

A Comparative Study of Word Association
Evaluation Methods in
Process-Reactive
Schizophrenics

By

David Michael Scott

Approved:

Richard Levin

Richard Levin-Chairman, Thesis Committee

Russell E. Walls

Russell E. Walls-Associate Professor of Psychology

Sue Moss

Sue Moss-Assistant Professor of Psychology

Joyce G. Crouch

Joyce G. Crouch-Chairperson, Department of Psychology

Richard H. Rupp

Richard H. Rupp-Dean of the Graduate School

391995

Archiving
closed
LD
175
A40K
TH
452

A Comparative Study of Word Association
Evaluation Methods in
Process-Reactive
Schizophrenics

Thesis
Presented to
The Graduate Faculty
Appalachian State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

By
David Michael Scott
October 1977

LIST OF TABLES

Table	Page
I. Summary of Analysis of Moran(Moduo & Mome) and Commonality(Unipri & Tripri) Factors Across Groups	25
2. Means and Standard Deviations of Moran(Moduo & Mome) and Commonality(Unipri & Tripri) Factors Across Groups	26
3. Intercorrelations of Process-Reactive Scale with Commonality and Moran Evaluations	27
4. Summary of Analysis of Variance of Control Factors Across Three Groups	28
5. Means and Standard Deviations of Control Factors Across Groups	30

Acknowledgements

I would like to express my sincere appreciation to Dr. Richard Levin for serving as my chairman and offering continued support and direction throughout this research endeavor. Appreciation is also expressed to thesis committee members Dr. Sue Moss and Dr. Russell Walls for their review and creative comments of this project. Many thanks are given to Dr. Alexander Manning and the research committee of Broughton State Hospital in Morganton, North Carolina for providing the needed subject population. The staff of Unit D is to be especially noted for their help and interest in conducting this study. As Dr. Stein and Dr. Riazuddin gave beneficial suggestions and open access to the wards, Mr. Jay Bevis and Mr. Daniel Kaylor were instrumental in the subject selection procedure. With the aid of experienced aides, and nurses such as Mrs. Blakely, running this experiment was both enjoyable and enlightening.

I would also like to thank Mr. Jeffrey Lou Kreutzer for his help with the statistical analysis, involving the use of computer terminals. Appreciation is expressed to Dr. Schneider for his aid in the initial development of this research project. Finally, I wish to thank the patients in this study for their trust and cooperation.

Abstract

Three IO-member groups, designated process, indeterminate, and reactive, were constructed through a preliminary screening and oral administration of the Ullmann-Giovannoni Process-Reactive Scale. Scores on the process-reactive scale were used to assign subjects, state hospital inpatients, to one of the three groups. The Kent-Rosanoff Word Association Test was administered orally and scored by two variations of both the Moran and commonality methods. While the Moran was predicted to be more sensitive to degrees of pathology than commonality, neither measure significantly differentiated among groups. Insignificant correlations were obtained with both measures and the process-reactive scale scores. Findings resulted in the following conclusions: 1) The Moran and commonality evaluations (using the Kent-Rosanoff word list) are insensitive measures of associative disturbance and/or 2) Differences among process-reactive schizophrenics are not always existent in the realm of associative function. The results of this and past commonality studies tend to support the latter.

	Page
Title Page	i
List of Tables	ii
Acknowledgements	iii
Abstract	iv

Table of Contents

Introduction	I
Overview	I
Applied Word Association	2
Quantitative measurement of word-association responses.	6
Qualitative measurement of word-association responses .	9
Process-Reactive Schizophrenia	II
Word Association and Process-Reactive Schizophrenia	I4
Hypotheses	I8
Method	I9
Subjects	I9
Instruments	I9
Procedure	23
Results	24
Discussion	3I
References	33
Appendix	4I

Introduction

Overview

E. Bleuler(1950) first defined the fundamental symptoms of schizophrenia as disturbances of association and affectivity. Concerning association, Bleuler proposed that drives and ideas which usually organized and direct thinking, lose most or all of their influence in schizophrenia.

In the normal thinking process, the numerous actual and latent images combine to determine each association. In schizophrenia, however, single images or whole combinations may be rendered ineffective.... thinking operates with ideas and concepts which have no, or a completely insufficient, connection with the main ideas and should therefore be excluded from the thought-process(Bleuler, 1950, p. 22).

Bleuler thought of this phenomenon as a weakening of associative ties. When the directive associative threads provided by the context is weakened, responses based upon remaining associative threads then appear. Bleuler went on to delineate ten different disturbances of association that might suggest the presence of schizophrenia.

While emphasizing association in his description and theory of schizophrenia, Bleuler strongly endorsed the investigation of association activity itself. Commenting on the significance of association in experiments, Bleuler stated, "Every psychical activity rests upon the interchange of the material derived from sensation and from memory traces upon associations... any psychical activity without word association is unthinkable"(Bleuler, 1919, p.1). This conclusion led Bleuler to regard word association as an excellent device for exploring the area of psychopathology, and more specifically in aiding with the diagnosis and understanding of symptoms within the group of psychoses.

Bleuler's theory concerning the weakening of associative threads in schizophrenia is currently in accord with a large amount of research findings, despite the fact that it was proposed over 60

years ago (Broen, 1968). Word association has been utilized extensively throughout those years in clinical and experimental applications, though its popularity has waxed and waned at different times in its history. At any rate, a number of methods and techniques of word association have been developed for use in the experimental study of psychopathology, resulting in a field which is at present, rather confused. There appear to be many different measures to describe the data derived from word association tests, but little comparability or consistency among such measures. 'Few comparative studies have been performed, and... it is difficult to compare results of studies using different measures' (MacKenzie, 1972, p. 438). An important aspect of the confused situation has been summarized by MacKenzie. 'Only a very few of the many association measures are closely related to theories of cognition or associative functioning' (MacKenzie, 1972, p. 439). Therefore, comparative studies of popular word association measures are necessary in order to evaluate their relationship and efficacy, adding clarity to the field and eliminating those measures which are not closely related to theories of associative functioning or cognition.

Applied Word Association

Investigations in the area of word association have been concerned with the identification of natural language associative habits, viewing such habits as the first stage in the study of other cognitive processes. Interest has also been focused on the word associations themselves, 'reflecting the belief that associative processes are among the basic mechanisms of thought, and that to understand associative processes it is necessary to understand the constituent associations of which they are formulated' (Cramer, 1968, p. 1). This belief has a long historical tradition, dating back to the time when Greek philosophers attempted to explain the sequence of ideas in a train of thought. They hypothesized that association between ideas is based on the principles later came to be known as the primary laws of association (Woodworth & Schlosberg, 1954).

British empiricists of the eighteenth and nineteenth centuries

conceived of the primary laws as an explanation of how the mind functions. The laws of association were seen as being accountable for even the most complex mental functions. This period resulted in the formulation of the secondary laws of association, taking into account variables which might influence the formation of associative relationships. Task and environmental variables were of importance, while "the potential influences of certain subject variables- as constitutional differences, changes in emotional state, and differences in past experience- were also included in the secondary laws"(Cramer, 1968, p. 3). The two groups of association laws has led to two distinct approaches to the study of association in the discipline of psychology. As primary laws seek to define the conditions under which associations are first formed, psychologists investigating verbal learning have typically been involved in this area. In contrast, those studying the secondary laws of association have been more concerned with the conditions which change previously formed associations(Cramer, 1968).

Secondary laws of association were found to be quite applicable in the modern learning experiment(Woodworth & Schlosberg, 1954). F. Galton(1879) was the first to begin systematic investigations of previously formed associations, introducing ways of treating associative data quantitatively. W. Wundt soon followed Galton's move in his pioneer psychology lab, while students Trautscholdt and Cattell extended the basic free association experiment to include a controlled association section(Boring, 1950). As an offshoot of such studies, the beginning diagnostic studies of Jung and Ricklin (1904) and the detective studies of Wertheimer(1905) represented more concern over the role of subject variables in modifying associations. These "methods were based on the belief that either from the content of the associative response or in the emotional reaction accompanying the response, it would be possible to discern the central problem, or complex, which bothered the patient... or to identify the criminal"(Cramer, 1968, p. 4). In regard to the patient, peculiarities in response were labeled complex-indicators by Jung, providing evidence that a complex has been reached by a stimulus

word(Jung, 1966).

While the clinician might select stimulus words aimed toward an individual patient, Jung constructed a standard 100 item word association test to use in clinical practice and research. The words were chosen and arranged in such a way as to strike most of the common complexes discerned at that time. Considering Jung and subsequent investigators, "most complex-arousing words... tend to suggest these sides of life: love and marriage; friendship; quarrels and anger, injustice; ridicule, contempt, pity; danger; expense, money; death"(Woodworth & Schlosberg, 1954, p. 69). As a result of the early influence of Jung, the word association test has been utilized extensively as a projective technique in clinical setting.

Investigators Kent and Rosanoff(1910) also initiated research in word association and mental diagnosis along similiar lines as Jung. However, their main interest was in differentiating the insane from the normal, developing a 100-item standardized word association test for that purpose. Utilizing the test, they found that the normal subjects had a tendency to give one or another of a small group of common reactions. Their total results displayed an average of 6.8% individual responses(a response given by only one subject in a particular population) for the normal subjects and 26.8% for the insane subjects. Ley and Menzerath's study(1911) pursued the same problem as Kent and Rosanoff, finding characteristic differences in association responses for each psychopathic type through a somewhat introspectionistic approach. Ley and Menzerath related their ideas on the utility of word association within their conclusion, "Cette méthode constitue un des moyens cliniques les plus précieux que nous possédions pour explorer l'affectivité et déceler l'existence et la nature des complexes.... Elle nous permet de faire ressortir des symptômes et des caracteres qu'il n'est possible de constater aussi facilement et aussi rapidement, par aucune autre méthode"(Ley et Menzerath, 1911, p. 187).

Soon after the Kent and Rosanoff(1910) and the Ley and Menzerath (1911) studies, Watson(1913) launched his declaration on behaviorism, alienating cognition and word association from the mainstream of empirical, behavioristic psychology. It remained for Hull to

reinstate cognition as a legitimate topic of interest by postulating the pure stimulus act, in which chains of verbal associations were equated with cognition (Hull, 1952). Such an approach to the study of cognitive processes has been followed by Osgood (1953) and others, "by assuming that cognition consists of a series of implicit mediating responses between the initial overt stimulus and subsequent overt response" (Cramer, 1968, p. 5). Despite Hull's contribution to the use of association in experimental psychology, the association method was displaying signs of dropping out of clinical practice during 1930-1940 (Woodworth & Schlosberg, 1954). However, a rapid growth in the use of projective techniques during the forties meant a period of revival for word association. As the Rorschach and Thematic Apperception Test were most popular, association became more widespread in use due to its resemblance to such projective tests.

Currently word association is not utilized extensively in clinical practice. However, there do appear to be strong enclaves of mental health practitioners still benefitting from word association. This is best demonstrated by a 37 page chapter devoted to "The Word Association Test" in *Diagnostic Psychological Testing* by Rapaport and associates, published as recently as 1976 (Rapaport, Gill, & Shafer, 1976, p. 231-267). In comparison, word association in the realm of experimental psychology is proving to be an effective instrument in the investigation of cognitive processes in normal and psychopathological groups.

Studies have generally focused on the effects of pathology on associative behavior, attempting to delineate associative-response domains characteristic of different pathological groups. Cramer has defined associative-response domain as "the collection and organization of all those responses which make up the response hierarchy to a particular stimulus word" (Cramer, 1968, p. 212). With regard to organic pathology, there appears to be a great restriction in the associative domain, reflecting the elimination of associative pathways and not a weakening of associative ties. Persons

with organic pathology have also demonstrated response rigidity, in that they are less able to change associative responses upon request. In contrast, depressives and alcoholics are noted to have an increased reaction time and display maintenance of strong associations in lieu of the elimination of weaker responses. Normals responding to emotional stimuli and schizophrenic individuals have also demonstrated an increase in reaction time (Cramer, 1968).

Schizophrenic populations have shown a somewhat unique difficulty in their associations, in that they are not able to restrict the associative domain. The origin of such appears to be a breakdown of the associative domain boundary plus the hierarchy within the domain. An increase in the strength of weaker responses may be a consequence of increased response competition and result in increased response variability in their associative behavior. At any rate, studies in word association indicate that associative domains differ according to different pathological groups. However, 'multiple causality of the same associative-response behavior has contributed to the difficulties investigators have encountered in trying to determine response measures which would discriminate among the various pathological conditions' (Cramer, 1968, p. 216).

Quantitative measurement of word-association responses. Quantitative measures have been used to indicate the degree of organization of the associative-response domain. The most popular response measures have been variants of a quantitative approach, utilizing response commonality through referral to standardized word association norms. Such norms are collected by administering a standardized list of stimulus words to a large number of persons within a particular population, generally designated as 'normal.' A number of norm collections upon a variety of groups have been reported. Though often used in psycholinguistic research, the previously discussed Kent-Rosanoff (1910) list and subsequent norms (Russel & Jenkins, 1954) appear most often in experimental studies of psychopathology. Rosanoff (1927) published frequency tables of responses evoked by giving the Kent-Rosanoff Word Association Test to 1000 normal subjects.

These norms were later revised for responses to the same one hundred stimulus words by a group of 1008 normal subjects (Russell & Jenkins, 1954).

The commonality score is based on norms and measures the strength of association between the stimulus word and a subject's association. The strength of association is measured by the frequency that the response word was given to the stimulus word in a normal population. As there is a tendency for many individuals to give identical responses in an association test, the frequency which one's associations occur in the general population may provide an objective index of the literal normality of the responses and the degree of organization of the associative response domain. Several popular methods of scoring commonality exist and have been used extensively in the same form for the last 30 or more years. One method relies upon the occurrence of a primary response, which is a response occurring with the highest frequency to any one stimulus word (as defined by norms). While each response qualifying as a primary may be assigned a value of one, a summation of values results in a total primary score. A similar scoring approach involves assigning a value to a response which is one of the three most common or frequent responses to the stimulus. Response commonality has also been determined at times by scoring each response with its associative-response frequency. Such a value could vary from zero to the total number of subjects tested. As these measures of response commonality are the most popular, Palermo and Jenkins (1964) sought to designate which of these scoring methods presents the best measure of associative strength. They concluded that "it appears that weighting schemes and scoring manipulations have little to offer. If one wants to approximate the complete weighted frequency score, the counting of popular responses is sufficient" (Palermo & Jenkins, 1964, p. 160).

The response commonality measure has proved useful over a broad range of research areas, but is often a topic of controversy and criticism. A heavy reliance on normative data has been cited as one of the commonality score's major shortcomings (DeWolfe &

McDonald, 1972; Jung, 1966; Jenkins & Russell, 1960). "Norms which are based on ... popularity of responses are especially susceptible to change and require frequent checking in our rapidly changing society"(Jenkins & Russell, 1960, p. 293). Jenkins and Russell(1960) have noted major changes between two sets of norms collected about 24 years apart, displaying an increase in the frequency of primary responses. They suggested that this phenomenon may be the result of a " general change in test taking attitudes" and possibly a "change in the meaning of particular stimuli over time"(Jenkins & Russell, 1960, p. 303).

While Russell and Jenkins discussed extraneous variables adversely affecting the use of norms, J. Jung(1966) has commented upon more immediate factors affecting word association performance, criticizing the casual use of response commonality in experimental studies. Jung emphasized that " variations in test administration procedures may lead to differences in the obtained responses" (Jung, 1966, p. 126), possibly affecting norm collection and or the responses of subjects under study. Investigators typically refer to previously collected norms to compare their experimental groups, regardless of the type of administration procedure involved. In relation to this issue, a written word association test may render different responses than an oral one, since words on the page may affect responses to other words(Jung, 1966; Wynne, Gerjuoy, & Schiffman, 1965). There is also the question of how valid it may be to apply group norms to the data of individual subjects, since the time of norming and the cultural aspects of the normative population is often quite different from subsequent subject groups. Jung goes on to cite studies showing how instructional set, stress and different subject set may also affect association responses.

Specifically in regard to experimental studies of psychopathology, response commonality can be a misleading and maladaptive measure. Jenkins has explained that deviation from the norm may be in either of two directions, either subnormal or supernormal. However, as all pathological associations are low in commonality, the reverse

is not true(Jenkins, 1960). Unpredictable results have also been obtained using the commonality score, demonstrated by the Sommer, Dewar, and Osmond(1960) study. The normal subjects in their study received lower commonality scores than nonpsychotic psychiatric patients. Similiar results were found by Dokecki, Polidoro, and Cromwell(1965), with college students being lower in commonality than general medical patients of which half were alcoholics. While response commonality may be valuable in linguistic studies: '' We have to conclude that the use of group norms to study thought processes is a risky procedure''(Schwartz & Rouse, 1961, p. 99).

Qualitative measurement of word-association responses. In contrast to such quantitative measures(response commonality), there are also measures which indicate the qualitative nature of the word association response. Responses may be described by a number of schemata, such as their part of speech, and whether they are opposites or contrasts to the stimulus. They may also be described in terms of a syntagmatic or paradigmatic response. A syntagmatic response fills a different grammatical position from its stimulus, while the paradigmatic occupies the same part of speech as the stimulus. These and other measures designated as qualitative are not subjective, but obtain a high degree of objectivity by reference to a standard criterion(Cramer, 1968).

As an amount of objectivity is obtainable, qualitative measures have dealt with characteristics relevant to the experimental study of psychopathology. Response characteristics '' such as emotionality, usualness, degree of disturbance, conceptual closeness to, or distance from the stimulus''(Cramer, 1968, p. 29) have been investigated through ratings by the experimenter. Ratings are based upon a previously designed classification scheme, utilizing categorical assignment of responses. As with response commonality, there has been some controversy over the effectiveness and efficiency of the qualitative rating approach. Cramer(1968) offered a negative evaluation upon this method, stating '' a fairly large number of subcategories of response disturbance have been proposed, but the inconsistent and/or insignificant findings obtained when they have been used makes it

somewhat doubtful if their use merits the amount of additional scoring effort required''(p. 30). Her somewhat harsh conclusion is supported only by the citation of the Applebaum(1963) study and the Flavell, Draguns, Feinberg, and Budin(1958) study. Referring to these studies, one might question Cramer's definition of ''inconsistent and/or insignificant findings.'' Both studies do implement a number of scoring categories(Applebaum: 10 categories; Flavell and associates: 16 categories), but appear to be somewhat broad investigations, making no strong initial argument for the existence of each category.

Applebaum(1963) proposed 10 characteristics of responses or categories which might show psychological deficits associated with brain damage. The categories include repetitions, blocking, multi-words, unrelated responses, failure, corrected repetitions, perseveration, self-reference, proper names and repetitions of the same stimulus word. Experimenting with three association sessions for each subject, the second session asked for individual reproductions of the first session's responses, while the third called for new individual associations. Experimental analysis demonstrated significant differences in the expected direction between brain-damaged patients and psychiatric patients without brain damage in regard to the categories of repetitions, unrelated responses and failures to respond. In addition, an analysis of responses to traumatic and non-traumatic stimulus words suggested that the brain-damaged group was not affected by the stimulus words designated traumatic. Applebaum's study thereby found a third association session improved the prediction of brain damage by association. ''On the added association trial, brain-damaged Ss tended to show disturbances in responding, regardless of whether the stimulus words were traumatic or not, while both nonbrain-damaged groups made their disturbances significantly more often in response to traumatic words''(Applebaum, 1963, p. 84).

Considering such a design and its findings, Cramer appears to have misinterpreted the goal of the Applebaum study. The experimenter did not hypothesize significant differences between

groups within all IO scoring categories, but chose to investigate the utility and effectiveness of repetition and a number of response characteristics in discriminating between brain-damaged and non-brain-damaged groups. Applebaum's use of a qualitative rating method for such an investigation seems appropriate and effective. Cramer may also be somewhat off base in relation to the Flavell, Draguns, Feinberg, and Budin (1958) study. While these experimenters admit to the overly broad and nonspecific nature of their scoring system, it was 'the primary purpose of the study to make a preliminary test of two broad hypothesis' (Flavell, Draguns, Feinberg, & Budin, 1958, p. 1). Therefore, Cramer's evidence for a negative evaluation of qualitative rating measures appears somewhat invalid, or at best near-sighted.

Rating measures are highly variable in construction from one experimenter to another and tend to measure different functions by any number of categories. They do not rely on standardized cultural norms, but reflect a wider range of culture-free applicability. As a strength of such a measure is the flexible nature of its construction, the experimenter selects response characteristics which are of interest and designs the rating measure by reference to some standard criterion in order to obtain objectivity. Owing to the personal mode of construction, few qualitative rating measures have been utilized consistently within the experimental study of psychopathological processes, resulting in a strong reliance on quantitative commonality measures. However, efficient rating scales designed particularly for the study of pathological thought processes, could be more applicable than the popular norm-based criteria. Such personalized scales might offer more generalizability and produce valid information on cognitive processes if used consistently across studies in reference to various diagnostic groups.

Process-Reactive Schizophrenia

In his review on this particular classification, Herron (1962) provides the general accepted definition of process and reactive schizophrenia,

process schizophrenia involves a long-term progressive deterioration of the adjustment pattern with little chance of recovery, while reactive schizophrenia indicates a good prognosis based on a history of generally adequate social development with notable stress precipitating the psychosis(p. 329).

The process-reactive distinction appears to have an origin in the early development of diagnostic categories. Kraepelin was the first to develop the concept of dementia praecox, identifying it as an incurable deteriorative disorder. Bleuler agreed with Kraepelin in an organic etiology for this diagnostic entity(Bleuler renamed dementia praecox as schizophrenia), but found that some cases recovered. He believed that schizophrenia '' was characterized by a splintering of psychic functions rather than by gradual deterioration''(Kantor & Herron, 1966, p. 8). Bleuler's new conception of the prognosis led to a great number of prognostic studies, resulting in formal descriptions of process-reactive schizophrenia, defined by specific criteria.

Considering such criteria, a case of process schizophrenia is described as having a slow insidious onset, while reactive schizophrenia occurs almost overnight and may be viewed as a result of acute stress. The process picture can not be seen as the result of any immediate stress, but has occurred gradually over the years, with increasing social withdrawal and cognitive disorganization. In comparison, the reactive picture involves a premorbid adjustment which ''was normal or neurotic, rather than schizoid, with some degree of approach tendencies in interpersonal relationships''(Higgins, 1964, p. 9). Upon admission to a mental health facility, the process schizophrenic presents a flat affect and almost no confusion. The opposite is true for the reactive, in that he shows confusion and a number of affective components. The case of reactive schizophrenia is seen to have a good prognosis and the case of process schizophrenia, a poor prognosis.

Conventional subclasses of psychiatry have relied heavily on the differences in apparent symptoms. This is not the case with

the process-reactive distinction, which utilizes variables such as premorbid adjustment and onset of illness. Zigler and Phillips (1962) have gone so far as to define this dual system as "superordinate categories employing a unique classificatory principle which cuts across the existing subgroups of schizophrenia" (p. 216). Even so, the process-reactive entity and other diagnostic subtypes of psychiatry are concerned with prognosis to a great extent.

The more popular and longstanding conception of the distinction involves a continuous dimension, with the process patient at one end and the reactive at the other. Becker (1956) stated that "the process-reactive syndromes are best thought of as end points on a continuum of levels of personality organization" (p. 229), defining personality organization as being "concerned with changes in the content and structure of mental organization as the human organism develops toward psychological maturity" (p. 229). The distinction is further conceived of as end points for a continuum involving severity of illness (Becker, 1959). Support for the continuum point of view has been offered by Kantor, Wallner, and Winder (1953), Becker (1956, 1959), Garmezy and Rodnick (1959), Kantor and Winder (1959), and Kantor and Herron (1965). In opposition to this concept, the dichotomy view of the process-reactive dimension usually implies a process-organic versus a reactive-psychogenic formulation of the etiology of schizophrenia. On the basis of empirical evidence, Garmezy and Rodnick (1959) maintained that there is little support for such a dichotomy.

In a critique of the process-reactive distinction, Higgins and Peterson (1966) agree that

process schizophrenia probably does reflect a more undifferentiated, less integrated personality structure than reactive schizophrenia; but to be of genuine utility, the process-reactive concept must be shown to have some surplus meaning above and beyond simple quantitative differences in severity of illness (p. 202).

Higgins appeared to be asking for qualitative differences between process and reactive groups, which might provide additional meaning

to the distinctions. In reaction to Higgins, DeWolfe (1974) presented a theoretical formulation involving multiple factors related to one aspect of the process-reactive distinction (i.e., cognitive functioning).... as an attempt to clarify some of the inconsistencies in the process-reactive literature and as a possible point of departure for research on cognitive functioning in process and reactive schizophrenics'' (p. 285).

The lower level of functioning in the process group is seen by DeWolfe as resulting from unconventional thinking and a general underresponsiveness to stimuli and environmental demands. They are not capable of thinking like others because their long term emotional withdrawal gave them no opportunity for such learning. In comparison, the reactive group's deficits occur because of fragmented thought processes, due to an excessive responsiveness to the external stimuli. Their level of functioning is expected to be closer to normals when they are not in a stress situation or acutely disturbed. However, the reactives' performance may be at or below that of a process patient if under stress. Therefore, disorganization of thought processes occurs in process schizophrenics through interference of internal stimuli, and in reactives, through interference of external stimuli (DeWolfe, 1974).

Word Association and Process-Reactive Schizophrenia

Word association has frequently been used in studying schizophrenic thinking, owing to the early influence of Bleuler. Bleuler was the first to indicate that associative disturbance is a mechanism underlying all schizophrenic symptomatology. Lang and Buss (1965) have demonstrated Bleuler's influence on current theories of schizophrenic functioning, by pointing out that a higher number of deviant associations for schizophrenics is necessary for interference theories of schizophrenic deficits (Broen, 1968 ; Storms & Broen, 1969). However, some studies have failed to find differences between the word associations of schizophrenics and normals

(Dokecki, Polidoro & Cromwell, 1965; Fuller & Kates, 1969) using the commonality score as the measure of associative strength. Such negative results also appear to be the case for studies comparing process and reactive schizophrenics on word association performance, again using the commonality scoring method (Fuller & Kates, 1969; Higgins, 1964; Humphries, 1960; Ries & Johnson, 1967; Schweid, 1966). In a review of more recent research in process-reactive schizophrenia, Higgins (1969) related three more unreported studies producing insignificant differences between process and reactive groups using commonality. He obtained the results of such studies through separate personal communications with Deckner, Cromwell and Rodnick.

Significant differences in associative strength between process-reactive groups have also been reported (Dokecki, Cromwell & Polidoro, 1968; Dokecki, Polidoro & Cromwell, 1965; Foley, 1968; Wynne, 1963), as well as differences between schizophrenics and normals (Herr, 1957), and process schizophrenics and control hospital patients (Dokecki, Polidoro & Cromwell, 1965; Wynne, 1963). Unexpected findings were reported in a study by Deckner and Cromwell (1970), in which the process group was actually higher in commonality than the reactive group. Attempting to account for this phenomenon, "the possibility of inadequate reliability of the K-R Word Association test as a measure of schizophrenic verbal behavior" (Deckner & Cromwell, 1970, p. 508) was considered. Deckner and Cromwell (1970) further added that "no studies... have dealt directly with this difficult question" (p. 508).

Deckner and Cromwell appear to be the first research team using the commonality scoring method to begin questioning its use. Reviewing the commonality based associative studies in process-reactive research, most of these researchers attempt to account for their own inconsistent findings by postulating a lack of controls and other methodological differences, in regard to age, education, sex, severity of current symptomatology, length of institutionalization and mode of word association administration procedure. Their concern with controlling for all variables may be called for, but controlling for these variables has not resulted in consistent or conclusive results (Deckner & Cromwell, 1970; Fuller &

Kates, 1969; Ries & Johnson, 1967).

In summary, process-reactive theory proposes that the process schizophrenic is more deviant in his associations than the reactive schizophrenic, displaying a lower commonality score. Process-reactive research using the commonality scoring method has resulted in confusion, as a result of a variety of experimental findings. While some studies found insignificant differences between the groups in commonality, others provided significant differences with either reactive or the process group highest in commonality. Perhaps it is time to evaluate the effectiveness of the commonality score.

A group of studies by DeWolfe and associates (DeWolfe, 1971; DeWolfe & McDonald, Note I, 1972; DeWolfe & Youkilis, 1974) using word association methods has been concerned with a hypothesis of different schizophrenic thought processes related to premorbid adjustment (process-reactive distinction) and other related issues. DeWolfe chose not to use the commonality score for associative evaluation, due to the previously described shortcomings of the method and the inconsistent findings reported with its use. Instead, a 5 point rating scale of relatedness of the stimulus word to the response word has been implemented in DeWolfe's studies, using a scale developed by L. J. Moran (1953).

Reviewing the past implementation of the scale, Moran (1953) found significant differences between schizophrenic patients and normals on word association measures in the first reported use of the Moran scale of associative disturbance. DeWolfe and McDonald (1972) also found significant differences between their schizophrenic group and three separate normal group's responses, previously collected and reported by Moran (1966) and associates (Moran, Mefferd, & Kimble, 1964), and Rapaport, Gill, and Shafer (1945-46). In regard to process-reactive research, the Moran scale appears to have been put to a variety of uses by DeWolfe. Positive results were found by DeWolfe and Youkilis (1974) with the scale, confirming their hypothesis that process and reactive schizophrenics produce equally deviant associations under high stress conditions, while reactives tend to produce significantly less deviant responses under low

stress conditions. Concerning sex differences and the process-reactive classification, the hypothesis of equivalence in associative disturbance under high stress conditions was confirmed (DeWolfe, 1971; DeWolfe & McDonald, Note 1, 1972).

Moran constructed this associative scoring method according to psychometric standards and through repeated testing. He originally used his association method as one test in a battery of 7, to do "an intensive comparative analysis of the understanding and use of word meanings by matched pairs of schizophrenic patients and non-psychiatric patients" (Moran, 1953, p. 1). Implementation of the Moran method involves trained judges assigning a score of 0-4 to each of the subject's responses, according to the following system (Moran scale as used by DeWolfe).

<u>Scale</u>	<u>Description</u>
4	synonym, antonym, or common opposite
3	category, example, function, or attribute
2	sentence completion, word extension, and other loose relationships, i.e. past tense (if not functional relationship)
1	a single, apparently unrelated word
0	multiword, repetition, blank

Word responses receiving a '3 or 4' are considered healthy responses, while scores of '0, 1 or 2' are considered pathological associations. In DeWolfe's type-of-deficit evaluation, used most frequently, the mean values for scores are computed for the categories of the pathological ('0, 1, 2') associations. The type-of-deficit evaluation determines which group gives a significantly greater total of pathological associations.

DeWolfe has also utilized the scale at times in controlling for severity of current symptoms (DeWolfe, 1971; DeWolfe & Konieczny, 1973a, 1973b) and exploring frequency of associations in idiodynamic set categories for healthy responses (scored '3, 4') (DeWolfe, 1971; DeWolfe & McDonald, Note 1, 1972). However, the major use of the Moran scale and most closely related to the function of commonality scoring is the type-of-deficit evaluation, in which the degree of pathological associations (0-2 responses) may be assessed.

From the reported use of the Moran scale, it appears to be a somewhat reliable and valid method of measuring associative disturbance. The Moran scale may be utilized in a number of ways to obtain a maximum amount of information, but need not depend on culturally biased norms and frequency assignment as commonality scoring. The purpose of this is to better understand the reasons for the inconsistent findings within the study of associative disturbance and process-reactive schizophrenia, through the investigation of the relative effectiveness of the Moran and commonality evaluation methods.

Hypothesis

In view of the preceding review of the research literature and theoretical considerations, the following hypotheses are put forth:

1. The Moran scale scores will demonstrate significant differences between process-reactive groups more reliably than the commonality scores based upon responses to the Kent-Rosanoff (1910) Word Association Test.
2. The Moran scale scores will demonstrate significant correlation with a patient's degree of pathology, as determined by placement on the process-reactive continuum, at a higher level of significance than obtained by commonality scale scores.

Method

Subjects

Subjects were 30 male patients from Broughton State Hospital at Morganton, North Carolina. The diagnosis of schizophrenia for each subject was arrived at by the assigned psychiatrist. Prior to considering a patient for the study, it was determined that they were between the ages of 18 and 40 years, had been in the hospital for at least 72 hours, and had no history of brain damage, alcoholism, drug addiction, mental retardation or any type of shock therapy in the previous 9 months and no more than 30 such treatments in all. Meeting such criteria, all acceptable patients on one main psychiatric treatment unit were randomly tested for construction of three, ten member groups over a six month period. Groups were constructed according to their scores on the Ullmann-Giovannoni (1964) Process-Reactive Scale (UG). Subjects receiving a score of 0-12 were placed in the process group, while a score of 16 or above would mean placement in the reactive group. One other indeterminate group was constructed for patients receiving a score of 13-15 (Berger, Note 2; Ullmann & Giovannoni, 1964). As each group contained 10 members, only the first ten patients tested during the six months with the appropriate scores were included in a group. It may be noted that subjects for the reactive group were quite difficult to find in the rather chronic population of a state hospital.

Instruments

The 100 word Kent-Rosanoff (1910) list was administered to each subject, as it is the most widely used list in associative studies of process-reactive schizophrenia. Word association responses were scored for commonality through use of the norms collected on the Kent-Rosanoff list by Russell-Jenkins (1954), involving a subject population of 1,008. As two commonality scorings were initiated, one entailed assigning a value of one to each response

appearing as the highest frequency response in the normed population. Another commonality score operated in the same manner, except a value of one was given to a response appearing as one of the three most frequent responses in the normed population.

Word association responses were also evaluated by way of the Moran (1953) scale of associative disturbance, as used by DeWolfe (1971) and associates (DeWolfe & McDonald, Note 1, 1972; DeWolfe & Youkilis, 1974). The Moran scale was constructed by extensive testing with small groups of psychiatric and nonpsychiatric patients, hospital and clinic non-professionals. While appropriate revisions were made during this period, the scale was considered adequate for use when its use "yielded a wide range of scores... a mean score near the mid-point or third quartile of the range of possible scores and... could be scored with maximum reliability" (Moran, 1953, p. 6). The Moran method involves judging each word response on the Moran 5 point scale of relatedness of the response word to the stimulus word. As each word response is judged and given a number, '0-4', the mean values for scores are computed for the categories of the pathological ('0, 1, 2').

Several criteria to determine process-reactive status were available, of which Humphries (1970) has classified into "three categories: physiological symptomatology, subjective description or objective measurement" (p. 15). Considering the first, Funkenstein, Greenblatt, and Solomon (195) designed the mecholyl test, measuring systolic blood pressure. This test has been found to have questionable reliability and is somewhat difficult to administer, due to the use of medication (Higgins & Peterson, 1967). In addition, there is now evidence that the mecholyl test is not effective in predicting long term outcome (Vaillant & Funkenstein, 1966). Therefore, the mecholyl test appeared to be an inadequate and possibly unreliable measure. The more popular criteria involving a subjective description include the Elgin Prognostic Scale (Wittman, 1941), Kantor, Wallner and Winder's (1953) items and the Phillips Scale (1953). While one of these criteria is often selected by researchers, Herron (1962) describes the difficulties in using these measures.

The criteria of Kantor et al. (1953) does not provide a quantitative ordering of the variables, and is descriptively vague in several dimensions as well as depending upon life history material which

is not always available. While the Elgin scale does provide a quantitative approach it also has the disadvantages of descriptive vagueness and excessive dependence upon life history material. The Phillips scale eliminates some of these difficulties, but its validity is limited to the adequacy or inadequacy of social-sexual premorbid adjustment(p. 341).

In his review of the literature, Herron added that the need for more effective criteria could be met through the use of rating scales in which the patient verbally supplies the appropriate information. The Ullmann-Giovannoni(1964) Process-Reactive Scale(UG) did fit this requirement, representing an objective measurement of the process-reactive status. It consists of "a 24 item true-false scale(self-report) dealing with behavior evidencing interaction with the environment... developed using a criterion of consistency"(Ullmann & Giovannoni, 1964, p. 41). High scores on the UG are indicative of good premorbid adjustment(reactive orientation), while lower scores are indicative of the opposite(process orientation).

The Ullmann-Giovannoni scale was developed from a 77 item true-false inventory, previously constructed to predict post-hospital employment. The original inventory contained items concerned mostly with social functioning and psychiatric symptomatology. Three clinicians judged all the items for relevance to the process-reactive status, resulting in 28 items, with each of the items being agreed upon by at least two of the three judges.

The 28 item scale was administered to two samples of 638 and 300 male schizophrenic Veteran's administration Hospital patients, all being under the age of 59 years and without central nervous system pathology. In the first 100 cases, part-whole chi-squares were in the predicted direction for all items, while twenty-three of the twenty-eight chi-squares were statistically significant(.01 level). The modified scale was then administered to a second and third sample of 100 patients each, resulting in a 24-item scale. Out of the 638 patient sample, all 24 of the part-whole chi-squares were in the predicted direction and 23 of the 24 chi-squares were

significant(.01 level). An adjusted split-half reliability estimate of .797 was obtained for an additional sample of 122 patients.

The UG demands little time and effort, and has been found to correctly categorize 90% of the patients into process and reactive types, utilizing the premorbid history section of the Phillips scale(Phillips, 1953) as comparable criterion(Berger, Note 2; Johnson and Ries, 1967). "Johnson and Ries(1967) concluded that the highly significant correlations between it and the Phillips score would tend to justify the use of the UG scale for differentiating process-reactive schizophrenics(process: 0-12; indeterminate group: 13-15; reactive group: 16-24)"(Berger, Note 2, p. 17). However, it should be noted that most discrepancies between the UG (1964) and the Phillips(1953) cluster within the midrange(13-15), even though few misclassifications occur outside of this range (Berger, Note 2; Johnson and Ries, 1967).

As Ullmann and Giovannoni(1964) have reported a split-half reliability of approximately .80, Margaro(1968) reported a test-retest reliability of .73(p less than .01) for the UG. These reliability results indicate that the scale maintained its consistency over time, in that the subjects do not appear to shift groups. Concerning validity, Meichenbaum(1966) has studied the predictive validity of the UG, finding that the more reactive patients were discharged sooner than were the process patients. Probing the construct validity of the UG, he found low but significant correlations(p less than .05) between the UG and three verbal conceptual ability tests. This led Meichenbaum to believe that the level of previous social adjustment demonstrated in the UG was related to degree of thinking pathology. The UG was found to have several advantages over physiological symptomatology measures and subjective description ratings as an objective measuring instrument to differentiate process and reactive schizophrenics. This study used the UG to measure degrees of pathology according to premorbid adjustment. An indeterminate group was included to establish a somewhat evenly distributed subject population.

Procedure

As unit staff aided in the identification of potential subjects, the patient was shown a confidential statement regarding participation in the study. If the patient agreed to participate, he signed the statement and the UG was administered verbally by the experimenter. Following the completion of the UG, the experimenter asked the subject to relax for several minutes. During that time, the scale was scored and it was determined if a position still existed for an additional member in the group corresponding to the subject's score. If that particular group had been previously filled, the subject was thanked for his participation and informed that he could leave. Finding an open position in a group for the subject, the experimenter administered the IOO item Kent-Rosanoff (1910) word association test under low stress conditions. This was defined as a face-to-face verbal administration, recording the subject's response with a cassette tape recorder and microphone in full view. The following instructions were given to subject prior to the administration. "I am going to read you a list of ordinary words, one by one. When I say the word, answer with the first word that comes into your mind." Upon giving a multi-word response, the experimenter stated, "please give only one word." The experimenter made this statement only on the first and second multi-word response by the subject, if any. After the completion of the word association administration, the subject was thanked for his participation and informed that he could leave. All recorded responses were transcribed at a later date and scored by the previously discussed methods. Note that the two judges used for the Moran method obtained an interjudge reliability correlation of .98 on a series of sample associations prior to actual scoring for this study.

Results

Hypothesis one stated that the Moran scale scores will demonstrate significant differences between process-reactive groups more reliably than the commonality scores upon responses to the Kent-Rosanoff (1910) Word Association Test.. In order to test for this, the main factors were analyzed in terms of their ability to differentiate among the three groups. Main factors included two Moran (Moduo and Mome) and two commonality (Unipri and Tripri) factors.

Analysis-of-variance was implemented separately to determine if each of the four main factors differentiated between the groups. Table I presents the results of Moduo, Mome, Unipri and Tripri across process, indeterminate and reactive groups. No significant differences were found using any of the four main factors, though each analysis produced a significantly high level of within-group variability. Such variability can also be seen in the means and standard deviations of groups on each factor in Table 2. As insignificant differences between groups were obtained on both Moran and commonality evaluations, hypothesis one was rejected and the null hypothesis accepted.

Hypothesis two stated that the Moran scale scores will demonstrate significant correlation with a patient's degree of pathology, as determined by placement on the process-reactive continuum, at a higher level of significance than obtained by commonality scale scores. Testing for this hypothesis, the main factors were correlated with a patient's degree of pathology, as defined by UG scores. Table 3 shows that no significant correlations were obtained between the UG and main factors. Therefore, hypothesis two was also rejected and the null hypothesis accepted.

Considering group construction, the groups appeared to be well matched. The process, indeterminate and reactive groups were compared on age, education level, length of institutionalization and UG scores by analysis-of-variance (refer to Table 4). While the groups did not differ significantly on education level and length of institutionalization at the .05 level, age obtained significance at the .10 level. Even so, the means and standard deviations shown tend to indicate that the age factor did not bias the group's construction. While the

Table I
 Summary of Analysis of Moran(Moduo & Mome) and
 Commonality(Unipri & Tripri) Factors Across Groups

Source	SS	df	MS	F ^a
<u>Moduo</u>				
Between Ss	2	2	I	.01
Within Ss	4743	27	I76	
Total	4745	29		
<u>Mome</u>				
Between Ss	I77.450	2	88.72500	.29895
Within Ss	80II.I25	27	296.70833	
Total	8I88.580	29		
<u>Unipri</u>				
Between Ss	I65	2	83	.64
Within Ss	3488	27	I29	
Total	3653	29		
<u>Tripri</u>				
Between Ss	23	2	I2	.09
Within Ss	3455	27	I28	
Total	3478	29		

Note. Moduo= Moran(1953) evaluation, assigning a value of one to a 0-2 response; Mome= Moran evaluation, adding values of 0-2 responses; Unipri= Commonality evaluation, assigning of a value of one to a response which is the most frequent one in a normed population; Tripri= Commonality evaluation, assigning a value of one to a response which is one of the 3 most frequent responses in a normed population.

^aFailed to be significant at the .05 level.

Table 2
 Means and Standard Deviations of Moran (Moduo & Mome)
 and Commonality (Unipri & Tripri) Factors Across Groups

Factor	Groups		
	Process	Indeterminate	Reactive
Moduo	M= 38.40	M= 38.80	M= 39.10
	SD= 13.30	SD= 10.60	SD= 15.40
Mome	M= 75.10	M= 80.95	M= 79.00
	SD= 12.24	SD= 19.89	SD= 23.81
Unipri	M= 29.30	M= 35.00	M= 32.80
	SD= 9.37	SD= 13.00	SD= 11.40
Tripri	M= 47.40	M= 48.00	M= 49.50
	SD= 10.30	SD= 11.00	SD= 12.60

Note. Moduo= Moran(1953) evaluation, assigning a value of one to a 0-2 response; Mome= Moran evaluation, adding values of 0-2 responses; Unipri= Commonality evaluation, assigning of a value of one to a response which is the most frequent one in a normed population; Tripri= Commonality evaluation, assigning a value of one to a response which is one of the 3 most frequent responses in a normed population.

Table 3
 Intercorrelations of Process-Reactive Scale
 with Commonality and Moran Evaluations^a

Variable	MORAN		COMMONALITY	
	Moduo	Mome	Unipri	Tripri
UG	.026	.154	.085	.012

Note. UG= Ullmann-Giovannoni Process-Reactive Scale(1964);
 Moduo= Moran(1953) evaluation, assigning a value of one to a 0-2
 response; Mome=Moran evaluation, adding values of 0-2 responses;
 Unipri= commonality evaluation, assigning of a value of one to a
 response which is the most frequent one in a normed population;
 Tripri= commonality evaluation, assigning a value of one to a
 response which is one of the 3 most frequent responses in a
 normed population.

^a Failed to be significant at the .05 level.

Table 4
 Summary of Analysis of Variance of Control Factors
 Across Three Groups

Source	SS	df	MS	F
<u>(Age)</u>				
Between Ss	148.2000	2	74.1000	2.77
Within Ss	722.5000	27	26.8000	
Total	870.7000	29		
<u>(Ed.Level)</u>				
Between Ss	10.4700	2	5.2300	1.36
Within Ss	103.7000	27	3.8400	
Total	114.1700	29		
<u>(L.Inst.)</u>				
Between Ss	308028.0000	2	154014.0000	1.06
Within Ss	3938611.0000	27	145874.0000	
Total	4246638.0000	29		
<u>(UG)</u>				
Between Ss	354.47	2	177.2300	65.55*
Within Ss	73.00	27	2.7000	
Total	427.47	29		

Note. Ed.Level= years of education; L.Inst.= days in institution (psychiatric) since birth; UG= Ullmann-Giovannoni(1964) Process-Reactive Scale; Age= age in years.

* $p < .001$

process group produced a mean of 25.2 and a standard deviation of 5.87 years, the reactive group had a mean of 30.6 years and a standard deviation of 4.5 years (refer to Table 5). It should also be noted that the mean of the indeterminate groups fell approximately between the end groups. Therefore, the mean ages rendered and a lack of significance between groups on length of institutionalization appear to control for any age or chronicity bias. Another factor of concern, level of education, also lacked any significant differences among the groups.

The UG scores were also evaluated by way of analysis-of-variance to determine efficiency of group construction. Scores between groups on the UG obtained significance at the .001 level, indicating valid group construction according to the process-reactive dimension. The results above involving analysis of control factors indicated that the groups were roughly comparable on all relative factors, adding further weight to the rejection of all major hypotheses.

Table 5
Means and Standard Deviations of
Control Factors Across Groups

Factor	Groups		
	Process	Indeterminate	Reactive
Age	M= 25.200 SD= 5.870	M= 28.5000 SD= 5.0600	M= 30.600 SD= 4.500
Ed.Level	M= 11.000 SD= 2.310	M= 12.2000 SD= .4220	M= 12.300 SD= 2.450
L.Inst.	M= 287.000 SD= 310.000	M= 385.1000 SD= 514.0000	M= 138.600 SD= 278.000
UG	M= 9.500 SD= 2.270	M= 14.2000 SD= .9190	M= 17.900 SD= 1.450

Note. Ed. Level= years of education; L.Inst.= days in institution (psychiatric) since birth; UG= Ullmann-Giovannoni(1964) Process-Reactive Scale; Age= age in years.

Discussion

This study investigated the inconsistent findings, in regard to the study of process-reactive schizophrenic differences using the commonality evaluation of association method. The investigation was in the form of a comparative study, determining the relationship of the commonality method to another which was known to have rendered more consistent and significant results, the Moran rating scale method (Moran, 1953). Each approach was evaluated in terms of its ability to differentiate between process, indeterminate and reactive schizophrenic groups by way of word association responses.

Using the same 30 subjects (10 per group) for each evaluation, neither the Moran or commonality method was found to significantly differentiate between the three groups. In addition, both approaches rendered insignificant correlations with the UG, further displaying an inability to distinguish between the process-reactive dimension. As the groups were comparable on all control measures (age, education level and length of institutionalization) and constructed using UG scores, there are few reasons to believe that the groups were poorly constructed. Previous cross-validation, construct-validity and reliability studies (Johnson & Ries, 1967; Margaro, 1968; Meichenbaum, 1966; Ullmann & Giovannoni, 1964) resulted in positive recommendations for utilization of this scale.

The results of this study indicated two possible interpretations. One interpretation is that both the Moran and commonality evaluations (using the Kent-Rosanoff Word Association Test) are insensitive measures of associative disturbance. An alternative interpretation is that process-reactive schizophrenics may not be differentiated consistently upon two different kinds of associative disturbance. As exhibited by the inconsistent results of past commonality association studies in process-reactive schizophrenia, associative differences may be too variable and personal to discern group differences within schizophrenics. This was displayed in the present study by the high within group variability across groups.

Commonality investigations of associative disturbance by Humphries (1960), Ries and Johnson(1967), and Fuller and Kates(1969) found no significant differences between process-reactive groups, as did this study. However, significant differences among process-reactive groups were obtained in commonality studies by Wynne(1963), Dokecki, Polidoro and Cromwell(1965), Foley(1968), and Dokecki, Cromwell and Polidoro(1968). Differences were also found using the Moran rating scale in studies by DeWolfe and McDonald(Note I), and DeWolfe and Youkilis(1974). Such contradictory findings might tend to indicate a fluctuation among process-reactive designated groups, in regard to levels of associative disturbance. Insignificant findings with the commonality and Moran evaluations in the current study were possibly due to normal variations in cognitive and associative functioning of process-reactive groups. While process-reactive schizophrenics may have a tendency toward differences on a number of cognitive tasks, the results of this and past commonality studies tend to indicate that such differences are not always existent in the realm of associative function.

Reference Notes

1. DeWolfe, A. S., & McDonald, R. K. Premorbid adjustment and the word associations of schizophrenics. Proceedings of the 78th Annual Convention of the American Psychological Association, 1970, 4, 510-512. (Summary)
2. Berger, M. S. Locus of control in process-reactive schizophrenic inpatients. Unpublished Master's thesis, Purdue University, 1970.

References

- Appelbaum, S. A. The expanded word association test as a measure of psychological deficit associated with brain damage. Journal of Clinical Psychology, 1963, 19, 78-84.
- Becker, W. A genetic approach to the interpretation and evaluation of the process-reactive distinction in schizophrenia. Journal of Abnormal and Social Psychology, 1956, 53, 229-236.
- Becker, W. C. The process-reactive distinction: A key to the problem of schizophrenia? Journal of Nervous and Mental Disease, 1959, 129, 442-449.
- Bleuler, E. Upon the significance of association experiments. In C. Jung, Studies in word association. New York: Moffat, 1919.
- Bleuler, E. Dementia praecox or the group of schizophrenias. Translated by Joseph Zinkin. New York: International Universities Press, 1950. (Originally published, Leipzig: Deuticke, 1911)
- Boring, E. G. A history of experimental psychology (2nd ed.). New York: Appleton, 1950.

- Broen, W. E., Jr. Schizophrenia- Research and theory. New York: Academic Press, 1968.
- Cramer, P. Word association. New York: Academic Press, 1968.
- Deckner, C. W., & Cromwell, R. L. Commonality of word association response in schizophrenia as a function of premorbid adjustment, chronicity and paranoid status. Psychological Reports, 1970, 26(2), 503-509.
- DeWolfe, A. S. Cognitive structure and pathology in the associations of process and reactive schizophrenics. Journal of Abnormal Psychology, 1971, 78, 148-153.
- DeWolfe, A. S. Are there two kinds of thinking in process and reactive schizophrenics? Journal of Abnormal Psychology, 1974, 83(3), 285-290.
- DeWolfe, A. S., & Konieczny, J. A. Premorbid adjustment and short-term recall in schizophrenia. Journal of Clinical Psychology, 1973, 29, 14-16.(a)
- DeWolfe, A. S., & Konieczny, J. A. Responsiveness in schizophrenia. Journal of Personality Assessment, 1973, 37, 568-573.(b)
- DeWolfe, A. S., & McDonald, R. K. Sex differences and institutionalization in the word associations of schizophrenics. Journal of Consulting and Clinical Psychology, 1972, 39, 215-221.
- DeWolfe, A. S., & Youkilis, H. D. Stress and the word associations of process and reactive schizophrenics. Journal of Clinical Psychology, 1974, 30(2), 151-153.
- Dokecki, P. R., Cromwell, R. L., & Polidoro, L. G. The chronicity and premorbid adjustment dimensions as they relate to commonality and stability of word association responses in schizophrenics. Journal of Nervous and Mental Disease, 1968, 146, 310-311.

- Dokecki, P., Polidoro, L., & Cromwell, R. Commonality and stability of word association responses in good and poor premorbid schizophrenics. Journal of Abnormal Psychology, 1965, 70, 312-316.
- Flavell, J. H., Draguns, J., Feinberg, L. D., & Budin, W. A micro-genetic approach to word association. Journal of Abnormal and Social Psychology, 1958, 57, 1-7.
- Foley, L. J. A study of the word associations of schizophrenic dimensions with varied instructions. Doctoral dissertation, Rutgers- The State University, No. 67-9248. University Microfilms, Ann Arbor, Mich., 1968.
- Fuller, G. D., & Kates, S. L. Word association repertoires of schizophrenics and normals. Journal of Consulting and Clinical Psychology, 1969, 33, 497-500.
- Funkenstein, D. H., Greenblatt, M., & Solomon, H. C. A test which predicts the clinical effects of electric shock treatment on schizophrenic patients. American Journal of Psychiatry, 1950, 106, 889-901.
- Galton, G. Psychometric experiments. Brain, 1879-1880, 2, 149-162.
- Garnezy, N., & Rodnick, E. H. Premorbid adjustment and performance in schizophrenia: Implications for interpretation of heterogeneity in schizophrenia. Journal of Nervous and Mental Disease, 1959, 129, 450-466.
- Herr, V. V. The Loyola language study. Journal of Clinical Psychology, 13, 258-262.
- Herron, W. The process-reactive classification of schizophrenia. Psychological Bulletin, 1962, 59, 329-342.

- Higgins, J. The concept of process-reactive schizophrenia: Criteria and related research. Journal of Nervous and Mental Disease, 1964, 138, 9-25.
- Higgins, J. Process-reactive schizophrenia. Journal of Nervous and Mental Disease, 1969, 149(6), 450-472.
- Higgins, J., & Peterson, J. C. Concept of process-reactive schizophrenia: A critique. Psychological Bulletin, 1966, 66(3), 201-206.
- Higgins, J., & Peterson, J. C. The mecholy test in schizophrenia. American Journal of Psychiatry, 1967, 123, 979-985.
- Hull, C. L. A behavior system. New Haven: Yale University Press, 1952.
- Humphries, C. C. Temporal variability and premorbid adjustment in schizophrenia. Dissertation Abstracts, 1961, 21, 2003.(Abstract)
- Jenkins, J. J. Commonality of association as an indicator of general patterns of verbal behavior. In T.A. Sebeok(Ed.), Style in language. New York: Wiley, 1960, 307-329.
- Jenkins, J. J., & Russell, W. A. Systematic changes in word association norms: 1910-1952. Journal of Abnormal and Social Psychology, 1960, 60(3), 293-304.
- Johnson, M. H., & Ries, H. A. Validation study of the self-report scale for process-reactive schizophrenia. Journal of Consulting Psychology, 1967, 31, 321-322.
- Jung, C. G., & Ricklin, F. Diagnostische Associations Studien. J. f. Psychol. u. Neurol., 1904, 3, 55-83; 145-164; 193-215; 283-308; 4, 24-87; 109-123; 129-143.

- Jung, J. Experimental studies of factors affecting word associations. Psychological Bulletin, 1966, 66, 125-133.
- Kantor, R. E., & Herron, W. G. Perceptual learning in the reactive-process schizophrenias. Journal of Projective Techniques and Personality Assessment, 1965, 29, 58-70.
- Kantor, R. E., & Herron, W. G. Reactive and process schizophrenia. Palo Alto, California: Science and Behavior Books, 1966.
- Kantor, R. E., Wallner, J. M., & Winder, C. L. Process and reactive schizophrenia. Journal of Consulting Psychology, 1953, 17, 157-162.
- Kantor, R. E., & Winder, C. L. The process-reactive continuum: A theoretical proposal. Journal of Nervous and Mental Disease, 1959, 129, 429-434.
- Kent, G. H., & Rosanoff, A. J. A study of association in insanity. American Journal of Insanity, 1910, 67, 317-377.
- Lang, P. J., & Buss, A. H. Psychological deficit in schizophrenia: II. Interference and activation. Journal of Abnormal Psychology, 1965, 70, 77-106.
- Ley, A., & Menzerath, P. L'étude expérimentale de l'association des idées dans les maladies mentales (VI Congrès belge de Neurologie et de Psychiatrie, Brugem 1911). Gand: Van der Haghen, 1911.
- MacKenzie, Brian D. (U. Edinburgh, Scotland) Measuring the strength, structure, and reliability of free associations. Psychological Bulletin, 1972, 77(6), 438-445.

- Magaro, P. A. A validity and reliability study of the process-reactive self-report scale. Journal of Consulting and Clinical Psychology, 1968, 32, 482-485.
- Meichenbaum, D. H. Effects of social reinforcement on the level of abstraction in schizophrenia. Journal of Abnormal Psychology, 1966, 71, 354-362.
- Moran, L. J. Vocabulary knowledge and usage among normal and schizophrenic subjects. Psychological Monographs, 1953, 67(20, Whole No. 370).
- Moran, L. J. Generality of word-association response sets. Psychological Monographs, 1966, 80(4, Whole No. 612).
- Moran, L. J., Mefferd, R. B., & Kimble, J. P. Standardization of psychometric and psychodiagnostic tests for daily measurements in psychopharmacological research. Transactions of the Fourth Research Conference on Chemotherapy in Psychiatry, 1960, 4, 135-318.
- Moran, L. J., Mefferd, R. B., & Kimble, J. P. Idiodynamic sets in words associations. Psychological Monographs, 1964, 78(2, Whole No. 579).
- Osgood, C. E. Method and theory in experimental psychology. New York & London: Oxford University Press, 1953.
- Palermo, D. S., & Jenkins, J. J. Word association norms: Grade school through college. Minneapolis: University of Minnesota Press, 1964.
- Phillips, L. Case History data and prognosis in schizophrenia. Journal of Nervous and Mental Disease, 1953, 117, 515-525.

- Rapaport, D., Gill, M. M., & Shafer, R. Diagnostic psychological testing(First volume only). Chicago: Year Book Publishers, 1945.
- Ries, H. A., & Johnson, M. Commonality of word associations and good and poor premorbid schizophrenia. Journal of Abnormal Psychology, 1968, 72, 487-488.
- Russell, W. A., & Jenkins, J. J. The complete Minnesota norms for responses to 100 words from the Kent-Rosanoff Word Association Test. Technical Report No. II, 1954, University of Minnesota, Contract N8 our-662I6.
- Schwartz, F., & Rouse, R. O. The activation and recovery of associations. Psychological Issues, 1961, 3(Whole No. 9).
- Schweid, E. I. Verbal reaction times of schizophrenics under varying conditions of noxious stimulation. Doctoral dissertation. University of Washington, No. 66-I2,045. University Microfilms, Ann Arbor, Michigan, 1966.
- Sommer, R., Dewar, R., & Osmond, H. Is there a schizophrenic language? Archives of General Psychiatry, 1960, 3, 665-673.
- Storms, L. H., & Broen, W. E. A theory of schizophrenic behavioral disorganization. Archives of General Psychiatry, 1969, 20, 129-144.
- Ullman, L. P., & Giovannoni, J. M. The development of a self-report measure of the process-reactive continuum. Journal of Nervous and Mental Disease, 1964, 138, 38-42.
- Vaillant, G. E., & Funkenstein, D. H. Long-term follow-up(10-15 years) of schizophrenic patients with Funkenstein(adrenalin-mecholyl) tests. In Hoch, P. H., & Zubin, J., eds. Psychopathology of Schizophrenia, 244-251. New York: Grune & Stratton, 1966.

- Watson, J. B. Psychology as the behaviorist views it. Psychological Review, 1913, 20, 158-177.
- Wertheimer, M. Experimentell Untersuchungen zur Tatbestands-diagnostik. Arch. f. d. ges. Psychol., 1905, 6, 59-131.
- Wittman, P. A scale for measuring prognosis in schizophrenic patients. Elgin State Hospital Papers, 1941, 4, 20-33.
- Woodworth, R. S., & Schlosberg, H. Experimental psychology. New York: Holt, 1954.
- Wynne, R. D. The influence of hospitalization on the verbal behavior of chronic schizophrenics. British Journal of Psychiatry, 1963, 109, 380-389.
- Wynne, R. D., Gerjuoy, H., & Schiffman, H. Association test and ~~anonym~~-response set. Journal of Verbal Learning and Verbal Behavior, 1965, 4, 341-347.
- Zigler, E., & Phillips, L. Social competence and the process-reactive distinction in psychopathology. Journal of Abnormal and Social Psychology, 1962, 65, 215-222.

APPENDIX

CONFIDENTIAL STATEMENT REGARDING EXPERIMENTAL PARTICIPATION

Date: 12/21/76

Researcher: David Michael Scott

Proposed Study: A Comparative Study In Word Association

1. I have been informed of the procedures to be used in this study. I know that Mr. Scott will have access to my personal file, but will not communicate this information to anyone. I realize that Mr. Scott needs access to my file to select patients for the study.
2. Upon signing this statement, Mr. Scott will determine if I am appropriate for the study and notify me of the decision. If I am in the study, I know that Mr. Scott will administer a 24 item True-False form to me.
3. I know that Mr. Scott may also administer a 100 item word association test, which will be recorded on tape and destroyed (along with all other material with my name on it) following the conclusion of the experiment.
4. I have the option to discontinue participation in the study at any time.

I agree to participate in the study being conducted by David Michael Scott, in accordance with the standards set forth in this confidential statement.

Date

Signature

ULLMAN-GIOVANNONI (U-G) PROCESS-REACTIVE SCALE

Name _____

Date _____

Please read each of the items carefully and decide whether it is true or false of you. If it is true, circle the T; if it is false, circle the F. Do not spend too much time on any item.

- T F 1. When I leave the hospital, I will live with my wife.
- T F 2. I am married now.
- T F 3. I have fathered children.
- T F 4. I have been married.
- T F 5. Before I was seventeen, I had left the home I was raised in and never went back except for visits.
- T F 6. When I leave the hospital, I will live with one or both of my parents.
- T F 7. As a civilian, I have worked steadily at one job or for one employer for over two years.
- T F 8. I finished at least one year of education after high school--trade apprenticeship, business school, college, etc.
- T F 9. Adding up all the money I earned for the last three years, it comes to less than \$700 before deductions (other than Social Security or other forms of compensation).
- T F 10. In my teens I was a member of a group of friends who did things together.
- T F 11. I hardly ever went over to another kid's house after school or on weekends.
- T F 12. When I was in school, I didn't like Physical Education classes.
- T F 13. Alcohol has nothing to do with my difficulties.
- T F 14. I have paid regularly to buy a house.
- T F 15. More than once in the last year I have stayed on after some group meeting and talked with some other members about something that went on.
- T F 16. Shortly before I came into the hospital there was some major change in my life such as marriage, birth of a baby, death, injury, loss of a job, etc.

-2-

- T F 17. I have been deeply in love with someone and have told them about it.
- T F 18. In the kinds of work I do, it is expected that people will stay for at least a year.
- T F 19. My top wage in the last five years was less than \$1.25 an hour.
- T F 20. I have earned my living for longer than a year at fulltime civilian work.
- T F 21. I have had to stay in a mental hospital for more than one year at a time.
- T F 22. Within the last five years, I have spent more than half of the time in a mental hospital.
- T F 23. In my teens I was a regular member of a club or organization that had a grown-up who came to meetings (Scouts, school club, 4-H, church youth club, etc.).
- T F 24. In my teens there was more than one girl with whom I had more than two dates.

1008

No.	Stimulus	Response	No.	Stimulus	Response
1.	Table	_____	26.	Wish	_____
2.	Dark	_____	27.	River	_____
3.	Music	_____	28.	White	_____
4.	Sickness	_____	29.	Beautiful	_____
5.	Man	_____	30.	Window	_____
6.	Deep	_____	31.	Rough	_____
7.	Soft	_____	32.	Citizen	_____
8.	Eating	_____	33.	Foot	_____
9.	Mountain	_____	34.	Spider	_____
10.	House	_____	35.	Needle	_____
11.	Black	_____	36.	Red	_____
12.	Mutton	_____	37.	Sleep	_____
13.	Comfort	_____	38.	Anger	_____
14.	Hand	_____	39.	Carpet	_____
15.	Short	_____	40.	Girl	_____
16.	Fruit	_____	41.	High	_____
17.	Butterfly	_____	42.	Working	_____
18.	Smooth	_____	43.	Sour	_____
19.	Command	_____	44.	Earth	_____
20.	Chair	_____	45.	Trouble	_____
21.	Sweet	_____	46.	Soldier	_____
22.	Whistle	_____	47.	Cabbage	_____
23.	Woman	_____	48.	Hard	_____
24.	Cold	_____	49.	Eagle	_____
25.	Slow	_____	50.	Stomach	_____

F
78
88

Name _____

No.	Stimulus	Response	No.	Stimulus	Response
51.	Stem	_____	76.	Bitter	_____
52.	Lamp	_____	77.	Hammer	_____
53.	Dream	_____	78.	Thirsty	_____
54.	Yellow	_____	79.	City	_____
55.	Bread	_____	80.	Square	_____
56.	Justice	_____	81.	Butter	_____
57.	Boy	_____	82.	Doctor	_____
58.	Light	_____	83.	Loud	_____
59.	Health	_____	84.	Thief	_____
60.	Bible	_____	85.	Lion	_____
61.	Memory	_____	86.	Joy	_____
62.	Sheep	_____	87.	Bed	_____
63.	Bath	_____	88.	Heavy	_____
64.	Cottage	_____	89.	Tobacco	_____
65.	Swift	_____	90.	Baby	_____
66.	Blue	_____	91.	Moon	_____
67.	Hungry	_____	92.	Scissors	_____
68.	Priest	_____	93.	Quiet	_____
69.	Ocean	_____	94.	Green	_____
70.	Head	_____	95.	Salt	_____
71.	Stove	_____	96.	Street	_____
72.	Long	_____	97.	King	_____
73.	Religion	_____	98.	Cheese	_____
74.	Whiskey	_____	99.	Blossom	_____
75.	Child	_____	100.	Afraid	_____

SUBJECT NUMBER: _____
 DATE OF EXAMINATION: _____
 SCORING SYSTEM: _____
 DATE OF SCORING: _____

DATA
 TOTAL REACTION TIME: _____
 AVERAGE REACTION TIME PER RESPONSE: 47
 TOTAL EVALUATION SCORE: _____
 AVERAGE EVALUATION SCORE PER RESPONSE: _____

No.	Stimulus	Response	R.T.	Score	No.	Stimulus	Response	R.T.	Score
1.	Table	_____	_____	_____	51.	Stem	_____	_____	_____
2.	Dark	_____	_____	_____	52.	Lamp	_____	_____	_____
3.	Music	_____	_____	_____	53.	Dream	_____	_____	_____
4.	Sickness	_____	_____	_____	54.	Yellow	_____	_____	_____
5.	Man	_____	_____	_____	55.	Bread	_____	_____	_____
6.	Deep	_____	_____	_____	56.	Justice	_____	_____	_____
7.	Soft	_____	_____	_____	57.	Boy	_____	_____	_____
8.	Eating	_____	_____	_____	58.	Light	_____	_____	_____
9.	Mountain	_____	_____	_____	59.	Health	_____	_____	_____
10.	House	_____	_____	_____	60.	Bible	_____	_____	_____
11.	Black	_____	_____	_____	61.	Memory	_____	_____	_____
12.	Mutton	_____	_____	_____	62.	Sheep	_____	_____	_____
13.	Comfort	_____	_____	_____	63.	Bath	_____	_____	_____
14.	Hand	_____	_____	_____	64.	Cottage	_____	_____	_____
15.	Short	_____	_____	_____	65.	Swift	_____	_____	_____
16.	Fruit	_____	_____	_____	66.	Blue	_____	_____	_____
17.	Butterfly	_____	_____	_____	67.	Hungry	_____	_____	_____
18.	Smooth	_____	_____	_____	68.	Priest	_____	_____	_____
19.	Command	_____	_____	_____	69.	Ocean	_____	_____	_____
20.	Chair	_____	_____	_____	70.	Head	_____	_____	_____
21.	Sweet	_____	_____	_____	71.	Stove	_____	_____	_____
22.	Whistle	_____	_____	_____	72.	Long	_____	_____	_____
23.	Woman	_____	_____	_____	73.	Religion	_____	_____	_____
24.	Cold	_____	_____	_____	74.	Whiskey	_____	_____	_____
25.	Slow	_____	_____	_____	75.	Child	_____	_____	_____
26.	Wish	_____	_____	_____	76.	Bitter	_____	_____	_____
27.	River	_____	_____	_____	77.	Hammer	_____	_____	_____
28.	White	_____	_____	_____	78.	Thirsty	_____	_____	_____
29.	Beautiful	_____	_____	_____	79.	City	_____	_____	_____
30.	Window	_____	_____	_____	80.	Square	_____	_____	_____
31.	Rough	_____	_____	_____	81.	Butter	_____	_____	_____
32.	Citizen	_____	_____	_____	82.	Doctor	_____	_____	_____
33.	Foot	_____	_____	_____	83.	Loud	_____	_____	_____
34.	Spider	_____	_____	_____	84.	Thief	_____	_____	_____
35.	Needle	_____	_____	_____	85.	Lion	_____	_____	_____
36.	Red	_____	_____	_____	86.	Joy	_____	_____	_____
37.	Sleep	_____	_____	_____	87.	Bed	_____	_____	_____
38.	Anger	_____	_____	_____	88.	Heavy	_____	_____	_____
39.	Carpet	_____	_____	_____	89.	Tobacco	_____	_____	_____
40.	Girl	_____	_____	_____	90.	Baby	_____	_____	_____
41.	High	_____	_____	_____	91.	Moon	_____	_____	_____
42.	Working	_____	_____	_____	92.	Scissors	_____	_____	_____
43.	Sour	_____	_____	_____	93.	Quiet	_____	_____	_____
44.	Earth	_____	_____	_____	94.	Green	_____	_____	_____
45.	Trouble	_____	_____	_____	95.	Salt	_____	_____	_____
46.	Soldier	_____	_____	_____	96.	Street	_____	_____	_____
47.	Cabbage	_____	_____	_____	97.	King	_____	_____	_____
48.	Hard	_____	_____	_____	98.	Cheese	_____	_____	_____
49.	Eagle	_____	_____	_____	99.	Blossom	_____	_____	_____
50.	Stomach	_____	_____	_____	100.	Afraid	_____	_____	_____