiatric Institute offers many advantages. That population is a highly selected one, relatively homogeneous in age, socio-economic status and education. Large percentages of them are patients experiencing an initial, acute, schizophrenic episode. Diagnostic procedures strive to be rigorous. Diet is uniform and medication is usually postponed during the first days of hospitalization. Non psychotics and non schizophrenic psychotics are also admitted routinely. In summary, then, this population potentially provides the opportunity to study and compare methodologically desirable groups of subjects who have not been examined for thought disorder using a transfer design in the past.

The inconsistent literature makes specific prediction based on diagnosis rather difficult. Some findings suggest that acute schizophrenic patients are most susceptible to associative interference (Higgins, 1966; Spence, 1965). There has been virtually no systematic attempt to compare schizophrenics as a whole with other psychotics. The present prediction, based on theory

and a slim preponderance of evidence, is that chronic schizophrenic subjects will be most susceptible to associative interference, followed by acute schizophrenics, non schizophrenic psychotics and controls.

Restatement of the Problem

Bleuler, Cameron, Von Damarus, Mednick and other theorists have described pathological thought process as perhaps the very heart of the schizophrenic condition. A great number of researchers have attempted to operationalize some aspects of the theory on schizophrenic thought disorder and study it in the laboratory. One line of investigation seems to suggest that word associations produced by schizophrenics are both different from and more variable than those of normals. A second line of investigation has found that social context does influence schizophrenic performance. Still another line of investigation has suggested that projective tests can differentiate schizophrenics from others on the basis of thought disorder. Research on interference in associational learning, however, has produced singularly inconsistent findings.

The current study represents another attempt to investigate interference in associational thinking. However, it differs from previous work in the following ways: Firstly, the traditional designs will be refined; and secondly, the spectrum of data will be fleshed out so that comparisons will be possible between schizophrenics and non schizophrenic psychotics as well as between acute and chronic schizophrenics.

If susceptibility to associative interference is greatest for chronic schizophrenics, then their transfer scores (main effects for test) as a whole and their deterioration on the A-Br variant (interaction effects) in particular, should be greatest, followed by acute schizophrenics and non schizophrenic psychotics. On the other hand, if susceptibility to associative interference is uniquely a characteristic of the "schizophrenic" taken as a unity, then the experimental task should prove most difficult for the schizophrenic subjects independent of sub-category.

CHAPTER II

METHODOLOGY

Subjects

The decision was made to recruit all subjects from two wards only at the Illinois State Psychiatric Institute, rather than from several wards within the hospital. The chiefs of both chosen wards were trained within the same theoretical framework. Thus, by limiting recruitment to two philosophically united wards, the use of a single diagnostic approach, with one consistent set of biases, was ensured. The decision was considered necessary because a number of diagnostic groups were utilized as the independent variable in the current study and diagnostic consistency was of special concern. As an additional safeguard, final research diagnosis was determined in conference with the chief psychiatrist and/or his research staff. All of the necessary diagnostic categories were represented on the two wards, and were available over a period of several months. Of course the limitation to two wards necessitated an extension in data collection time, and therefore introduced an additional possible confound (Campbell, 1966). It was decided, however, that the possibility of such a confound was less damaging than the variability which would be introduced by utilizing several wards and diagnostic teams.

In any study where diagnostic classification is used as an

independent variable, the question of validity of diagnosis arises. Although standard practices concerning diagnosis are not available on a wide range basis, the effort was made in the present study to limit the number of diagnostic biases by severely limiting the number of teams involved. Other possible diagnostic confounds such as, for example, the existence of organicity concomitant with chronic schizophrenia, have hopefully been identified during the diagnostic process. Similarly, it has been assumed that patients with previous psychotic episodes, previous outpatient treatment, and previous hospitalizations were diagnosed accordingly.

Given the restriction to two wards, the further question of cell size becomes crucial. Traditionally verbal learning research has included 10-20 subjects per cell. Presumably these numbers originally grew out of a desire to approximate a normal distribution on an intra cellular level. Today, consistency and comparability with the large body of literature would be provided by their use.

Several statisticians (Edwards, Myers and Winer) have reported formulae which can provide an estimate of necessary cell size. These formulae, however, require the estimating of such values as correlation between independent variables and criterion performance, and meaningful differences among all the possible patterns of means involved. Such estimates are possible where very similar, previous research data are available, and/or where

only two means (as in a t test situation) are involved. In a multi-faceted design such as the present one, the necessary estimates are impossible to make in any stringently meaningful way. In addition, no sufficiently similar, previous research is available to provide guidelines. With these reservations in mind, estimates were calculated (see Myers, chapter 6) and the decision was made to strive for a cell size of 15 as possible. Ultimately, cell sizes of 16, 6, 9, 9, 9, 7, 4, 12, 18 and 9 were used. See Table 1.

The need for generalizability necessitated the inclusion of two control groups; namely, a hospitalized, non psychotic group and a non hospitalized, non psychotic group. To these controls were added three experimental groups (acute schizophrenics; acute non schizophrenic psychotics; chronic schizophrenics). The final design, then, included five subject blocks and two test conditions.

A measure of severity of current illness was available for each subject on one of the two wards by means of a rating scale which is routinely filled out by nurses. A copy of this rating form is included in the Appendix. Similarly, the motivation level of every subject was assessed by the examiner using a psychologic rating scale developed at Tulance University (modified by Holzman, 1973). This scale has been designed to measure the subject's involvement in the experimental task. A copy of the form is also included in the Appendix. Both of these variables, as well as age, sex and race were controlled for by means of analysis of covariance to help insure that any significant findings would indeed be related

TABLE 1

ALL SUBJECT BLOCKS

Block I.....acute schizophrenics
Block II.....acute, non schizophrenic psychotics
Block III.....chronic schizophrenics
Block IV.....hospitalized, non psychotic controls
Block V.....non hospitalized, non psychotic controls

to manipulated variables only.

Years of schooling was also controlled for and used as an approximation of IQ. This approximation was necessary since only a single contact was available with each experimental subject, and there was no opportunity to administer a formal intelligence test. The literature indicates, however, that years of schooling is indeed an accurate approximation of IQ. Wechsler (1958), for example, states: "Practically all studies show that educational attainment (as measured by test scores) correlates to a high degree with scores on tests of intelligence. The correlations range from about 0.60 to 0.80. A correlation of this order suggests that the ability to do well on intelligence tests may be largely dependent upon formal education and has so been interpreted by a number of authors (Wechsler, 1958, p. 87)."

Finally, the question of medication as a confound was dealt with by scheduling examinations as soon as patients achieved sufficient remission and by including medication status as a covariate.¹

¹Of the several covariates to be studied in the present design, many yield dichotomous data (sex; medication status; race; form of List 1). It should be emphasized that such data are quite appropriate for covariance procedures since they meet the sole requirement of linearity. That is, any linear data are acceptable as covariates. Obviously, findings must be interpreted with full knowledge of the coding system used (for example; 0 = male; 1 = female) (Draper, 1966; Scheffe, 1959).

Experience has indicated, however, that most of the patients included would in fact already be on medication before sufficient remission had been achieved. As a result, it was projected that only 15-30 per cent of all hospitalized subjects would be medication free at the time of testing.

Lists

A standard, paired associates, transfer of learning paradigm was employed. List 2 (OL) was administered first and contained two variants. These include the following: A-C list (This list incorporates the same stimuli used in the subsequent A-B task and entirely new responses.) and the A-Br list (This list incorporates the same stimuli and responses used in the subsequent A-B task, but repaired.). Both variants consist of six pairs of nonsense syllable-two digit combinations. List 1 (Transfer Task), which was administered second, also contains six, nonsense syllable-two digit combinations. There are two forms of List 1 (A-B and A-B') to ensure against the contamination of unique pairing. See the Appendix for all lists.

Meaningfulness of all nonsense syllables ranges from 48-53 per cent (Archer, 1966), following Cieutat (1959) who found that schizophrenics were less able to deal with nonsense syllables of low meaningfulness than normals. Meaningfulness of digits ranges from 1.3 - 2.1 on a scale from 0 - 5 (Battig and Spera, 1962) on the assumption that schizophrenics may also be less able than normals to learn in a situation involving the use of low meaningful

numbers. All pairs have been examined in order to eliminate formal similarity. As a result, no vowel is repeated within any list, no consonant is repeated within any list, only four consonants appear on both lists 1 and 2 and never in the same position. Pairs and the three list orders were arranged using a randomizing procedure.

Procedure

At the outset each subject was given the same practice list containing three, nonsense syllable-two digit pairs. The practice pairs are of the same type as the experimental lists 1 and 2. See Appendix. Each subject was presented with standard, anticipation learning instructions which are a slight modification of those developed in the verbal learning laboratory at Loyola University:

This is a test of association. These cards will show you how the test will work. Firstly, on the left, you will see a kind of word. Then, a moment later, on the right, you will see a number, too. You are to associate the two by remembering which number goes with each word. Then, when you see the word again, you will soon be able to call out the number that goes with it. Now try to remember these numbers to go with each word.

Following one perfect recitation instructions for one variant of the OL task (List 1) were read immediately as follows:

"Now learn these the very same way."

Transfer task learning continued to 60 trials or one perfect recitation. Every subject was assigned to one of the two, OL variants and one of the two forms of the transfer task blindly

and randomly (within the constraints described elsewhere).

All testing was conducted in the same, quiet, private room. Standard 2:2 time intervals were maintained. The experimenter's manner was standardized and all reinforcing behavior was avoided insofar as possible to reduce the influence of social context. Following each testing session the examiner completed a rating scale (as described previously) on the subject just tested. Equipment needed included the Stowe Memory Drum and scoring sheets (samples of which are enclosed in the Appendix).

Specific hypotheses are the following:

- 1) It is predicted that there will be no significant differences between the performances of all psychotics and all controls on the OL task.
- 2) It is predicted that the performances of all psychotics will be significantly inferior to those of all non psychotic controls in transfer performance (main effects).
- 3) It is predicted that the performances of all schizophrenics will be significantly inferior to those of all other subjects in both variants of the transfer task (main effects).
- 4) It is predicted that chronic schizophrenic subjects in particular will score poorly relative to all other subjects in transfer performance (main effects).
- 5) It is predicted that the performances of all schizophrenics

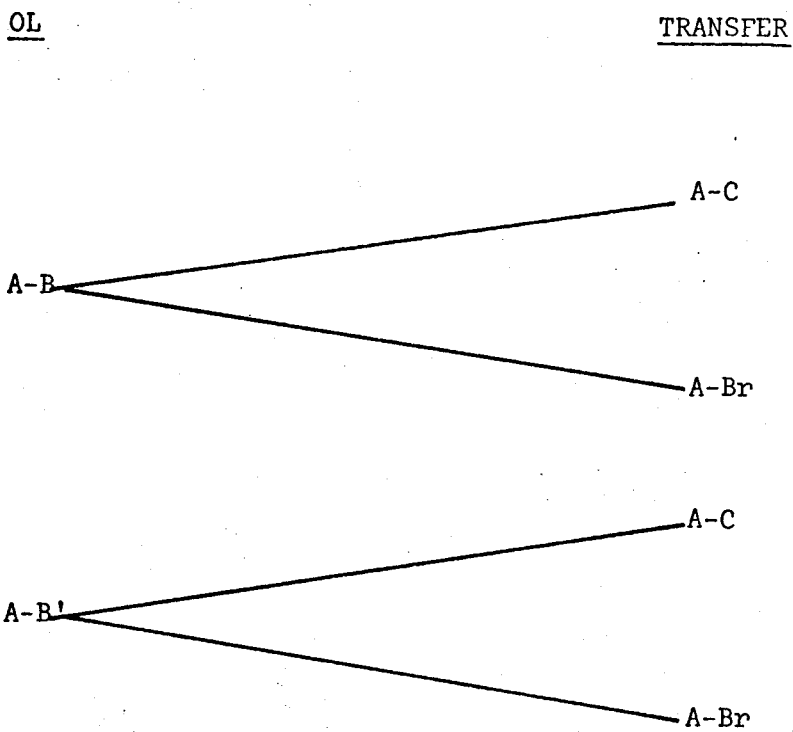
will be significantly inferior to the performances of all non schizophrenic psychotics in terms of deterioration from the A-C variant to the A-Br variant of the transfer task (interaction effects).

6) It is predicted that the performances of the chronic schizophrenic group will be significantly inferior to the performances of the acutely schizophrenic group in terms of deterioration from the A-C variant to the A-Br variant of the transfer task (interaction effects).

To summarize procedure once again, then, all subjects learned one variant of the OL task (List 2) followed by one form of the transfer task (List 1). See Table 2.

TABLE 2

OL AND TRANSFER CONDITIONS FOR ALL BLOCKS



CHAPTER III

RESULTS

Introduction

The data were analyzed by means of Multivariate, a Fortran IV program designed for use by the social sciences at the State University of New York (Finn, 1972). Initially analysis of variance was used to study original learning (OL) performance among the various diagnostic groups, across both types of negative transfer. The basic design, then, was a 5 X 2 analysis of variance (acute schizophrenia; acute, non schizophrenic psychosis; chronic schizophrenia; hospitalized, non psychotic control; non hospitalized, non psychotic control by associative or response competition). Covariance was then introduced to eliminate the effects of age, years of schooling, sex, race, motivation and medication status.

Subsequently analysis of variance, as well as covariance, was utilized to study differences among diagnostic groups in transfer performance, for both types of negative transfer. In the transfer analysis, OL score and form of transfer task were evaluated as covariates along with those which had already been introduced in the analysis of OL data (age, years of schooling,

sex, race, motivation and medication status.

Later, analysis of variance as well as covariance techniques were used to study the patterning of intrusions in transfer performance. Finally, t tests were used to compare the performances of schizophrenic subjects, divided on the basis of presence or absence of paranoid symptomatology, with other subjects. Specific findings follow.

Covariates

In the original, transfer analysis, several covariates were included. These covariates include form of List 1; OL score; motivation; medication status; age; sex; years of schooling; severity of illness and race. Specific findings vis a vis these covariates will be discussed more specifically as the primary data are reviewed. However, analysis of the correlation matrices as well as the covariance analyses suggest that three of the nine covariates were in no way influential in the primary findings. These three covariates will be discussed briefly, along with two others, and henceforth be eliminated from consideration of results.

Form of List 1, motivation and race were found to be insignificant contributors to the primary findings. Severity of illness was not found insignificant, but rather could not be evaluated because ratings were only available for a subsample of the total subject pool. Similarly, medication status could not be formally evaluated due to the fact that most psychotic subjects were

medicated at the time of testing, while most non psychotic subjects were not.

Lastly, study of the correlation matrices indicates that transfer performance is, in fact, inversely influenced by age. These findings can be demonstrated graphically as well. That is, an increase of twenty years produces an average deterioration of .02 in transfer score (transformed data). In addition, both stepping and non stepping covariance procedures indicate that OL performance is the single, best predictor of transfer score and a high degree of correlation obtains between OL performance and transfer score. (Results were similar using either stepping or non stepping procedures since either technique produces similar results if the covariate under examination is indeed explaining a good part of the variance.)

Transformation of Data and Nonlearners

In order to permit retention of some subjects who were non learners the OL and transfer data were calculated in a transformed form. The reciprocal of the raw data was chosen as the transformation of choice for two reasons. Firstly, a nonlearner could thus be retained with a score of "0." Secondly, a transformation such as this provided the closest approximation of a normal distribution in the data and is therefore most appropriate for use with the ANOV technique. Because of the transformation, all subjects could be retained in the OL calculations. The transfer analysis was com-

puted without nonlearners in OL, but with nonlearners in the transfer task.

Finally, a square root transformation was utilized for the analysis of intrusion data. This decision was made on the basis of the fact that such a transformation rendered the data more appropriate for analysis of variance. The intrusion data were computed without all nonlearners.

Original Learning

Two way, Model I analysis of variance was employed to study original learning (OL) performance among the various subject cells. The primary 5 X 2 analysis revealed no significant differences among cells in number of trials to criterion. Means and standard deviations appear in Table 3. However, when the effects of age had been eliminated by means of covariance, near significant findings were obtained which suggest that the acute schizophrenic group was inferior to other psychotics in OL performance ($p = <.06$). See Table 4.

Transfer

Transfer (List 1) scores were initially analyzed by means of a 5 X 2 analysis of variance. This most central analysis contained as independent variables the same five diagnostic categories and the same two testing conditions. Means and standard deviations are presented in Table 5. Number of trials to one perfect recitation of the transfer task was the measure of interest. The following contrasts were examined: all psychotics vs all

TABLE 3

MEAN NUMBER OF TRIALS AND STANDARD DEVIATIONS ON OL FOR ALL
BLOCKS OF SUBJECTS EXPRESSED IN RECIPROCAL FORM

BLOCKS	MEANS & STANDARD DEVIATIONS	<u>A-B & A-B' COMBINED</u>			
		A-C	N	A-Br	N
Acute Schizophrenics	\bar{x} s	.055 .041	17	.073 .031	7
Acute non Schizophrenic Psychotics	\bar{x} s	.110 .078	7	.049 .051	6
Chronic Schizophrenics	\bar{x} s	.056	9	.070	16
Hospitalized Non Psychotic Controls	\bar{x} s	.050 .042	11	.070 .036	19
Hon Hospitalized Non Psychotic Controls	\bar{x} s	.091 .033	9	.064 .039	10

Total N = 111

TABLE 4

SIGNIFICANT COVARIANCE FINDINGS IN OL

<u>COVARIATE</u>	<u>CONTRAST</u>	<u>t</u>	<u>P</u>
Age	Acute Schizophrenics vs Other Psychotics	1.90	<.06

The t statistic has approximately 80 degrees of freedom

TABLE 5

MEAN NUMBER OF TRIALS AND STANDARD DEVIATIONS ON TRANSFER
FOR ALL BLOCKS OF SUBJECTS EXPRESSED IN RECIPROCAL FORM

BLOCKS	MEANS & STANDARD DEVIATIONS	A-B & A-B' COMBINED			
		A-C	N	A-Br	N
Acute Schizophrenics	\bar{x} s	.068 .025	14	.058 .033	7
Acute non Schizophrenic Psychotics	\bar{x} s	.084 .054	6	.065 .049	4
Chronic Schizophrenics	\bar{x} s	.043 .023	9	.076 .046	12
Hospitalized Non Psychotic Controls	\bar{x} s	.066 .050	9	.051 .031	18
Non Hospitalized Non Psychotic Controls	\bar{x} s	.106 .056	9	.076 .027	9

Total N = 97

controls; hospitalized controls vs non hospitalized controls; acute schizophrenics vs all other psychotics; chronic schizophrenics vs non schizophrenic psychotics; acute schizophrenics vs chronic schizophrenics; all schizophrenics vs all other psychotics. Of these the only significant main effect to emerge was the superiority of non hospitalized controls over hospitalized controls.

The introduction of covariance to eliminate the contaminating effects of OL score, age, years of schooling, and sex produced additional findings, however. More specifically two significant main effects were elicited. Namely, all psychotics performed significantly more poorly than all controls ($p = <.01$). In addition, hospitalized controls again performed significantly more poorly than non hospitalized controls ($p = <.01$). See Table 6.

In addition, with the introduction of covariance, several interaction effects achieved significance as well. Most generally all controls dropped more precipitously than all psychotics from the response competition condition (A-C) to the associative interference condition (A-Br), ($p = <.04$). In addition the chronic schizophrenic group improved considerably from the response competition condition to the associative interference condition while the non schizophrenic psychotic group dropped ($p = <.02$). Finally, the chronic schizophrenic group improved considerably



TABLE 6

SIGNIFICANT COVARIANCE CONTRASTS (MAIN EFFECTS) FOR THE
TRANSFER CONDITION

COVARIATE	CONTRAST	t	P
OL; Age; School; Sex	All Psychotics vs All Controls	2.61	<.01
OL; age; School; Sex	Hospitalized Controls vs Non Hospitalized Controls	2.57	<.01

The t statistic has approximately 80 degrees of freedom

from the response competition condition to the associative interference condition while the non schizophrenic psychotic group dropped ($p = <.02$). Finally, the chronic schizophrenic group improved considerably from the response competition condition to the associative interference condition in comparison with the acute schizophrenic group, which deteriorated somewhat ($p = <.04$). See Table 7 and Figures 1 and 2.

Intrusions

Intrusions were defined as any appearance of an OL number among the transfer task responses in the A-C paradigm, and the appearance of any OL pairing of nonsense syllable and number among transfer task responses in the A-Br paradigm. An additional 5 X 2 analysis of variance was used to evaluate these data, composed of the same five diagnostic categories and the same two testing conditions. Means and standard deviations appear in Table 8. Subsequently covariance was used to eliminate the effects of transfer score. A single, significant main effect emerged. Namely, the associative interference condition (A-Br) produced far more intrusions for all subjects than the response competition condition (A-C) ($p = <.001$). See Table 9.

Additional Comparisons of subdivided Schizophrenic Data

Comparison of Transfer Performance in Acute vs Chronic Paranoid

Schizophrenics: A two tailed t test was performed on a sub sample of the total data and revealed significant differences in transfer score between acute and chronic paranoid schizophrenic experimental

TABLE 7

SIGNIFICANT COVARIANCE INTERACTION EFFECTS

COVARIATE	CONTRAST	t	P
Age; Years of School; Sex	All Psychotics vs All Controls	2.08	<.04
Age; Years of School; Sex	Non Schizophrenic Psychotics vs Chronic Schizophrenics	2.32	<.02
Age; Years of School; Sex	Acute Schizophrenics vs Chronic Schizophrenics	2.09	<.04

The t statistics have approximately 80 degrees of freedom

FIGURE 1

SIGNIFICANT INTERACTION EFFECTS:
SCHIZOPHRENICS AND OTHER PSYCHOTICS

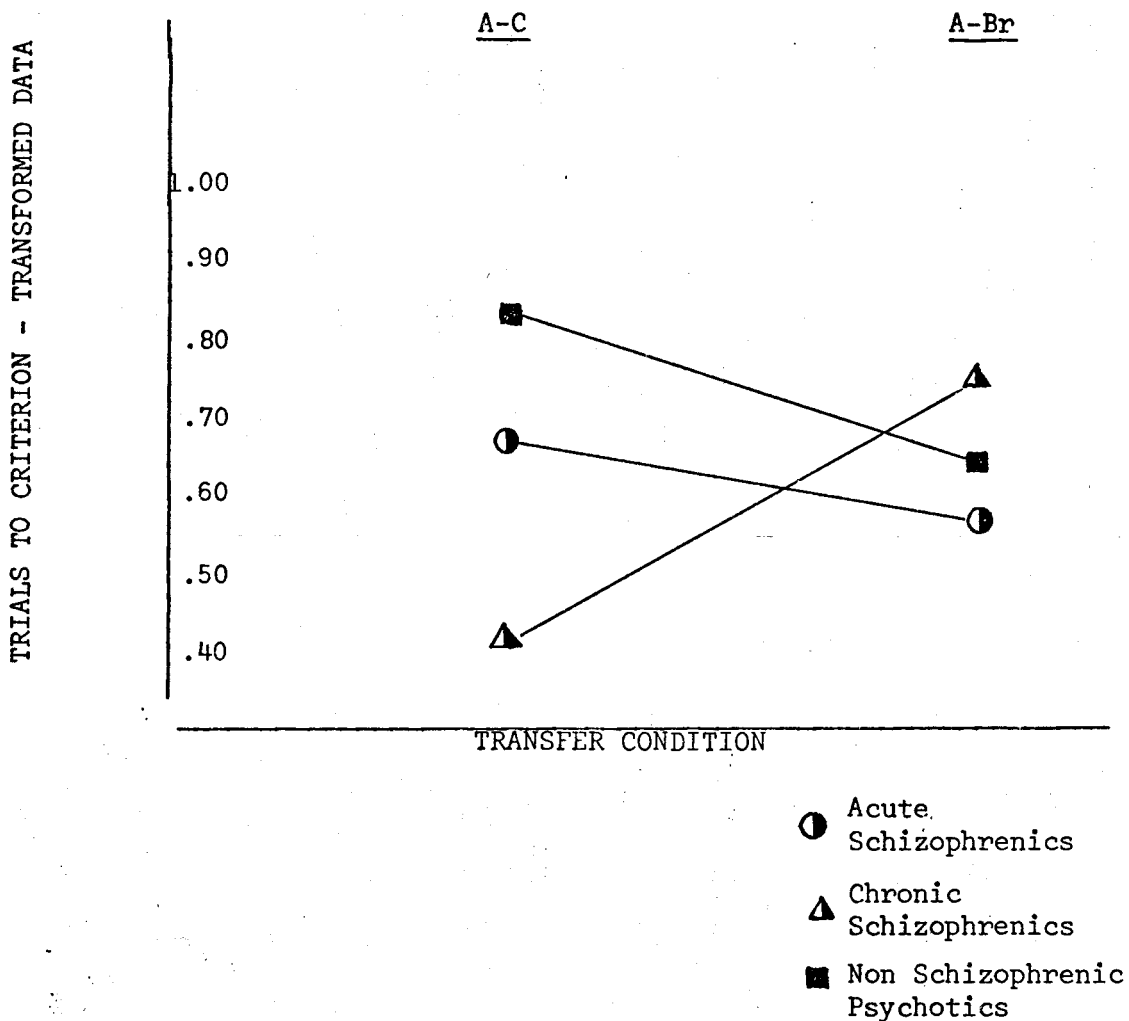
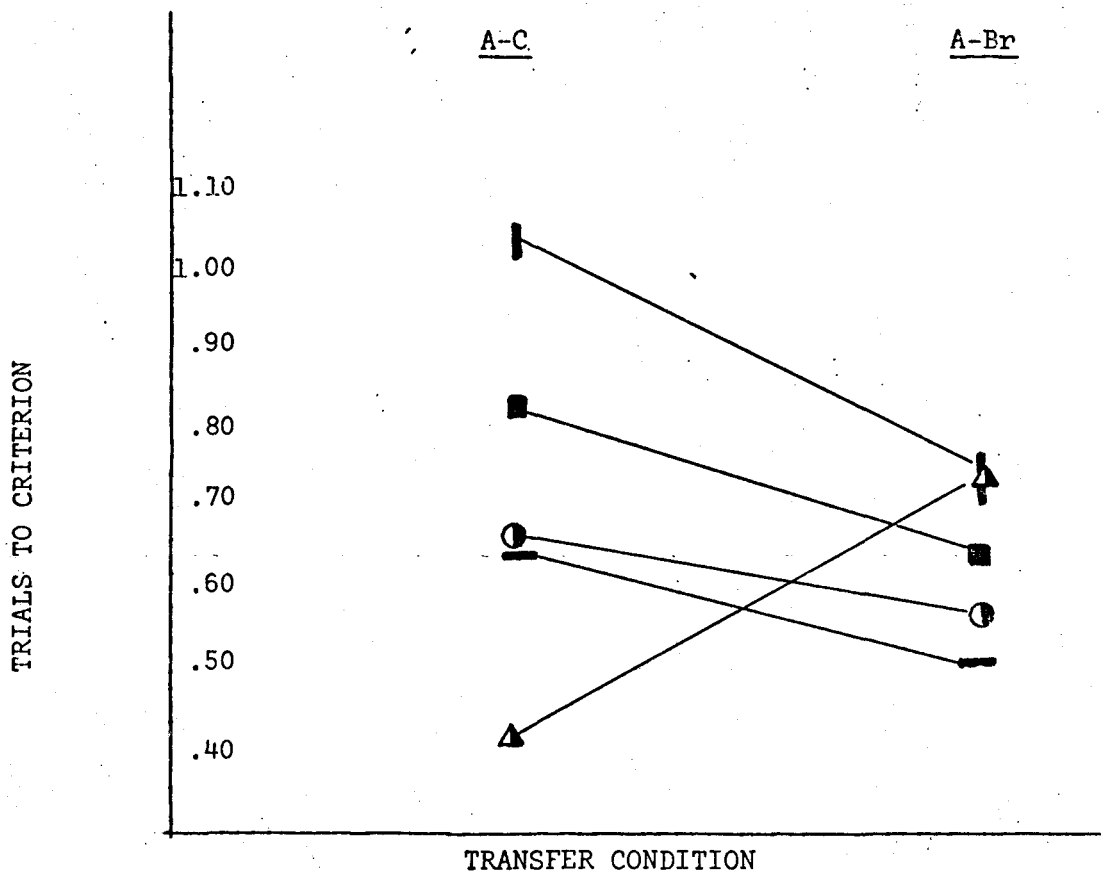


FIGURE 2

INTERACTION EFFECTS:

ALL SUBJECTS



- Acute Schizophrenics
- △ Chronic Schizophrenics
- Non Schizophrenic Psychotics
- Hospitalized Controls
- ⊥ Non Hospitalized Controls

TABLE 8

MEAN NUMBER OF TRIALS AND STANDARD DEVIATIONS ON INTRUSION

DATA FOR ALL BLOCKS OF SUBJECTS EXPRESSED IN SQUARE ROOT FORM

BLOCKS	MEANS & STANDARD DEVIATIONS	A-B & A-B' COMBINED			
		A-C	N	A-Br	N
Acute Schizophrenics	\bar{x} s	1.440 .831	14	2.405 .957	7
Acute non Schizophrenic Psychotics	\bar{x} s	.980 .805	6	2.562 .394	3
Chronic Schizophrenics	\bar{x} s	1.417 .839	8	2.318 1.814	11
Hospitalized Non Psychotic Controls	\bar{x} s	.798 .919	8	2.603 1.450	16
Non Hospitalized Non Psychotic Controls	\bar{x} s	.111 .333	9	2.506 .747	9

Total N = 91

TABLE 9

SIGNIFICANT COVARIANCE CONTRAST (MAIN EFFECT) FOR INTRUSION
 DATA WITH TRANSFER SCORE ELIMINATED

CONTRAST	t	P
A-C vs A-Br	6.31	<.001

The t statistic has approximately 8 degrees of freedom

subjects. That is, acute paranoid schizophrenics were found to perform significantly more poorly on the transfer task than chronic paranoid schizophrenics ($p = <.05$). See Table 10 and Figure 3. Because the sub sample was so small, no covariance-like procedures were possible to eliminate the effects of OL score, or other possible contaminants. However, perusal of the OL means suggests that similar trends are present.

Comparisons of Transfer Performance in Acute vs Chronic Non

Paranoid Schizophrenics: Because of the significant finding which suggested that paranoid subjects may have skewed findings within the schizophrenic cells, an additional, two tailed t test was performed on the acute and chronic schizophrenic data from which all paranoid subjects had been removed. Here too significant findings were obtained to the effect that chronic non paranoid schizophrenics performed more poorly in the transfer task than did acute non paranoid schizophrenics ($p = <.05$). See Table 10 and Figure 3. That is, opposite trends appeared in the paranoid and non paranoid data. Again, a visual scanning of the OL means suggested that similar patterns obtain there.

Comparisons of Transfer Performance in Non Schizophrenic Psychotics

vs Chronic Non Paranoid Schizophrenics: Still again, a two tailed t test was performed on the chronic non paranoid schizophrenic sample and the non schizophrenic psychotic sample, Findings indicate that without question the nonschizophrenic psychotic

TABLE 10

SIGNIFICANT t TESTS FOR TRANSFER (SUBDIVIDED SCHIZOPHRENIC DATA)

CONTRAST	df	t	P
Chronic Paranoid Schizophrenics vs Acute Paranoid Schizophrenics	12	1.92	<.05
Non Paranoid Acute Schizophrenics vs Non Paranoid Chronic Schizophrenics	26	1.88	<.05
Non Schizophrenic Psychotics vs Chronic Non Paranoid Schizophrenics	23	3.00	<.005
Chronic Paranoid Schizophrenics vs Chronic Non Paranoid Schizophrenics	19	2.03	<.05

subjects were superior to the other group in transfer performance ($p = <.005$). See Table 10 and Figure 3.

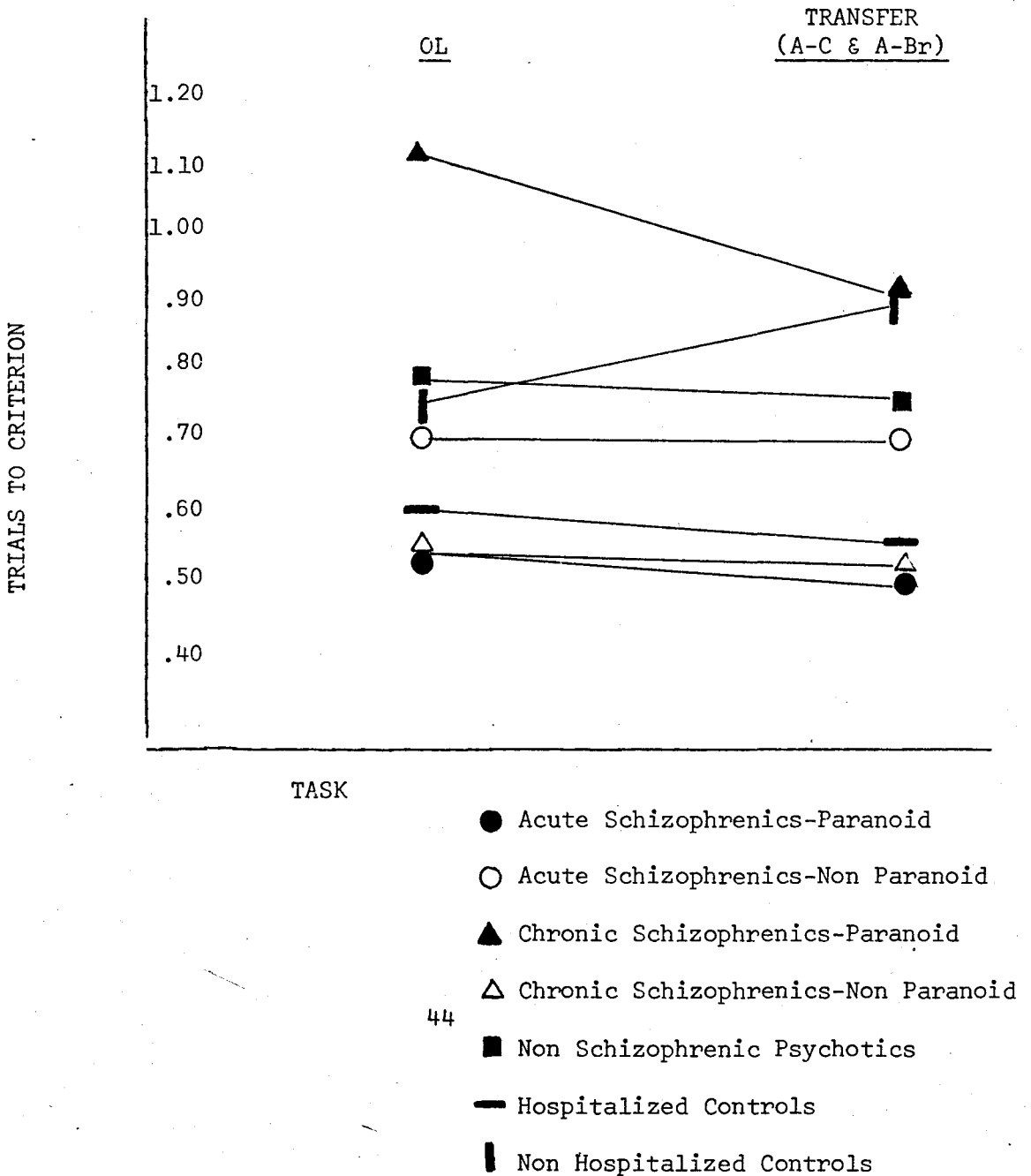
Comparisons of Transfer Performance in Chronic Paranoid Schizophrenics vs Chronic Non Paranoid Schizophrenics: Still again, a two tailed t test was performed on the chronic paranoid schizophrenic sample and the chronic, non paranoid schizophrenic sample. Here, the findings indicate that chronic paranoid subjects unquestionably are superior to chronic non paranoid schizophrenic subjects in transfer performance ($p = <.05$). See Table 10 and Figure 3.

Comparisons of Non Schizophrenic Psychotics vs Chronic Non Paranoid Schizophrenics (A-C Condition Only): An even finer evaluation of the data was attempted by dividing transfer performance into its two, component testing conditions (A-C and A-Br) and comparing various diagnostic groups, including the subdivided schizophrenic groups, by means of t tests. The study of the non schizophrenic psychotic group and the chronic non paranoid schizophrenic group, in particular, produced significant findings to the effect that non schizophrenic psychotics are far superior in a response competition situation (A-C) ($p = <.05$). See Table 11 and Figure 4.

Comparisons of Chronic Paranoid Schizophrenics vs Acute Paranoid Schizophrenics (A-Br Only): When the chronic paranoid schizophrenics were compared with the acute paranoid schizophrenics it was also unquestionably clear that the chronic paranoid subjects

FIGURE 3

SIGNIFICANT t TESTS: TRANSFER: ALL
 PSYCHOTICS: SUBDIVIDED SCHIZOPHRENICS



are far superior in the associative interference situation (A-Br), ($p = <.025$). See Table 11 and Figure 4.

To recapitulate, then, OL data reveal that within the present sample, acute paranoid and chronic non paranoid schizophrenics are inferior to other psychotics. Transfer data indicate that psychotics are inferior to controls and that hospitalized controls are inferior to non hospitalized controls. Interaction data indicate that controls dropped from A-C to A-Br more than psychotics. Further, it was learned that acute schizophrenics and non schizophrenic psychotics both suffer more from increased associative interference (A-Br) while chronic schizophrenics improve.

However, when the schizophrenic cells are subdivided along the paranoid-non paranoid and the acute-chronic dimensions, transfer "main effects" are shown in greater detail. Here t tests indicate that the chronic paranoid schizophrenics are very much intact with respect to associative interference while chronic non paranoid schizophrenics are very debilitated. Finally, when the two transfer conditions are considered individually, a still fuller spectrum of differences emerges. In the A-C condition, non hospitalized controls are far superior, while chronic non paranoid schizophrenics and acute paranoid schizophrenics are most inferior. The A-Br condition reveals an expected drop in performance for all subjects except the chronic schizophrenics, who both improve. Acute paranoid schizophrenics are still far inferior to others.

TABLE 11

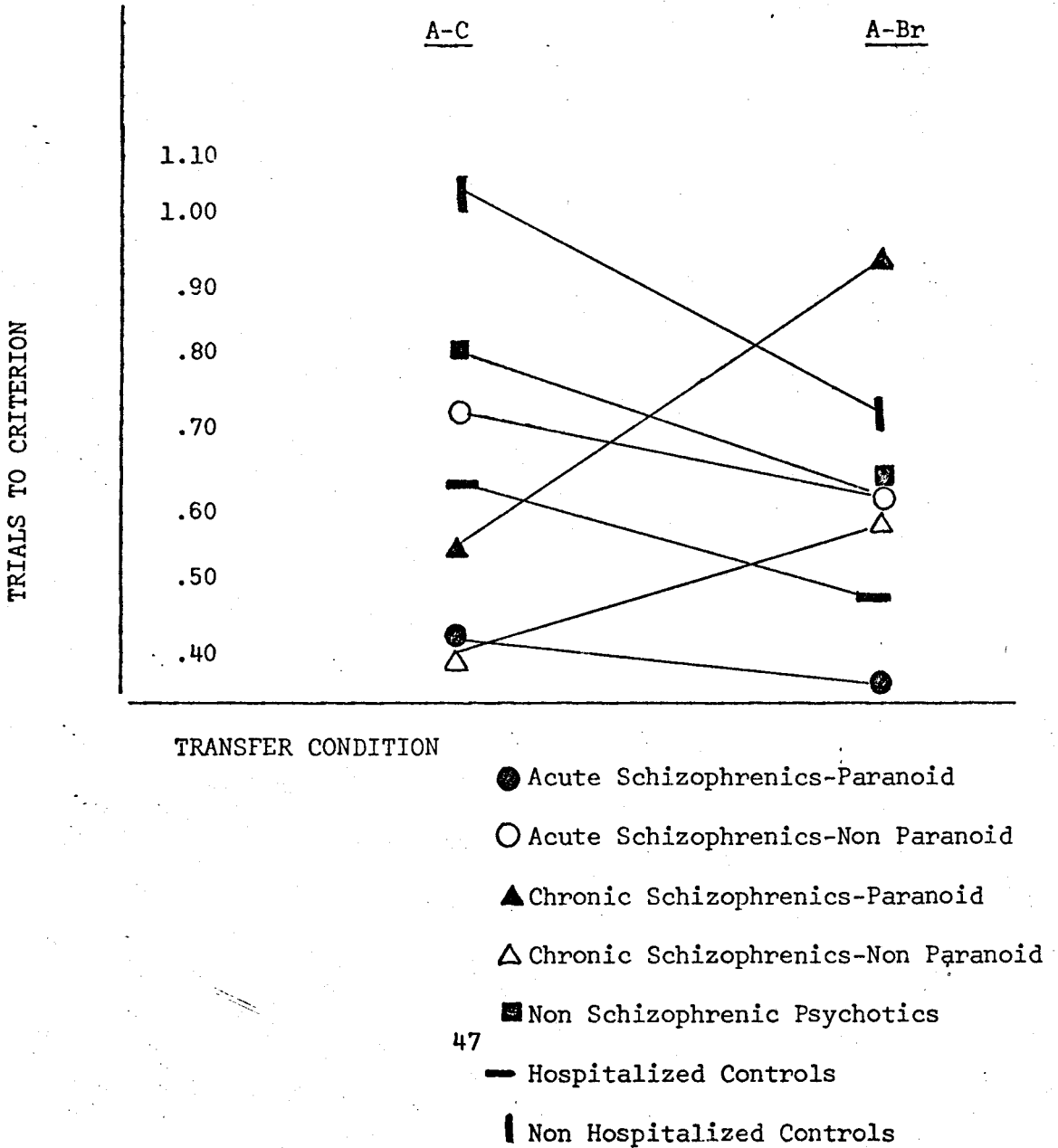
SIGNIFICANT t TESTS (A-C ONLY)
AND (A-Br ONLY)

CONTRAST	df	t	P
(A-C ONLY):			
Non Schizophrenic Psychotics	12	1.98	<.05
vs			
Chronic Non Paranoid Schizophrenics			
(A-Br ONLY):			
Chronic Paranoid Schizophrenics	5	2.83	<.025
vs			
Acute Paranoid Schizophrenics			

FIGURE 4

SIGNIFICANT t TESTS: A-C & A-Br: ALL

SUBDIVIDED DATA



Still another view of the subdivided data was provided by the calculation of a final, 7 X 2 analysis of variance, which indicated a significant main effect of diagnosis ($p = <.01$). Means and standard deviations appear in Table 12. The analysis of variance appears in Table 13. Two probing techniques were further utilized to provide specific comparisons among designated cell means. Firstly, the analysis was re-calculated excluding the non hospitalized controls, across both test conditions. Following this elimination, no significance was elicited. Secondly, the analysis was re-calculated including only the two most disparate cells; the acute paranoid schizophrenics and chronic paranoid schizophrenics, across both test conditions. Again, following this elimination, no further significance remained.

In sum, then, perhaps the best summary view is found in Figure 3, where the major trends can be seen. Clearly, in terms of dealing with transfer in general, chronic non paranoid schizophrenics, acute paranoid schizophrenics and hospitalized controls are most deficient. Non schizophrenic psychotics and acute non paranoid schizophrenics are moderately skillful. Finally, non hospitalized controls and chronic paranoid schizophrenics are most intact.

TABLE 12

MEANS AND STANDARD DEVIATIONS FOR ALL SUBDIVIDED

DATA: A-C AND A-Br

GROUP	MEAN	PARADIGM		MEAN	ST. DEV.	N
		A-C ST. DEV.	N			
Acute Paranoid Schizophrenics	.044	.038	8	.039	.002	2
Acute Non Paranoid Schizophrenics	.076	.016	8	.065	.115	5
Non Schizophrenic Psychotics	.084	.055	6	.065	.145	4
Chronic Paranoid Schizophrenics	.056	-----	1	.098	.047	5
Chronic Non Paranoid Schizophrenics	.041	.024	8	.061	.041	7
Hospitalized Controls	.066	.050	9	.051	.031	18
Non Hospitalized Controls	.106	.056	9	.076	.027	9

TABLE 13

ANALYSIS OF VARIANCE FOR ALL SUBDIVIDED DATA:

A-C AND A-Br COMBINED

SOURCE	df	MS	F	P
Diagnosis	6	.0152	5.61	<.01
Test Condition	1	.0001	.04	NS
Interaction	6	.0003	.01	NS
Within Cell	85	.0027		

CHAPTER IV

DISCUSSION

Covariance

The addition of covariance techniques in order to eliminate possible contaminants was obviously useful. OL score, age years of schooling and sex were revealed as important potential contaminants of the primary data, the elimination of which permitted the emergence of far more compelling, significant findings.

The import of age and years of schooling are relatively explicable in terms of the possible general deterioration of intellectual ability with age and the probable relationship between years of schooling, intelligence and verbal learning performance. With regard to sex, however, there is no ready rationale for understanding or explanation. One can only state that traditional assumptions concerning the irrelevance of sex were not supported and possibly the issue of sex differences in cognitive disability among the psychoses should be explored more fully.

All but five of the 24 acute schizophrenic subjects were primarily on phenothiazines during hospitalization. All but 8 of the 25 chronic schizophrenic subjects were also primarily on phenothiazines. On the other hand, 30 of the 42 non psychotic control subjects were unmedicated at the time of testing. That is to say,

then, simply, that most schizophrenics were on phenothiazines while most controls were unmedicated. Thus medication status could not have seriously influenced comparisons within the schizophrenic group. In addition, since the administration of phenothiazines to almost all schizophrenics would tend to suppress the level of overt pathology (Adler, 1974), it can be assumed that, at worst, differences between schizophrenic subjects and controls were diminished by virtue of the medication. Thus it is possible that even more significant data would be forthcoming from unmedicated schizophrenic patients.

Among the non schizophrenic psychotics, 6 were primarily on Valium; 1 was primarily on Elavil; 2 were primarily on Tofranil; 1 was primarily on Haldol; 2 were primarily on Phenobarbital; 5 were primarily on phenothiazines; and 3 were unmedicated. None of these medications, other than the Phenobarbital, would tend to interfere with cognitive function and indeed the major tranquilizers and anti-depressants would tend to stimulate cognitive function (Hernandez, 1974). Only three randomly distributed, non schizophrenic patients were additionally taking anti convulsant medication which has a generalized effect on the cortex and may have had a significant effect on cognitive functioning. In only a small number of cases, then, is it likely that medication effects were significant. In all other cases, if anything, medication served to obscure potential differences.

Original Learning

The original learning findings indicate that when the effects

of age, years of schooling and sex have been eliminated, acute schizophrenics require more trials to criterion than other psychotics. These findings, then, are only partially confirmatory of Hypothesis I (no significant differences between the performances of all psychotics and all controls on the OL task). While, as predicted, psychotics as a whole are not differentiable from controls, it does appear that acute schizophrenics may well be inferior in OL learning to all others. Even more specifically, the relevant cell means indicate that it is the acute paranoid schizophrenics and the chronic non paranoid schizophrenics who are most deficient. It seems, then, that the literature on OL must be amended and made more rigorous. While the OL of schizophrenics and normals is indeed indistinguishable, the fuller spectrum provided by the present design permits the discovery of differences between certain types of schizophrenics and other types of psychotics.

Although extant theory does not permit a ready explanation for these findings, it must be assumed that some inhibitory factor (possibly extra experimental associative interference) hampers certain schizophrenics in some unique way, even as they first attempt to learn stimuli and responses and build associations. Whether the acute paranoid schizophrenic subject and the chronic non paranoid schizophrenic share some unique cognitive inhibition remains unknown.

Transfer

One of two, significant main effects of diagnosis which were obtained asserts the superiority of the non hospitalized controls over hospitalized controls. This finding suggests that the artificially produced interference schema was generally effective in separating

subjects of a non psychotic type. The finding is consistent with the traditional verbal learning literature and affirms the general capability of the transfer design to produce difference degrees of negative transfer as has long been reported (Besch, 1958; Kausler, 1963; Porter, 1953; Twedt, 1959). Such depressed performance from the hospitalized controls was not predicted and yields the interesting possibility that some cognitive dysfunction should be looked at as a distinguishing feature of the severely disturbed (or medicated) rather than of the schizophrenic (Harrow, 1972).

In addition, significant differences were obtained between all psychotics and all controls. This significant main effect provides further confirmation of the verbal learning methodology and also suggests that psychotic status, independent of specific diagnosis, is sufficiently debilitating to increase sensitivity to negative transfer. This finding, too, confirms Hypothesis II (that the performances of psychotics will be inferior to controls in transfer). Clearly, psychotic status represents a serious inhibitor of cognitive function. As the demands of the cognitive task increase, as in the transfer situation, the debilitating influence of the psychotic state also increases. As a result, the added demands of the transfer situation produced a deficit which was quite independent of the deficit produced in the original learning task and more severe for psychotics.

Taken together, then, the main effects reveal that, independent of OL, non hospitalized controls were most capable of coping with experimentally induced transfer, followed by hospitalized controls and all psychotics. No significant differences were obtained between

schizophrenics and other psychotics or between acute and chronic schizophrenics.

Thus, while Hypotheses III (the inferiority of all schizophrenic subjects as compared to all others in transfer) and IV (the special inferiority of chronic schizophrenics as compared to all others in transfer) cannot be accepted, the main effects which were revealed are sufficient to validate the methodology used and to raise a crucial question: namely, can it be concluded that various types of psychotics do not, in fact, vary among themselves significantly in susceptibility to associative interference?

The interaction data may begin to provide an answer to this question. Most generally, it was learned that controls were far more sensitive to experimentally induced differences in type of negative transfer than were all psychotics. (Even further, cell means suggest that non hospitalized controls were more discriminating than hospitalized controls). For these non psychotic subjects the current methodology was again proved to be a discriminating and useful means for the study and comparison of association and response competition.

Among the psychotic subjects, it was learned that the chronic schizophrenics performed quite differently from the acute schizophrenics and acute non schizophrenic subjects. In contrast to both, the chronics were more capable under conditions of greater potential associative interference. Thus Hypotheses V (the special deterioration of all schizophrenics compared to non schizophrenic psychotics from A-C to A-B) and VI (the greatest deterioration of the chronic schizophrenics

as compared with the acute schizophrenics from A-C to A-Br) cannot be totally confirmed. Acute schizophrenics did indeed suffer from the addition of greater associative interference. However, chronic schizophrenics did not. Rather, their performance improved. In addition, acute non schizophrenic psychotics also dropped in score, along with the acute schizophrenics. These data then call into question previous findings which have shown chronic schizophrenics to be generally inferior to acute schizophrenics with respect to associative interference (Kausler, 1964; Higgins, 1965; Spence, 1964). This rather anomalous finding led to closer inspection of the data within the schizophrenic cells and also led to the subdivisions of those cells which will now be discussed.

Additional Comparisons of Subdivided Schizophrenic Data

Additional Comparisons: Chronic Paranoid Schizophrenics vs Acute

Paranoid Schizophrenics: Transfer (A-C and A-Br Combined): While there were no main effects elicited between the entire acute schizophrenic group and the entire chronic schizophrenic group, there was a significant t elicited between paranoid subjects in those two diagnostic categories. It was unmistakably clear that chronic paranoid subjects remain remarkably intact in the face of transfer demands, compared to acute paranoid schizophrenic subjects. It may be conjectured that "acute" status for paranoid schizophrenic subjects implies a severe breakdown in the kind of cognitive skill needed to overcome transfer demands. On the other hand, the

adaptation defined by a chronic paranoid diagnosis includes an over emphasis on the cognitive.

Additional Comparisons: Chronic Paranoid Schizophrenics vs

Chronic Non Paranoid Schizophrenics: Transfer (A-C and A-Br

Combined): Another most compelling finding obtained in the present study is the second task superiority of the chronic paranoid schizophrenics over the chronic non paranoid schizophrenics. Since the chronic paranoid schizophrenics comprise a large subsample of the entire chronic schizophrenic group, the effect of these patients on the larger cell of which they are members must be considered. Quite clearly, the chronic paranoids within the chronic schizophrenic group served to inflate learning scores enormously in the transfer condition. Without their influence it can be assumed that the chronic schizophrenic group would not have demonstrated the anomalous adequacy which prevented the appearance of predicted main effects of transfer score for schizophrenics. On the other hand, it can be assumed that the chronic non paranoid schizophrenics greatly deflated the mean of the chronic schizophrenic cell. It may well be this subgroup which has often led experimenters to the conclusion that "schizophrenics" are more susceptible to learning difficulties than others. Already the importance of the distinctions which careful diagnosis provides is abundantly clear. Far from being simplistic unities, the traditional diagnostic categories --- even within the general rubric of

"schizophrenia" --- represent complex integrations of many variables.

Rather than all schizophrenics, then, it is specifically the chronic, non paranoid schizophrenic subjects (along with the acute paranoid schizophrenic subjects) who are the poorest performers in terms of transfer. It is these patients who are most debilitated cognitively and can be distinguished from non schizophrenic psychotics and controls.

Additional Comparisons: Subdivided Schizophrenics and Others:

A-C Only: When the A-C transfer variant was examined individually, it was learned that, again, chronic non paranoid schizophrenics were significantly inferior to non schizophrenic psychotics. Again, chronic non paranoid schizophrenics can be clustered with acute paranoid schizophrenics in terms of loss of cognitive skill. Non schizophrenic psychotics are far more intact and resemble acute non paranoid schizophrenic subjects most closely. In other words the constellation of findings in the A-C condition is quite clearly similar to the constellation observed in the transfer condition taken as a whole.

Additional Comparisons: Subdivided Schizophrenics and Others: A-

Br Only: In the A-Br condition the full anomalous nature of the chronic paranoid subjects became apparent. It seemed almost as if the theoretically most difficult cognitive task called forth the best performance in these subjects. Perhaps the paranoid adapta-

tion permits them to try harder when confronted with a more difficult cognitive task, and achieve very well as a result. Similarly the non paranoid chronic schizophrenics demonstrated an improvement in performance in this associative interference condition. This finding, in particular, defies explanation and bears further study.

The additional data provided by the t tests and the final analysis of variance (including probing) served as a possible missing link. Although the differences in significance obtained via the two different methods demand extremely cautious interpretation, it is possible that the lack of significant differences between schizophrenics, other psychotics and controls can now be seen as a washout of significant differences among the paranoid and non paranoid, chronic and acute subjects within the schizophrenic cells. When the various types of schizophrenics are separated, it appears possible that chronic paranoid schizophrenics are an entity unto themselves. They appear quite intact --- more so than normal controls --- with regard to association skill. Similar conclusions have been drawn by McGhie (1969) who stated;

in the distraction studies reported by McGhie and his colleagues it was found that all positive findings were consistently related to schizophrenic patients who displayed a recognizable pattern of hebephrenic symptoms. Those patients who were markedly distracted in certain aspects of psychomotor performance, on a task demanding perception and short term retention and on a test of speech comprehension had all been diagnosed within the hebephrenic sub type. In striking contrast, those patients with a predominantly paranoid picture had no difficulty in fixing attention on one of a number of competing stimuli. Indeed on most tests the paranoid group were found to be less distractible than the normal control subjects. In most cases scores on the

tests used were bimodal indicating the presence of two clearly differentiated sub groups. The high variance of the distributions of the total schizophrenic group scores was accounted for mainly by the blending of paranoid and hebephrenic patients (McGhie, 1961, p. 90).

Still further, McGhie stated:

Many schizophrenics entertain transient delusions during the course of their illness although these may be embedded in a welter of other schizophrenic symptoms. In other patients, a highly elaborated system of delusional thinking is a prominent feature of the illness and may exist in the absence of other schizophrenic symptoms. Some clinicians would feel that the inclusion of such paranoid patients within the schizophrenic group merely obscures the clinical picture, and they should be regarded as constituting an entirely separate psychotic group. The findings of most studies of disturbed attention in schizophrenic patients would support such a decision (McGhie, 1961, p. 98).

At the other extreme, chronic non paranoid schizophrenics, acute, paranoid schizophrenics and hospitalized non psychotic controls are the most deficient subjects, in general, in transfer performance. It is quite probable that their common deficit is multi-determined. That is, chronic non paranoid schizophrenics are the long term, back ward patients, who suffer the effects of institutionalization and apathy. Acute, paranoid schizophrenics, on the other hand, are in the throes of disorganization, and have not yet reintegrated via a paranoid adaptation. Still again, it can be assumed that non psychotic hospitalized patients may be extremely preoccupied, depressed or lonely, in such a way that their motivation for cognitive expression is greatly reduced.

In sum, then, the original hypotheses should perhaps be paraphrased as follows:

- 1) Only non hospitalized non psychotic controls will be superior in transfer performance to psychotic subjects when all psychotics are taken as a unity.
- 2) When subdivided, only certain types of schizophrenics will appear inferior to other acute psychotics in transfer skill; namely, chronic non paranoids and acute paranoids.
- 3) In a situation requiring flexibility of association rather than dexterity with competing responses, chronic paranoid schizophrenics will be remarkably intact. Chronic non paranoid schizophrenics can also improve their level of performance in such a testing situation.

Intrusions

The significant intrusion finding again provides general validation of the verbal learning methodology as a technique for understanding thought disorder. In terms of Underwoodian two stage theory, it can be re-affirmed that a negative transfer paradigm such as the A-C paradigm, which primarily requires new response learning, is inherently different from an A-Br paradigm which primarily requires rearrangement of responses which have already been learned. Present data indicate that for all types of subjects, A-Br associations are "stickier" and reassert themselves more determinedly than do A-C items. It may be that the two different thought processes involved require different levels of cognitive skill, just as the concrete operations of Piaget differentially require a new type of skill than the formal (Piaget, 1969).

Despite the general verification of the usefulness of an interference paradigm, however, there was no evidence that schizophrenics or any other single, clinical group inserted more intrusions into their transfer responses than did normal controls. As a result, it must be concluded that none of the clinical groups, more than normals, tend to perseverate old responses or old associations.

It might be profitable to examine the data for extra-experimental intrusions in order to determine whether differences obtain in introduction of irrelevant material. This type of intrusion has been studied on occasion and constitutes another, albeit sloppier, means of understanding thought disorder.

Scoring

Because the use of reciprocal data permitted the retention of non learners it was possible to follow convention (Kapche, 1969; Higgins, 1966; Laing, 1962) and use number of trials to criterion as the variable to be measured. It bears mention, however, that there are other ways of scoring which have been utilized in the past. Perhaps the most common involves the comparison of errors. Such comparison, while not independent of the measure currently employed, would offer a different perspective on the data. Thus, such a scoring system would permit the distinction between those subjects who repeatedly miss just one or two pairs before achieving criterion and those subjects who seem to learn very little before, somehow, surprisingly, producing

one perfect recitation. Re-analysis of the present data using error scores would be still another means of amplifying present findings.

Among the other, but less commonly used scoring systems are errors on early trials only, and gain scores (number of correct responses on early trials subtracted from number of correct responses on later trials).

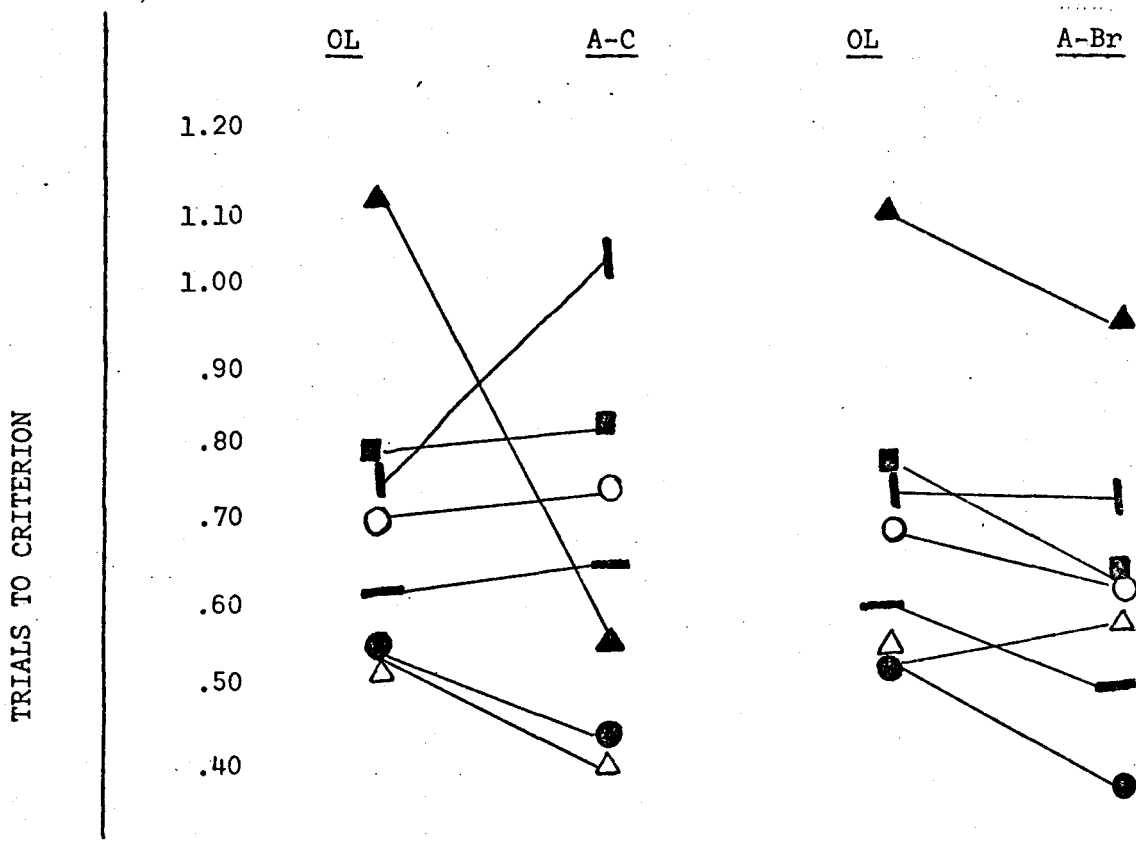
Interaction and Verbal Learning Theory

Again, the use of an A-C, A-Br paradigm permitted the examination of the data in terms of the traditional verbal learning literature. See Figure 5. Given a transfer task which requires new response learning, it is evident that four groups of subjects (non hospitalized controls; non schizophrenic psychotics; acute non paranoid schizophrenics; and hospitalized controls) improved in performance over OL, while three groups of subjects (acute paranoid schizophrenics; chronic paranoid schizophrenics; and chronic non paranoid schizophrenics) deteriorated. This pattern suggests clearly that among the present sample, chronic schizophrenics in particular, but also acute paranoid schizophrenics have great difficulty with new response acquisition.

However, given a transfer task which requires associative flexibility only one group (chronic non paranoid schizophrenics) improved in performance while all others deteriorated. This pattern suggests that most subjects have more difficulty with

FIGURE 5

MEAN SCORES OF ALL SUBDIVIDED SUBJECTS
ON BOTH TRANSFER TASKS



TASK

- Acute Schizophrenics-Paranoid
- Acute Schizophrenics-Non Paranoid
- ▲ Chronic Schizophrenics-Paranoid
- △ Chronic Schizophrenics-Non Paranoid
- Non Schizophrenic Psychotics
- Hospitalized Controls
- ⊥ Non Hospitalized Controls

associative interference tasks. Although differences are not all significant, these patterns taken together suggest that it is primarily the chronic schizophrenic and the acute paranoid schizophrenic who have difficulty with new response learning. In the face of associative competition, however, it seems that four additional groups of subjects begin to encounter difficulty, while the chronic non paranoid schizophrenics are strangely restored. Further study will be needed to shed more light on these highly specific differences in learning disability.

Methodological and Theoretical Issues

The current findings also suggest that stage of illness, within specific diagnostic category, may be a crucial variable to study. During the data collection phase, it became clinically obvious that acute schizophrenic patients, for example, varied greatly in the severity of their symptoms. Similarly, these patients were tested at varying stages in severity. Since examiners vary in their ability to coax performances from acutely schizophrenic subjects, it is quite probable that such subjects in other studies have varied in severity too.

One way to partially alleviate this difficulty would be to use a measure of severity, such as the nurses' rating scale, which was unsuccessfully utilized in the present study. Such a measure if available on all subjects, might equate subjects, in a gross way, for severity, or stage of illness, within a given diagnostic

category.

In fact, one possible explanation for the inferior performance of the present sample of acute paranoid schizophrenics is that they were somehow less remitted at the time of testing than the acute, non paranoid subjects. Either the acute paranoid schizophrenic condition may be inherently "sicker" or these subjects may have inadvertently been tested earlier in the course of remission than non paranoid subjects. It may even be possible that acute paranoid schizophrenics more quickly encapsulate their difficulties into pockets of paranoid symptomatology, thereby freeing more psychic energy for cognitive tasks.

Harrow (1973) has become interested in this issue of level of remission. Recently, he wrote, "It would seem important to collect data at a uniform stage of the disorder, including the most acute phase, to control for possible differences...as the acuteness of the patient's symptom picture changes. Failure to control for this factor may account for some of the varied results in this area (Harrow, 1973, p.68)." Most recently he has demonstrated that differences in cognitive skill between schizophrenic subjects and non psychotic subjects diminish quickly as the acute phase of the disorder passes (Adler, 1974).

Another inherent difficulty in clinical research concerns the related fact that highly florid, acute psychotic patients

are almost always excluded. The kinds of materials usually used in clinical studies include standard projectives, standard intelligence tests, perceptual tests and memory tests. The inability to include highly florid patients, of course, stems from the fact that they are unable to "listen" to directions and unable to perform. Because of the unreachableness of such patients theorists have sometimes assumed that their skills are inferior to those of other patients. In reality, however, motivational, attentional or physiological deficits may overlay and obscure other skills, which in fact remain intact. It is the woeful truth that so long as our instruments require "attention" and "cooperation" such patients may remain excluded and not understood.

Still another difficulty facing the clinical researcher concerns the limitations in the current diagnostic system. In the present study, internal inconsistencies were avoided by utilizing diagnosticians who had all been trained together, and held similar points of view. External inconsistencies, however, could not be avoided. That is, at the present time it is impossible to guarantee that any given sample of chronic schizophrenics, for example, would be so defined by any other clinical team. To illustrate the difficulties involved in accurate diagnosis, consider the following three cases:

Louis was hospitalized for a catatonic episode in 1970. He was

hospitalized currently with marked paranoid ideation, but no other apparent thought disorder. Is he chronically psychotic? Acute? Should he be considered schizophrenic on the basis of the previous, catatonic episode or should he be considered paranoid but not schizophrenic on the basis of current symptoms.

Tom was diagnosed as chronic schizophrenic on the grounds that several months of hospitalization had failed to produce adequate remission. Subsequent to discharge, however, he has been doing well, holding a job outside the hospital, etc. Should he have been diagnosed as acute schizophrenic after all?

Bob has probably suffered a drug induced psychosis. Almost overnight he reintegrated so as to appear quite normal. (It was in this reintegrated condition that he was tested.) Should he be considered acutely psychotic?

Some Ordered Thoughts About Thought Disorder

Although "thought disorder" has been advanced as the basic feature of schizophrenia, the practicing researcher is at times perplexed when he attempts to define or understand this phenomenon. Many various names have been used to describe it, including idiosyncratic thinking, confabulation, bizarre thinking, overinclusion, underinclusion, concretism, paralogical thinking, irrelevant association, failure to maintain set, distractibility, and stimulus sensitivity. Most often, attempts to operationalize the phenomenon have been either too specific, or too vaguely

theoretical.

The present study was another attempt to operationalize the notion of thought disorder into a paper and pencil test which could then be used to evaluate some theoretical assumptions, which have survived almost intact since Bleuler.

The present data suggest that, when thought disorder is operationally defined as susceptibility to associative interference in the form of negative transfer, it is not uniquely a characteristic of the schizophrenic patient. Rather, it appears to be characteristic of some types of schizophrenic patients, and some non-schizophrenic psychotics and even some non-psychotic controls, to a lesser degree.

Harrow, too, has recently been attempting to operationalize the concept of thought disorder more pragmatically. His "idiosyncratic thinking" appears to be quite similar to the definition applied in the present study. Namely, idiosyncratic thinking has been defined as 1) responses which involve an unexplained gap in the reasoning process or lack of shared communication, 2) strange or socially deviant responses including strange responses which convey the correct meaning of the stimulus, 3) logically coherent statements which are totally unrelated to the question, 4) inconsistent, confused or disorganized responses which do not make sense, and 5) overelaborated, or strange responses (Harrow, 1972).

Implications for Future Research

In addition to the manifold suggestions which have already

been mentioned throughout the discussion chapter, two additional suggestions for further research will be discussed. Firstly, the work of Harrow and his colleagues represents a very similar attempt to operationalize thought disorder and study various clinical groups in order to assess their skills or deficits. In light of the present findings, it would be useful to isolate paranoid and chronic subjects within his schizophrenic sample. It may well be that such a division would provide the explanation for Harrow's notion that "...there are several subgroups of schizophrenic patients (i.e. one that no longer evidences idiosyncratic thinking during the recovery phase and one that continues to evidence idiosyncratic thinking during this phase (Adler, 1974, p. 65)." More specifically, it would be predicted that remitted paranoid schizophrenics do not evidence idiosyncratic thinking, while remitted non paranoid schizophrenics do evidence such a thought disorder. Of course, any such effort would also require resolution of the severity, remission, acute-chronic issue, which has already been discussed here from several points of view. Most specifically, it would have to be determined at what point non remitted subjects should be reclassified as chronic.

Another direct application of the present methodology concerns the study of childhood psychosis. Although childhood

schizophrenia is an extremely common, well articulated clinical entity, there is relatively little literature on formal thought disorder in childhood schizophrenics. Moreover there is virtually no experimental literature on this subject. It would be valuable to explore the nature of formal thought disorder in children diagnosed as schizophrenic. Certain modifications would be necessary in the formulation of such studies. For example, the delineation of acute or chronic conditions is uncommon. Since children are more manageable in society, they are not always brought to a psychiatric facility at the "beginning" of a reactive episode. Most often, rather, they are seen after there has been an accretion of insidious symptoms to the point of obvious withdrawal, mutism, or even bizarre behavior. As a result, it would be less feasible to study childhood schizophrenics, initially, along acute-chronic or reactive-process or paranoid-non paranoid dimensions. It would therefore probably be necessary to begin by considering childhood schizophrenics as a unity, despite the evidence gleaned from adult patients to the contrary.

It would also be necessary to design a task which would be appropriate for children and yet be able to tap associative interference. Rather than using a memory drum, it might be preferable to use cards, with colors and shapes as stimuli and responses. The use of colors would be facilitated by the fact

that they have already been evaluated for meaningfulness (Solso, 1968). Shapes could be taken from memory for designs items on the Stanford Binet, Form L-M. The goal of any initial study, probably, should be to investigate whether childhood schizophrenics, in contrast to adult schizophrenics, are differentiable as a group from other types of patients.

The largest, and last, task which shall be discussed as a possible successor to the present effort is an integrative one. That is, the many other modalities which have been used to study cognitive deficit in schizophrenia should be categorized and an attempt made to determine to what extent all the various "skills" measured overlap or represent related, more basic processes.

SUMMARY

The attempt was made to operationally define one facet of thought disorder in terms of susceptibility to increases in associative interference. Then various types of psychiatric patients were tested to ascertain whether, in fact, schizophrenics are inferior to others, or more prone to this type of thought disorder. It was learned that the methodology as a whole was effective and that differences among subjects could be elicited. Acute schizophrenics were found to be most deficient in all phases of the testing, taken generally. More specifically, great differences were uncovered among various kinds of schizophrenics with regard to susceptibility to increases in associative interference. Most spectacularly it was learned that chronic paranoid schizophrenics (and, to some extent, all chronic schizophrenics) are very much intact in ability to withstand associative interference relative to other clinical subjects. The primary conclusion is that thought disorder, at least as presently defined, is not a general characteristic of all schizophrenics. Rather, some schizophrenics appear to have a generalized learning deficit, while others are particularly susceptible to associative interference and still others are remarkably intact.

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APPENDIX A

NURSES' RATING CRITERIA

1) Psychiatric Sickness

0: Does not apply.

Low: Good discharge planning, has returned to high pre-morbid level of functioning, can independently plan and follow through, may overreact to situations but does not interfere with functioning, talks appropriately about feelings, no symptomatology.

Moderate: Overreacts to things at times and affects functioning but can be appropriate. Some inappropriate behavior or expression of feelings, strange looking, acting or talking, thought disorder, needs lots of input from staff but can respond to external controls. Has some degree of control over symptoms. Some delusional thinking.

High: Has little or no control. Completely out of control. Disoriented, has great difficulty eating or sleeping, does not make sense, needs much external control.

2) Depression

0: Does not apply

Low: May look sad, eat less than normal, doesn't feel too good about himself as a person, but is responsive to others and is easily cheered up, etc.

Moderate: May openly admit to feeling sad and may cry at times (perhaps occasionally at night in bed). Is still hopeful things will be better soon, etc.

High: Much of his talk and feeling tone involves being terribly sad or guilty about something. Feels unhappy and worthless as a person. Hopeless about his future; may feel that there is not a future for him, etc.

3) Anger

0: Does not apply

Low: Grumpy and irritable, snappish, sarcastic, complaining, with hostility and sarcasm thinly veiled, etc.

Moderate: Much passive aggressive behavior. Angry much of the time but has fair degree of control over anger, etc.

High: Is angry and abusive at the slightest provocation or at no provocation. Anger is mobilized easily and with little or no control. Most people are afraid of the patient, etc.

4) Anxiety

0: Does not apply

Low: Is a bit nervous but under control. Anxiety doesn't interfere with functioning.

Moderate: Worried and asks for reassurance, etc.

High: Chronically and highly anxious. Constantly up and down and paces, etc.

5) Psychosis

High: Has little or no control. Completely out of control

0: Does not apply

Low: Inappropriate affect, strange look or talk, some

2) Depressed thought disorder, has some difficulty concentrating for period of time, etc.

Moderate: Paranoid ideation affects more of patient's activities. Has crazy thoughts that affect functioning, etc.

High: Severe thought disorder. Definitely hallucinating. Needs high degree of structure and control but may not respond.

9: No real contact - no impulse control.

6) Depressed manner: sad face, slumped body, self-destructive

0: Does not apply

Low: Sad looking, sad voice, slowed movements, etc.

Moderate: Persistent dejected air, occasional crying, etc.

High: Steady, persistent, extremely sad posture, etc.

7) Angry Manner: annoyed face, threatening posture, striking another

0: Does not apply

Low: Annoyed facial expression; sullen, brusque or abrupt in interpersonal contact, etc.

Moderate: Occasional intense, glaring, threatening expression, or moderate angry expression throughout the shift, slamming around, kicking or banging objects, etc.

High: Threatening expression for several hours, hits or grapples with another person, etc.

8) Anxious manner: tense, jumpy, panicked, restless

0: Does not apply

Low: Somewhat tense, occasionally appears anxious, etc.

Moderate: Occasional very tense expression, mild tremblings, distinct muscular tension, etc.

High: Continuous agitated, hand-wringing, hiding manner, terrified, gross trembling.

9) Psychotic Behavior

0: Does not apply

Low: Says things which are strange but not clearly psychotic, thoughts may be hard to follow, etc.

Moderate: At times expresses definitely crazy ideas, but is not completely in their grip, etc.

High: Expresses crazy thoughts and fully believes them, may be definitely hallucinating, etc.

10) Paranoid

0: Does not apply

Low: Some suspiciousness, oversensitive, takes things as meant personally when they weren't, etc.

Moderate: Has very strong tendency to believe someone else is the cause of his difficulties. Has put together a definite system which patient will not give up, etc.

High: Verbalizes paranoid delusions-ideas of persecution, conspiracies of people having abnormal sexual interest in him, etc.

11) Hyperactivity

0: Does not apply

Low: Lots of gesturing with arms. Frequently up and down from chair, etc.

Moderate: Doing a lot of rapid pacing on ward, all bodily movements very quick, etc.

High: Moving almost all the time, extremely overactive, has been in frequent physical struggles, etc.

9: Has been definitely bruised.

12) Underactivity

0: Does not apply

Low: Engages in less than normal activity. Reluctant to engage in any activities. Most movements slowed. Takes a nap.

Moderate: Doing little but sitting or lying down, etc.

High: Always sitting or lying down. Almost impossible to mobilize.

9: Catatonic, will not move at all.

13) Confusion

0: Does not apply

Low: Patient knows who he is, who people are, but at times doesn't seem to understand things he should know, etc.

Moderate: At times says something clearly confused about time, place or familiar people, etc.

High: Patient confused most of the time, cannot state who and where he is, or the time, etc.

14) Effective Contact with People

0: Most of his relationships are very good. He is able

to resolve conflicts very well, etc.

Fair: Patient has a few good relationships with his family, other patients, or staff. He is able to communicate his feelings slightly, etc.

Poor: Patient gets along poorly with practically everybody. No warmth to any of his relationships, etc.

15) Stressful Change in Life Situation on or off Ward

0: No stressful change today

Low:

Moderate:

High:

A complete copy of this rating scale, as developed by the research team on 10 West, Illinois State Psychiatric Institute, headed by Dr. Herbert Meltzer, is available on request.

PSYCHOLOGIC RATING SCALE

Scoring: Each item is scored from 0 to 40, depending upon the rating assigned. The values 0, 20, 30 and 40 are assigned respectively to the five anchor points on the continuum for the item of behavior. In general, 0 represents the most extreme variation and 40 a normal performance. Several of the items are double-ended, however (Nos. 2,3,8,9,12), for the behavior described by these may vary from normal in the direction either of over- or underexpression. They are scored in terms of deviation from the midpoint and this value is doubled to permit the final score to range between 0 and 40 so that it will be comparable with other items of the scale. The maximum score (normal subjects) is 480.

1. Cooperation. An over-all estimate of the degree of difficulty experienced by the examiner in handling the patient.

No.....Very Poor.....Poor.....Fair.....Good

2. Relevant Verbalization. The degree to which the patient's relevant verbalizations occur (by "relevant" is meant particularly the testing situation or other factors deemed by the examiner to be a normal topic of conversation in the interview).

No.....Under.....Average.....Over.....Excessive

3. Expressive Play. An estimate of the amount of facial and bodily expression seen in the course of the interview.

No.....Under.....Average.....Over.....Excessive

4. Grasp of Instructions. Patient's grasp of the task set for him as rated by the examiner in terms of the number of repetitions and side explanations required -- not a measure of motivation.

No.....Very Poor.....Poor.....Fair.....Good

5. Effort on Test. The examiner's estimate of the degree to which the patient was motivated to comply with instructions and complete the task set for him.

No.....Very Poor.....Poor.....Fair.....Good

6. Willingness. The examiner's estimate of the subject's attitude of acceptance of the task itself as an activity.

No.....Very Poor.....Poor.....Fair.....Good

7. Attention to Test. An estimate of the entrance of distraction into test performance (i.e., the object nature of the task -- how well can lose self in it).

No.....Very Poor.....Poor.....Fair.....Good

8. Self-Criticism. Estimate of the individual's ability to evaluate his own performance as indicated by speech and/or action.

No.....Under.....Average.....Over.....Extreme

9. Self-Confidence. The degree of the individual's assertiveness as to the adequacy of his performance, by speech and/or action.

No.....Under.....Average.....Over.....Extreme

10. Rapport. An estimate of the degree of mutual communication between patient and examiner, based upon contact with the examiner as immediate environment.

No.....Under.....Average.....Over.....Extreme

No.....Under.....Average.....Over.....Extreme

11. Intrusion of Psychotic Influence. The examiner's estimate of psychotic coloring which becomes manifest in the course of the interview by speech and/or action (includes such factors as bizarreness, irrational speech, delusions, irrational fears, mutism, posturing, inappropriate emotion, etc.)

Very Strong.Strong.....Slight.....Very Slight...No

12. Personal Concern With the Examiner. The degree to which the patient seems concerned with the examiner as another individual and expresses either curiosity or interest in the examiner as a person rather than as an examiner.

No.....Minor.....Mild.....Curious.....Very Active

LISTS

	1	4	7	10	13	16	19
BEM 56							
QIN 48							
GUK 95							
FAH 14							
CYL 30							
POZ 89							

	2	5	8	11	14	17	20
FAH 14							
POZ 89							
BEM 56							
CYL 30							
QIN 48							
GUK 95							

	3	6	9	12	15	18	21
CYL 30							
GUK 95							
POZ 89							
FAH 14							
BEM 56							
QIN 48							

	1	4	7	10	13	16
FAH 76						
CYL 80						
GUK 32						
POZ 19						
QIN 27						
BEM 64						

	2	5	8	11	14	17
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FAH 76						
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GUK 32						
CYL 80						

	3	6	9	12	15	18
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CYL 80						
FAH 76						

1 4 7 10 13 16 19
POZ 27

QIN 32

BEM 80

FAH 19

GUK 64

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2 5 8 11 14 17 20
GUK 64

QIN 32

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APPROVAL SHEET

The dissertation submitted by Eileen Sheila Trafimow has been read and approved by the following Committee:

Dr. Robert Solso, Chairman
Professor of Psychology

Dr. James Johnson
Associate Professor of Psychology

Dr. John Shack
Associate Professor of Psychology

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

May 16, 1974
Date

Robert L. Solso
Director's Signature