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The Course of Thought Disorder at Acute and Posthospitalization Phases: With an Emphasis on the Roles of Energy Level and Affective Disturbance

David J. Berndt
Loyola University Chicago

THE COURSE OF THOUGHT DISORDER AT ACUTE AND POSTHOSPITALIZATION PHASES WITH AN EMPHASIS ON THE ROLES OF ENERGY LEVEL AND AFFECTIVE DISTURBANCE

by

David J. Berndt

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VITA

The author, David John Berndt, is the son of Melvin and Edith Berndt. He was born July 14, 1950, in Elgin, Illinois.

His elementary and secondary education was obtained in public school district #200 in Woodstock, Illinois. He graduated from Woodstock Community High School in 1968.

In 1977 he received a B.S. degree, graduating first in his class from the College of Charleston in South Carolina. He received the Outstanding Psychology Student Award upon graduation. He entered Loyola University of Chicago in the fall of 1977, supported by a National Institute of Mental Health Fellowship. The following year he was financially supported by the Doyle Fellowship, and in May of 1979 he received a Master of Arts degree, majoring in clinical psychology. He did externship training at V.A. Lakeside Hospital-Northwestern, and later at Wexler Clinic at Michael Reese Hospital. His internship was at the Psychiatric and Psychosomatic Institute, Michael Reese Hospital. In 1980, he became an Associate Member of both the American Psychological Association and the Society for Personality Assessment. He also became a member of the Eastern Psychological Association and the Association for the Advancement of Psychology.

The author has made twelve professional presentations, and has published the following articles:

Berndt, D.J. Construct validation of the personal and sociopolitical dimensions of Rotter's Internal-External Locus of Control Scale. Psychological Reports, 1978, 42, 1259-1263.

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CHAPTER I

INTRODUCTION

Disordered thinking has been considered a central symptom of schizophrenia since Bleuler (1950) emphasized the role of loosened associations. Since that time, thought disorder has been noted in depressives (e.g., Braff & Beck, 1974), manic patients (e.g., Andreasen & Powers, 1974), and other diagnoses (Harrow & Quinlan, 1977). Consequently, the current study investigated the extent to which thought disorder might be observed in other diagnoses in addition to schizophrenia. Additionally, in order to examine the course of thought disorder in several diagnoses, a cross-sectional design compared patients in the active phase of their disorder with patients in a posthospitalization phase. Finally, the current study focused on the relationship of energy level, affective disturbance, and impulse control to thought disorder.

One problem which the current study shared with other similar investigations is the multiple ways theorists and researchers operationalize thought disorder. Little consensus, if any, exists as to what is or is not meant by the term (Chapman & Chapman, 1973). Most of the theorizing began, at least, with schizophrenia. Bleuler (1911, 1950) emphasized a loss of goal and splitting of associative threads. Cameron (1939; Cameron & Margaret, 1951) conceptualized overinclusive thinking as the prominent disorder. Goldstein (1944; Goldstein & Scheerer, 1941) specified concreteness as the central deficit. Arieti (1959) and von Domarus (1944) placed importance on an apparent deficit in the use of formal logic. Chapman and Chapman (1973) suggested that thought disorder resulted from excessive yielding to normal response biases. Blatt and Wild (1976) attributed most thought pathology to boundary disturbances related to inadequate differentiation between the self and the environment, and difficulties in maintaining and evoking consistent images and cognitive representations of the external world. Still others focused on communication disturbances, particularly within the family context (Bateson, Jackson, Haley, & Weakland, 1969). Thus different researchers and clinicians apparently have used the term "thought disorder" to describe different phenomena, and while at least some of the concepts are overlapping, others may describe unrelated phenomena. None appear to have gained the widespread acceptance necessary for the development of conceptual clarity.

As a result of the lack of construct clarity outlined above, the current study adopted a descriptive atheoretical approach to the definition of thought disorder. Kraepelin (1917) provided perhaps the most complete clinical description of patients' verbal and cognitive behavior, and he gave descriptive labels to his examples. He did not, however, attempt to formulate an explanatory theory or conceptual basis for the integration of these observations. Like

Kraepelin, Andreasen (1979a) utilized an atheoretical descriptive system, and developed a rating scale for the assessment of thought, language, and communication (TLC hereafter). Andreasen, as a member of the working group associated with the task force for writing the third edition of the American Psychiatric Association's Diagnostic and Statistical Manual (DSM-III), was influential in writing the definitions of thought disorder used in the official glossary. The current study consequently operationalized thought disorder from the variables of Andreasen's TLC rating scale. Despite the advantages of the timely, descriptive, multidimensional approach typified by the TLC scale, it was necessary to clarify the construct validity of the TLC variables by simultaneously employing a selection of the more traditional measures of thought disorder (e.g., concreteness, over-inclusion, bizarre-idiosyncratic thinking).

The use of the TLC scale also had other advantages for the purposes of the present study. Andreasen (1979b) has demonstrated that the TLC variables are useful in distinguishing diagnostic groups. Specifically, she found that symptoms she characterized as relevant to Fish's (1962) positive and negative distinction were useful in distinguishing manics from schizophrenics. Hence, it is possible that thought disorder manifests itself differently in different patients. Patients identified as manics more frequently manifested positive symptoms (e.g., pressured speech) while patients classified as schizophrenic more often were characterized by negative symptoms (e.g., laconic speech). Another set of symptoms which were identified by Andreasen (1979b) as characteristic of looseness of association did not distinguish manics from schizophrenics. The current study investigated more closely both the distinction of positive vs. negative thought disorder and looseness of associations. While Andreasen (1979b) primarily compared manics and schizophrenics, the current study also explored the utility of these distinctions for distinguishing other diagnostic groups. Additionally, the choice of variables representative of the positive and negative distinction may have been arbitrary. For example, is distractibility a positive symptom, as Andreasen (1979b) suggests, or a negative sympton (increased distractibility vs. decreased ability to focus or attend)?

Disordered thinking might, of course, manifest itself the same way across diagnostic groups, and apparent differences could be determined instead by several other factors such as age, sex, intelligence, acute distress, etc. While the present research either controlled or systematically looked at such confounding variables, the focus was particularly on the role in thought disorder of three relatively neglected dimensions: affect, energy level, and impulse control. In short, one central question addressed by the current study can be stated very simply: Are differences in disordered thinking across diagnostic groups related to parameters of affect, energy level, and impulse control, and what is the nature of such relationships if indeed they exist?

Several authors (e.g., Andreasen, 1979b; Bleuler, 1911; DeWolfe, 1962) have noted a relationship between affect and disordered thinking.

For example, Andreasen (1979b) recently suggested that euphoric mood and the accompanying excitation may be the primary or underlying phenomena in the disordered speech associated with mania, and that the process would be reversible. On the other hand, she speculated that flatness of affect may be a mechanism which accounted for some aspects of disordered thinking in at least a subset of schizophrenics, and was not reversible. The current research explored the relationship between disordered thinking and several parameters of affect among diagnostic groups over different time periods.

In order to study the course of thought disorder over time, a cross-sectional design was employed. One sample of hospitalized patients in the active phase of their illness were compared with a second sample of former patients, tested concurrently. These former patients had been out of the hospital for a period of approximately two years. This comparison permitted a cross-sectional look at energy level and affective disturbance, as well as thought disorder. To date, no research has been reported on the prevalence of TLC symptoms in a sample of patients tested after hospitalization, although Andreasen (1979b) speculated that manics recover from their thought disorder more than schizophrenics. The cross-sectional design had several disadvantages (see Chapter V); however, time constraints precluded a longitudinal study for the current research.

Finally, several steps were taken in the current study to improve the quality of the design relative to many recent studies of thought disorder. First, a broad emphasis on naturalistic communication, rather than artificially manipulated stimuli permitted greater generalizability of results, improving external validity. Another advantage was that patients from at least two hospitals (Michael Reese Hospital and Illinois State Psychiatric Institute) were used, and since patients from these hospitals differ considerably in socioeconomic status, IQ, treatment philosophy, and other variables, the full sample was perhaps more representative than if patients from only one hospital had been used. Variables such as race, education, age, and IQ were systematically addressed from both methodological and statistical vantage points.

Major Questions Addressed in the Current Study

Although specific hypotheses will be stated in Chapter IV, along with the experimental designs relevant to each hypothesis, at this point a summary of the major questions asked in the current research will help to sharpen the issues discussed heretofore, and provide a rationale for the program of research.

1) Does a thorough, descriptive analysis of disordered communication, using Andreasen's rating system, permit the isolation of a pattern of symptoms of disordered thought and language that meaningfully distinguishes diagnostic groups?

2) Does the positive-negative distinction emphasized by Andreasen and others contribute to our understanding of thought disorder?

3) What patterns of disordered communication (using the TLC variables) characterize each of the following groups of patients

using modern diagnostic methods: manic, schizophrenic, depressive, and schizoaffective, depressed type?

4) Are extreme affective disturbances associated with disordered thinking related to diagnoses?

5) Does energy level relate to disordered thinking and diagnoses?

6) Does the control of impulsivity lead to or influence effective communication?

7) Does the relationship between thought disorder and affective parameters vary across diagnoses and over time?

8) Do different diagnostic groups maintain stable patterns of disordered thinking over time? What kinds of residual thought disorder persist for each group?

9) What evidence is there for the construct validity of traditional measures of thought disorder and the TLC variables: in what manner are they related?

10) Is looseness of association a viable concept, or does it require a redefinition in terms of goal-directed behavior highlighting the ability to generate a coherent, goal-directed communication?

11) What are the effects, if any, or age, sex, medication, race, IQ, and educational level on the disordered thinking?

CHAPTER II

REVIEW OF THE RELATED LITERATURE

The role of disordered thinking and communication in psychopathological groups, especially schizophrenia, has been a widely studied area (for reviews, see Buss & Lang, 1965; Chapman & Chapman, 1973; Lang & Buss, 1965). In order to narrow the focus to a manageable amount of material, this review has focused on two areas. The first section reviews the relationship between affect and thought disorder. The second section reviews the concept of looseness of associations. Included under this discussion will be the matter of goal-directed behavior, an aspect central to Bleuler's (1911) original conceptualization.

Section A

Affect, energy level, and thought disorder. The relationship between thought disorder and affect has been one of considerable controversy. Bleuler (1911), for example, believed that blunted affect and other affective disturbances were fundamental symptoms associated with schizophrenia (that is, they were always present), but that they were secondary phenomena resulting from broken associations. His colleagues Jung (1919) placed a much more central emphasis on the role of affect, postulating that thought disorder was the result of intrusion of the emotional needs of schizophrenics.

Besides schizophrenia, the role of affect in thought disorder has been noted and disputed in both depression and mania. Several authors (e.g., Beck, 1963, 1964, 1971; Braff & Beck, 1974) have contended that thought disorder has a central role in depression. However, Andreasen (1978) demonstrated that depressives' ability to abstract and their quality of associations did not change significantly upon recovery, and in a more recent article (1979b) she found only one of the TLC variables (circumstantiality) was more frequent in depressives than in schizophrenics. The controversy about the presence or absence of thought disorder in depression has yet to be resolved, however. Recently Donnelly, Waldman, Murphy, Wyatt, and Goodwin (1980) demonstrated impaired abstraction ability on the Categories Test for hospitalized depressives. In addition, the learned helplessness literature (e.g., Raps, Reinhart, & Seligman, 1980; Seligman, 1975) has provided evidence that depressed persons demonstrate a failure to learn in problem solving tasks and motivational deficits. The learned helplessness paradigm, however, has been challenged from a variety of theoretical (e.g., Jackson & Larrance, 1979; Wortman & Dintzer, 1978), and experimental (Blaney, Behar, & Head, 1979) perspectives. When conceptualized as decreased response initiation, these performance deficits are congruent with the negative distinction, that is, the decrease or narrowing of a response repertoire.

If affect or energy level affect thought disorder, one might expect to find its role most clearly evident in manic depressives.

Surprisingly little research, however, has been done examining thought disorder in manic patients. Andreasen has presented strong evidence in a series of articles (Andreasen & Powers, 1974, 1975; Andreasen, 1979b) that thought disorder is perhaps even more important in manics than in schizophrenics. What is more, she speculated (1979b) that euphoric mood or excitement might be the primary cause of thought disorder in manics. Additionally, Breakey and Goodall (1972) noted the prominence of thought disorder in manics, and more recently, Harrow, Grossman, Silverstein and Meltzer (1980) noted that while manics were not significantly more bizarre than schizophrenics, nearly all manics evidenced significant thought pathology, while 20% of the schizophrenics evidenced no thought disorder. Additionally, Harrow et al. (1980) found that at a stage of partial recovery, seven weeks after hospitalization, severe levels of disordered thinking persisted in some manics. Indirect evidence for the importance of thought disorder in mania comes from other studies (e.g., Carlson & Goodwin, 1973; Taylor & Abrams, 1975), however in both studies thought disorder was not assessed through formal testing procedures.

The roles of affective disturbance and energy level, however, have not systematically been studied for either manics or depressives. The current study is the first to directly assess the relationship for these diagnostic groups.

For some time authors have debated the role of affect in schizophrenic performance. Various authors have attempted to study the importance of affect by varying the affective nature of stimuli, and measuring subsequent decrements in performance. Blumenthal (1964) asked affective and neutral questions and found no differences in incoherence. Similarly, Feldstein (1962) failed to detect differential speech disruption with affective and neutral cartoon strips. Other failures to demonstrate performance differences by schizophrenics on tasks with affective and neutral stimuli include a recall task by Deering (1963); concept formation tasks by Cavanagh (1958), and Nathan (1964); syllogistic reasoning with both affective and neutral syllogisms (Jacobs, 1969; Nims, 1959; Williams, 1964; Wyatt, 1965); rank ordering of facial emotions versus a neutral task (Spiegel, Gerard, Grayson, & Gengerelli, 1962); and a comprehensive factor analytic study by Hamlin and Lorr (1971).

Positive evidence for the differential effect of affective stimuli and schizophrenic performance can also be found in the literature. Conceptual sorting differences were found by several authors (Brodsky, 1963; Davis & Harrington, 1957; Moriarty & Kates, 1964; Whiteman, 1954). Similarly, sorting of affective and neutral objects differentially affected schizophrenics in a study by Cohen, Senf, and Houston (1954). Among other studies reporting similar evidence were: completion of affective and neutral sentence stems (Senf, Houston, & Cohen, 1955); construction of sentences using either an emotional or a neutral verb (DeWolfe, 1962); category naming (Storms, Broen, & Levin, 1967; Woods, 1961); ordering photographs (Bannister & Salmon, 1966; McPherson & Buckley, 1970); word associations (Storms, Broen, & Levin, 1967); arithmetic problems (Chapman, 1961); visual discrimination

(Dunn, 1954); and interpretation of emotional and neutral proverbs (Lewinsohn & Riggs, 1962; Lewis, Griffith, Reidell, & Simmons, 1959). Furthermore, evidence from several sources suggests that subgroups of schizophrenics, such as process and reactive, or acute and chronic, have differential arousal levels, and that the arousal level interacts with socially meaningful or affective stimuli (Fowles, Watt, Maher, & Grinspoon, 1970; Higgins, 1968; Johnson, Petzel, & Figueroa, 1973; Mednick, 1958; Venables, 1964, 1966).

The balance of the evidence to date, however, has supported an inference that affective stimuli were not especially disruptive to schizophrenics. Particularly important studies have been published recently by Chapman and colleagues, which provided sophisticated controls over several confounding variables. Consequently, the studies by Chapman's group provided the best tests of the importance of affective stimuli. Chapman, Chapman, and Daut (1973) used drug-free chronic schizophrenics, with emotional and neutral vocabulary items, and found that manipulation of differential reliability of the tasks produced effects which were contradictory, presumably indicating that differential reliability was more important than the nature of the affective stimuli. In another study, Chapman and Chapman (1973) used a multiple choice analogy test in which reliability and mean and variance of item difficulty were matched. With these careful controls, schizophrenics showed no differential responses to affective and neutral stimuli. Chronicity, however, may have been responsible for the unresponsive approach for patients who probably had little contact with the external world.

In addition to the methodological problems addressed by the Chapmans, several other flaws question the relevance of the articles reviewed. Among the most noticeable deficiencies are lack of adequate control groups, tasks that were not equated for difficulty or reliability, diverse ways of measuring affect, and "schizophrenic" groups that varied considerably from study to study. While all of these problems make it difficult to draw any meaningful conclusions from the literature reviewed, perhaps an even more telling criticism is that the tasks were so artificial. Responses, for instance , to multiple choice questionnaires may not have much generalizability to the everyday affective world of patients, or their communication. The current study, therefore, did not limit itself to the manipulation of artificial affective stimuli, but instead attempted to operationalize affects through self and observer ratings of behavior in a relatively naturalistic, conversational, interview. For a more thorough discussion of the methodology for the operationalization of affective variables, see Chapter III.

Specifically, the current study investigated the relationship between affect and thought disorder in several ways. Self-reported trait energy level, self and observer rated affect and energy level in a particular communicative situation, and measures of impulse control, all converged to investigate the person x situation interaction. To be more specific, while various diagnoses, for example, might react differently to stimuli with different stimulus characteristics, (e.g., naturalistic communication vs. object sorting) patients with various diagnoses (and subtypes) are probably beginning from quite different level and kinds of arousal responsiveness, regardless of the stimuli chosen by the experimenters, and it is possible that these initial differences, either alone or interacting with task, diagnosis, or phase of illness, account for the conflicting results in the literature.

As an example of one such confound, Gruzelier (1978) recently argued persuasively that the considerable evidence for a bimodal distribution of schizophrenic patients on various orienting responses is indicative of two substantially different physiological states in schizophrenia, and he refers to the subtypes as responders and nonresponders. A Loyola University dissertation by Bruce Pfau (1980) recently found that this responder/nonresponder dimension interacted with the acute/chronic dimension in accounting for thought disorder.

Section B

Looseness of associations. Bleuler's (1911) major explanation for disordered thinking in schizophrenia was broken associative threads. Bleuler was the first to postulate that broken associative threads were a primary symptom of schizophrenia, and that a loss of goal directed thought was responsible for the schizophrenic's reliance on maladaptive associational patterns. Bleuler's approach was influenced by associationistic psychology, but also by the medical tradition. He assumed that an underlying organic deficit was directly responsible for the phenomenon. He was additionally influenced by Freud and particularly Jung, in formulating the importance of complexes, wishes, and conflicts.

Although Bleuler considered schizophrenic affective disturbance to be a result of looseness of associations, (which in turn had an organic basis), Jung emphasized the central role of affect in the process. Wishes and conflicts resulted in complexes, which were essentially glued together by affects relevant to the conflict or wish. Loss of goal, for Jung, then became the predominance of an affectively glued complex of associations, to which the ego, with its goal-directing capacity, took a back seat.

Another, more recent version of looseness of association is the theory by Chapman and Chapman (1973) which attempts to account for most disordered thinking by the tendency to "yield" to inappropriate normal responses with high likelihood of occurrence (high associational value). Thus a bias to prefer "normal" or high association responses to the correct, context relevant, response is said to be the distinguishing feature between normals and schizophrenics. While Chapman and Chapman (1973) persuasively criticize other theories for methodological deficiences, few outside their own research group have attempted to assess other theories using measures matched for reliability and task difficulty, in drug free groups. Additionally, their samples have tended to include chronic, institutionalized schizophrenics. Their tasks, in order to meet the criteria for methodological rigor, have sacrificed external validity. Finally, a recent study by Nacify and Willerman (1980) indicated that an excessive yielding to normal response biases was problematic for manics as well as schizophrenics.

Several researchers have studied classical looseness of associations in schizophrenia, most frequently with a word association task. Kent and Rosanoff (1910), following the lead of Jung (1906), developed a word association task in which a stimulus word is responded to by the subject with the first word that comes to his mind. Besides developing the first extensive norms, Kent and Rosanoff found significantly more deviant responses by schizophrenics. Similarly, early findings by Gardner Murphy (1923) were later supported by a host of other studies (e.g., Deering, 1963; DeWolfe, 1973; Dockecki, Polidoro, & Cromwell, 1965; Goldstein & Acker, 1967; Johnson, Weiss, & Zelhart, 1964; Moran, Mefferd, & Kimble, 1964; Rappaport, Gill, & Schafer, 1945; Rawlings, 1921; Shakow & Jellinek, 1965; Sommer, Dewar, & Osmond, 1960; Sommer, Witney, & Osmond, 1962).

Several other authors, however, have raised important questions. O'Brien and Weingartner (1970) have interpreted the deficit as a possible function of several conditions, such as speed of response and anxiety. Moon, Mefferd, Wieland, Pokorny and Falconer (1968) accounted for some schizophrenic deficit as "mishearing" the stimulus word. Meanwhile, Moran, Mefferd, and Kimble (1964) found similar factor structures of mistakes for normals and schizophrenics. Furthermore, Andreasen (1979b) found that variables which she considered indicative of looseness of association were not useful in discriminating manics from schizophrenics.

In reviews of the literature in this area, Chapman and Chapman (1973), and Pavy (1968) drew somewhat different conclusions. Chapman and Chapman concluded that techniques like the word association task measured non-goal directed looseness of association, and that these studies, generally did not provide evidence for the theory. According to Chapman and Chapman (1973) however, goal directed broken associative threads might be a viable construct. Although no direct evidence had been evaluated, Chapman and Chapman (1973) cite both Shakow's (1950, 1962, 1963, 1971) theory and their own as providing indirect evidence of the centrality of loss of goal.

Pavy (1968) concluded, on the other hand, that schizophrenic responses to association tasks were different from normal responses. He argued, however, that consistent patterns had not emerged, and that results might have been related to deficits in attention allowing the intrusion of irrelevant stimuli.

Some recent studies have attempted to look directly at loss of goal. Mednick and Schlusinger (1970) utilized a derivation of Cramer's (1968, 1969) Continuous Word Association Task to study subjects in their Denmark high risk vulnerability research. High risk subjects had more deficits in goal directed word associations, and within the high risk group, those who developed schizophrenia performed more poorly than those who had maintained normal adaptation. Silverstein and Harrow (1979), however, found only weak trends for diagnostic differences, and little or no relationship to outcome, social and work functioning, or level of psychotic symptoms. Finally, Andreasen (1979b), using a rating scale for loss of goal, found no differences between schizophrenics and manics in an unstructured interview.

In conclusion, looseness of association has not proved to be a major factor in schizophrenia, despite differences noted for diagnostic groups. Artificial tasks have characterized the research, and with the exception of the Continuous Word Association Task, little attention has been directed towards the concept of loss of goal. While loss of goal may be a promising conceptual distinction, it is not clear that it exclusively characterizes disordered thought in schizophrenics, and may be a function of some other variable such as acute distress or psychosis.

CHAPTER III

METHODOLOGY

The current study was derived from an ongoing series of projects that comprised a longitudinal study of thought disorder at Michael Reese Hospital and The Illinois State Psychiatric Insitute (ISPI). The longitudinal study was coordinated and directed by Dr. Martin Harrow. Instrumentation for traditional measures of thought disorder (e.g., bizarreness, concreteness, overinclusion), as well as the diagnoses and collection of demographic data were all well beyond the pilot stage by the time the current study began. The methodology specific to the current project and added to that of the basic study was a self-report measure of energy level, an interview designed to elicit relatively naturalistic discourse samples, five self-ratings of affective interference, ratings by the interviewer and rater on the same five variables, and two measures of impulse control (spoken and written). The additional methodology was piloted on a dozen patients by the author with the assistance of Ilene Lanin. Research assistants were trained by the author and Ms. Lanin, and 14 of the assistants participated in data collection. Specifics of the methodology will be discussed in a later section.

Subjects

Subjects were 121 psychiatric patients from two hospitals, Michael Reese Hospital and ISPI. A subsample of 98 subjects who could be readily assigned to one of four diagnostic categories was the core sample for the current study, while the other 23 subjects were a heterogeneous group with diagnoses that were rare or infrequent. The current study employed a cross-sectional design, with two concurrently tested groups. Sample one was tested at an active phase of their illness, typically in the first few weeks of hospitalization. The second sample was a post-hospitalization group tested concurrently with sample one at a time period approximately two years following their initial testing as inpatients.

Descriptive statistics for the sample are included in Tables 1 and 2. The first sample will at times be referred to as the active phase, and the second sample as the post-hospitalization sample. Table 1 indicates the means for the two time periods on four demographic variables. Table 2 lists means and standard deviations of four major diagnostic groups (Schizophrenic, Manic, Schizoaffective, depressed type, and Depressed) on an estimate of intelligence, phenothiazine dosage, education, and age at two time periods.

Diagnoses

All subjects were diagnosed using the Research Diagnostic Criteria (RDC) refined by Spitzer, Endicott, and Robins (1978 a,b). The RDC was designed to permit more reliable diagnoses and is similar to the third version of the American Psychiatric Association's

Table 1

Demographic Data on Hospitalized Patients Tested at Either an Active Phase of Their Illness or at a Phase Two Years Post-Hospitalization

	Sample 1 (n=51)		Sample 2 (n=47)	
	Active Phase		Post-Hospitalization	
	M	SD	M	SD
Intelligence[a]	10.27	3.09	11.27	3.43
Phenothiazine Dosage[b]	93.14	212.59	194.68	274.99
Age	28.02	8.10	30.44	8.93
Education	12.92	2.36	13.25	2.39

[a] Age corrected scaled score from the Information subscale of the Wechsler Adult Intelligence Scale.

[b] Based on Chlorpromazine equivalent dosages.

Table 2

Comparison of Four Diagnostic Groups at Two Time Periods for

Age, Education, Intelligence, and Medication

Diagnosis		Age		Education		Intelligence[a]		Dosage[b]	
	n	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Schizophrenic									
Active Phase	15	25.07	3.97	12.93	1.75	9.46	2.47	76.67	212.86
Post-Hospitalization	15	29.07	10.71	12.47	2.92	10.60	3.75	310.00	403.64
Manic									
Active Phase	11	33.55	13.84	12.64	3.32	9.45	2.50	36.36	120.60
Post-Hospitalization	10	29.80	4.98	12.90	1.66	11.40	3.53	150.00	246.08
Schizoaffective									
Active Phase	12	27.08	7.08	12.33	2.53	9.58	3.57	216.67	346.63
Post-Hospitalization	10	28.70	7.96	13.80	1.93	11.90	3.81	250.00	267.71
Depressed									
Active Phase	13	27.62	8.96	13.69	2.09	12.54	3.86	46.15	166.41
Post-Hospitalization	13	34.17	10.79	14.08	2.74	11.58	2.64	41.67	144.34

Note. 51 patients were tested in the active phase of their illness, and 47 patients at a post-hospitalization phase.

[a] An estimation of intelligence from the age corrected scaled score from the Information subscale of the WAIS.

[b] Based on Chlorpromazine equivalent dosage, means are significantly different for Diagnosis at $p < .06$, and for Time Period at $p < .10$.

Diagnostic and Statistical Manual (DSM-III) which evolved out of the RDC. To further increase the reliability of diagnoses, a standardized interview procedure is essential for providing a sound data base. Endicott and Spitzer (1978a) developed the Schedule for Affective Disorders and Schizophrenia (SADS), and its variations (Life and Change forms) to provide a thorough data base for reliable diagnosis. A similarly useful interview was Wing's (1966) Present State Examination (PSE). For patients at Michael Reese Hospital a modification of the SADS and SADS-Life form provided the data base interview material. At ISPI, Wing's PSE plus weekly administrations of the SADS-Change form were utilized to derive diagnoses.

Interviewers who administered these instruments were thoroughly trained over a period of more than a year prior to the study, and initial taped interviews using SADS were monitored for continued quality.

After reviewing the data base, RDC diagnoses were made on a consensus basis by a team of at least three experienced researchers. At all times either a senior clinical psychologist or psychiatrist participated. Raters on all dependent measures were blind to diagnosis at time of rating.

The RDC diagnoses of 121 patients who completed the minimum requirements (diagnosis, IQ estimate, and communication interview) are listed in Table 3. Of the 121 subjects, 98 fell into one of the four major diagnostic categories that were investigated in the current

Table 3

Diagnoses by Research Diagnostic Criteria of Patients at

Either Active or Post-hospitalization Phases

Diagnosis	Active Phase	Post-hospitalization
Schizophrenia[c]	15	15
Schizoaffective, manic	2	4
Schizoaffective, depressed[d]	12	10
Manic, unipolar[a]	3	4
Manic, bipolar[a]	8	6
Bipolar with hypomania (bipolar II)	0	2
Generalized Anxiety Disorder	2	0
Unspecified Functional Psychosis	2	1
Drug abuse	0	1
Other psychiatric disorder	2	1
Major depressive illness (unipolar)[b]	13	12
Hypomanic disorder (bipolar II)	1	0
	62	59

[a]Subjects who were considered Manic for the current study.

[b]Subjects who were considered Depressed for the current study.

[c]Subjects who were considered Schizophrenic for the current study.

[d]Subjects who were considered Schizoaffective for the current study.

study: Schizophrenic, Manic, Schizoaffective (depressed type), and Depressed.

Measures and Instrumentation

Measures and instruments described below were administered by more than a dozen interviewers, each in a different order. Consequently, order effects were minimized, but not completely controlled. One problem was that six interviewers did the largest number of interviews, while one interviewer tested only one subject. Another problem was that immediately following written consent, the Information subscale of the Wechsler Adult Intelligence Scale (WAIS) was administered. The purpose was to select out subjects who were functioning at an intellectual level too low to participate adequately. Although selecting subjects with a minimum IQ criterion provided problems in external validity, these problems will be discussed in Chapter V. The second major constraint on order was that the SADS, a long and repetitive interview used for diagnosis, was frequently given last.

Missing data occurred for all subjects, typically when they either refused further participation, when premature discharge occurred, or when the patient became severely disturbed (e.g., patients in restraints or seclusion were not tested). Although several patients failed to participate in the communication interview, for the purposes of the current study, subjects must have completed at least the communication interview, hence there was no missing data on that variable. However, a considerable number of subjects did not complete several of the other instruments described below.

The Object Sorting Test. To determine presence and severity of several measures of thought disorder, the Goldstein-Sheerer (1941) Object Sorting Test was administered. Extensive criteria for scoring, and a manual for administration was developed by Himmelhoch, Harrow, Hersh, and Tucker (1973), and provided scores for a) idiosyncratic thinking (bizarreness), b) behavioral overinclusion, c) conceptual overinclusion, d) underinclusive thinking, and e) concrete thinking. These indices have been used successfully by several authors studying disturbed thinking (e.g., Andreasen & Powers, 1975; Harrow & Bromet, 1972; Harrow, Bromet, & Quinlan, 1974; Harrow, Himmelhoch, Tucker, Hersh, & Quinlan, 1972). The Object Sorting Test included 36 common items (e.g., matches, a spoon, a pair of pliers). Each of seven items was placed, one at a time, in front of the subject, and the subject was asked to sort the items that went with it. Interviewers recorded not only the order of items sorted, but all verbalizations and behavior. If a concept for sorting was not evident, a forced question ("if you had to sort something.....") was asked to elicit the sorting concept.

The Gorham (1956) Proverbs Test and subtests of the Wechsler (1955) Adult Intelligence Scale. The study used a combination of the Comprehension subtest of the Wechsler (1955) Adult Intelligence Scale (WAIS), and the Gorham (1956) Proverbs Test to provide a sample of verbal behavior which has proved useful in several studies (e.g., Adler & Harrow, 1973, 1974; Harrow, Adler, & Hanf, 1974; Harrow, Tucker, & Adler, 1972). A manual by Adler and Harrow (1973) specified not only the standard administration procedures, but the method for deriving indices of a) the abstract-concrete dimension of thinking, and b) bizarre (idiosyncratic) thinking. The Information subscale of the WAIS was given to patients as well, as an estimate of their intellectual functioning, and the Digit Symbol subtest was also employed, to derive a measure of global deficit. The deficit measure was obtained by subtracting the age-corrected scaled Digit Symbol score from the age-corrected scaled Information score for each patient.

Self-report energy level. Energy level was assessed by responses on the Energy Level (Fatigue) scale (Berndt, Petzel, & Berndt, 1980; Berndt, in press). The Energy Level scale was a 12-item, true-false measure with items balanced for acquiescent response set. Internal consistency reliability was .91, and test-retest reliability over a three week period was .81. The items were written in a trait format. This scale is included in Appendix C.

The communication interview. For the current study, it was considered desirable to develop a semi-structured interview which more closely approximated typical language behavior than a psychiatric interview. Andreasen (1979b) used such an interview in validating the TLC, however her interview was unsystematic. There were several merits to such a naturalistic approach. First, the less an interview probed for symptoms and signs the more subsequent raters were likely to be relatively blind to diagnosis when hearing a taped interview.

Second, psychiatric interviews typically have dealt with a very circumscribed area of a subject's life, and as such are not necessarily generalizable to language as it would be used in a more casual interview. Third, each question asked in an interview can have potentially different stimulus meaning to the subject, and the content and form of responses might vary in a haphazard fashion from question to question. Rather than ignore the stimulus properties of interview questions, the current research developed a semi-structured interview which systematically varied the questions along three dimensions. Finally, by using a standardized set of probes, a relatively naturalistic communication pattern was obtained with a minimum loss in standardization of the stimulus material.

The development of the communication interview proceeded over a period of more than one year of pilot work in which Ilene Lanin and the author collaborated. In addition to refining and substituting topic questions, prompts were improved to elicit continued conversation with a relatively natural flow. After interviewing several pilot subjects the version employed in the current research was selected. Appendix D includes the written instructions to interviewers and the eight topic questions with prompts. A warm-up question was also used when the interview was given at a point in the testing sequence where adequate rapport had not yet been established.

The interview varied along three dimensions: personal/impersonal, opinion/account; and self-generated/reportative. While these three dimensions might well have elicited differences in disturbed communication the current study did not examine the effects of the three dimensions. Rather, the current study employed the distinctions to improve the content validity of the interview, selecting questions so that for each of the three specified dimensions at least four questions were included.

The three dimensions were chosen after careful consideration. The personal/impersonal dimension characterized questions where response content was typically of a more personal and affective nature, or alternatively of a more impersonal, non-affective nature. The opinion/account dimension contrasted whether a question favored description of an event without the necessary inclusion of one's beliefs or opinions. The self-generated/reportative distinction designated whether the subject was asked to construct a novel account of some hypothetical situation, or alternatively, was asked to merely report something which actually exists or has happened.

Subjects participated voluntarily in the interview which was recorded on audiotapes. Audiotapes were number coded to protect the subject's identity. The audiotapes were later rated for Andreasen's TLC variables. An example of a portion of an interview with a patient is included in Appendix E. The average interview lasted about 30 minutes.

Impulse control. Impulse control was measured using a technique validated by Singer, Wilensky, and McCraven (1956). In addition to writing "New Jersey Chamber of Commerce" at a normal speed and as slow as possible (Singer et al., 1965), patients were asked to repeat the sentence "The boys and girls chased the butterfly all around the park" in the normal and slow conditions. Verbal impulse control was measured by the difference between the seconds spent repeating the sentence under normal and slow conditions. Written impulse control was the difference between time spent writing the phrase in the normal and slow conditions. The high control groups were at least five seconds slower on the spoken, and eight seconds slower on the written task. Low impulse control subjects spoke or wrote in the slow condition in an amount of time less than the above criteria, and a few individuals were actually faster when they were asked to speak or write slowly. The instructions for the measures of impulse control and a sample data collection sheet are included in Appendix F. Ceiling times were added for those subjects who employed excessive control.

Although the article by Singer et al. (1956) indicated clear evidence that the written condition in the current study had good construct validity as a measure of impulsivity, the current study conceptualized the construct as "impulse control". This distinction, while acknowledging the relationship of the measures to classical measures of impulsivity, emphasizes the executive control function inherent in the task. Subjects are asked to delay their normal speaking or writing behavior. If one assumes that the "normal" speed for each subject is the one which is most rewarding, then the act of speaking or writing more slowly can be seen as an executive attempt to delay the gratification of speaking or writing at one's normal rate. From a more reductionistic viewpoint, it is behaviorally a manifested ability to control the rate variation of verbal or written behavior. The author, however, considers the key element the cognitive ability to control one's speech or writing, although rate is admittedly the specific behavior under control.

Self and other ratings of affective interference. Appendix G includes a self rating for affective interference, in which subjects, following the communication interview, were asked to rate their interview behavior on seven scales, each anchored with five points ranging from "not at all" to "very much", or the equivalent. The first two questions were considered filler items for the purposes of the current study, and will be analyzed elsewhere in a study of perspective. Patients were asked how much their emotions, good feelings, bad feelings, excitement, and lack of energy interfered with their communication during the interview. They completed the rating scales immediately following the communication interview.

Ratings by two others were obtained on the same variables that were in the self-rating scale. The interviewer typically completed the same questions independent of the patient. These ratings will be referred to as the interviewer ratings, and these raters had access to both non-verbal cues and responses by patients to other instruments, although they were instructed to rate only the behavior on the communication interview. A second rater also completed the rating scale, using only the tape-recorded communications interview as a guide. These ratings will be referred to as "other" ratings. A sample of instructions plus wording of items is in Appendix H.

TLC ratings. Ratings on the TLC variables were made by two independent raters, blind to diagnosis, exclusively on the basis of only the taped communication interview, with the exception of the three subjects interviewed by the author. Reliability of the ratings will be discussed below, however, once adequate reliability levels were established, only the ratings of the author were employed in the final analysis. The two raters independently evaluated the following variables from the TLC: poverty of speech (laconic), poverty of content, pressure of speech, distractible speech, tangentiality, derailment, incoherence, illogicality, clanging, neologisms, word approximations, circumstantiality, loss of goal, perseveration, echolalia, blocking, and stilted speech. Self-reference was not rateable because of the nature of the interview, and the two measures of aphasia were not of interest in the current study. For definitions of the TLC variables, see Andreasen (1979b).

Inter-rater reliability. Reliability of the variables in the current study which are part of the ongoing longitudinal project were not problematic, since periodic training sessions and checks by administrators for reliability drift have served to maintain continually good reliability. For example, ratings on the abstract-concrete variables for the proverbs test have tended to range from .90 to .96 (Buckley & Harrow, 1979; Harrow & Buckley, 1979). Similarly high reliability has been repeatedly demonstrated by the research group for object sorting variables and for the bizarreness ratings.

For the purposes of the current research, two main sets of variables have required reliability checks. Both the TLC variable raters, and interviewer and "other" raters were checked for adequate inter-rater reliability.

As a pilot study for the current research, archival interview data was rated by two raters, D.J.B. and S.M.B., and ratings compared after every three tapes. The archival interview tapes were from the research with the Schizophrenic State Interview (SSI; Grinker & Holzman, 1973; Schwartz, Grinker, Harrow, & Holzman, 1978), in which an interviewer, usually Roy Grinker, interviewed Michael Reese Hospital patients in their post-acute phase. Results from this "trial" reliability run for 25 patients are described in Table 4. Table 5 represents reliability for the two raters for 40 subjects' communication interviews. The first 25 patients were rated consecutively and the remaining 15 were randomly chosen from the remaining tapes. Table 6

Table 4

Inter-Rater Reliabilities for Andreasen's Thought, Language, and Communication Variables for the Grinker SSI Interview

TLC Variable	Kappa	Kappa (weighted)
Laconic Speech	.61	.78
Poverty of Content	.77	.79
Pressure of Speech	.88	.92
Distractibility	.88	.92
Tangentiality	.64	.81
Derailment	.87	.95
Incoherence	.49	.71
Illogicality	.70	.84
Clanging	.68	.68
Neologisms	1.00	1.00
Word Approximations	1.00	1.00
Circumstantiality	.87	.93
Loss of Goal	.89	.95
Perseveration	.81	.88
Echolalia	1.00	1.00
Blocking	1.00	1.00
Stilted Speech	.55	.68
Global Rating	.84	.91

Note. n = 25.

Table 5

Inter-Rater Reliabilities for Andreasen's Thought, Language, and Communication Variables for the Communication Interview

TLC Variable	Kappa	Kappa (weighted)
Laconic Speech	.85	.94
Poverty of Content	.75	.87
Pressure of Speech	.83	.91
Distractibility	.71	.85
Tangentiality	.77	.84
Derailment	.88	.94
Incoherence	.73	.85
Illogicality	.89	.95
Clanging	.82	.98
Neologisms	1.00	1.00
Word Approximations	.79	.85
Circumstantiality	.66	.76
Loss of Goal	.88	.94
Perseveration	.62	.76
Echolalia	1.00	1.00
Blocking	.78	.78
Stilted Speech	.85	.89
Global Rating	.82	.89

Note. *n* = 40.

Table 6

Inter-Rater Reliabilities for Interviewer and Tape Rater for the Affect Rating Scales

Scale	Reliability
Emotions	.505
Good Feelings	.568
Bad Feelings	.612
Excitement	.680
Fatigue	.462

Note. All reliabilities significant at $p < .001$, based on $n = 90$.

represents the inter-rater reliability for 90 subjects on the affective variables, and all reliabilities were significant at $p < 01$. Because the reliabilities were moderate, composite variables averaging the two ratings were made with the intention of increasing reliability. Consequently, only pooled ratings (the average of intervewer and tape-rater) were employed for the remainder of the study, and were referred to hereafter as "observer" or "other ratings."

CHAPTER IV

HYPOTHESES, DESIGN, AND RESULTS

Because of the large number of variables in the current study, the variables were grouped by experimental design (e.g., independent vs. dependent), and other conceptual designs (e.g., bizarreness).

Dependent Variables

Andreasen's Thought, Language, and Communication variables[1] were considered as dependent variables and analyzed as two separate groups, the ten most frequent, and the remaining seven, relatively infrequent, in addition to the global TLC score. Andreasen (1979, b) also distinguished her frequent from infrequent symptoms. Infrequent symptoms would be less useful diagnostically, because they are rare. They are less likely to be statistically significant because less variance typically exists. For the more traditional measures, variables were analyzed separately, as Bizarreness (bizarreness on the

[1] Throughout the remainder of the study, means and standard deviations of TLC scores will be based on a linear transformation using a multiplication constant of ten, in order to provide data with whole numbers rather than decimals.

Comprehension subtest of the WAIS, the Proverbs test, and on the Object Sorting Test), and the remaining measures were analyzed together under the category Classical Measures of Thought Disorder. Dependent variables, then, included the variables listed in Table 7.

Independent Variables

Independent variables were classified into five groups, listed in Table 8. The first group, labelled "Control Variables", were primarily of interest only to the extent that they modified the effects of the basic variables. The group of variables labelled in Table 8 as "Basic Independent Variables" were the three independent variables of greater interest: diagnosis, phase of illness, and energy level, as assessed by the Energy Level scale. Impulse control (both written and spoken) was analyzed separately. Affective disturbance ratings, distinguished as self and observer ratings, were analyzed with Pearson-product moment correlations for each diagnosis at each time period.

Table 7

Dependent Variables

<u>TLC Frequent</u>	<u>Bizarreness</u>
Laconic Speech	Comprehension
Poverty of Content	Proverbs
Pressure of Speech	Object Sorting
Tangentiality	<u>Classical Measures</u>
Derailment	Proverbs-Abstract
Incoherence	Proverbs-Abstract/Correct
Illogicality	Proverbs-Concrete
Circumstantiality	Proverbs-No Response
Loss of Goal	Object Sorting-Conceptual Overinclusion
Perseveration	Object Sorting-Conceptual Underinclusion
<u>TLC Infrequent</u>	Object Sorting-Behavioral Overinclusion
Distractibility	Object Sorting-Concreteness
Clanging	Digit Symbol Difference
Neologisms	
Word Approximations	
Echolalia	
Blocking	
Stilted Speech	
<u>TLC Globality</u>	
Global Rating	

Table 8

Independent Variables

Control Variables

Sex

Race (Caucasian, Non-Caucasian)

Intelligence (age-corrected scaled Information score)

Medication

Age

Education

Basic Independent Variables

Diagnosis:

1. Schizophrenic
2. Manic
3. Schizoaffective, depressed type
4. Depressed

Time Period (active vs. post-hospitalization)

Energy Level (high/low using a median split at 5)

Impulse Control

Written (median split)

Spoken (median split)

Affective Disturbance

Observer Ratings:

Emotions

Good Feelings

Bad Feelings

Excitement

Lack of Energy

Self Ratings:

Emotions

Good Feelings

Bad Feelings

Excitement

Lack of Energy

Analyses

In all designs, the null hypothesis was that there was no difference between groups, and no significant differences between interactions. The literature about the course of symptoms is ambiguous. For diagnoses, the author predicted no differences for any of the dependent variables between diagnoses. Similarly, no evidence from the literature allowed predictions for differences for Energy Level, Impulse Control, or Affective Disturbance. Again, dependent and independent variables will be discussed in groups to provide conceptual clarity.

For the basic independent variables, and for the variables assessing spoken and written impulse control, unequal *n*'s factorial analysis of variance was the design employed for analysis of the dependent variables in Table 7. The result was a large number of analyses, with a consequential increase in the likelihood of capitalizing on chance when rejecting the null hypothesis. Table 9 demonstrates the number of analyses in which significant results were found, compared with the numbers expected by chance.

Similarly, the Pearson product-moment correlations used to explore the relationship between affective ratings and thought disorder may have increased the likelihood of falsely detecting

Table 9

Expected and Obtained Significant ANOVAs Using 90 Analyses at a Specified Alpha Level

A. 2(Energy Level) x 2(Time Period) x 4(Diagnosis)

n of analyses	*n* of significant analyses	*n* expected at $p < .05$
30	22	1.5

B. 2(Written Control) x 2(Time Period) x 4(Diagnosis)

n of analyses	*n* of significant analyses	*n* expected at $p < .05$
30	21	1.5

C. 2(Spoken Control) x 2(Time Period) x 4(Diagnosis)

n of analyses	*n* of significant analyses	*n* expected at $p < .05$
30	21	1.5

D. All factorial ANOVAs

n of analyses	*n* of significant analyses	*n* expected at $p < .05$
90	64	4.5

a significant correlation. However, since correlations were necessarily high, due to the number of subjects in each condition, the significant correlational results were probably accurate (the higher the magnitude of a correlation, the smaller the variance of its distribution).

Control Variables

In the current study, control variables were those variables in the design that were potentially related to the dependent variables (or the basic independent variables) but were not of specific interest or relevance to the questions addressed in the present research. Control variables included medication dosage, estimated intelligence, age, education, sex, and race. For the control variables, several approaches were simultaneously employed. First, a 4 x 2 unequal cells analysis of variance (ANOVA) tested for the effects of four diagnoses, two time periods, and the interaction of time period and diagnosis on the variables medication dosage, intelligence, age, and education, analyzed as dependent variables. Means and standard deviations for these comparisons were reported on page 22 in Table 2. The only results from Table 2 that were significant were diagnosis, $F(3,90) = 2.70$, p .06; and time period, $F(1,90) = 3.10$, $p < .10$, for medications. The lax criterion of $p < .10$ is appropriate when the experimenter would prefer to find the null hypothesis of no difference between groups. However, for analyses where the experimenter would prefer to find a significant difference (rejecting the null hypothesis), the more conservative and conventional level of $p < .05$ will be used.

Additionally, medication, intelligence, age, and education were correlated with TLC frequent and infrequent variables, and were reported in Appendix A. The same four control variables were correlated with the three measures of Bizarreness, and the Classical thought disorder variables. Results of these correlations are in Appendix B. Correlations were at best, low to moderate, with the highest correlations between intelligence and the abstraction measures on the proverbs test. Because both sex and race were dichotomous variables, their relationships to the dependent variables were examined by 2 x 4 x 2 analyses of variance with unequal $\underline{n}$'s. For sex, no significant main or interaction effects were noted for any of the dependent variables. Effects related to the main independent variables were equivalent to those discussed in the following section and will be reported there. For race, there was, however, a main effect for circumstantiality, $\underline{F}(1.82) = 5.92$, $\underline{p} < .05$, with caucasians producing more ($\underline{M} = 7.37$) circumstantial speech than non-caucasians, ($\underline{M} = 3.17$). The source table for the unequal cells ANOVA for circumstantiality is included as Appendix I. The other significant difference related to race was a three way interaction between race, diagnosis, and time period, for pressure of speech. The differences between time period and diagnosis for caucasians and non-caucasians are illustrated in Figure 1. The source table for the ANOVA for pressure of speech is listed in Appendix J.

The question of how to handle these control variables in an experimental design is an unresolved methodological issue. Some would

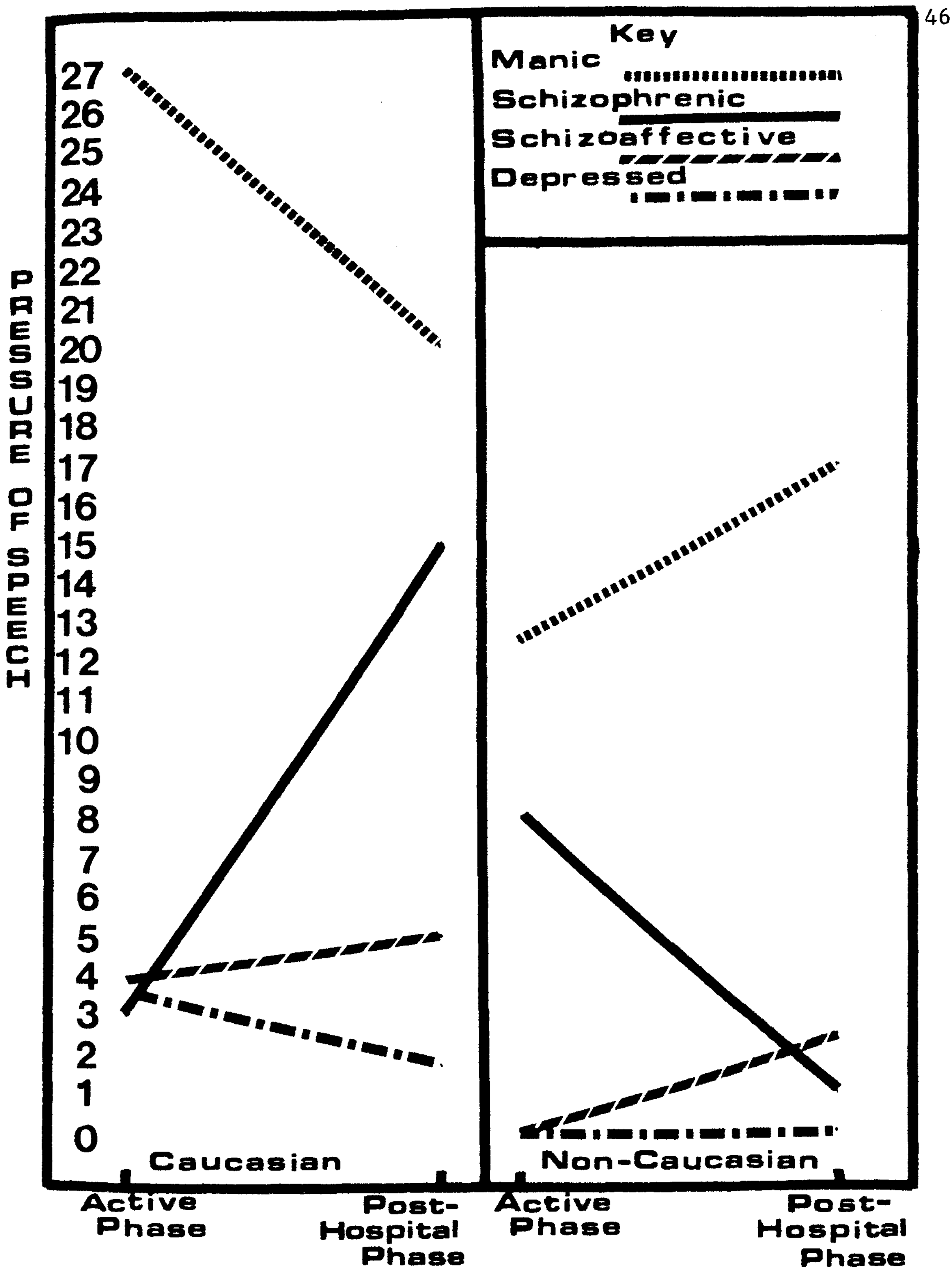

Figure 1

Mean Ratings for Pressure of Speech for Caucasians and Non-Caucasians

Depending on Phase of Disorder and Diagnosis argue that for internal validity, it is better to control for these variables, and that for continuous variables, analysis of covariance is the best available technique. Others state that rarely can a variable meet the rigorous assumptions of analysis of covariance, and if they did the resulting analysis would lack external validity. While the author preferred the second view, the analyses in the next section for the basic independent variables are also re-analyzed with an analysis of covariance with unequal *n*'s and the source tables for these analyses are included in Appendices K through AN.

One further question of interest was the frequency of males and females and caucasians and non-caucasians in the sample. Table 10 illustrates the frequency of males and females by diagnosis, and Table 11 represents the same breakdown by time period. Table 12 indicates the frequency of caucasians and non-caucasians by diagnosis, and Table 13 illustrates the frequency by time period. Table 10 reveals that there appear to be a disproportionate number of males in the schizophrenic group, and more females than might be expected by chance in the depressed group. Analysis of the data by chi square reveals a χ^2 (3) = 5.68, n.s. Table 11 shows no remarkable discrepancies between the sexes at the time periods, χ^2 (1) = .16, n.s. Table 12 indicated a discrepancy between the expected number of caucasians and non-caucasians in the depressed group, however the difference was non-significant, χ^2 (3) = 6.75, n.s. Furthermore, Table 13 revealed no significant differences between races based on phase of illness, χ^2 (1) = .30, n.s. Of the non-caucasian group described in

Table 10

Frequencies of Males and Females in Schizophrenic, Manic,

Schizoaffective (depressed type), and Depressed Groups

Diagnosis	n	Males	Females
Schizophrenic	30	19	11
Manic	21	11	10
Schizoaffective	22	12	10
Depressed	25	8	17
Totals	98	50	48

Table 11

Frequencies of Male and Female Patients Tested at Active and Post-Hospitalization Phases

Phase	n	Males	Females
Active	51	27	24
Post-Hospitalization	47	23	24
Totals	98	50	48

Table 12

Frequencies of Caucasians and Non-Caucasians in Schizophrenic, Manic, Schizoaffective (depressed type), and Depressed Groups

Diagnosis	*n*	Caucasian	Non-Caucasian
Schizophrenic	30	16	14
Manic	21	10	11
Schizoaffective	22	11	11
Depressed	25	20	5
Totals	98	57	41

Table 13

Frequencies of Caucasians and Non-Causasians Tested at Active and Post-Hospitalization Phases of Their Illness

Phase	n	Caucasian	Non-Caucasians
Active	51	31	20
Post-Hospitalization	47	26	21
Totals	98	57	41

Tables 12 and 13, 90% were black, and the remainder were spanish-speaking, or asian-pacific.

Frequencies of Dependent Variables and Intercorrelations

Means and standard deviations of Andreasen's TLC variables are listed in Table 14. Variables from the TLC were transformed linearly by multiplying by a constant of 10. The transformation was done routinely for all TLC variables because of their infrequency. Table 15 includes the means and standard deviations of the bizarreness variables and classical thought disorder measures. The intercorrelations between TLC variables are reported in Tables 16, 17, and 18, while the intercorrelations between the classical thought disorder measures are included in Table 19. The correlations between TLC variables and the Bizarreness measures are in Table 20, while Table 21 includes correlates between the TLC variables and the classical measures of thought disorder.

Basic Independent Variables and Frequent TLC Variables

The major independent variables for the current study were Diagnoses, Time Period, and Energy Level. Consequently, a 4 (Diagnosis) by 2 (Time period) by 2 (Energy level) ANOVA with unequal $\underline{n}$'s was employed to analyze the ten most frequent TLC variables. The Energy Level scale (Berndt, Petzel, & Berndt, 1980) was divided by a median split (5 and below versus above 5). For laconic or slow speech there were significant main effects for Time Period, $\underline{F}(1,82) = 4.04$, $\underline{p} < .05$, and Energy Level, $\underline{F}(1,82) = 15.94$, $\underline{p} < .001$. Subjects who reported a high energy level significantly less often produced laconic

Table 14

Mean Scores[a] on Andreasen's Thought, Language, and Communication Variables

TLC Variables	M	SD
Laconic Speech	8.67	9.40
Poverty of Content	10.60	10.60
Pressure of Speech	7.14	8.14
Distractibility	2.35	3.58
Tangentiality	3.57	5.52
Derailment	9.18	10.55
Incoherence	6.12	9.17
Illogicality	7.86	7.49
Clanging	.61	1.93
Neologisms	.31	1.14
Word Approximations	3.06	6.08
Circumstantiality	5.61	7.72
Loss of Goal	5.10	6.95
Perseveration	5.61	7.99
Echolalia	.20	.75
Blocking	.92	2.29
Stilted Speech	2.75	6.13
Global Rating	14.59	11.63

Note. n = 98.

[a] Scores are based on a linear transformation using a multiplication constant of 10.

Table 15

Mean Scores on the Classical Measures of Thought Disorder

Measure[a]	$\underline{M}$	$\underline{SD}$
BIZCOMP	9.26	25.75
BIZPROV	10.59	25.94
ACPROV	9.61	6.58
ABSPROV	15.72	7.17
CPROV	4.82	5.31
NRPROV	3.17	4.53
BIZOBJ	1.87	3.14
COIOBJ	1.74	1.96
UINOBJ	2.45	2.69
CONOBJ	2.73	2.96
BEHOBJ	24.6	12.63

[a] Measures are coded: BIZCOMP = Bizarreness-Comprehension; BIZPROV = Bizarreness-Proverbs; ACPROV = Proverbs-Abstract/Correct; ABSPROV = Proverbs-Abstract; CPROV = Proverbs-Concrete; NRPROV = Proverbs-No Response; BIZOBJ = Object Sorting-Bizarreness; COIOBJ = Object Sorting-Conceptual Overinclusion; UINOBJ = Object Sorting-Conceptual Underinclusion; CONOBJ = Object Sorting-Concrete; BEHOBJ = Object Sorting-Behavioral Overinclusion.

Note. $\underline{n}$ = 98.

Table 16

Intercorrelations Between the Ten Most Frequent of Andreasen's Thought, Language, and Communication Variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Laconic									
2. Poverty of Content	-.152								
3. Pressure of Speech	-.318***	.385***							
4. Tangentiality	.027	.529***	.454***						
5. Derailment	-.100	.647***	.609***	.652***					
6. Incoherence	-.083	.505***	.511***	.457***	.671***				
7. Illogicality	.016	.583***	.551***	.609***	.763***	.720***			
8. Circumstantiality	-.237**	.338***	.256***	.073	.222*	.162*	.032		
9. Loss of Goal	-.198*	.564***	.627***	.566***	.837***	.666***	.699***	.228**	
10. Perseveration	.013	.419***	.446***	.514***	.634***	.664***	.599***	.521***	.206*

Note. $n = 110$.

Note. *($p < .05$); **($p < .01$); ***($p < .001$).

Table 17

Intercorrelations Between the Seven Less Frequent of Andreasen's Thought, Language, and Communication Variables

TLC Variable	1.	2.	3.	4.	5.	6.	7.
1. Distractibility							
2. Clanging	.198*						
3. Neologisms	.094	.496***					
4. Word Approximations	.557***	.528***	.385***				
5. Echolalia	.008	.381***	.456***	.216*			
6. Blocking	.093	.246**	.140	.112	.097		
7. Stilted Speech	.123	-.098	.014	.131	.062	-.034	
8. Global Rating	.404***	.336***	.205*	.548***	.261**	.073	.123

Note. n = 110

Note. *($p < .05$); **($p < .01$); ***($p < .001$).

Table 18

Intercorrelations Between the Ten Frequent and Seven Infrequent and Global Variables

From Andreasen's Thought, Language, and Communication Scale

TLC Variable	1.	2.	3.	4.	5.	6.	7.	8.
Laconic	.003	-.099	-.006	-.047	.022	.137	-.120	.288**
Poverty of Content	.219*	.374***	.125	.442***	.132	.055	.224*	.509***
Pressure of Speech	.398***	.374***	.125	.388***	.167*	-.057	.676***	.499***
Tangentiality	.413***	.594***	.353***	.549***	.351***	.194**	-.019	.612***
Derailment	.388***	.455***	.186**	.524***	.295**	.067	.112	.773***
Incoherence	.224*	.433***	.238*	.571***	.266**	.056	.070	.639***
Illogicality	.439***	.457***	.286**	.621***	.194*	.022	-.012	.746***
Circumstantiality	-.139	.206*	.122	.022	.034	.000	.222*	.074
Loss of Goal	.373***	.418***	.188*	.447***	.199*	.047	.086	.641***
Perseveration	.259**	.445***	.216*	.521***	.261**	.035	.119	.621***

Note. *($p < .05$); **($p < .01$); ***($p < .001$).

Note. 1. Distractibility; 2. Clanging; 3. Neologisms; 4. Word Approximations; 5. Echolalia; 6. Blocking; 7. Stilted Speech; 8. Global Rating.

Table 19

Intercorrelations Between the Classical Measures of Thought Disorder

Variable (n)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. BIZCOMP (110)										
2. BIZPROV (110)	.987***									
3. ACPROV (98)	-.058	-.148								
4. ABSPROV (98)	-.029	-.122	.752***							
5. CPROV (98)	.041	.081	-.550***	-.737***						
6. NRPROV (98)	-.046	.011	-.491***	-.661***	.169*					
7. BIZOBJ (98)	.047	.185*	-.414***	-.447***	.337***	.102				
8. COIOBJ (98)	.008	.068	-.332**	-.240*	.187*	.016	.559***			
9. UINOBJ (98)	.021	.048	-.270**	-.429***	.176	.392***	.213*	.026		
10. CONOBJ (98)	.004	.045	-.338***	-.473***	.309**	.331**	.396***	.091	.631***	
11. BEHOBJ (103)	.080	.102	-.024	.072	-.094	-.260*	.344***	.239*	.496***	-.316**

Note. *($p < .05$); **($p < .01$); ***($p < .001$).

Note. BIZCOMP = Bizarreness-Comprehension; BIZPROV = Bizarreness-Proverbs; ACPROV = Proverbs-Abstract/Correct; ABSPROV = Proverbs-Abstract; CPROV = Proverbs-Concrete; NRPROV = Proverbs-No Response; BIZOBJ = Object Sorting-Bizarre; COIOBJ = Object Sorting-Conceptual Overinclusion; UINOBJ = Object Sorting-Conceptual Underinclusion; CONOBJ = Object Sorting-Concrete; BEHOBJ = Object Sorting-Behavioral Overinclusion.

Table 20

Correlations Between Andreasen's Thought, Language, and Communication Variables and Three Measures of Bizarreness

	Bizarreness		
Variable (TLC)	Comprehension	Proverbs	Object Sorting
Laconic	-.076	-.089	-.101
Poverty of Content	.064	.107	.536***
Pressure of Speech	-.033	.033	.424***
Distractibility	.052	.095	.190
Tangentiality	-.067	-.033	.309**
Derailment	-.075	-.033	.584***
Incoherence	-.007	-.033	.559***
Illogicality	-.041	.028	.568***
Clanging	-.055	-.009	.343***
Neologisms	.190*	.203*	.074
Word Approximations	-.014	.038	.269**
Circumstantiality	.094	.096	.184*
Loss of Goal	-.099	-.058	.566***
Perseveration	.073	.108	.437***
Echolalia	-.055	.109	.437***
Blocking	-.092	-.097	-.105
Stilted Speech	.094	.086	.042
Global Rating	-.073	-.019	.496***

Note. *($p < .05$); **($p < .01$); ***($p < .001$); based on n = 98.

Table 21

Correlations Between Andreasen's Thought, Language, and Communication Variables and the Classical Measures of Thought Disorder

TLC Variable	1.	2.	3.	4.	5.	6.	7.	8.
Laconic	-.204*	-.247*	.103	.319**	-.220*	.257*	.308**	-.193*
Poverty of Content	-.221*	-.230*	.144	-.002	.374***	.091	.189*	.171*
Pressure of Speech	-.279**	-.254	.193	.033	.385***	.099	.068	.186*
Distractibility	-.343***	-.262*	.244*	.071	.169	.046	.083	.186*
Tangentiality	-.231*	-.303*	.266**	.089	.357***	.071	.174*	.215*
Derailment	-.412***	-.452***	.393***	.096	.462***	.173	.266*	.204
Incoherence	-.434***	-.412***	.351***	.150	.351***	.157	.163	.091
Illogicality	-.488***	-.427***	.288**	.106	.425***	.244*	.238	.184*
Clanging	-.105	-.118	.025	.019	.297**	.049	.058	.219*
Neologisms	-.016	.071	-.121	-.109	.129	-.059	-.042	.170*
Word Approximation	-.300**	-.197*	.237*	-.043	.199*	-.005	.107	.159
Circumstantiality	.051	.053	.035	-.017	.178	-.159	-.025	.074
Loss of Goal	-.341***	-.380***	.365***	-.019	.463	.037	.143	.182*
Perseveration	-.299**	-.302**	.233*	.109	.298**	.165	.154	.143
Echolalia	-.011	.167	-.100	-.134	.054	-.074	-.044	.056
Blocking	.046	-.078	-.036	.185	.055	.029	-.066	-.078
Stilted Speech	.043	.113	-.024	-.125	.108	-.072	-.056	.019
Global Rating	-.518***	-.507***	.381***	.294	.319**	.221*	.347***	.034

<u>Note</u>. *($p < .05$); **($p < .01$); ***($p < .001$); based on n = 98.

<u>Note</u>. 1. Abstract-Correct Proverbs; 2. Abstract Proverbs; 3. Concrete Proverbs; 4. No Response Proverbs; 5. Object Sorting-Conceptual Overinclusion; 6. Object Sorting-Underinclusion; 7. Object Sorting-Concrete; 8. Object Sorting-Behavioral Overinclusion.

speech, M = 4.23, than subjects who reported low energy level, M = 13.70. Patients at the active phase[1] of their illness also produced more laconic speech M = 10.40, relative to patients assessed at post-hospitalization, M = 6.60. Furthermore, an interaction of diagnosis by time period was also significant, $F(3,28) = 2.79$, $p < .05$. Figure 2 illustrates the interaction. A simple effects analysis of the data revealed, $F(1,82) = 19.39$, $p < .001$, that time period was an important variable primarily for the schizoaffective diagnosis. Schizoaffectives produced significantly more laconic speech at the active phase of their illness relative to the posthospitalization sample. There were no significant main effects for poverty of content, however there was a trend for significance with diagnosis, $p < .06$. A significant interaction was obtained, nevertheless, between diagnosis and time period. A simple effects analysis indicated that significant interaction effects between time and diagnosis were primarily in the schizophrenic, $F(1,82) = 4.88$, $p < .05$ and manic groups, $F(1,82) = 5.87$, $p < .05$. Figure 3 illustrates the pattern of the interaction, with poverty of content significantly lower in the posthospitalization manics and schizophrenics, contrasted with minimally increased symptomatology for post-hospitalization schizoaffective and depressed patients. Pressure of speech could be accounted for by significant main effects for

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[1]The more accurate term "active phase" will be used interchangeably with the term acute. Patients in the "active phase" of their disorder are those who have been tested within the first few weeks of hospitalization.

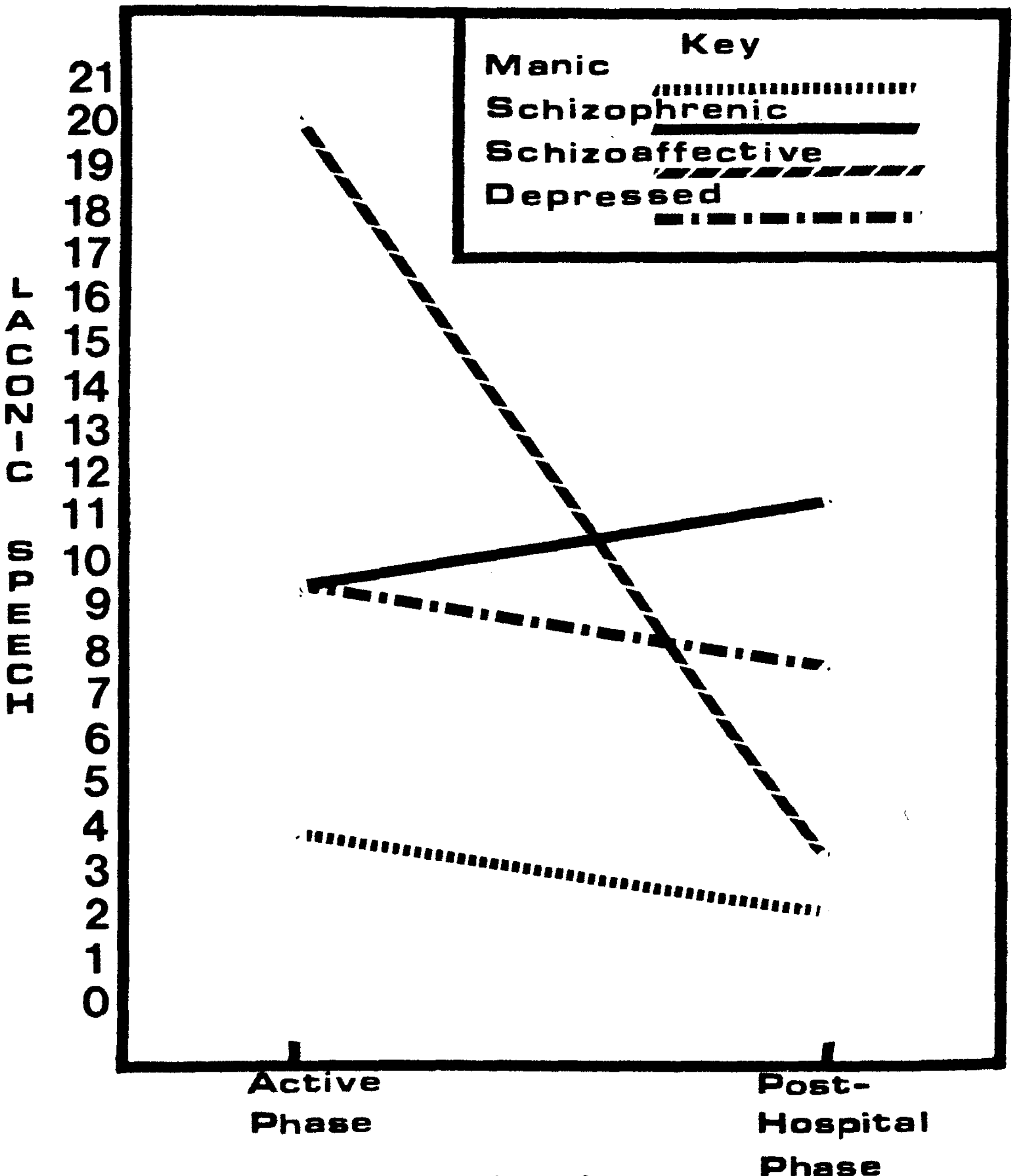

Figure 2

Laconic Speech for Four Diagnoses at Two Time Periods

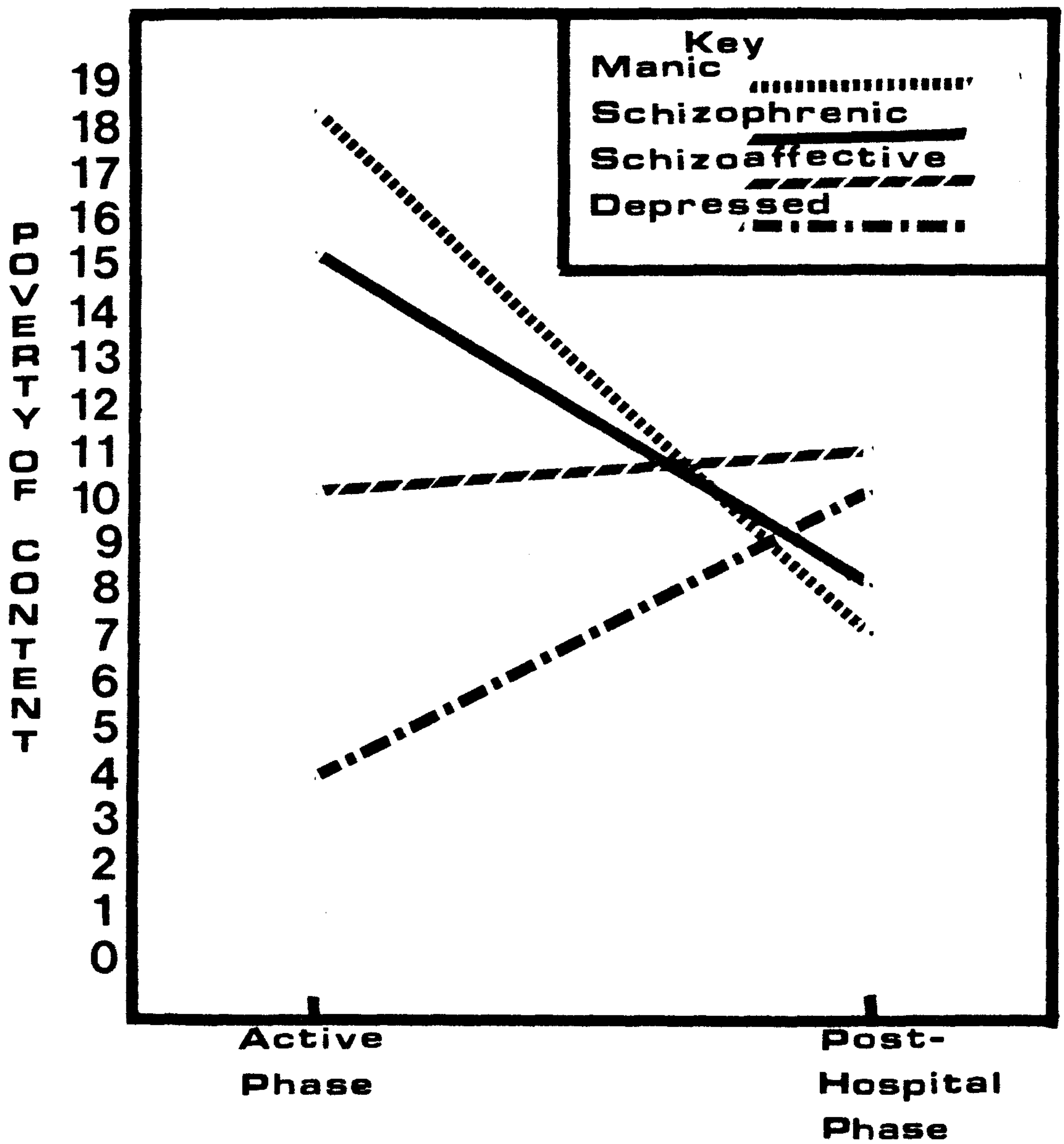

Figure 3

Poverty of Content for Four Diagnoses at Two Time Periods diagnosis, $F(3,82) = 10.45$, $p < .001$, and for energy level, $F(1,82) = 9.69$, $p < .01$. Subjects reporting high levels of energy evidenced significantly more pressure of speech, $M = 11.34$, relative to those reporting low levels of energy, $M = 2.39$. Manics, $M = 20.00$, scored significantly higher than schizophrenics, $M = 5.67$, schizoaffectives, $M = 2.73$, and depressives, $M = 2.00$ (Newman-Keuls analysis, $p < .05$). No other groups differed in their scores on pressured speech.

An unequal n's ANOVA of tangentiality indicated that the main effect for diagnosis was the only significant factor, $F(3,82) = 3.26$, $p < .05$. A Newman-Keuls post hoc analysis at .05 criterion indicated that manics were significantly more tangential, $M = 6.19$; than depressives, $M = .80$, and schizoaffectives, $M = 2.73$. Schizophrenics, $M = 3.11$, were not significantly different from any of the three other categories.

Derailment was accounted for by main effects for diagnosis, $F(3,82) = 7.07$, $p < .001$, time period, $F(1,82) = 4.12$, $p < .05$, and an interaction between time period and energy level, $F(1,82) = 8.06$, $p < .01$. A simple effects analysis demonstrated that the interaction effect was significant for energy level at the post-hospitalization phase, $F(1,82) = 4.42$, $p < .05$. The interaction phenomenon is illustrated in Figure 4. High energy was associated with derailment at either time period, while a lower energy level at post-hospitalization phase was related to less derailment.

The main effect for time period was constrained by the limiting

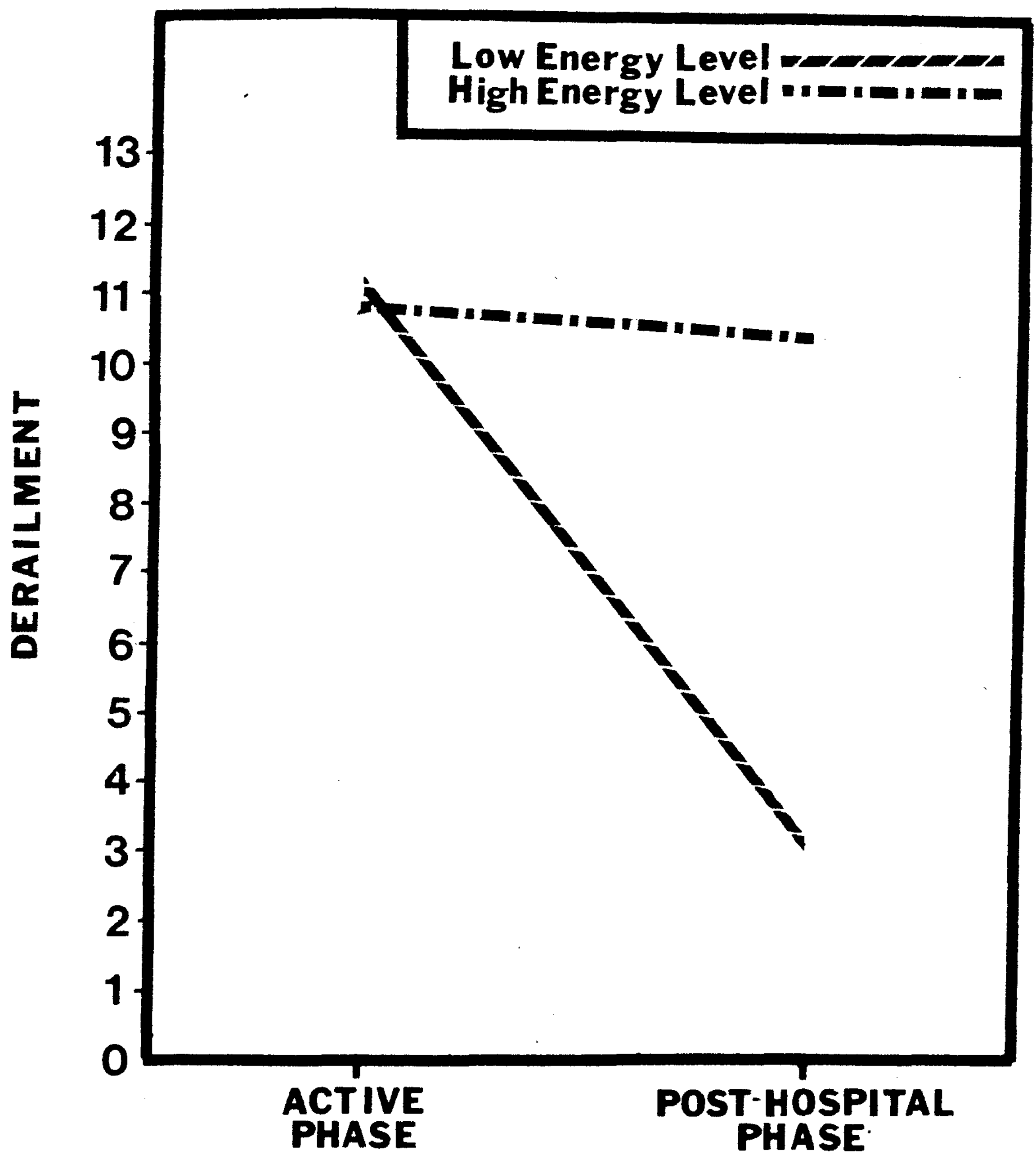

Figure 4

Derailment for High and Low Energy Groups at Two Time Periods effect of the interaction with energy level, however the main effect for diagnoses remained to be explained. A post hoc Newman-Keuls ($p < .05$) analysis revealed that although manics, $M = 16.67$, and schizophrenics, $M = 12.00$, were not significantly different, they both had more derailment than the depressed group, $M = 1.60$. The manics produced significantly more derailment than the schizoaffective group, $M = 5.91$, however the schizoaffectives did not differ significantly from either the schizophrenic or the depressed group.

The only difference for incoherence, was the main effect for diagnosis, $F(3,82) = 3.12$, $p < .05$. Again, a Newman-Keuls post hoc analysis with .05 alpha criterion was employed to detect the major sources of variance. Manics, $M = 10.00$ were significantly more incoherent than depressed patients, $M = 1.20$, as were schizophrenics, $M = 9.33$. Manics, however, were not significantly different from schizophrenics or schizoaffectives, $M = 3.64$. Schizoaffectives were not significantly more incoherent than any group.

The unequal n's ANOVA of the variable illogicality revealed main effects for both diagnosis $F(3,82) = 4.91$, $p < .01$, and time period $F(1,82) = 7.87$, $p < .01$. The effect for time period indicated that patients at the active phase of their illness are more illogical, $M = 10.59$, than a comparable group tested at two years post-hospitalization, $M = 4.89$. The post hoc Newman-Keuls analysis of diagnosis revealed that manics were significantly ($p < .05$) less logical, $M = 12.38$, than depressed patients, $M = 1.60$. Manics were not significantly different from either schizophrenics, $M = 12.33$, or schizoaffectives,

$M = 5.45$. However, schizophrenics were significantly ($p < .05$) more illogical than depressed or schizoaffective patients. Furthermore, schizoaffectives were significantly more illogical than depressives.

The variable circumstantiality could not be accounted for by any of the three basic independent variables or the interactions. A different picture, however emerged for loss of goal. A highly significant main effect was obtained for diagnosis, $F(3,82) = 6.90$, $p < .001$. Additionally, an energy level by time period interaction was also significant, $F(1,82) = 5.68$, $p < .05$. A simple effects analysis of the interaction, $F(1,82) = 7.01$, $p < .01$, reveals that the significant difference in the interaction was located in the posthospitalization phase. Figure 5 illustrates the interaction of time period and energy level. A Neuman-Keuls post hoc test with a .05 criterion indicates that both manics, $M = 10.00$, and schizophrenics, $M = 8.00$, evidenced loss of goal more frequently than schizoaffectives, $M = 1.36$, or depressives, $M = .40$. Schizophrenics did not differ from manics. Similarly, schizoaffectives did not differ from depressives.

Finally, a main effect for time period accounted for a significant portion of the variance in ratings of perseveration, $F(1,82) = 5.74$, $p < .05$. Subjects at the active phase perseverated significantly more often, $M = 7.45$ than subjects assessed as the post-hospitalization phase, $M = 3.48$.

Basic Independent Variables and Infrequent TLC Variables

Clanging, neologisms, echolalia, blocking, and stilted speech

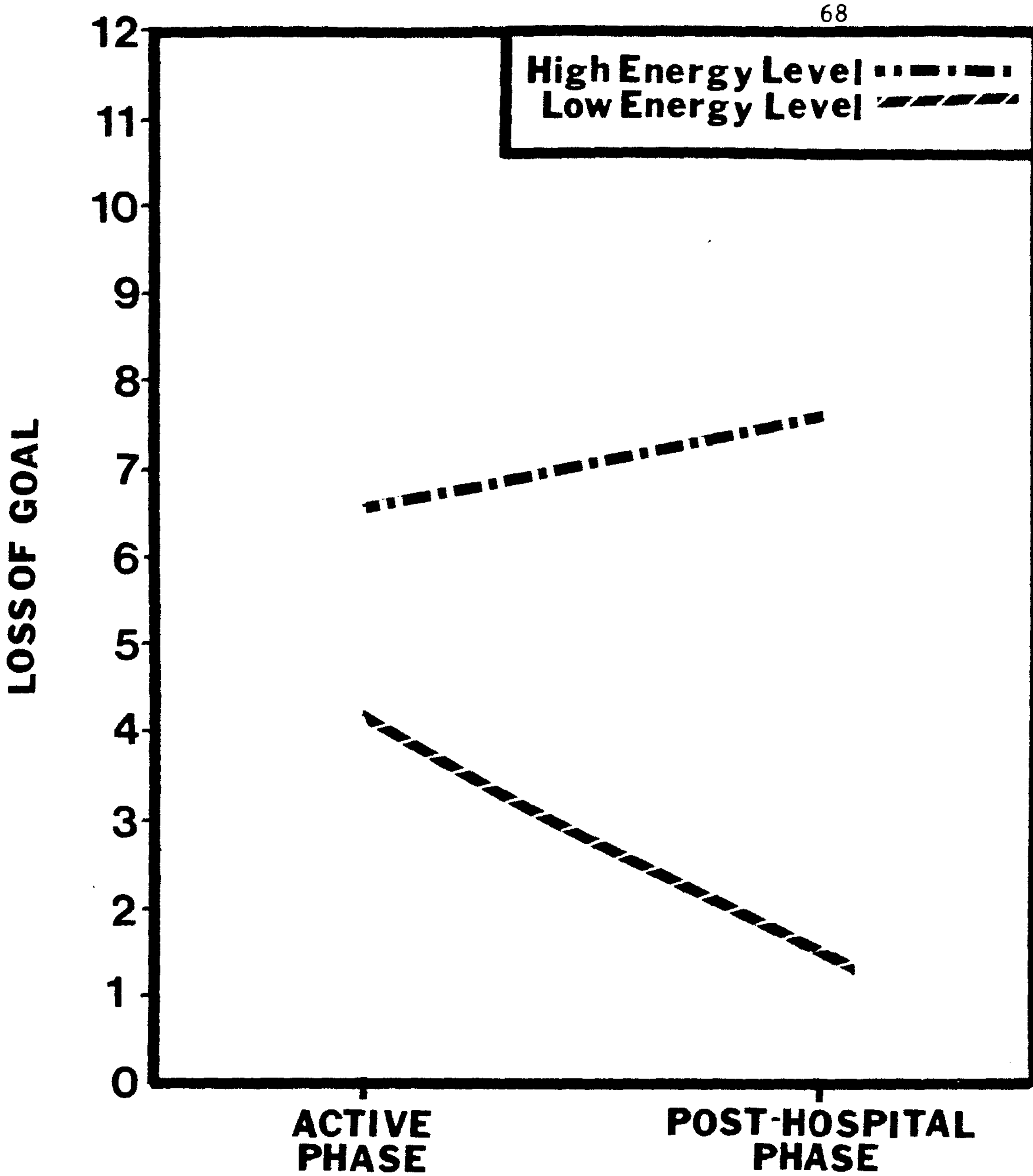

Figure 5

Loss of Goal for High and Low Energy Groups at Two Time Periods were the infrequent TLC variables that could not be significantly accounted for by the ANOVAS for the basic independent variables. However, a significant main effect for diagnosis was noted on the less frequent TLC variable of distractibility. A Newman-Keuls post hoc analysis of the means with a .05 criterion indicated that schizophrenics, $M = 5.00$, were significantly more distractible than schizoaffectives, $M = .46$, or depressives, $M = 0.00$. Manics, $M = 3.33$ were not significantly less distractible than schizohrenics, but were significantly more distractible than the other diagnoses. The unequal n's ANOVA for work approximation indicated a significant main effect for energy level, $F(1,82) = 4.37$, $p < .05$. Subjects reporting high energy level produced significantly more word approximations, $M = 4.16$, than subjects who reported less energy, $M = 1.30$.

The global ratings of thought disorder on the TLC scale were a function of several significant variables. There were main effects for both diagnosis, $F(3,82) = 11.84$, $p < .001$, and time period, $F(1,82) = 16.62$, $p < .001$. In addition, there were significant interactions between diagnosis and energy level, $F(3,82) = 2.81$, $p < .05$, and between energy level and time period, $F(1,82) = 11.68$, $p < .001$.

The interaction between energy level and diagnosis limits the interpretation of the main effect for diagnosis, just as the interaction between energy level and time period constrains the main effect of time period. The interaction between energy level and diagnosis is illustrated in Figure 6. As the figure reveals, higher energy does not appreciably affect global ratings of thought disorder for manics,

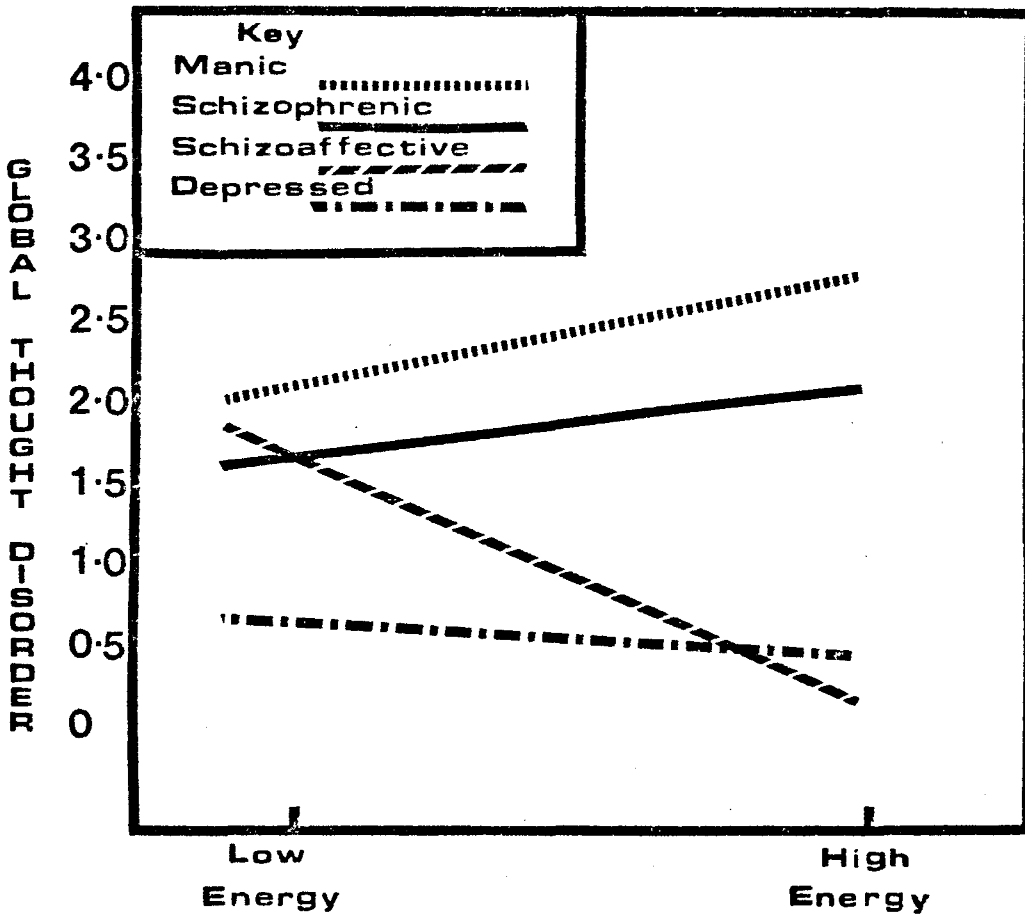

Figure 6

Mean Global Ratings of Thought Disorder for Four Diagnoses

With Either High or Low Energy Level

schizophrenics, or depressives. For schizoaffectives however, those with low energy had significantly more global thought disorder than those with high energy (who had virtually none). The interaction between energy level and time period is illustrated in Figure 7, in which a high energy level is associated with less global thought disorder at the active phase of illness, but more at the post-hospitalization phase, relative to low energy level.

The main effect for time period reflects more global thought disorder for the active phase of the illness, $\underline{M}$ = 1.67, relative to the post-hospitalization phase, $\underline{M}$ = 1.00. Differences by diagnosis, analyzed post hoc by Newman-Keuls, indicated that manics, $\underline{M}$ = 2.29, and schizophrenics, $\underline{M}$ = 2.10, differed significantly from schizoaffectives, $\underline{M}$ = 1.14, and depressives, $\underline{M}$ = .56, producing more global thought disorder. Schizoaffectives did not differ from depressives significantly, and manics did not significantly differ from schizophrenics.

In summary, the basic independent variables were often significantly related to TLC variables, particularly the frequent ones, and to the global rating. Interaction effects frequently occurred, and were illustrated in Figures 2 through 7. The most frequent significance effects, however, were for the main effect of diagnosis, and Table 22 summarizes groups that were significantly different, using the Newman-Keuls procedure for 8 TLC variables and the global rating for severity of thought disorder.

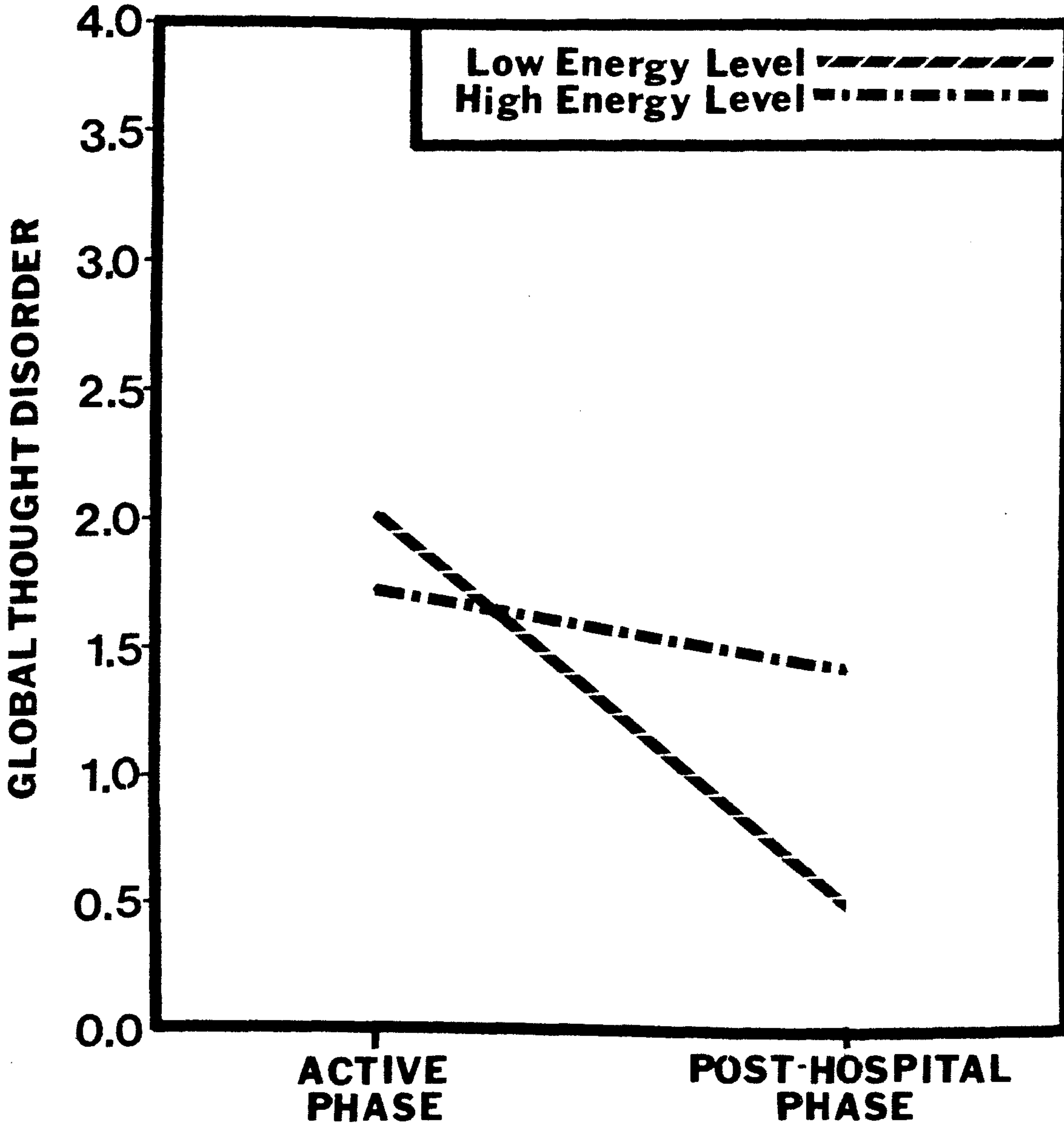

Figure 7

Mean Global Thought Disorder Ratings at Two Time Periods for

High and Low Energy Groups

Table 22

Order of Four Diagnoses From High to Low Mean Ratings on Measures of Thought Disorder and the Newman-Keuls Analyses of Group Differences

Pressure of Speech	M	S	Z	D
Tangentiality	M	S	Z	D
Derailment	M	S	Z	D
Incoherence	M	S	Z	D
Illogicality	S	M	Z	D
Loss of Goal	M	S	Z	D
Distractibility	S	M	Z	D
Perseveration [a]	S	M	Z	D
Global Thought Disorder	M	S	Z	D

[a] Not significant for ANOVA for basic variables, however significant from analyses of spoken and written impulse control.

Note 1. M = Manics; S = Schizophrenics; Z = Schizoaffectives; D = Depressed.

Note 2. Groups sharing a line are not significantly different using the post hoc criterion of $p < .05$.

Basic Independent Variables and Bizarreness

In the current section, the results of unequal *N*'s ANOVAS for the basic independent variables (diagnosis, time period, and energy level) are reported for bizarreness measures derived from proverbs, the Comprehension subtest of the WAIS, and for Object Sorting.

Bizarreness scored from the Comprehension subtest was analyzed by the unequal *N*'s ANOVA. The only significant variable was the main effect for diagnosis, $F(3,77) = 3.55$, $p < .05$. A post hoc Newman-Keuls analysis at the .05 criterion revealed manics, $M = 4.21$, were significantly more bizarre than schizoaffectives, $M = .96$, and depressives, $M = .50$. Schizophrenics, $M = 3.37$, were also significantly more bizarre than both schizoaffectives and depressives. Manics did not differ from schizophrenics, and schizoaffectives did not differ from depressives in bizarreness or comprehension.

A similar main effect was obtained for diagnosis on bizarreness scored from the Proverbs Test, $F(3,77) = 3.43$, $p < .05$. The Newman-Keuls post hoc analysis ($p < .05$) indicated that both manics, $M = 7.51$, and schizophrenics, $M = 4.54$, were both significantly more bizarre than schizoaffectives, $M = 1.60$, and depressives, $M = .57$. Depressives did not differ significantly from schizoaffectives, nor were manics significantly different from schizophrenics.

Bizarreness as measured on the Object Sorting task was analyzed by the same basic independent variables. A significant main effect for diagnosis was obtained, $F(3,74) = 7.48$, $p < .001$. An additional main effect for phase of illness was also detected, $F(1,74) = 6.57$, $p < .05$. Patients at the active phase of their illness were more bizarre on the object sorting, $M = 2.80$, compared with subjects tested at a post-hospitalization phase, $M = 1.30$. A Newman-Keuls ($p < .05$) post hoc analysis of the diagnostic variables indicated, as in the other two analyses of bizarreness, than manics, $M = 3.76$, and schizophrenics, $M = 3.21$, were significantly more bizarre than either schizoaffectives, $M = 1.05$, or depressives, $M = .39$. Furthermore, there were no differences between manics and schizophrenics, or between depressives and schizoaffectives.

Basic Independent Variables and Classical Measures

Two scores for abstraction were derived from the proverbs test; abstract, and abstract-correct. A significant main effect for diagnosis was obtained on abstraction, $F(3,75) = 5.02$, $p < .01$. The Newman-Keuls post hoc analysis was used to explore differences between diagnostic groups. The depressed patients produced significantly ($p < .05$) more abstract responses, $M = 20.47$, than manics, $M = 14.10$, schizoaffectives, $M = 14.00$, and schizophrenics, $M = 13.31$. The other three groups did not differ significantly.

For abstract-correct proverb responses there were significant main effects for diagnosis, $F(3,75) = 5.48$, $p < .01$, and time period, $F(1,75) = 13.05$, $p < .001$. More abstract-correct responses were produced for the post-hospitalization group, $M = 11.79$, than for subjects assessed in the active phase of their illness, $M = 8.17$. A post hoc Newman-Keuls ($p < .05$) analysis indicated that depressed patients gave more abstract-correct responses to proverbs, $M = 14.83$ than manics, $M = 9.14$, schizoaffectives, $M = 8.19$, and schizophrenics, $M = 7.62$. No significant differences occurred for the other groups.

A significant main effect for time period, $F(1,75) = 7.53$, $p < .01$ was obtained for the no-response category of the proverbs test. Results indicated that patients at the active phase of their illness produced more no-response scores, $M = 4.40$, than subjects tested at the post-hospitalization phase, $M = 1.75$

An unequal N's ANOVA was used to analyze concreteness scored from the proverbs. A significant main effect for diagnosis was evident, $F(1,75) = 4.93$, $p < .01$. A Newman-Keuls post hoc analysis was computed using the .05 alpha criterion to detect significant differences. Manics, $M = 6.71$, schizophrenics, $M = 6.08$, and schizoaffectives, $M = 5.86$, were all significantly more concrete than depressives, $M = 1.48$.

Conceptual overinclusion, a measure derived from the Object Sorting Test, was analyzed by the unequal N's ANOVA and a significant main effect was evident for diagnosis, $F(1,74) = 7.742$, $p < .001$. A post hoc Newman-Keuls analysis ($p < .05$) indicated that manics, $M = 3.10$, were significantly more overinclusive than schizophrenics, $M = 1.92$, schizoaffectives, $M = 1.14$, and depressives, $M = .96$. All other groups were not significantly different from each other. No significant main or interaction effects were noted for either conceptual underinclusion or behavioral overinclusion on the Object Sorting Test.

A significant main effect in the ANOVA for concreteness was detected for diagnosis, $F(3,74) = 3.677$, $p < .05$, and also for energy level, $F(1,74) = 3.974$, $p < .05$. Subjects who self-reported low energy level were more concrete, $M = 2.91$, relative to subjects with high energy level, $M = 2.49$. The differences among diagnoses were explored with the Newman-Keuls post hoc test ($p < .05$). None of the variables however, could be disciminated with the post hoc procedure. Schizoaffectives were the most concrete, $M = 3.57$, schizophrenics next, $M = 3.36$, then manics, $M = 2.19$, and depressives were the least concrete, $M = 1.69$.

Digit Symbol Difference was analyzed by an unequal N's ANOVA for the basic independent variables and the only significant difference was for the main effect for Energy Level, $F(1,82) = 11.803$, $p < .001$. Low energy level subjects had a larger digit symbol difference than subjects with a high energy level.

Table 23 summarizes the diagnostic differences accounted for by the basic independent variables for the classical measures of thought disorder. Underlined groups were not statistically different, using the Newman-Keuls analysis. Only variables with a significant main effect for diagnosis were included.

The above section concludes the results section on the basic independent variables, for all measures considered dependent variables. For the remaining analyses, diagnosis and time period will again be used as independent variables, typically together with one new independent variable. Source tables will be somewhat redundant regarding

Table 23

Order of Four Diagnoses From High to Low Mean Ratings on Classical Measures of Thought Disorder and the Newman-Keuls Analyses of Group Differences

Bizarreness-Comprehension	M	S	Z	D
Bizarreness-Proverbs	M	S	Z	D
Bizarreness-Object Sorting	M	S	Z	D
Proverbs-Abstract	D	S	Z	M
Proverbs-Abstract/Correct	D	S	Z	M
Proverbs-Concrete	M	S	Z	D
Conceptual Overinclusion	M	S	Z	D
Object Sorting-Concrete	Z	S	M	D

Note 1. M = Manics; S = Schizophrenics; Z = Schizoaffectives; D = Depressed.

Note 2. Groups sharing a line are not significantly different using the post hoc criterion of $p < .05$.

both diagnosis and time period in most cases, so they will be reported as appendices only. Later sections then deal with primarily the additional variable under analysis, and discuss diagnosis and time period only as they interact with the new independent variable.

Written and Spoken Impulse Control

For the following analyses, unequal *N*'s ANOVAs were computed for the dependent variables of the current study using three crossed independent variables: diagnosis (4 levels), time period (2 levels), and impulse control (2 levels). The first discussion reports results from a written measure of impulse control (Singer, et al., 1956). A median split of 7 seconds defined the two groups. Low control subjects took 7 or less seconds to write the phrase under the slow condition. The subsequent section then reports results with a verbal variation of the same procedure, with a median split at 4 seconds.

Written Impulse Control and TLC Variables

Results from the unequal *N*'s ANOVAs typically paralleled those reported in source tables for the TLC variables for the independent variables of diagnosis and time period. The analysis of laconic speech revealed no significant differences accounted for by written impulse control, or its interaction with other variables. Significant effects reported earlier for the basic independent variables retained their significance. The same was true for circumstantiality.

The analysis of poverty of content revealed a significant interaction between diagnosis and written impulse control, $F(3,76) = 3.45$,

$p < .05$. As Figure 8 demonstrates, high written impulse control generally was associated with decreased production of poverty of content for all groups, but the effect was primarily located in the manic group.

For pressured speech there was a significant main effect for written impulse control, $F(1,76) = 5.16$, $p < .05$. Results indicated that patients with low impulse control produced more pressured speech, $M = 10.47$, relative to subjects with high control, $M = 4.20$.

For tangentiality, two effects were significant that had not been reported in the section on basic independent variables. An interaction between time period and written impulse control was significant, $F(1,76) = 3.96$, $p < .05$. The interaction of these two variables is illustrated in Figure 9. Figure 10 illustrates the significant interaction between diagnosis and time period, $F(3,76) = 2.96$, $p < .05$. As Figure 9 highlights, low impulse control is associated with more tangentiality at the active phase of the illness, while at the post-hospitalization phase little difference is accounted for by impulse control. Figure 10 illustrates significantly less tangentiality occurs in schizophrenics at the post-hospiltalization phase, while tangentiality actually is more frequent at the post-hospitalization phase for manics.

Significant main effects for written impulsivity were noted for derailment, $F(1,76) = 6.73$, $p < .05$; incoherence, $F(1,76) = 6.59$, $p < .05$; illogicality, $F(1,76) = 10.07$, $p < .01$; and loss of goal, $F(1,76) = 6.59$, $p < .05$. The main effect for derailment indicated that patients with poor impulse control became derailed significantly more often,

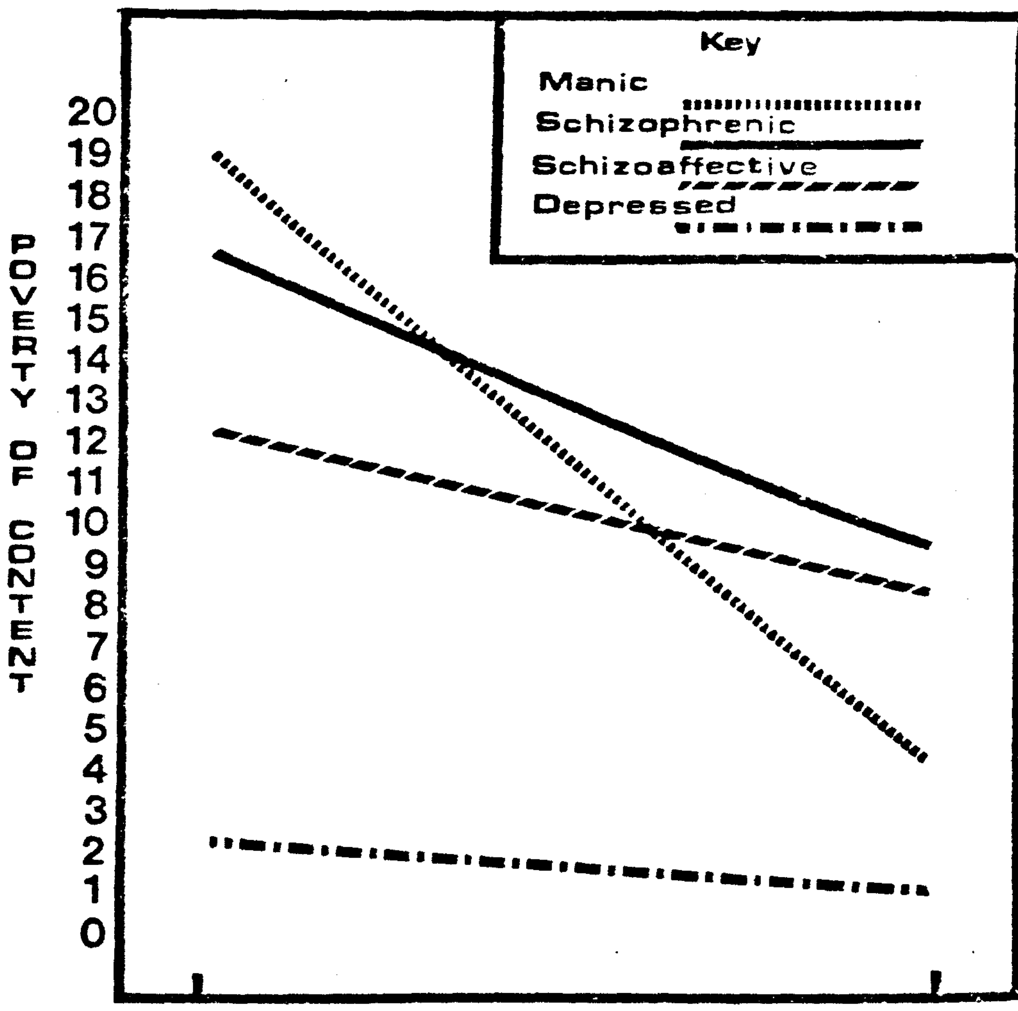

Figure 8

Mean Ratings of Poverty of Content for Four Diagnoses at

Two Time Periods

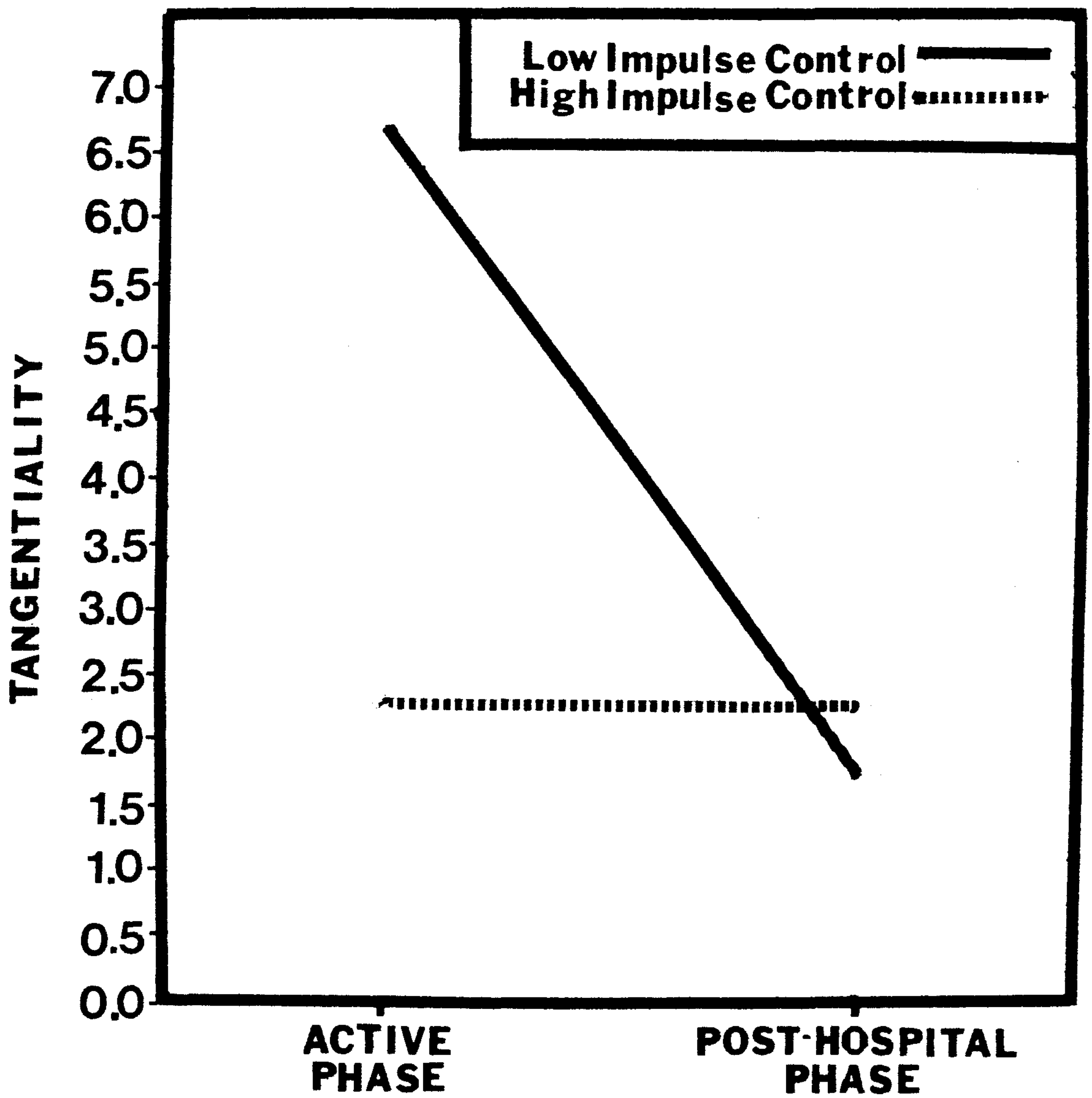

Figure 9

Mean Ratings of Tangentiality for Groups with High and Low Impulse Control (Written) at Two Time Periods

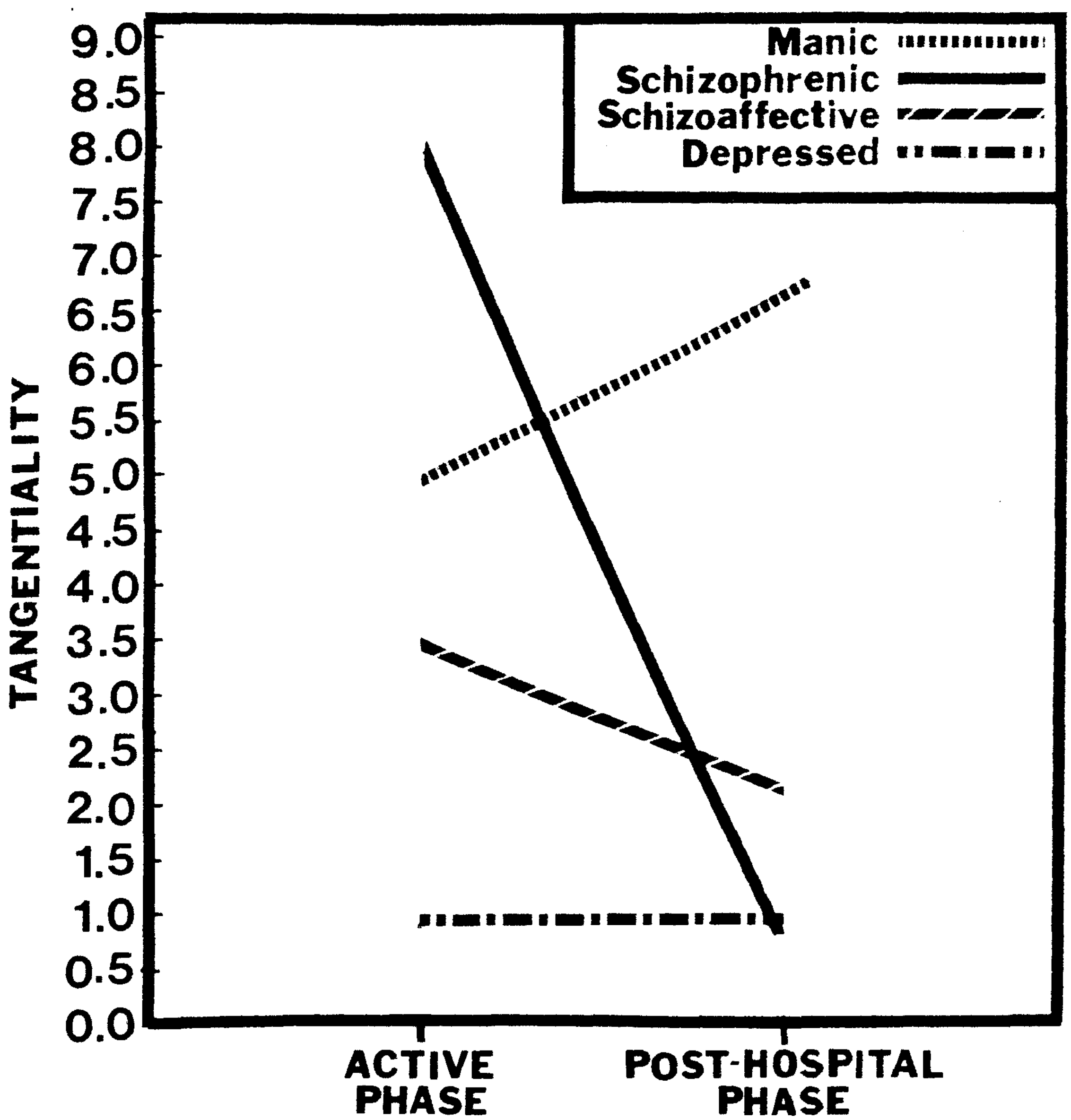

Figure 10

Mean Ratings of Tangentiality for Four Diagnoses at Two

Time Periods

M = 1.40, than subjects with high impulse control, *M* = .52. Subjects with low impulse control were more incoherent, *M* = 10.23, than subjects with more impulse control, *M* = 3.00. Subjects with less written impulse control were also more illogical, *M* = 12.38, compared with subjects with less impulsivity, *M* = 3.80. Finally, subjects with high impulse control were rated to have significantly less *M* = 2.20 loss of goal compared with low impulse control patients, *M* = 8.30.

A previously undetected main effect for diagnosis was obtained for perseveration, $F(3,76) = 3.96$, $p < .05$. A Newman-Keuls post hoc analysis ($p < .05$) indicated that schizophrenic perseverated significantly more, *M* = 13.93, than manics, *M* = 8.42, schizoaffectives, *M* = 3.80, and depressives, *M* = 2.50. All other groups were indistinguishable (refer back to Table 22 for representation of Newman-Keuls analyses).

None of the infrequent TLC variables were accounted for by impulsivity. Analyses of distractibility, clanging, neologisms, word approximations, echolalia, blocking, and stilted speech all indicated impulsivity was not a significant factor. Written impulsivity produced a main effect for global ratings, $F(1,76) = 8.65$, $p < .01$. Low impulse control was associated with a higher global thought disorder rating, *M* = 2.02, as compared with high impulse control, *M* = .98.

Written Impulse Control and Bizarreness

Bizarreness on the Comprehension substest of the WAIS was also analyzed with an unequal *N*'s ANOVA with impulse control (written) as on independent variable. A significant two-way interaction was found between written impulse control and time period, $F(1,74) = 6.05$, $p < .05$. Additionally, a three-way interaction between diagnosis, time period, and written impulse control, $F(3,74) = 3.86$, $p < .05$ was detected. The two-way interaction is illustrated in Figure 11, and the three-way interaction is described in Figure 12. While Figure 11 demonstrates that the effect of low impulse control is primarily in the post-hospitalization phase, where it is associated with greater bizarreness, this figure demonstrates the effect across diagnoses. Figure 12 demonstrates that low impulse control is associated with greater bizarreness at post-hospitalization primarily for manics and schizophrenics. At the phase of the illness, the slightly higher bizarreness of the other three diagnoses with low impulse control are meagre compared with the severe bizarreness associated with high impulse control for manics.

In contrast with the above results, no differences from results with the basic variables warrant discussion for proverbs bizarreness. For bizarreness of the Object Sorting task, however, results indicate a significant three-way interaction for diagnosis, time period, and written impulsivity, $F(3,71) = 3.66$, $p < .05$. Figure 13 illustrates the three-way interaction. The results indicate that proverbs bizarreness changes from active to post-hospitalization phases for manics and schizophrenics that differed for high and low impulse control.

Written Impulse Control and Classical Measures

Both abstract and abstract-correct responses to proverbs were accounted for by significant main effects for written impulse control.

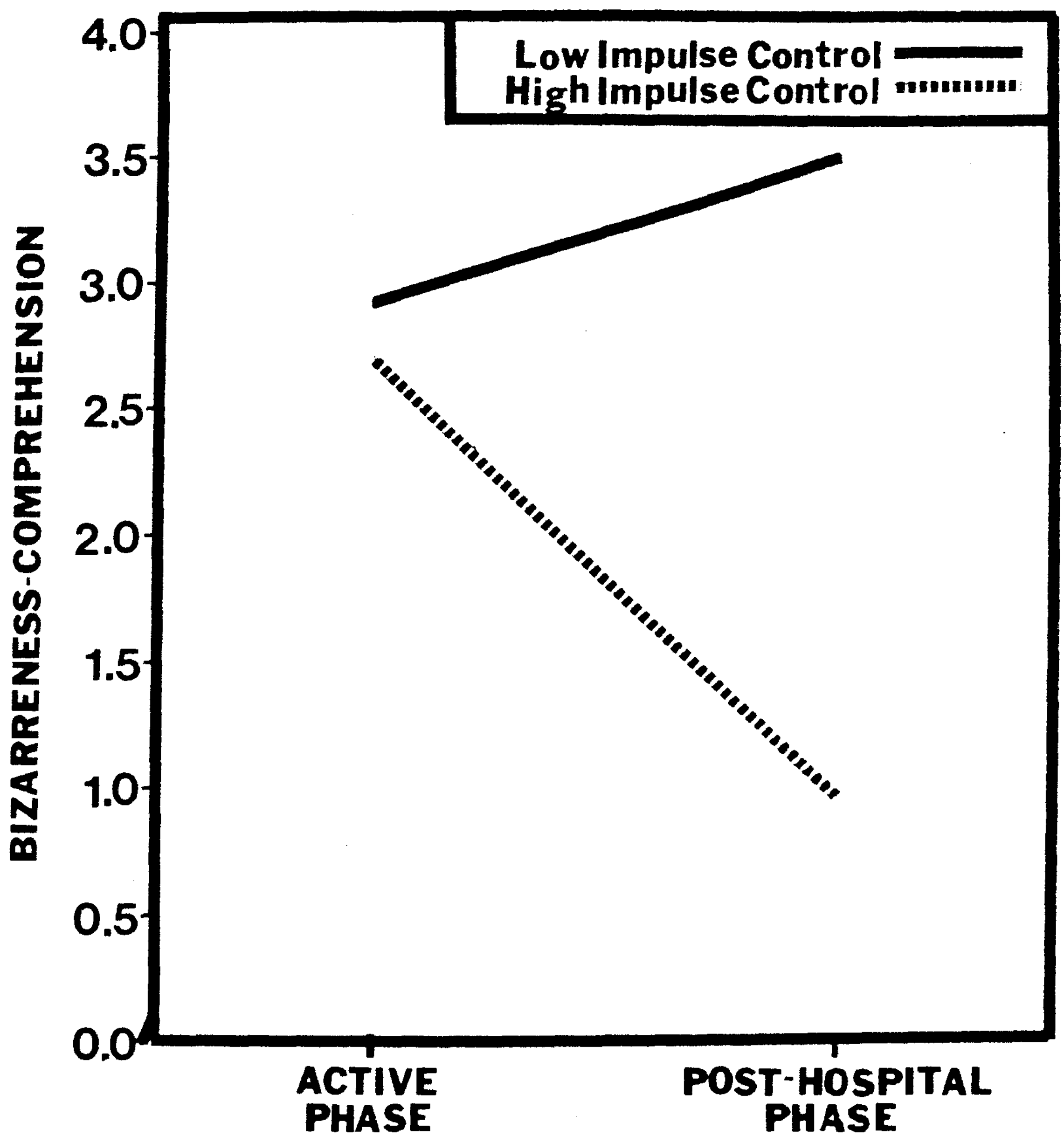

Figure 11

Mean Bizarre-Idiosyncratic Thinking on WAIS Comprehension for Groups with High and Low Impulse Control at Two Time Periods

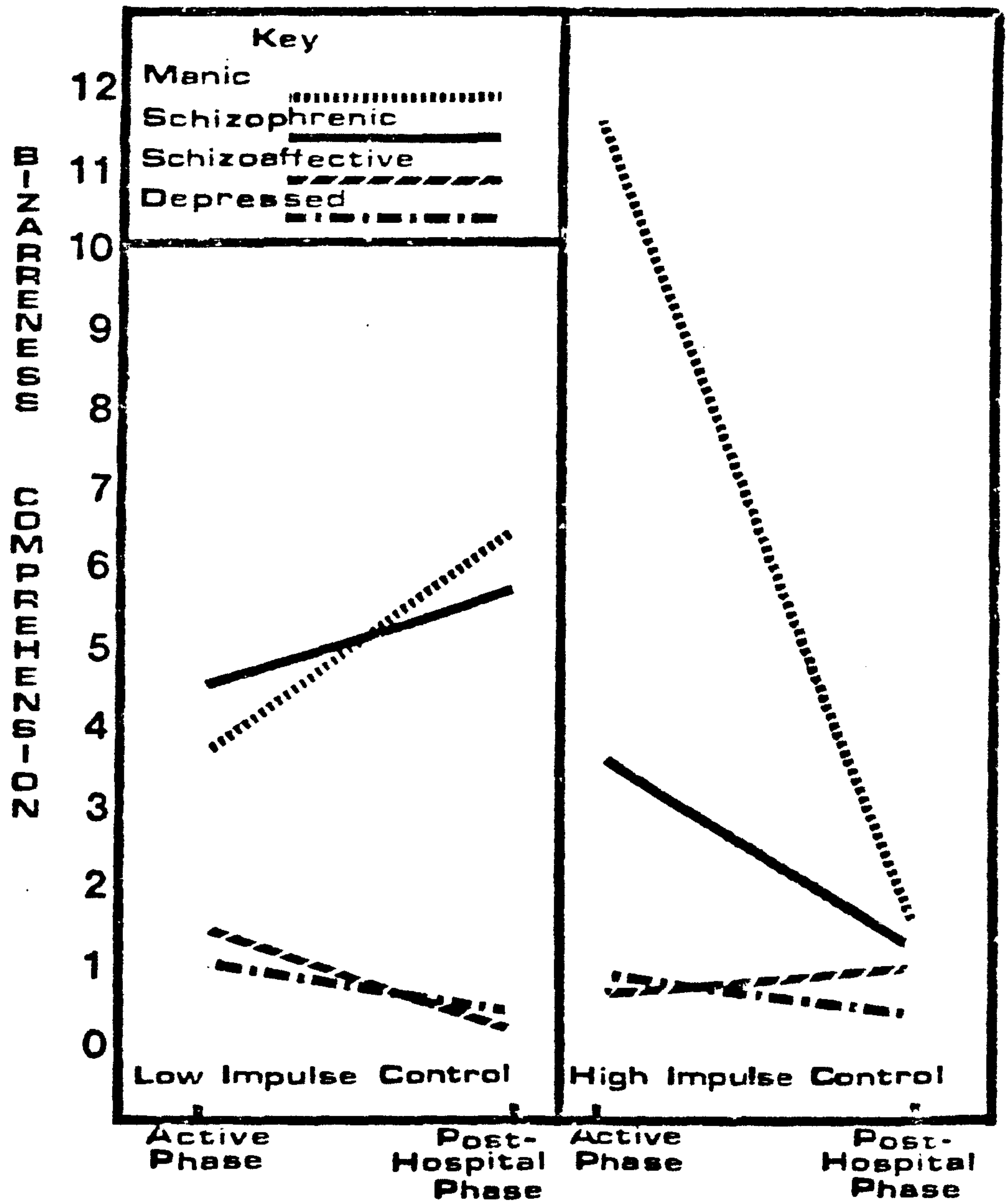

Figure 12

Bizarre-Idiosyncratic Thinking on the WAIS Comprehension Test for Four Diagnoses with Either High or Low Impulse Control at Two Time Periods

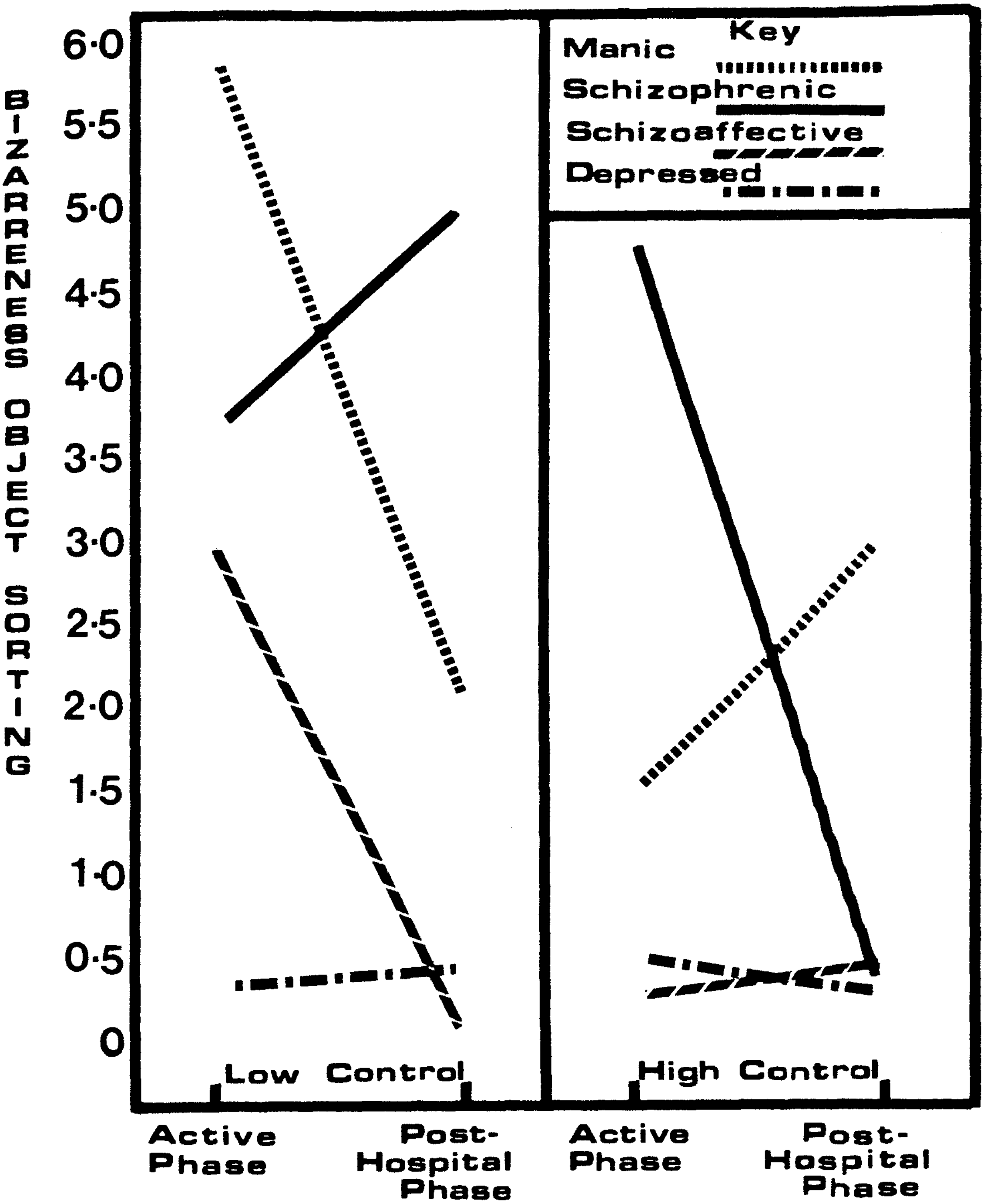

Figure 13

Bizarre-Idiosyncratic Thinking on the Object Sorting Test for Four Diagnoses with High and Low Impulse Control Groups at Two Time Periods

The main effect for the proverbs' abstraction variable, $F(1,72) = 4.87$, $p < .05$ indicated that subjects with less impulse control produced significantly fewer abstractions, $M = 13.15$, than subjects with high impulse control, $M = 17.24$. Similarly, subjects with high impulse control produced more abstract-correct responses, $M = 20.70$, compared with subjects with low impulse control, $M = 7.25$. The main effect for written impulse control was highly significant for the latter abstraction measure, $F(1,73) = 9.22$, $p < .01$

ANOVAs for classical measures of thought disorder which did not detect significant main or interaction effects related to impulse control included: proverbs-no response; proverbs-concreteness; conceptual underinclusion; behavioral overinclusion; and digit symbol difference. Most of the analyses however, paralleled the results for the basic independent variables.

A significant main effect for written impulsivity was noted in the ANOVA for conceptual overinclusion on the Object Sorting Test. The results, $F(1,71) = 4.41$, $p < .05$, indicate low written impulse control was associated with more conceptual overinclusion, $M = 2.41$, while high impulse control was associated with less conceptual overinclusion, $M = 2.00$.

Finally, a three-way interaction was detected for concreteness on the Object Sorting Test with a significant interaction between diagnosis, time period, and impulse control, $F(3,71) = 4.47$, $p < .01$. The three-way interaction is represented in Figure 14. Figure 14 demonstrates

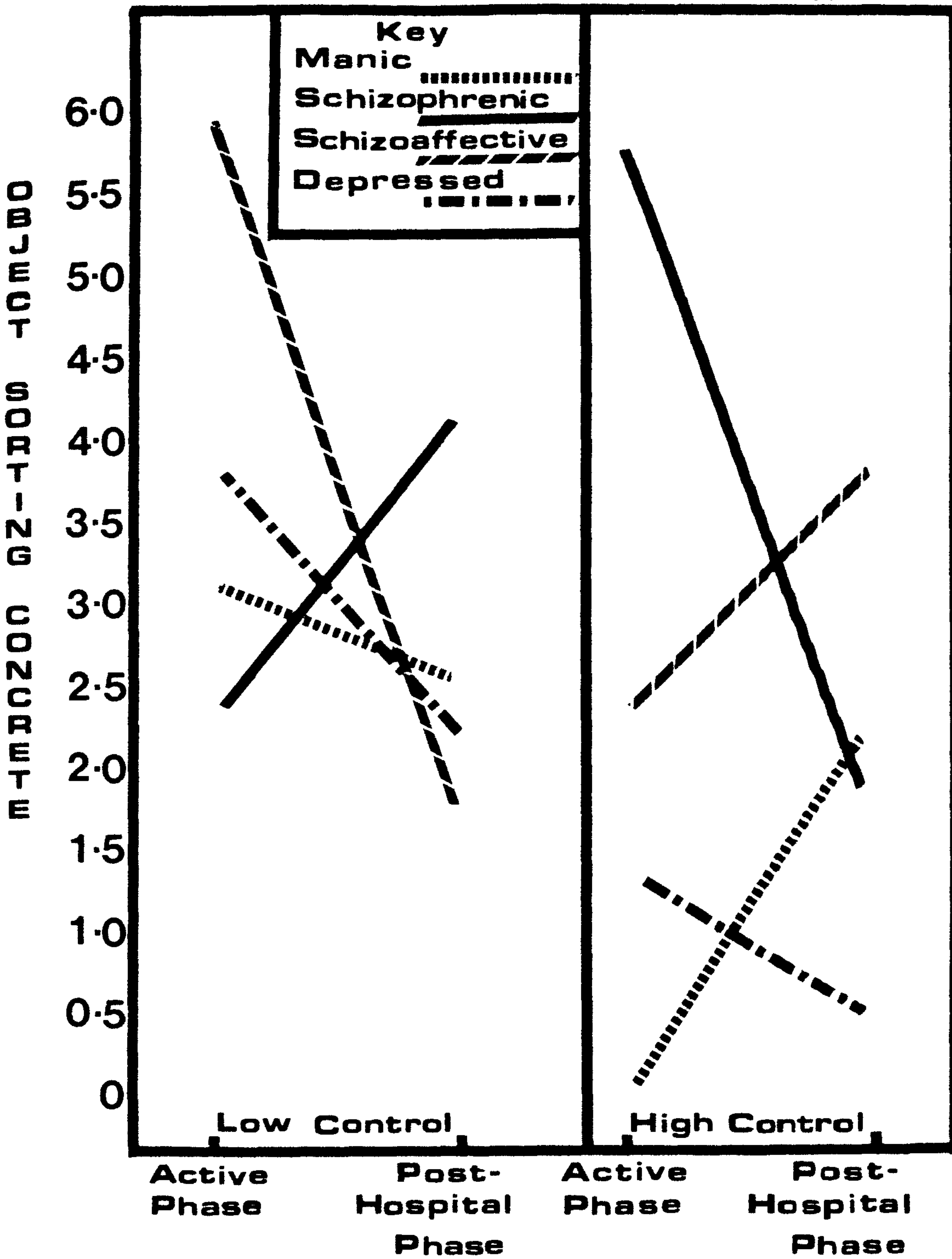

Figure 14

Concreteness on the Object Sorting Test for Four Diagnoses with Groups Demonstrating High and Low Impulse Control at Two Time Periods that for low impulse groups, schizoaffectives are the most concrete at the active phase and the least concrete at post-hospitalization. Schizophrenics, on the other hand, were least concrete at the active phase, with low impulse control, and more concrete at post-hospitalization. Subjects with high impulse control generally had more concreteness at a post-hospitalization phase, except schizophrenics who, under high impulse control, had significantly greater concreteness at an active phase of their illness.

Spoken Impulse Control and TLC Variables

Spoken impulsivity was employed as an independent measure by suing a median split (4 or less seconds for the low impulse control group, and greater than 4 for the high control group). Spoken impulse control (2 levels), along with time period (2 levels) and the four diagnoses were employed in unequal *N*'s ANOVAs of all dependent variables. Only results that were not redundant with the basic analyses will be reported.

For the TLC variables, no new information was detected from the analyses of the following dependent variables: poverty of content; derailment; incoherence; illogicality; circumstantiality; loss of goal; perseveration; distractibility; clanging; neologisms; word approximations; echolalia; blocking; and stilted speech.

Other dependent variables, however, were significantly related to spoken impulse control. For laconic speech there was a significant two-way interaction between diagnosis and spoken impulse control,

$F(3,80) = 2.73$, $p < .05$. The results of the interaction are illustrated in Figure 15. The figure indicates that both schizoaffectives and schizophrenics produce appreciably more laconic speech if there is high impulse control.

Pressure of speech was accounted for by a significant main effect for spoken impulse control, $F(1,80) = 7.83$, $p < .01$. Subjects who scored high on spoken impulse control produced significantly less pressured speech, $M = 3.30$, relative to subjects with low impulse control, $M = 10.00$

Tangentiality was analyzed, and the analysis identified a diagnosis by time period interaction, $F(3,80) = 3.10$, $p < .05$. The interaction pattern, however, is similar to that in Figure 10, and will not be further elaborated.

Finally, the ANOVA for the global ratings of thought disorder identified a main effect for spoken impulse control, $F(1,80) = 7.41$, $p < .01$. Subjects with low spoken impulse control scored significantly higher, $M = 1.87$, relative to subjects with high control, $M = .91$.

Spoken Impulse Control and Bizarreness

Spoken Impulse Control, as an independent variable added to the basic variables of diagnosis and time period, resulted in several changes in the analyses for comprehension-rated bizarreness. A main effect for time period, $F(1,76) = 5.74$, $p < .05$ was evident, as was an interaction between time period and spoken impulse control, $F(1,76) = 7.91$, $p < .01$. A significant interaction of all three variables was

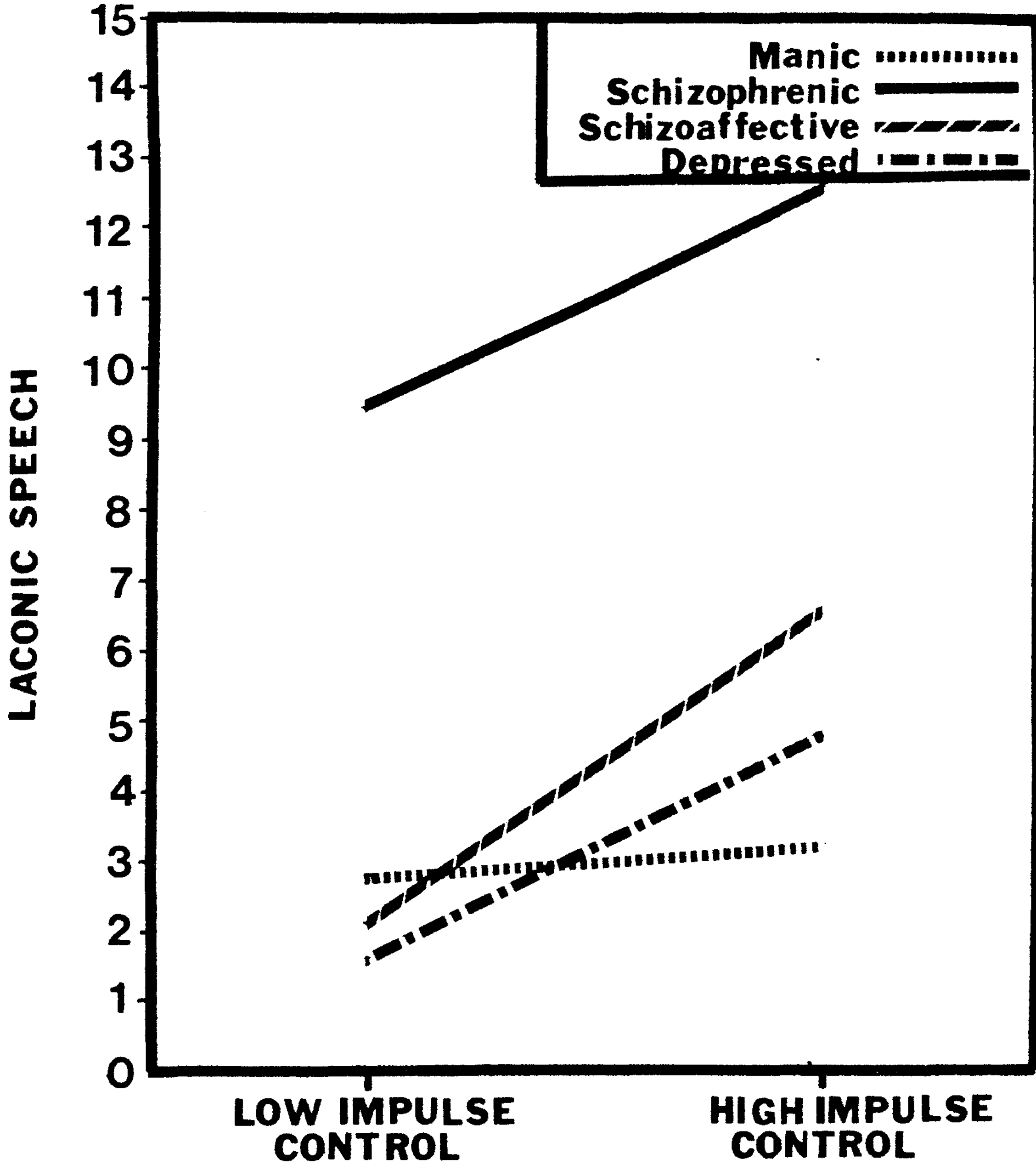

Figure 15

Mean Ratings for Laconic Speech for Four Diagnoses with High and Low Impulse Control also indicated, $F(3,76) = 5.42$, $p < .05$. The two-way interaction between time and spoken impulsivity is illustrated in Figure 16, while Figure 17 depicts the interaction of diagnosis, time period, and spoken impulse control. Figure 16 highlights that overall, high impulse control had little effect at the active phase of the illness, but less bizarreness occurs at the post-hospitalization phase with high impulse control. That is not true for manics, however, according to Figure 17. High impulse control manics at the active phase of their illness are significantly more bizarre than at follow up, while they are actually more bizarre at follow up with low impulse control. Finally, the main effect for time period reflected a generally more bizarre response repertoire for subjects at the active phase, $M = 2.67$, than for subjects assessed at post-hospitalization, $M = 1.92$.

For bizarre responses to the proverbs test, the unequal N's ANOVA detected a significant interaction between time period and pulse control, $F(1,76) = 5.60$, $p < .05$, and a significant three-way interaction, $F(3,76) = 3.17$, $p < .05$. The two-way interaction is illustrated in Figure 18. Spoken impulse control had the most effect, from Figure 18, at the post-hospitalization phase, a period when high impulse control subjects made significantly ($p < .05$) fewer bizarre responses. Figure 19 represents the three-way interaction between diagnosis, impulse control, and time period. The main interaction indicates that manics with high spoken impulse control produce considerably more bizarreness at the active phase than the manics tested at post-hospitalization. Other diagnoses demonstrate only modest decreases in bizarreness if they were

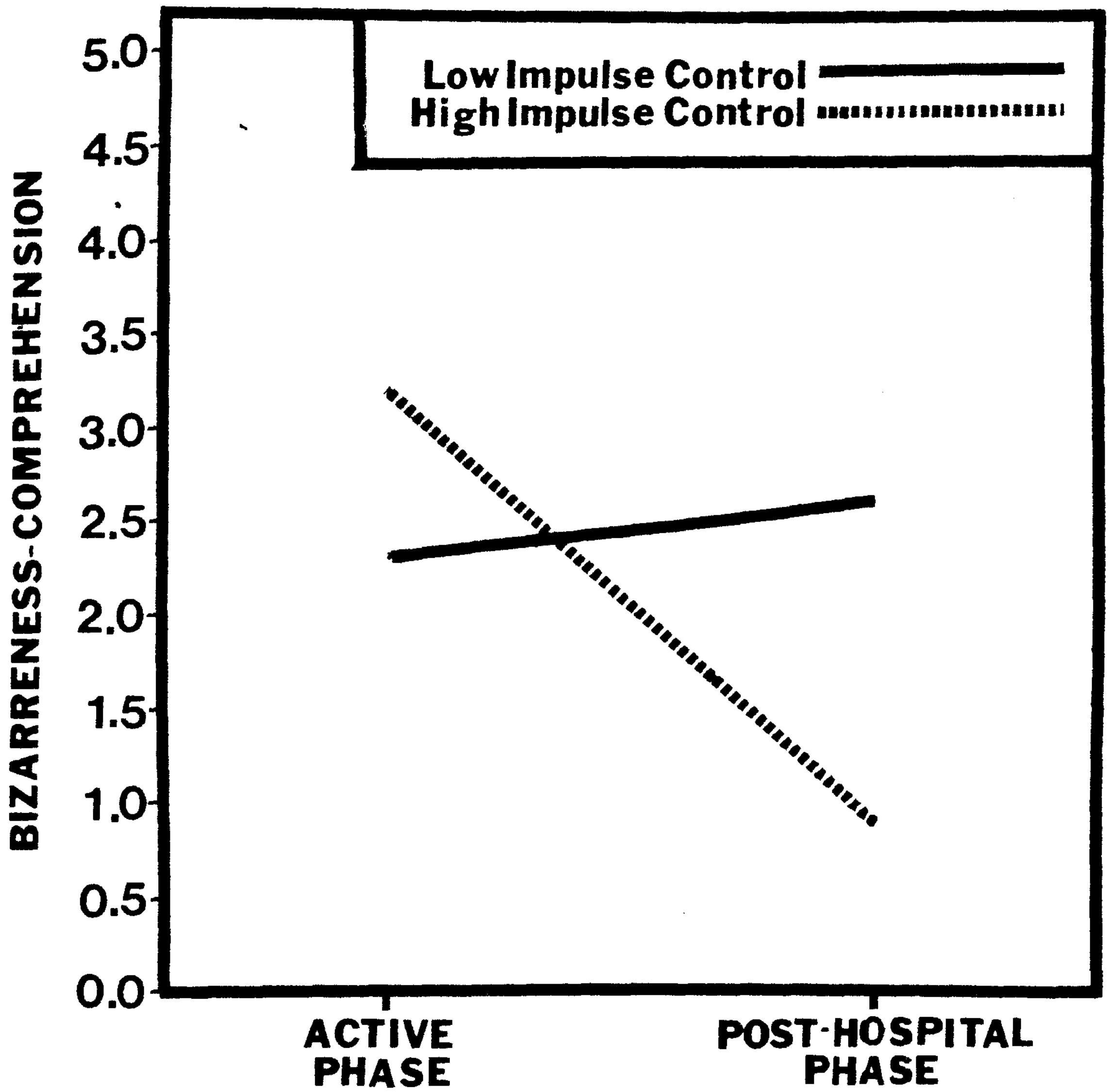

Figure 16

Bizarre-Idiosyncratic Thinking on the Comprehension Test of the WAIS for High and Low Impulse Control Groups at Two Time Periods

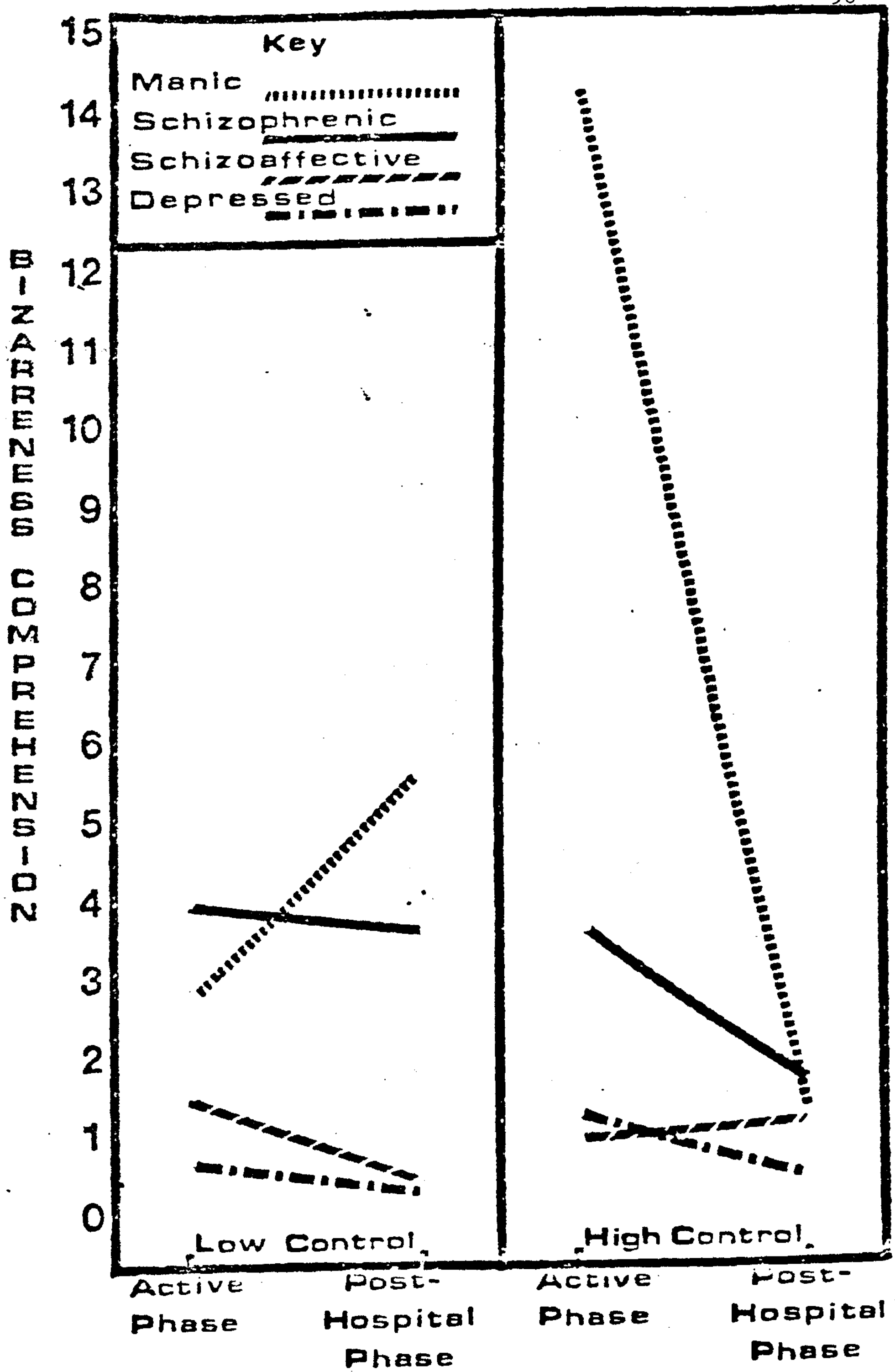

Figure 17

Bizarre-Idiosyncratic Thinking on the WAIS Comprehension Test for Four Diagnoses with High or Low Spoken Impulse Control at Two Time Periods

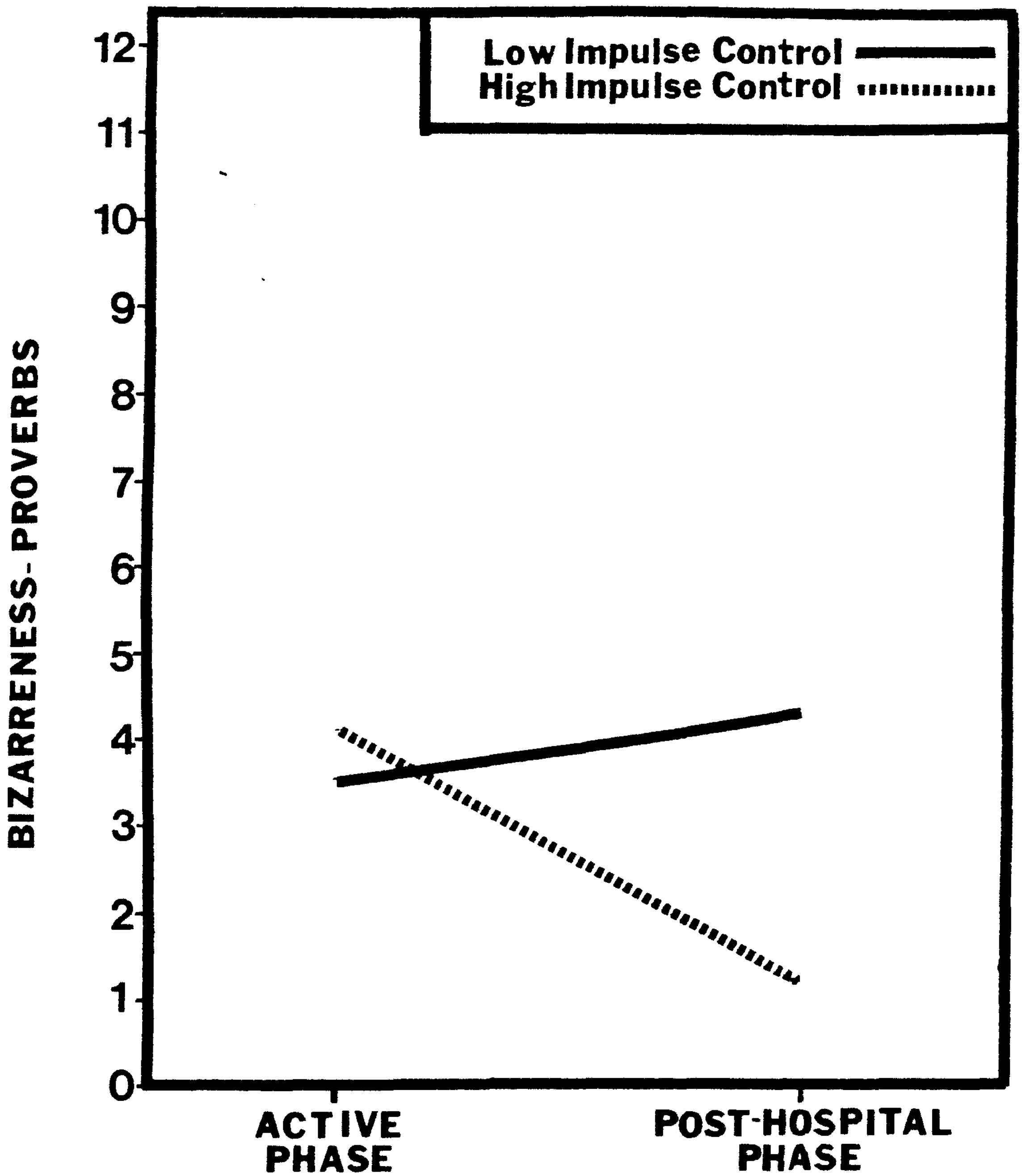

Figure 18

Bizarre-Idiosyncratic Thinking on the Proverbs Test for High and Low Spoken Impulse Control Groups at Two Time Periods

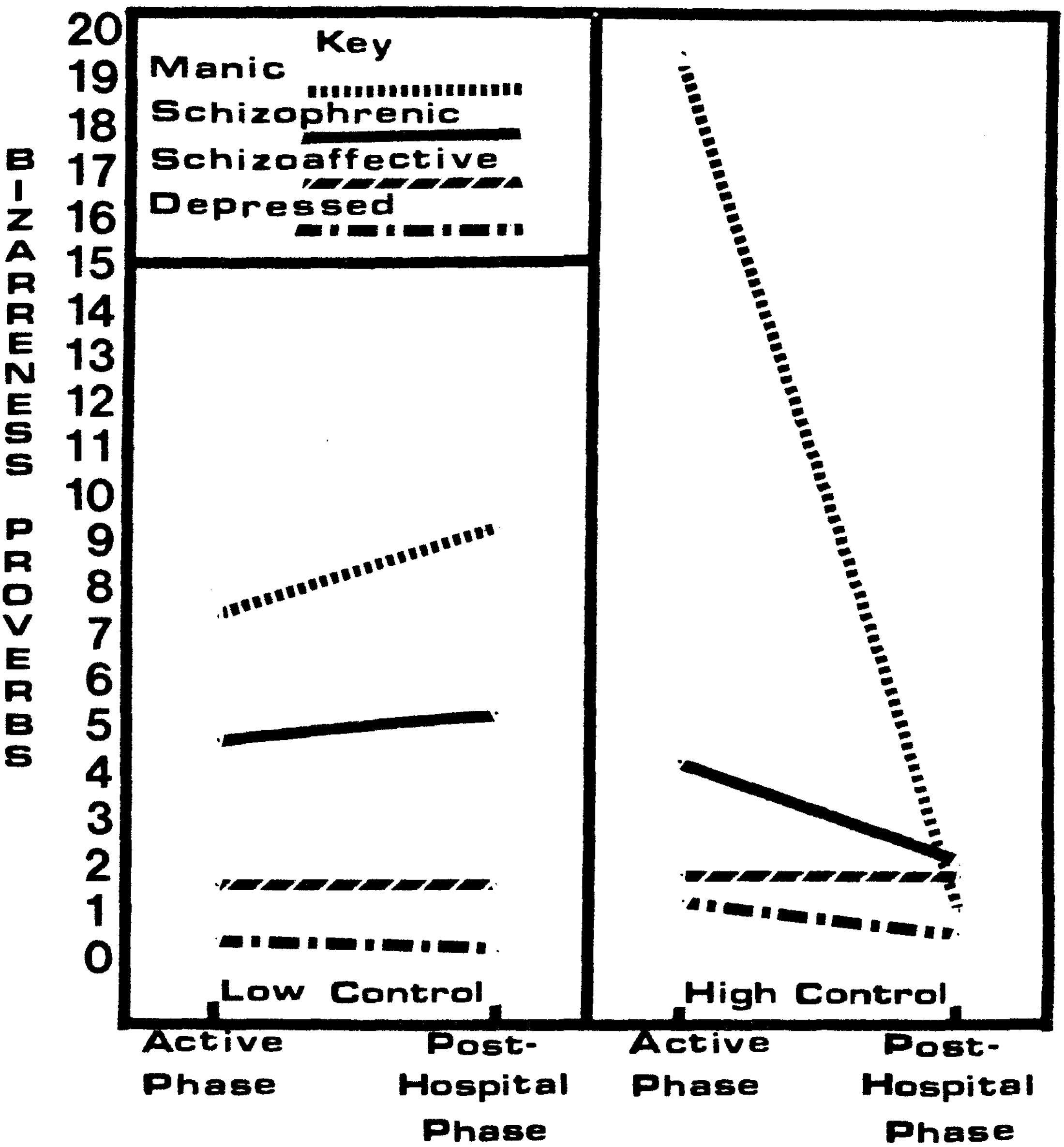

Figure 19

Bizarre-Idiosyncratic Thinking on the Proverbs Test for Four

Diagnoses with Either High or Low Impulse Control at

Two Time Periods

in high control.

Bizarreness on the Object Sorting Test, as analyzed by the 2 x 4 x 2 ANOVA for spoken impulse control revealed a new significant effect. The result was a main effect for spoken impulse control. Subjects with low impulse control, $M = 3.02$, were significantly more bizarre than subjects with more spoken impulse control, $M = .89$.

Spoken Impulse Control and Classical Thought Disorder

Unequal N's analyses of variance for the classical measures of thought disorder with spoken impulse control, diagnosis, and time period, were performed for the following classical variables: proverbs-abstract/correct; proverbs-no response; concreteness on proverbs; conceptual overinclusion; conceptual underinclusion; behavioral overinclusion, and concreteness on the Object Sorting task and, the digit symbol difference score.

Of the above analyses, only a few revealed significant differences related specifically to spoken impulsivity, although the results for diagnosis and time period were essentially isomorphic. Abstraction on proverbs, $F(1,74) = 6.13$, $p < .05$; concreteness on both proverbs, $F(1,74) = 4.15$, $p < .05$; and object sorting, $F(1,73) = 5.42$, $p < .05$, as well as conceptual underinclusion, $F(1,73) = 5.04$, $p < .05$, all contained significant main effects for spoken impulse control. Subjects who were more controlled produced more abstractions, $M = 17.76$, than subjects who were less controlled, $M = 13.76$. The more controlled subjects were less concrete on object sorting, $M = 1.92$, compared with subjects with low control, $M = 3.33$. Additionally, more controlled subjects were less concrete on the proverbs, $M = 3.46$, relative to subjects with less control, $M = 6.09$.

Only one significant interaction related to spoken impulse control was noted. For conceptual underinclusion, $F(3,73) = 3.03$, $p < .05$, an interaction was detected between diagnosis and spoken impulse control, as well as the main effect for impulse control, $F(1,73) = 5.04$, $p < .05$. The main effect indicated that subjects with high control were less underinclusive, $M = 1.62$, than subjects with low impulse control, $M = 3.04$. Figure 20 illustrates the interaction of control and diagnosis; underinclusive responses are much lower for the depressed and schizoaffective patients with high spoken impulse control, while schizophrenics were more underinclusive when they evidenced high impulse control.

Self and Observer Affect Ratings and Thought Disorder

The relationship between affect ratings and the measures of thought disorder was assessed initially through computation of zero-order correlation coefficients, with 88 df for all correlations reported in Tables 24 and 25. Table 24 indicated the relationship between the ratings of affective interference and the ten most frequent TLC variables. Observer rated emotional interference was positively related to all TLC variables, with the highest correlations with derailment, $r = .528$, and illogicality, $r = .578$ (both $p < .001$). Observer rated interference of good feelings was negatively related to laconic speech, $r = .319$, $p < .001$, and positively related to all other variables. The highest correlations were with pressure of speech,

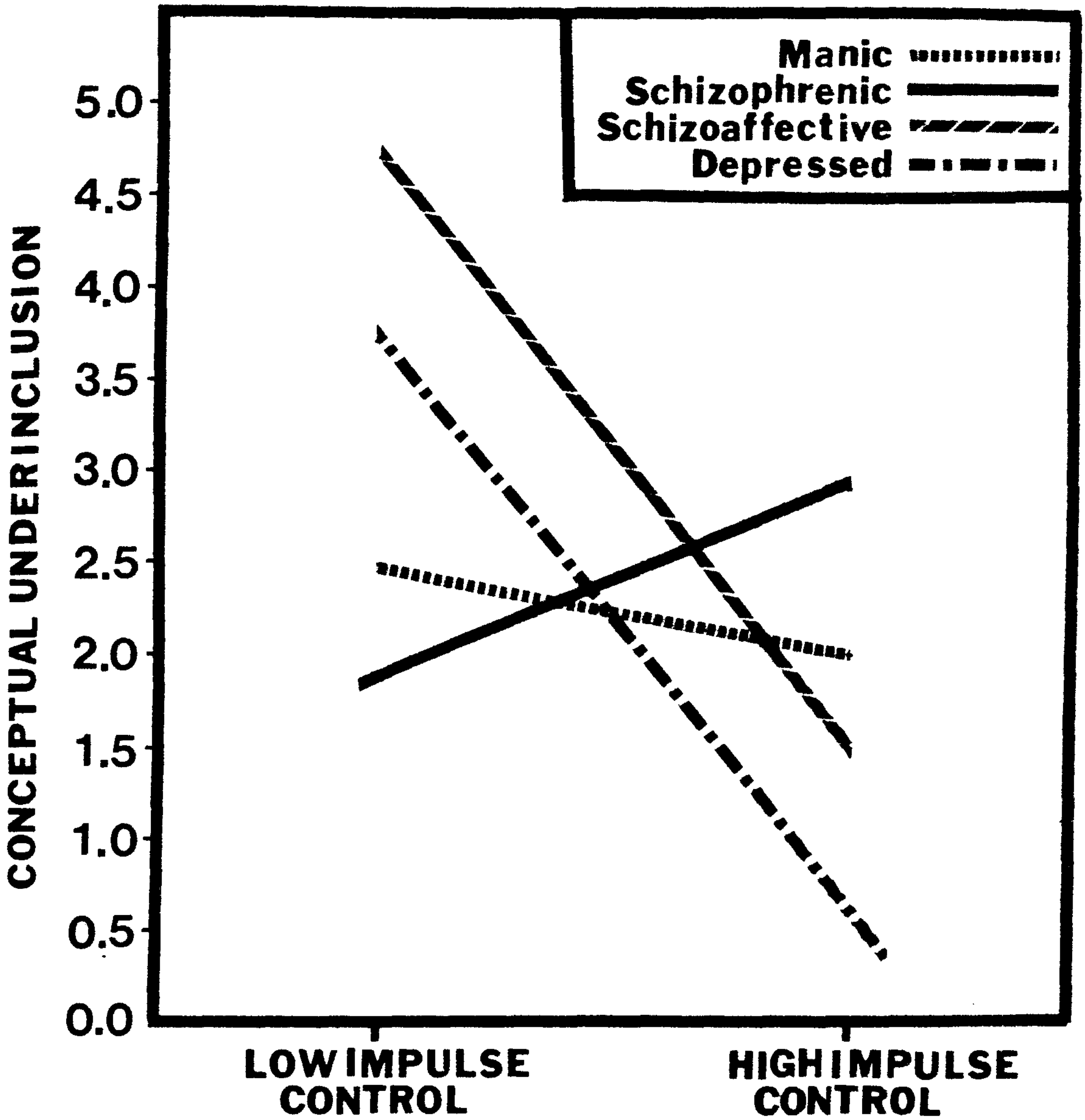

Figure 20

Conceptual Underinclusion on the Object Sorting Test for

Four Diagnoses Evidencing Either High or Low

Spoken Impulse Control

Table 24

Correlations Between Observer Ratings of Different Affects and the Ten Most Frequent of Andreasen's Thought, Language, and Communication Variables

Affect	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Emotions	.166	.310***	.392***	.376***	.528***	.445***	.578***	.154	.482***	.453***
Good Feelings	-.319***	.264**	.596***	.341***	.427***	.364***	.321***	.169	.450***	.388***
Bad Feelings	.405***	.209*	.052	.286**	.409***	.473***	.478***	.009	.301**	.410***
Excitement	-.273**	.296**	.712***	.370***	.531***	.473***	.431***	.188	.580***	.443***
Low Energy	.542***	.072	-.298**	.222*	.090	.101	.197	-.225*	-.062	.152

*($p < .05$); **($p < .01$); ***($p < .001$); based on n = 90.

Note. 1. Laconic Speech; 2. Poverty of Content; 3. Pressure of Speech; 4. Tangentiality; 5. Derailment; 6. Incoherence; 7. Illogicality; 8. Circumstantiality; 9. Loss of Goal; 10. Perseveration.

Table 25

Correlations Between Observer Ratings of Different Affects and the Seven Less Frequent of Andreasen's Thought, Language, and Communication Variables

Affect	1.	2.	3.	4.	5.	6.	7.	8.
Emotions	.298**	.266**	.057	.223*	.230*	.074	.141	.622***
Good Feelings	.212*	.266**	-.081	.224*	-.098	-.097	.215*	.354***
Bad Feelings	.140	.154	.054	.178	.307**	.217	.015	.547***
Excitement	.245*	.253*	-.060	.246*	-.039	-.157	.122	.428***
Low Energy	.090	.009	.286**	.159	.302**	.368***	-.059	.291**

*($p < .05$); **($p < .01$); ***($p < .001$).

Note. 1. Distractibility; 2. Clanging; 3. Neologisms; 4. Word Approximations; 5. Echolalia; 6. Blocking; 7. Stilted Speech; 8. Global Rating.

$\underline{r}$ = .596, and loss of goal, $\underline{r}$ = .450 (both $\underline{p}$ < .001). Observer rated interference of bad feelings correlated significantly with most variables. The largest correlations for interference from bad feelings was with incoherence, $\underline{r}$ = .478, and illogicity, $\underline{r}$ = .473 ($\underline{p}$ < .001 for both). Excitement correlated negatively with laconic speech, $\underline{r}$ = .273, $\underline{p}$ < .01, and most highly with pressured speech, $\underline{r}$ = .712, $\underline{p}$ < .001. Observer ratings of interference from lack of energy was highly related to laconic speech, $\underline{r}$ = .542, $\underline{p}$ < .001, and negatively related to pressured speech, $\underline{r}$ = -.296, $\underline{p}$ < .01, and circumstantiality, $\underline{r}$ = -.225, $\underline{p}$ < .05.

Table 25 indicates theless frequent TLC variables and the global rating correlated with affective disturbances. The strongest relationship for emotional interference was with global thought disorder, $\underline{r}$ = .622, $\underline{p}$ < .001, and the most significant TLC variable was distractibility, $\underline{r}$ = .298, $\underline{p}$ < .01. Observer rated interference of good feelings was most strongly related to clanging, $\underline{r}$ = .266, $\underline{p}$ < .01. Bad feelings were related to echolalia, $\underline{r}$ = .307, $\underline{p}$ < .01, and disturbance due to excitement was related to clanging, $\underline{r}$ = .253, $\underline{p}$ < .05. Disturbed communication due to lack of energy was related to blocking, $\underline{r}$ = .368, $\underline{p}$ < .001.

Observer ratings of affective disturbance on the communications interview were related to the classical measures of thought disorder as well. Table 26 indicates that observer rated emotional interference was strongly related to a deficit in abstraction (abstract or abstract-correct on proverbs), and was positively related to bizarreness and

Table 26

Correlations Between Observer Ratings of Different Affects and the Classical Measures of Thought Disorder

Affect	1. (n=90)	2. (n=90)	3. (n=84)	4. (n=85)	5. (n=85)	6. (n=85)	7. (n=85)	8. (n=84)	9. (n=84)	10. (n=84)	11. (n=86)
Emotions	.008	.046	.365***	-.476***	-.305**	.187	.194	.469***	.107	.026	.129
Good Feelings	.022	.036	.241*	-.261*	-.184	.252*	-.023	.367***	.043	-.046	.131
Bad Feelings	-.045	-.017	.312**	-.375***	-.323***	.199	.208*	.223*	.196	.116	.058
Excitement	.062	.089	.342***	-.353***	-.284**	.330***	.023	.433***	.-76	.023	.145
Low Energy	.124	.117	-.105	-.171	-.149	-.029	.206*	-.117	.036	.026	-.007

*($p < .05$); **($p < .01$); ***($p < .001$).

Note. 1. Bizarreness-Comprehension; 2. Bizarreness-Proverbs; 3. Bizarreness-Object Sorting; 4. Proverbs-Abstract/Correct; 5. Proverbs-Abstract; 6. Proverbs-Concrete; 7. Proverbs-No Response; 8. Object Sorting-Conceptual Overinclusion; 9. Object Sorting-Underinclusion; 10. Object Sorting-Concrete; 11. Object Sorting-Behavioral Overinclusion.

conceptual overinclusion on the object sorting test ($r(82) = 3.65$ and $r(82) = .469$ respectively, both $p < .001$). Observer rated disturbance in good feelings had several low but significant relationships to classical measures; the strongest relationship was to conceptual overinclusion, $r(82) = .367$, $p < .001$. Bad feelings, as rated by observers, were negatively related to abstract and abstract-correct responses on the proverbs test ($r(83) = -.323$ and $r(83) = -.375$ respectively, both $p < .001$). Observer rated excitement was related to bizarreness, $r(82) = .342$, $p < .001$, and overinclusion, $r(82) = .433$, $p < .001$ on the object sorting task, and negatively related to abstraction. Observer rated lack of energy was related to the "no response" score on the proverbs test, $r(83) = .206$, $p < .05$.

Self Ratings of affective disturbance had generally lower relationships, both to the TLC measures (Tables 27 and 28), and to the classical measures of thought disorder (Table 29). No significant relationships between self-rated emotional interference and any of the TLC variables were obtained, except echolalia, $r(80) = .325$, $p < .001$. Self rated interference from good feelings was related to several variables, most notably, incoherence $r(80) = .274$, and perseveration, $r(80) = .273$, (both $p < .05$). Interference from bad feelings (self-rated) was also related to echolalia, $r(80) = .315$, $p < .01$, and negatively related to pressure of speech, $r(80) = -.208$, $p < .05$. Self-rated interference due to excitement was related to several variables, especially incoherence, $r(80) = .323$, derailment, $r(80) = .305$, and illogicality, $r(80) = .307$ (all $p < .01$). The self-rated disturbance

Table 27

Correlations Between Self-Rated Affect and Energy Level and the Ten Most Frequent of Andreasen's Thought, Language, and Communication Variables

Affect	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Emotions	.089	.080	-.033	.071	.038	.073	.034	.156	-.100	-.103
Good Feelings	-.054	.229*	.185	.146	.118	.274*	.151	.117	.245*	.273*
Bad Feelings	.114	-.054	-.208*	-.046	-.021	.075	.093	.054	-.187	-.039
Excitement	-.250*	.261*	.286**	.296**	.305**	.323**	.307**	.188	.243*	.199
Low Energy	.127	.052	-.197	.216	.086	.031	.094	.088	.027	.041
Energy Level Scale	.344***	-.147	-.441***	-.151	-.167	-.169	-.175	.050	-.192	-.118

*($p < .05$); **($p < .01$); ***($p < .001$); based on n = 82.

Note. 1. Laconic Speech; 2. Poverty of Content; 3. Pressure of Speech; 4. Tangentiality; 5. Derailment; 6. Incoherence; 7. Illogicality; 8. Circumstantiality; 9. Loss of Goal; 10. Perseveration.

Table 28

Correlations Between Self-Ratings of Affect and Energy Level and the Seven Less Frequent of Andreasen's Thought, Language, and Communication Variables

Affect	1.	2.	3.	4.	5.	6.	7.	8.
Emotions	-.007	.003	.002	-.013	.325***	.191	.155	.101
Good Feelings	.112	.071	.084	.187	-.093	-.065	.256*	.093
Bad Feelings	-.179	-.057	.024	.021	.315**	-.009	.009	.040
Excitement	.125	.275*	-.136	.270*	-.144	-.082	.056	.162
Low Energy	.114	-.006	.206	.143	.262*	.078	.017	.168
Energy Level Scale	-.265*	-.102	-.038	-.237	.174	.221*	-.005	-.131

*($p < .05$); **($p < .01$); ***($p < .001$); based on n = 82.

Note. 1. Distractibility; 2. Clanging; 3. Neologisms; 4. Word Approximations; 5. Echolalia; 6. Blocking; 7. Stilted Speech; 8. Global Rating.

Table 29

Correlations Between Self-Ratings of Affect and Energy Level and the Classical Measures of Thought Disorder

Affect	1. (n=82)	2. (n=82)	3. (n=77)	4. (n=77)	5. (n=77)	6. (n=77)	7. (n=77)	8. (n=77)	9. (n=77)	10. (n=77)	11. (n=78)
Emotions	-.153	-.156	.067	-.158	.053	-.169	.129	.014	.087	.049	-.133
Good Feelings	.213	.211	.221*	-.274*	-.292**	.332**	.055	.228*	-.065	-.065	.084
Bad Feelings	-.118	-.153	-.128	-.010	.118	-.179	.027	-.160	.160	.094	-.167
Excitement	-.066	-.008	.259*	-.195	-.114	.239*	-.107	.312**	.041	-.019	.035
Low Energy	.112	.068	-.056	.080	.177	-.227*	-.057	-.038	-.099	-.083	.106
Energy Level Scale	-.274*	-.337***	-.268*	.183	.192	-.233*	-.032	-.142	.049	.020	-.037

*($p < .05$); **($p < .01$); ***($p < .001$).

Note. 1. Bizarreness-Comprehension; 2. Bizarreness-Proverbs; 3. Bizarreness-Object Sorting; 4. Proverbs-Abstract/Correct; 5. Proverbs-Abstract; 6. Proverbs-Concrete; 7. Proverbs-No Response; 8. Object Sorting-Conceptual Overinclusion; 9. Object Sorting-Underinclusion; 10. Object Sorting-Concrete; 11. Object Sorting-Behavioral Overinclusion.

due to lack of energy was related to only one TLC variable, compared with better results self-rated energy on the Energy Level scale (Berndt, Petzel, & Berndt, 1980). The Energy Level scale was included again in Tables 27-29, to contrast with the other self-report measures. Energy level was positively related to laconic speech, $r(80) = .344$, $p < .001$, and negatively related to pressure of speech, $r(80) = -.441$, $p < .001$.

The relationship between self-rated affective disturbance and the classical thought disorder measures were also generally nonsignificant. Self-rated emotional disturbance was unrelated to any of the measures. Good feelings were related primarily to concreteness on the proverbs and a deficit in either of the abstraction measures. Self-rated bad feelings and low energy also did not relate to the classical measures. Self-rated disturbance due to excitement was related to conceptual overinclusion, $r = .312$, $p < .01$; pressured speech, $r = .259$, $p < .05$; and concreteness, $r = .239$, $p < .05$. The trait Energy Level scale indicated that a high energy level was related to more bizarreness on all three measures, and more concreteness (all at least $p < .05$).

The Relationship Between Affect Ratings and Thought Disorder at Two Time Periods for Manics, Schizophrenics, Schizoaffectives, and Depressives

Although Tables 24 to 29 illustrate the overall relation between thought disorder and the affect rating scales, the importance of the role of affective variables may vary from diagnosis to diagnosis, and from the active phase to a post-hospitalization phase of the illness.

Consequently, the relationship between self and observer ratings of affective disturbance, and the self-report trait Energy level scale were related to the TLC and classical thought disorder measures, at different time periods and diagnoses. Tables 30 through 33 relate the measures for schizophrenics tested at the active phase of their illness. Tables 34 through 37 similarly demonstrate the correlation matrix for schizophrenic patients tested at the post-hospitalization period. Tables 38 through 41 demonstrate correlations for manics at the active phase of their illness, while Tables 42 to 45 represent the same variables for manics at a post-hospitalization phase. Schizoaffectives assessed at their active phase (Tables 46 to 49), and others assessed at post-hospitalization (Tables 50 to 53) are also reported. Finally, depressives' responses are shown in Tables 54-61, with the active phase in Tables 54-57, and the post-hospitalization phase in 58-61.

The results reported in Tables 30-61 are complex, and in general their discussion is left to Chapter V. However, in general it can be observed that indeed both diagnosis and time period affected the direction and magnitude of the correlation. Those relationships demonstrated in Tables 24-29 often were primarily the result of a few diagnosis-time period combinations, with the other combinations decreasing correlations. Additionally, some noticeable effects (e.g., perseveration with observer ratings for schizophrenics at post-hospitalization) were "washed out" in the total analysis.

Final Analyses

Finally, to capture the differences between diagnoses at the

Table 30

Correlations Between Observer Ratings of Affect and Andreasen's Thought, Language, and Communication Variables for Schizophrenics at the Acute Phase

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite- ment	Low Energy
Laconic	.087	-.329	.000	-.449	.368
Poverty of Content	-.398	-.031	-.375	.044	-.211
Pressure of Speech	-.018	.539	.265	.310	.114
Tangentiality	.122	.346	-.065	.251	.194
Derailment	.117	.061	.286	.085	.241
Incoherence	-.093	.402	.196	.517	.02
Illogicality	.315	.159	.246	.084	.194
Circumstantiality	-.341	-.371	-.206	-.334	-.107
Loss of Goal	.119	-.044	.211	.055	.222
Perseveration	-.021	.354	.277	.314	.186
Distractible	.151	.406	.195	.482	.211
Clanging	.188	.297	.146	.127	.356
Neologisms	___	___	___	___	___
Word Approximation	-.117	.725**	-.099	.619*	.102
Echolalia	.373	-.161	.714**	.092	.123
Stilted Speech	.321	-.297	.709**	-.056	.078
Global	.013	.064	.115	-.006	.502*

*($p < .05$); **($p < .01$); based on n = 13.

Table 31

Correlations Between Observer Ratings of Affect and the Classical Measures of Thought Disorder for Schizophrenics at Active Phase

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Bizarreness-Comprehension	-.486	.079	-.509	.382	-.691*
Bizarreness-Proverbs	-.472	.145	-.533	.421	-.674*
Bizarreness-Object Sorting	-.287	-.192	-.178	-.059	-.588
Proverbs-Abstract/Correct	-.602*	-.463	-.467	-.286	-.634*
Proverbs-Abstract	.123	-.371	.257	-.048	-.452
Proverbs-Concrete	-.029	.543	.036	.457	.149
Proverbs-No Response	-.095	-.124	-.256	-.338	.321
Object Sorting-Overinclusion	.253	.065	.043	.121	-.253
Object Sorting-Underinclusion	.153	-.092	.074	-.189	-.122
Object Sorting-Concrete	-.432	-.302	-.268	-.331	-.535
Object Sorting-Behavioral Overinclusion	.046	.067	.098	.198	-.273
Digit Symbol Difference	-.391	.000	.101	.153	.051

*($p < .05$); based on n = 11, except Bizarreness and Digit Symbol, where n = 13.

Table 32

Correlations Between Self Ratings of Affect and Energy Level and Andreasen's Thought, Language, and Communication Variables for Schizophrenics at Active Phase

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite- ment	Low Energy	Energy Scale
Laconic	.056	.189	-.309	-.587*	-.153	.336
Poverty of Content	-.458	.075	.131	.338	.604*	.026
Pressure of Speech	-.442	.303	.311	.540	.268	.115
Tangentiality	-.395	.024	-.433	.496	.515	-.168
Derailment	-.252	.032	.253	.522	.588*	.418
Incoherence	-.228	.541	.219	.427	.370	.368
Illogicality	-.424	-.161	.417	.345	.657*	.338
Circumstantiality	-.065	-.054	.101	.391	.145	.379
Loss of Goal	-.086	.056	.077	.162	.756**	.455
Perseveration	-.322	.489	.217	.507	.272	.294
Distractible	-.074	.243	-.379	.204	.494	-.197
Clanging	-.239	.054	-.304	.684**	.048	.063
Neologisms	———	———	———	———	———	———
Word Approximation	-.539	.612*	-.287	.697**	.281	.036
Echolalia	.454	-.039	.557*	-.280	.104	.410
Stilted Speech	.458	-.054	.506	-.391	.242	.379
Global	-.458	.492	-.034	.195	.485	.660*

*($p < .05$); **($p < .01$); based on n = 13.

Table 33

Correlations Between Self Ratings of Affect and Energy Level and Classical Measures of Thought Disorder for Schizophrenics at the Active Phase

Variable	Emotions	Good Feelings	Bad Feelings	Excite- ment	Low Energy	Energy Scale
Bizarreness-Comprehension	-.189	.467	-.218	.168	.501	-.671*
Bizarreness-Proverbs	-.349	.384	-.464	.501	.421	-.695*
Bizarreness-Object Sorting	.122	.177	.057	.310	.196	.586
Proverbs-Abstract/Correct	.082	-.304	.301	-.169	-.114	-.653*
Proverbs-Abstract	.707*	-.539	.529	-.254	-.096	-.055
Proverbs-Concrete	-.493	.422	-.140	.835***	.279	.109
Proverbs-No Response	-.141	.196	-.434	-.493	-.306	.013
Object Sorting-Overinclusion	.341	-.227	-.256	.468	.027	.328
Object Sorting-Underinclusion	-.049	-.224	.409	-.447	-.202	-.426
Object Sorting-Concrete	-.158	.246	.378	-.018	-.141	.254
Object Sorting-Behavioral Overinclusion	.269	-.004	-.039	.557	-.063	.190
Digit Symbol Difference	-.269	.237	.382	-.051	.216	-.349

*($p < .05$); **($p < .01$); ***($p < .001$); based on $n = 10$.

Table 34

Correlations Between Observer Ratings of Affect and Andreasen's Thought, Language, and Communication Variables for Schizophrenics at Post-Hospitalization

TLC Variables	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Laconic	-.246	-.601*	-.176	-.186	.166
Poverty of Content	.616**	.304	.654**	.314	.136
Pressure of Speech	.472	.486	.173	.579*	-.332
Tangentiality	.472	.431	.464	.499	.203
Derailment	.538*	.396	.541*	.524*	.002
Incoherence	.693**	.282	.685**	.518*	.014
Illogicality	.664**	.316	.509	.528*	.225
Circumstantiality	.336	.428	.183	.469	-.302
Loss of Goal	.416	.383	.472	.393	-.185
Perseveration	.608*	.419	.641**	.673**	.183
Distractibility	.374	.128	.033	.245	-.154
Clanging	.106	.246	-.243	.205	-.351
Neologisms	-.016	-.123	-.125	-.088	.342
Word Approximation	.385	-.043	.104	.143	.109
Echolalia	____	____	____	____	____
Stilted Speech	.229	.248	.093	.173	-.031
Global	.535*	.232	.410	.518*	-.075

*($p < .05$); **($p < .01$); based on n = 15.

Table 35

Correlations Between Observer Ratings of Affect and the Classical Measures of Thought Disorder for Schizophrenics at Post-Hospitalization Phase

Variable	Emotions	Good Feelings	Bad Feelings	Excite- ment	Low Energy
Bizarreness-Comprehension	.013	-.128	-.094	-.056	.290
Bizarreness-Proverbs	.064	-.122	-.040	-.021	.254
Bizarreness-Object Sorting	.345	.142	.346	.099	-.296
Proverbs-Abstract/Correct	-.086	.289	-.028	-.143	.303
Proverbs-Abstract	-.287	.087	-.314	-.208	.144
Proverbs-Concrete	.287	.019	.237	.212	-.225
Proverbs-No Response	-.006	-.388	.189	-.068	.068
Object Sorting-Overinclusion	.572*	.214	.536	.186	-.181
Object Sorting-Underinclusion	.065	-.032	.357	-.101	.081
Object Sorting-Concrete	-.317	-.274	-.198	-.123	-.242
Object Sorting-Behavioral Overinclusion	.045	.281	-.161	.077	.101
Digit Symbol Difference	-.208	-.342	-.257	.033	.029

*($p < .05$); based on n = 15 for Bizarreness, n = 14 for Proverbs, n = 13 for Object Sorting, and n = 15 for Digit Symbol.

Table 36

Correlations Between Self Ratings of Affect and Energy Level and Andreasen's Thought, Language, and Communication Variables for Schizophrenics at Post-Hospitalization

TLC Variables	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Laconic	.185	-.334	-.141	-.292	-.376	-.018
Poverty of Content	.091	.057	-.216	.043	-.245	-.084
Pressure of Speech	.035	.354	-.216	.607*	-.245	-.491
Tangentiality	____	____	____	____	____	____
Derailment	-.010	.085	-.418	.318	-.517*	-.202
Incoherence	.282	.346	-.104	.271	-.526*	-.242
Illogicality	.337	.582*	-.127	.176	-.315	-.364
Circumstantiality	-.059	-.097	-.131	.166	-.186	-.152
Loss of Goal	-.306	.106	-.567*	.278	-.471	-.238
Perseveration	.123	.607*	-.074	.373	-.448	-.232
Distractibility	.409	.303	.008	.344	-.260	-.486
Clanging	.284	-.139	.146	.353	-.074	-.316
Neologisms	-.177	.464	-.330	-.220	.166	-.316
Word Approximation	.609*	-.011	.144	-.063	-.330	-.478
Echolalia	____	____	____	____	____	____
Stilted Speech	-.101	.073	.174	-.246	-.087	.006
Global	.158	.105	-.309	.106	-.745**	-.564*

*($\underline{p}$ < .05); **($\underline{p}$ < .01); based on $\underline{n}$ = 15.

Table 37

Correlations Between Self Ratings of Affect and Energy Level and the Classical Measures of Thought Disorder for Schizophrenics at Post-Hospitalization

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Bizarreness-Comprehension	-.222	.486	-.423	-.181	.085	-.389
Bizarreness-Proverbs	-.205	.533	-.444	-.127	.025	-.435
Bizarreness-Object Sorting	-.152	.297	-.543	.197	-.338	-.395
Proverbs-Abstract/Correct	-.346	-.329	.206	-.331	.621*	.415
Proverbs-Abstract	-.153	-.277	.416	-.115	.687*	.386
Proverbs-Concrete	.039	.123	-.544	.067	-.576*	-.334
Proverbs-No Response	.290	.415	.037	.131	-.561	-.231
Object Sorting-Overinclusion	.068	.616*	-.373	.371	-.251	-.255
Object Sorting-Underinclusion	.000	.254	-.287	.106	-.404	-.076
Object Sorting-Concrete	-.378	-.351	-.597	-.201	-.505	-.587
Object Sorting-Behavioral Overinclusion	-.210	-.065	.223	-.412	.759**	.337
Digit Symbol Difference	-.076	.011	-.289	.095	-.186	-.569*

*($p < .05$); **($p < .01$); based on n = 13, except Object Sorting (n=11).

Table 38

Correlations Between Observer Ratings of Affect and Andreasen's Thought, Language, and Communication Variables for Manics at the Active Phase

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite- ment	Low Energy
Laconic	-.415	-.025	.057	-.140	.543
Poverty of Content	.652*	.484	.502	.684*	-.126
Pressure of Speech	.418	.385	-.184	.486	-.748*
Tangentiality	.380	.718*	.214	.851**	-.383
Derailment	.721*	.592	.406	.783**	-.364
Incoherence	.571	.321	.551	.473	.095
Illogicality	.392	.044	.401	.299	.119
Circumstantiality	.161	.133	-.075	.169	-.678*
Loss of Goal	.895***	.580	.439	.718*	-.506
Perseveration	.466	.383	.218	.348	.000
Distractibility	-.281	-.231	-.671*	-.339	-.300
Clanging	.578	.405	.511	.547	-.343
Neologisms	___	___	___	___	___
Word Approximation	.175	-.216	.568	-.011	.321
Echolalia	___	___	___	___	___
Stilted Speech	___	___	___	___	___
Global	.594	.507	.365	.656*	-.187

*($p < .05$); **($p < .01$); ***($p < .001$); based on n = 10.

Table 39

Correlations Between Observer Ratings of Affect and the Classical Measures of Thought Disorder for Manics at the Active Phase

Variables	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Bizarreness-Comprehension	-.292	-.259	-.302	-.120	.288
Bizarreness-Proverbs	-.446	-.656*	-.323	-.536	.425
Bizarreness-Object Sorting	.526	.316	.424	.530	-.432
Proverbs-Abstract/Correct	-.448	-.024	-.243	-.314	.352
Proverbs-Abstract	-.451	-.138	-.208	-.367	.578
Proverbs-Concrete	.191	.165	.276	.395	-.511
Proverbs-No Response	.488	.063	.047	.184	-.394
Object Sorting-Overinclusion	.648*	.258	.603	.479	-.163
Object Sorting-Underinclusion	.297	.180	-.037	.310	-.238
Object Sorting-Concrete	.278	.260	-.095	.355	-.682*
Object Sorting-Behavioral Overinclusion	-.065	-.229	.181	-.347	.101
Digit Symbol Difference	-.319	-.569	-.374	-.532	.391

*($p < .05$); n = 10.

Table 40

Correlations Between Self Ratings of Affect and Energy Level and Andreasen's Thought, Language, and Communication Variables for Manics at the Active Phase

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Laconic	-.180	.067	.049	.288	.000	.382
Poverty of Content	.595	.519	.396	.497	.549	.587
Pressure of Speech	.374	.068	-.482	-.359	-.345	-.409
Tangentiality	.667*	.439	-.061	.333	.333	.182
Derailment	.422	.521	.057	.180	.316	.103
Incoherence	.478	.185	.407	.327	.411	.188
Illogicality	.521	.103	.601	.468	.468	.289
Circumstantiality	-.157	.233	-.518	-.404	-.471	-.616
Loss of Goal	.220	.628*	-.060	-.026	.183	.091
Perseveration	-.454	.202	-.149	-.175	-.408	.000
Distractibility	.099	-.589*	-.368	-.479	-.372	-.292
Clanging	.232	.344	.027	.106	-.248	-.114
Neologisms	____	____	____	____	____	____
Word Approximation	.326	.023	.806**	.548	.582	.144
Echolalia	____	____	____	____	____	____
Stilted Speech	____	____	____	____	____	____
Global	.714*	.388	.052	.203	.474	.181

*($p < .05$); **($p < .01$); n = 10.

Table 41

Correlations Between Self Ratings of Affect and Energy Level and the Classical Measures of Thought Disorder for Manics at the Active Phase

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Bizarreness-Comprehension	-.397	-.130	.403	.331	-.018	.399
Bizarreness-Proverbs	.036	-.519	.315	.093	-.019	-.018
Bizarreness-Object Sorting	.551	.445	-.041	.144	-.112	-.061
Proverbs-Abstract/Correct	-.563	-.547	-.256	-.325	-.378	-.428
Proverbs-Abstract	-.345	-.595	.239	.032	.187	.058
Proverbs-Concrete	.302	.721*	-.115	.248	.000	-.005
Proverbs-No Response	.259	.202	-.257	-.273	-.269	-.099
Object Sorting-Overinclusion	.129	.848*	.272	.379	.265	.544
Object Sorting-Underinclusion	.082	.015	.055	.125	-.398	.168
Object Sorting-Concrete	.618	.146	-.427	-.206	-.259	-.230
Object Sorting-Behavioral Overinclusion	-.055	.123	-.277	-.317	.138	-.404
Digit Symbol Difference	-.453	-.432	.280	-.078	.061	-.016

*($p < .05$); n = 10.

Table 42

Correlations Between Observer Ratings of Affect and Andreasen's Thought, Language, and Communication Variables for Manics at Post-Hospitalization

TLC Variables	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Laconic	-.683	-.585	-.260	-.475	-.356
Poverty of Content	.605	.467	.464	.605	.563
Pressure of Speech	.864**	.662	.519	.654	.518
Tangentiality	.685	.463	.618	.548	.508
Derailment	.599	.298	.562	.441	.662
Incoherence	.758*	.356	.882**	.513	.837**
Illogicality	.824*	.559	.791*	.725*	.757*
Circumstantiality	.047	-.273	.486	-.127	.476
Loss of Goal	.739*	.490	.626	.618	.656
Perseveration	.503	.149	.662	.311	.701
Distractibility	.536	.266	.533	.417	.662
Clanging	____	____	____	____	____
Neologisms	____	____	____	____	____
Word Approximation	.331	.091	.324	.190	.476
Echolalia	____	____	____	____	____
Stilted Speech	-.033	.000	-.172	-.045	-.067
Global	.804*	.615	.526	.675	.581

*($p < .05$); **($p < .01$); $n = 8$.

Table 43

Correlations Between Observer Ratings of Affect and the Classical Measures of Thought Disorder for Manics at Post-Hospitalization

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Bizarreness-Comprehension	.738*	.761*	.622	.867**	.505
Bizarreness-Proverbs	.731*	.630	.782*	.800*	.654
Bizarreness-Object Sorting	.468	.046	.849**	.280	.823*
Proverbs-Abstract/Correct	-.740*	-.781*	-.545	-.873**	-.577
Proverbs-Abstract	-.703	-.674	-.611	-.825*	-.581
Proverbs-Concrete	.484	.588	.322	.699	.332
Proverbs-No Response	.265	-.055	.319	-.096	.245
Object Sorting-Overinclusion	.313	.189	.252	.148	.383
Object Sorting-Underinclusion	.442	.356	.339	.371	.199
Object Sorting-Concrete	-.005	.041	.127	.042	.117
Object Sorting-Behavioral Overinclusion	.354	.304	.271	.291	.439
Digit Symbol Difference	.214	.369	.120	.437	-.057

*($p < .05$); **($p < .01$); n = 8.

Table 44

Correlations Between Self Ratings of Affect and Energy Level and Andreasen's Thought, Language, and Communication Variables for Manics at Post-Hospitalization

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Laconic	-.267	.371	-.203	-.466	-.275	-.182
Poverty of Content	-.286	.275	-.509	.268	-.059	-.613
Pressure of Speech	.069	.082	.053	.645	.186	-.257
Tangentiality	.127	.556	.032	.801*	-.026	-.642
Derailment	-.102	.022	-.259	.356	-.042	-.418
Incoherence	-.069	.320	-.088	.645	.072	-.257
Illogicality	-.209	.216	-.194	.701	-.302	-.466
Circumstantiality	.250	.053	.127	.335	-.103	.000
Loss of Goal	-.084	.260	-.234	.574	-.086	-.608
Perseveration	.000	.567	-.311	.382	.252	-.614
Distractibility	-.183	.136	-.417	.321	.034	-.474
Clanging	____	____	____	____	____	____
Neologisms	____	____	____	____	____	____
Word Approximation	.000	.267	-.381	.067	.309	-.546
Echolalia	____	____	____	____	____	____
Global	-.065	.187	-.214	.531	.067	-.523

*($p < .05$); n = 8.

Table 45

Correlations Between Self Ratings of Affect and Energy Level and The Classical Measures of Thought Disorder for Manics at Post-Hospitalization

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Bizarreness-Comprehension	-.403	.548	-.337	.643	-.392	-.528
Bizarreness-Proverbs	.414	.556	-.331	.673	-.423	-.496
Bizarreness-Object Sorting	-.031	.502	-.216	.520	-.032	-.469
Proverbs-Abstract/Correct	.636	-.552	.731*	-.222	.016	.497
Proverbs-Abstract	.513	-.589	.582	-.436	.289	.709*
Proverbs-Concrete	-.544	.595	-.681	.178	-.251	-.782*
Proverbs-No Response	.531	-.413	.713*	.519	.172	.528
Object Sorting-Overinclusion	-.194	-.007	-.279	-.334	.708*	.416
Object Sorting-Underinclusion	.348	-.097	.477	.869**	-.503	-.181
Object Sorting-Concrete	-.056	-.341	.099	.067	-.266	.529
Object Sorting-Behavioral Overinclusion	-.416	.060	-.540	-.332	.616	.308
Digit Symbol Difference	-.236	.155	.025	.457	-.801*	-.401

*($p < .05$); **($p < .01$); $n = 8$.

Table 46

Correlations Between Observer Ratings of Affect and Andreasen's Thought, Language, and Communication Variables for Schizoaffectives at the Acute Phase

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Laconic	.577	-.319	.672*	.000	.418
Poverty of Content	.149	.422	-.279	.712*	-.281
Pressure of Speech	.327	.793**	-.229	.975***	-.431
Tangentiality	.641*	-.039	.415	.588	.418
Derailment	.561	.313	.322	.694*	.114
Incoherence	-.081	-.049	.228	-.362	.142
Illogicality	.495	.106	.486	.563	.029
Circumstantiality	.136	.691*	-.494	.381	-.478
Loss of Goal	.400	.198	.272	.813**	.032
Perseveration	.163	.049	.456	.072	-.071
Distractibility	.400	.198	.272	.813**	.032
Clanging	___	___	___	___	___
Neologisms	.400	0.242	.272	-.162	.671*
Word Approximation	.600	-.033	.408	.488	.526
Echolalia	.400	-.242	.272	-.162	.671*
Stilted Speech	.036	.859***	-.578	.488	-.606
Global	.713*	.004	.721*	.290	.342

*($p < .05$); **($p < .01$); ***($p < .001$); n = 10.

Table 47

Correlations Between Observer Ratings of Affect and the Classical Measures of Thought Disorder for Schizoaffectives at the Active Phase

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Bizarreness-Comprehension	.272	.217	.407	.388	-.008
Bizarreness-Proverbs	.236	.188	.465	.097	-.148
Bizarreness-Object Sorting	.448	.313	.303	.482	-.105
Proverbs-Abstract/Correct	-.274	.032	-.441	-.174	-.265
Proverbs-Abstract	.091	-.161	-.135	-.276	.041
Proverbs-Concrete	-.259	.023	.062	-.260	-.068
Proverbs-No Response	-.261	.157	-.069	.187	-.045
Object Sorting-Overinclusion	.386	.211	.202	.780*	-.165
Object Sorting-Underinclusion	.055	.381	-.022	.468	-.360
Object Sorting-Concrete	.198	.126	-.006	.436	-.211
Object Sorting-Behavioral Overinclusion	.461	-.068	.407	.567	.064
Digit Symbol Difference	.323	-.461	.239	-.076	.314

*($p < .05$); n = 10.

Table 48

Correlations Between Self Ratings of Affect and Energy Level and Andreasen's Thought, Language, and Communication Variables for Schizoaffectives at the Active Phase

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Laconic	-.022	-.291	.425	-.052	.179	.375
Proverty of Content	.000	.309	-.293	.587	-.545	-.117
Pressure of Speech	.560	.389	-.332	.944***	-.288	-.064
Tangentiality	.488	-.251	.887**	-.043	.447	.246
Derailment	.841*	-.168	.728	.320	.554	.237
Incoherence	.148	.247	.575	-.196	.204	.160
Illogicality	.070	.116	.443	.166	-.288	-.089
Circumstantiality	.572	.430	-.106	.987***	-.416	-.060
Loss of Goal	———	———	———	———	———	———
Perseveration	-.420	-.428	-.332	-.222	.288	.160
Distractibility	———	———	———	———	———	———
Clanging	———	———	———	———	———	———
Neologisms	.560	-.428	.702	-.222	.866*	.016
Word Approximation	.560	-.428	.702	-.222	.866*	.086
Echolalia	.560	-.428	.703	-.222	.866*	.016
Stilted Speech	.560	.389	-.333	.944***	-.288	.453
Global	.479	-.472	.621	.052	.718	.492

*($p < .05$); **($p < .01$); ***($p < .001$); n = 7.

Table 49

Correlations Between Self Ratings of Affect and Energy Level and Classical Measures of Thought Disorder for Schizoaffectives at the Active Phase

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Bizarreness-Comprehension	.420	-.206	.591	-.296	.769*	.097
Bizarreness-Proverbs	.495	-.330	.026	.354	.612	.033
Bizarreness-Object Sorting	.297	.101	.382	.545	-.149	.074
Proverbs-Abstract/Correct	-.115	-.333	-.572	.161	.000	.002
Proverbs-Abstract	.406	-.681	.110	-.020	.549	.158
Proverbs-Concrete	-.351	.538	.100	-.050	-.477	-.161
Proverbs-No Response	-.400	.764*	-.317	.123	-.559	-.135
Object Sorting-Overinclusion	.256	-.298	.074	.093	-.096	-.239
Object Sorting-Underinclusion	-.127	-.047	-.335	.403	-.262	.020
Object Sorting-Concrete	.009	-.189	.184	.215	-.253	-.087
Object Sorting-Behavioral Overinclusion	.137	-.266	.316	-.309	.032	-.290
Digit Symbol Difference	.448	-.554	.838*	-.382	.552	.047

*($p < .05$); n = 7.

Table 50

Correlations Between Observer Ratings of Affect and Andreasen's Thought, Language, and Communication Variables for Schizoaffectives at Post-Hospitalization

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Laconic	.053	.262	.428	.335	.342
Poverty of Content	.439	.126	.649*	-.331	.546
Pressure of Speech	.213	.861***	.127	.968***	-.165
Tangentiality	.163	.228	.703*	-.208	.415
Derailment	.147	.543	.614	.223	.179
Incoherence	.319	.823**	.428	.583	.106
Illogicality	.163	.228	.703*	-.208	.415
Circumstantiality	.218	.255	.054	.212	-.282
Loss of Goal	.106	.636*	.428	.459	.224
Perseveration	.162	.800**	.218	.929***	-.126
Distractibility	____	____	____	____	____
Clanging	____	____	____	____	____
Neologisms	____	____	____	____	____
Word Approximation	.244	.343	.327	-.028	.216
Echolalia	____	____	____	____	____
Stilted Speech	.228	.321	.534	-.115	.329
Global	.213	.486	.762*	.099	.266

*($p < .05$); **($p < .01$); ***($p < .001$); n = 10.

Table 51

Correlations Between Observer Ratings of Affect and Classical Measures of Thought Disorder for Schizoaffectives at Post-Hospitalization Phase

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Bizarreness-Comprehension	.809**	-.054	.475	-.212	.780*
Bizarreness-Proverbs	.823**	-.050	.475	-.221	.788*
Bizarreness-Object Sorting	.028	.297	.374	.524	-.134
Proverbs-Abstract/Correct	.037	-.178	.215	-.335	.415
Proverbs-Abstract	-.119	-.273	-.031	.299	.023
Proverbs-Concrete	.305	.193	.004	.105	.320
Proverbs-No Response	-.336	.071	.038	.253	-.567
Object Sorting-Overinclusion	.346	.140	.260	.102	.123
Object Sorting-Underinclusion	.000	.557	.215	.644	-.188
Object Sorting-Concrete	-.179	.474	.070	.575	-.213
Object Sorting-Behavioral Overinclusion	.179	-.473	.256	-.551	.268
Digit Symbol Difference	.597	.590	.462	.411	.183

*($p < .05$); **($p < .01$); n = 9.

Table 52

Correlations Between Self-Ratings of Affect and Energy Level and Andreasen's Thought, Language, and Communication Variables for Schizoaffectives at Post-Hospitalization

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Laconic	-.218	.135	.668*	.163	-.022	.196
Poverty of Content	.320	.457	.061	.122	.106	.007
Pressure of Speech	.516	.406	.425	.244	-.304	-.196
Tangentiality	.393	.206	.247	.248	.099	.134
Derailment	.575	.187	.448	.225	-.120	-.131
Incoherence	.774**	.676*	.284	.352	-.238	-.209
Illogicality	.394	.207	.247	.248	.099	.134
Circumstantiality	.338	-.093	.138	.111	-.223	-.300
Loss of Goal	.178	.135	.284	.000	-.238	.466
Perseveration	.393	.206	.557	.248	-.232	-.072
Distractibility	----	----	----	----	----	----
Clanging	----	----	----	----	----	----
Neologisms	----	----	----	----	----	----
Word Approximation	.581	.620	-.093	.186	-.099	-.186
Echolalia	----	----	----	----	----	----
Stilted Speech	.554	.484	.058	.234	-.015	-.053
Global	.516	.261	.425	.325	.022	.108

*($p < .05$); **($p < .01$); n = 10.

Table 53

Correlations Between Self Ratings of Affect and Energy Level and Classical Measures of Thought Disorder for Schizoaffectives at Post-Hospitalization

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Bizarreness-Comprehension	-.206	.210	-.062	-.483	.436	.143
Bizarreness-Proverbs	-.191	.240	-.078	-.484	.428	.133
Bizarreness-Object Sorting	-.028	.035	.917***	.628	-.338	.149
Proverbs-Abstract/Correct	.354	-.417	.074	-.178	.712*	-.203
Proverbs-Abstract	.434	-.368	-.043	-.082	.756*	-.534
Proverbs-Concrete	-.366	.218	-.028	-.254	-.518	.537
Proverbs-No Response	-.011	.164	.109	.556	-.221	-.129
Object Sorting-Overinclusion	.220	.443	.426	.428	-.047	-.244
Object Sorting-Underinclusion	.208	.334	.404	.567	-.316	.181
Object Sorting-Concrete	-.169	-.118	.347	.060	-.514	.401
Object Sorting-Behavioral Overinclusion	-.398	.209	.002	.254	.089	.126
Digit Symbol Difference	.387	.868***	.259	.195	-.418	-.374

*($p < .05$); **($p < .01$); ***($p < .001$); n = 10 for Bizarreness, n = 9 for all other variables.

Table 54

Correlations Between Observer Ratings of Affect and Andreasen's Thought, Language, and Communication Variables for Depressives at the Active Phase

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Laconic	.531	-.384	.907***	-.378	.918***
Poverty of Content	.458	.148	.451	.085	.295
Pressure of Speech	.109	.468	-.174	.378	-.407
Tangentiality	.103	-.196	.454	-.197	.572
Derailment	.109	.187	.000	.252	.134
Incoherence	.143	.136	.253	.275	.175
Illogicality	.243	.368	.202	.349	.049
Circumstantiality	.581*	.439	.029	.506	.031
Loss of Goal	.376	.685*	-.363	.789**	-.265
Perseveration	.303	.434	.081	.612*	.049
Distractibility	—	—	—	—	—
Clanging	—	—	—	—	—
Neologisms	—	—	—	—	—
Word Approximation	.103	.245	.045	.398	-.097
Echolalia	—	—	—	—	—
Stilted Speech	.397	.749**	-.317	.917***	-.292
Global	.498	.031	.701*	.042	.681*

*($p < .05$); **($p < .01$); ***($p < .001$); n = 12.

Table 55

Correlations Between Observer Ratings of Affect and Classical Measures of Thought Disorder for Depressives at the Active Phase

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Bizarreness-Comprehension	-.154	.461	-.499	.383	-.577*
Bizarreness-Proverbs	-.152	.178	-.184	.319	-.299
Bizarreness-Object Sorting	-.192	.274	-.255	.256	-.355
Proverbs-Abstract/Correct	-.271	-.232	-.245	-.126	-.167
Proverbs-Abstract	.007	.324	-.405	.332	-.512
Proverbs-Concrete	-.007	-.317	.295	-.247	.330
Proverbs-No Response	-.002	-.302	.389	-.298	.494
Object Sorting-Overinclusion	.359	.615*	-.289	.747**	-.185
Object Sorting-Underinclusion	-.185	-.361	.217	-.322	.324
Object Sorting-Concrete	.025	-.157	.302	-.103	.459
Object Sorting-Behavioral Overinclusion	.123	.204	-.131	.215	-.212
Digit Symbol Difference	.014	-.118	.338	-.182	.190

*($p < .05$); **($p < .01$); n = 12.

Table 56

Correlations Between Self Ratings of Affect and Energy Level and Andreasen's Thought, Language, and Communication Variables for Depressives at the Active Phase

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Laconic	.132	.065	.074	-.112	.646*	.481
Poverty of Content	.326	-.148	.112	-.254	.318	-.208
Pressure of Speech	.388	.328	-.247	.000	-.264	-.527
Tangentiality	.667*	-.287	.681*	-.282	.616*	.260
Derailment	.218	-.027	.527	.000	.249	.385
Incoherence	.667*	-.287	.681*	-.282	.616*	-.301
Illogicality	.792**	.031	.325	-.211	.264	-.527
Circumstantiality	-.035	.352	.177	.268	.177	.231
Loss of Goal	-.156	.533	.062	.563	-.264	.171
Perseveration	.475	.185	.557	.211	.264	-.211
Distractibility	___	___	___	___	___	___
Clanging	___	___	___	___	___	___
Neologisms	___	___	___	___	___	___
Word Approximation	___	___	___	___	___	___
Echolalia	___	___	___	___	___	___
Stilted Speech	-.167	.533	.062	.563	-.264	-.052
Global	.621*	-.137	.484	-.252	.656*	.115

*($p < .05$); **($p < .01$); n = 12.

Table 57

Correlations Between Self Ratings of Affect and Energy Level and Classical Measures of Thought Disorder for Depressives at the Active Phase

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Bizarreness-Comprehension	.134	.164	-.123	.080	-.267	-.379
Bizarreness-Proverbs	-.402	-.056	-.277	.096	-.383	-.431
Bizarreness-Object Sorting	.218	.107	-.284	.184	-.326	-.594*
Proverbs-Abstract/Correct	-.449	.082	-.358	.421	-.238	.210
Proverbs-Abstract	-.441	.486	-.658*	.463	-.469	-.149
Proverbs-Concrete	.107	-.563	.557	-.483	.389	.111
Proverbs-No Response	.461	-.415	.606*	-.407	.433	.122
Object Sorting-Overinclusion	-.192	.568*	.000	.634*	-.305	.078
Object Sorting-Underinclusion	.387	-.599*	.621*	-.584*	.454	.269
Object Sorting-Concrete	.599*	-.357	.751**	-.292	.645*	.463
Object Sorting-Behavioral Overinclusion	-.194	.508	-.350	.428	-.097	-.088
Digit Symbol Difference	.409	-.456	.186	-.475	.114	-.463

*($p < .05$); **($p < .01$); n = 12.

Table 58

Correlations Between Observer Ratings of Affect and Andreasen's Thought, Language, and Communication Variables for Depressives at Post-Hospitalization

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Laconic	.228	.173	.529	.176	.519
Poverty of Content	.372	-.150	.153	.000	.361
Pressure of Speech	.547	.798**	.187	.929***	.332
Tangentiality	-.246	-.207	-.380	-.126	-.372
Derailment	.738**	.786**	.633*	.885***	.522
Incoherence	____	____	____	____	____
Illogicality	____	____	____	____	____
Circumstantiality	.356	-.060	.403	.037	.108
Loss of Goal	____	____	____	____	____
Perseveration	.547	.430	.564	.564	.111
Distractibility	____	____	____	____	____
Clanging	____	____	____	____	____
Neologisms	____	____	____	____	____
Word Approximation	-.246	-.207	-.380	-.126	-.075
Echolalia	____	____	____	____	____
Stilted Speech	.000	-.207	.126	-.126	.522
Global	.547	.430	.563	.563	.111

*($p < .05$); **($p < .01$); ***($p < .001$); n = 12.

Table 59

Correlations Between Observer Ratings of Affect and the Classical Measures of Thought Disorder for Depressives at Post-Hospitalization

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy
Bizarreness-Comprehension	.218	.146	-.224	.224	-.264
Bizarreness-Proverbs	-.089	-.437	-.231	-.232	-.407
Bizarreness-Object Sorting	.301	.269	.178	.437	.367
Proverbs-Abstract/Correct	-.518	.120	-.387	.383	.014
Proverbs-Abstract	.045	.453	-.491	.313	.100
Proverbs-Concrete	-.248	-.387	.476	-.270	-.176
Proverbs-No Response	.389	-.361	.257	-.276	-.088
Object Sorting-Overinclusion	.384	.231	.165	.154	.389
Object Sorting-Underinclusion	-.161	-.023	.049	.138	-.087
Object Sorting-Concrete	-.111	-.174	.198	-.095	-.068
Object Sorting-Behavioral Overinclusion	.208	.339	.332	.018	.436
Digit Symbol Difference	.212	.010	-.062	-.186	-.183

_n_ = 11, except Bizarreness, where _n_ = 12.

Table 60

Correlations Between Self Ratings of Affect and Energy Level and Andreasen's Thought, Language, and Communication Variables for Depressives at Post-Hospitalization

TLC Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Laconic	.157	.267	.140	.245	-.055	.721**
Poverty of Content	.409	.443	-.091	.379	-.285	.149
Pressure of Speech	-.367	.285	-.224	.155	-.058	-.256
Tangentiality	-.383	-.331	-.302	.313	-.275	-.025
Derailment	-.113	-.122	.000	.104	.196	-.025
Incoherence	____	____	____	____	____	____
Illogicality	____	____	____	____	____	____
Circumstantiality	.555	.358	.436	.333	-.011	.121
Loss of Goal	____	____	____	____	____	____
Perseveration	.033	-.181	.447	-.154	-.058	.109
Distractibility	____	____	____	____	____	____
Clanging	____	____	____	____	____	____
Neologisms	____	____	____	____	____	____
Word Approximation	-.383	-.331	-.302	-.313	.196	-.517
Echolalia	____	____	____	____	____	____
Stilted Speech	.157	.087	-.302	.104	-.275	.468
Global	.033	-.181	.447	-.155	-.058	.109

*($p < .05$); **($p < .01$); n = 12.

Table 61

Correlations Between Self Ratings of Affect and Energy Level and the Classical Measures of Thought Disorder for Depressives at Post-Hospitalization

Variable	Emotions	Good Feelings	Bad Feelings	Excite-ment	Low Energy	Energy Scale
Bizarreness-Comprehension	-.040	-.155	-.133	-.185	-.139	-.262
Bizarreness-Proverbs	.008	-.234	.219	-.342	-.186	-.206
Bizarreness-Object Sorting	.107	.606*	-.193	.538	.100	-.181
Proverbs-Abstract/Correct	-.587	-.177	-.486	-.310	-.124	.036
Proverbs-Abstract	-.386	-.096	-.652*	-.195	-.309	-.119
Proverbs-Concrete	.227	.017	.662*	.148	.282	.195
Proverbs-No Response	.412	-.047	.465	-.071	.161	-.074
Object Sorting-Overinclusion	.266	.134	-.287	.266	.000	-.209
Object Sorting-Underinclusion	.000	.241	.200	.557	.177	-.036
Object Sorting-Concrete	.249	.109	.346	.608*	.154	.102
Object Sorting-Behavioral Overinclusion	-.083	.018	-.292	-.149	.146	.341
Digit Symbol Difference	.155	-.017	.148	.205	-.096	-.194

*($p < .05$); n = 11, except Bizarreness, n = 12.

two time periods more vividly, Table 62 will document the presence or absence of the ten most frequent TLC ratings within each time period. Table 63 demonstrates the frequency of none, mild, moderate, and severe global thought disorder for the four diagnoses at the two time periods.

The results clearly indicate some interesting differences that will be discussed in detail in the discussion section.

Table 62

Frequencies of Subjects in Each Diagnosis at Two Time Periods for Each Level of Global Rating of Thought Disorder

	None		Mild		Moderate		Severe		Extreme	
Diagnosis	A	F	A	F	A	F	A	F	A	F
Schizophrenic	20%	27%	0%	33%	20%	13%	53%	20%	7%	7%
Manic	10%	20%	18%	10%	27%	40%	27%	20%	28%	10%
Schizoaffective	33%	80%	8%	10%	25%	0%	17%	10%	17%	0%
Depressed	54%	83%	23%	17%	8%	0%	8%	0%	7%	0%

Note. *n* = 98.

Note. A = Active Phase; F = Post-Hospitalization Phase.

Table 63

Frequencies of Subjects From Each Diagnosis at Two Time Periods with at Least a Mild Rating on the Ten Thought, Language, and Communication Variables

Diagnosis	TP	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Schizophrenic	1	47%	87%	40%	60%	73%	53%	73%	13%	60%	73%
Schizophrenic	2	67%	53%	33%	7%	46%	33%	40%	40%	27%	40%
Manic	1	27%	91%	82%	45%	73%	73%	73%	73%	45%	45%
Manic	2	20%	40%	80%	60%	60%	40%	60%	30%	60%	20%
Schizoaffective	1	92%	50%	16%	25%	50%	33%	42%	25%	8%	42%
Schizoaffective	2	30%	60%	20%	10%	30%	30%	10%	50%	30%	10%
Depressed	1	30%	23%	23%	8%	23%	15%	23%	69%	8%	23%
Depressed	2	87%	58%	17%	8%	8%	0%	0%	0%	16%	0%

Note 1. *n* = 98.

Note 2. TP = Time Period; 1 = Active Phase; 2 = Post-Hospitalization.

Note 3. 1. Laconic; 2. Poverty of Content; 3. Pressure of Speech; 4. Tangentiality; 5. Derailment; 6. Incoherence; 7. Illogicality; 8. Circumstantiality; 9. Loss of Goal; 10. Perseveration.

CHAPTER V

DISCUSSION AND IMPLICATIONS

The current study, despite several weaknesses, produced some interesting results with important implications. Before proceeding with a discussion of the results, several methodological problems will be discussed.

Methodological Problems

Researchers who have attempted experiments with clinical populations typically have encountered a variety of pitfalls, so that the endeavor appears to be as difficult as the labyrinth in which Theseus sought the Minotaur.

Medication

One of the major problems in the study of clinical populations has been the confounding effects of medication, most especially the phenothiazines. Because most psychiatrists are convinced of the effectiveness of psychopharmacological treatments, nearly all studies of inpatients have been conducted in settings where researchers had no control over medication. Consequently, many articles published since the acceptance of phenothiazines by the psychiatric community have employed samples in which nearly all, or even 100% (e.g., Nacify & Willerman, 1980) of the schizophrenics have been on phenothiazines or phenothiazine equivalents.

If phenothiazines can be shown to have minimal relationship to the variables of interest, then the damage to the internal validity of a study is presumably minimal. However, several studies indicate that phenothiazines do affect specific psychological variables. For example, several studies (e.g., Downing, Ebert, & Shubrooks, 1963; Downing, Shurbrooks, & Ebert, 1966) have demonstrated that phenothiazines reduce performance disruption by inhibiting the disturbing effects of associative distractions.

A considerable amount of conflicting research has shown that phenothiazines affect abilities (e.g., learning and memory) by improving (Datson, 1958), or interfering with (Lloyd & Newbrough, 1964) abilities. Chapman and Knowles (1964) in perhaps the most careful study, found decreased overinclusion, but increased random errors. They noted the findings were consistent with clinical observations that drugs reduce signs of thought disorder, but make the patient groggy and inefficient. If it is true that phenothiazines can reduce psychopathology, then drugs should make it more difficult for researchers to reject the null hypothesis.

The majority of studies, however, have either ignored the medication variable, or found that medication had little or no effect on the variables under study (e.g., Abrams, 1958; Pearl, 1962; Vestre, 1961).

A small number of studies have been done using "drug free" samples. "Drug free" however, can be a misleading term for these studies, as the subjects are typically unique in more ways than the absence of treatment of phenothiazines. Perhaps the most vocal group favoring medication-free samples in their research is the University of Wisconsin-Madison research group. In several studies, however, Chapman and colleagues (e.g., Chapman, 1958; Chapman & Chapman, 1965; Chapman, Chapman, & Miller, 1964) have relied on a chronic "back ward" schizophrenic population. Presumably psychiatrists with chronic "untreatable" schizophrenics are more willing to try a drug-free period. In these studies, then, chronicity and severity of illness may have been entirely confounded with the absence of medication.

Other selection factors also typically present difficulties in medication-free research. Ward personnel will typically tolerate "drug-free" status for patients who present no management problems. However, patients who symptomatology manifests active, disruptive behavior are frequently eliminated from the study, and placed back on medication.

One of the advantages of using patients who are on medication is greater external validity: psychotic patients are typically on phenothiazines in the real world, so if the level of inference from the study is meant to generalize to real world patients, they should not be taken off medication. On the other hand, if the inference is about the nature or course of a particular behavior characteristic of a basic diagnostic category, medication does indeed add confounding variance, challenging internal validity.

The current study involved the best and worst of both worlds, plus some unique methodological problems of its own. A large portion of the patients tested at ISPI were drug-free at the time of testing, and these patients were typically young, acutely disturbed, patients tested within the first few weeks of admission. However, also included in the sample were those patients who, because they were a management problem, required medication.

Our sample from Michael Reese Hospital, however, was not drug-free. Nevertheless, because the treatment philosophy at Michael Reese typically emphasized psychoanalytic or supportive psychotherapy, a high number of the Michael Reese patients were also drug-free.

Hence, the patients from the current study assessed at the active phase consisted of a heterogeneous group. Characteristically, less than 30% of the schizophrenics were on phenothiazines. By thus controlling to some extent (but not completely) the threats to internal validity due to medication effects, there was some loss of external validity. The tradeoff, however, could be seen as a compromise between the demands of external and internal validity. The author had no personal control over the medication problem, other than the decision to include ISPI patients who were on medication, thus avoiding one confounding selection factor and erring on the side of external rather than internal validity. Throughout the study the author preferred to enhance external validity, since the threats to internal validity were so numerous.

When the methodological confusion surrounding drug-free samples becomes especially troublesome, however, is with the addition of the cross-sectional design. Since no experimental control over medication was possible, external validity was not a problem for this specific phase, however medication was a confounding variable, affecting the internal validity of the post-hospitalization sample. When the cross-sectional comparison is made, however, there is an interaction between selection and time period, with differential selection criteria affecting the samples tested at the two phases of illness. In the current study, for example, there were more patients on phenothiazines at the post-hospital phase than at the active phase. Other methodological confounds discussed in a later section (i.e., attrition) interact with the medication confound as well.

All the aforementioned problems, and their limitations on the inference of the current study must be acknowledged. Nevertheless, in general when phenothiazines were present their effect was minimal (Table 2, Appendices K to AN) on the variables in the current study.

Other Control Variables

Age, sex, race, education, and IQ were free to vary more in the current study than is typically the case, because subjects were drawn from two institutions where the demographic variables were discrepant. Whereas ISPI consisted of patients with less education, a lower IQ, and more frequently non-caucasian males, Michael Reese had a slightly younger, caucasian female sample with higher IQ and more education. Additionally, admission criteria varied between the two hospitals. The result was an increase, again, in external validity, and considerable error variance which made rejection of the null hypothesis more difficult.

For sex and age, there were no important relationships with either independent or dependent variables. For race, there were two dependent variables that were affected by it. For circumstantiality, non-caucasians were significantly less circumstantial than caucasians. This result, while interesting, contributes little to the understanding of psychopathology because, in the context of the current study, circumstantiality showed perhaps the least construct validity. It was not very useful in discriminating diagnoses or phase of illness, nor was it more than mildly related to other measures of thought disorder. Nevertheless, the results contradict findings by Andreasen (1979b), that circumstantiality was more prevalent in her depressed and manic samples. Either the current ratings of circumstantiality were not comparable to Andreasen's ratings, or differences in diagnostic groups were due to regional differences that may have affected the results. The current study may have had a greater percentage of non-caucasians in the manic and schizophrenic groups.

The three-way interaction between race, diagnosis, and time period must also be considered. Pressure of speech was one of the few variables that differentiated manics from all other groups in the post hoc analyses in Table 22: on those analyses however, race was not considered a moderating variable. Figure 1 illustrated the importance of race as a variable. The failure of race to affect concreteness on proverbs contradicts Shimkanus, Gynther, and Smith (1966, 1967).

Intelligence and education were both used as control variables in the current study. Chapman and Chapman (1973) devote several pages of discussion to the question of how to handle differences in intelligence. They indicate that tests such as vocabulary (or the information subscale of the WAIS in the current study) measure neither present intellectual functioning nor premorbid IQ, but something inbetween. Tests like vocabulary and information show less deficit in schizophrenics than do other subscales of the WAIS (Rappaport, Gill, & Shafer, 1945). As measures of current functioning however, the information and vocabulary subtests are perhaps the best available measures, although they do reflect somewhat the premorbid IQ.

Matching on premorbid intellectual functioning, according to Chapman and Chapman (1973) is best accomplished by using level of achieved education. Even education, however, can be disrupted by a psychotic process, hence there is no "perfect" measure of premorbid intellectual functioning.

The current study used both the age-corrected scaled scores for the Information subtest of the WAIS as an estimate of intelligence, and education as a measure of premorbid ability. Although these variables were assessed, groups were not matched on the variables because of several methodological problems, particularly regression to the mean. For example, a comparison group selected to have below average intelligence, would on the average or another measure, have scores closer to the mean. Fortunately, these two variables did not differ significantly for diagnostic groups. However, they were both frequently related to dependent variables.

There is not elegant or legitimate to deal with this problem upon which psychologists have not reached a consensus. Since diagnostic groups did not differ on IQ or education, some would say one of Lords' (1967) primary objections to analysis of covariance had been circumvented. Chapman and Chapman (1973) however, claim that the only legitimate use for analysis of covariance is for reducing variability of scores in groups that vary randomly. Since neither diagnosis nor time period were random variables in the current design, the current study does not meet their criterion. A common assumption for analysis of covariance is parallel regression slopes, something rarely obtainable. Nevertheless, results for the basic independent variables were analyzed, and the source tables were reported in Appendices K through AN, with the four variables as covariates. For nearly every variable, IQ was a highly significant covariate, however this rarely affected the main independent variables. The cost of a few degrees of freedom was well worth the typical reduction of the error term. Nevertheless, the current study views these as auxillary analyses at best, and deals instead with the more statistically and externally valid ANOVA design for analysis and inference. The effect of intelligence is acknowledged, noted, but not pursued further as it was not a focus of the current study.

Other Problems of Design

The use of a cross-sectional design has many inherent limits. It is a quasi-experimental design (Campbell & Stanley, 1963) with non-random assignment to groups. As such, the best methodological approach would be combine the longitudinal and cross-sectional approaches so that most rival hypotheses could be cancelled. Although such a modified recurrent institutional design is a long range plan of the author, the current study, being limited to about one year of data collection, consisted of only a cross-sectional slice of the data.

As a result, many of the threats to internal and external validity of the longitudinal design were avoided, but all the rival hypotheses associated with a cross-sectional design were problematic. While history, for example, was the same for both groups, the interaction of selection and diagnosis, was a problem. Attrition differed in each diagnosis, so that the post-hospitalization sample was not only more select than the patients tested at the active phase of their illness, but the selection factor differed with each diagnosis.

One problem with a cross-sectional design is that the two time periods were different cohorts. Although they were tested concurrently, so history was not confounded as a primary factor, nevertheless, the subjects were at different ages when the same experiences occurred to them. The average patient tested at the active phase of their illness was 11 years old when John Kennedy was shot, and the average post-hospitalization patient was 13. Similarly, and perhaps more relevant, the Illinois State mental health code was revised to increase patient rights at a time during which the two samples were at different ages. The active phase sample may have benefited from these increased rights, while the post-hospitalization sample typically underwent their index hospitalization prior to the impact of the code.

These, and other limitations of the cross-sectional approach must be acknowledged as threats to the validity of the current study, that only future research can address.

Differential Reliability and Task Characteristics

Chapman and Chapman (1973) discuss the important point that measures which have different reliability cannot be adequately compared. This point is crucial in considering the variables in the current study. In the case of one variable, like pressure of speech, which successfully discriminated manics from other diagnoses (when other variables failed), was it due to the better reliability for pressure of speech, or due to it's being a more valid symptom for distinguishing manics? For variables with similar reliability the problem may not have been great, however, for some of the less reliable measures it was probably a problem, and certainly must be considered when the data is interpreted.

Because schizophrenics have typically shown deficits on most tasks, the more reliable tasks were more likely to document the differences and hence the schizophrenics (or psychotics) might have appeared more disturbed on the more reliable tasks. Another related problem pointed out by Chapman and Chapman (1973) is that task difficulty may also differentially affect performance. Schizophrenics typically have a more difficult time with performance tasks, and consequently the more difficult the task, the more likelihood of thought disorder. While this was probably not a problem in the TLC ratings (the interview was not a very difficult or stressful one), it might account for differences between, for example, proverb interpretation and answers to the comprehension subtest of the WAIS.

Other important stimulus dimensions however, were not addressed by Chapman and Chapman (1973). One important difference is the ambiguity of the task, for example, it is conceivable that the most ambiguous task (perhaps the object sorting task) provided the most opportunity for errors, and increasingly less ambiguous tasks (proverbs and comprehension, respectively) produced fewer errors. This may be especially true of bizarreness, and it may interact with diagnoses in that the effect of ambiguity may have been greater on one group than on another. While the current study did not systematically vary all stimulus dimensions of the tasks in order to document differences, such as those related to ambiguity, there was an attempt to sample tasks with a variety of characteristics, hence increasing generalizability across tasks (external validity). While the communication interview was relatively naturalistic, for example, proverbs are rarely interpreted in the everyday lives of psychiatric patients. Also, as discussed in Chapter III, the communication interview was systematically varied along three dimensions to increase the content of validity of the interview. When considering both significant and nonsignificant results in the current study, these stimulus dimensions should also be considered.

Problems of Design

The current study, by employing a large number of independent and dependent variables, posed a fundamental question of design. A multivariate analysis of variance and/or a few regression analyses would have reduced the number of tables and the results section to fraction of the current abundance. However several problems necessitated the approach employed in the current research.

Multivariate research typically choses "optimal linear combinations" of variables to derive an overall index of significance. In any study in which the variables are chosen with care, the computer has little difficulty juggling variables with the intention of maximizing the degree of significance. The standardized weighting and inclusion criteria for the variables, however, reflect the experimenters desire for an optimally significant difference, however, rather than the valid contribution of a particular variable. Furthermore, the regression beta weights or similar standardized coefficients are highly unstable, since the multivariate approach capilelizers to the computer softwares capacity on sample specific variance. While the current study, as reported, must be crossvalidated, crossvalidation is imperative for multivariate approaches.

Simple zero-order coefficients are unambiguous to interpret, and the average clinician is more familiar with the current methodology; the methodology of multivariate techniques are primarily used by social psychologists, and has yet to become commonplace in clinical journals.

The argument against using so many variables, is the likelihood of capitalizing on chance. Table 9, however, clearly indicated that variables used in the unequal n ANOVAs were significant far more frequently than chance. In fact, with the exception of the infrequent TLC variables, nearly all of the dependent variables were typically significant.

Another aspect of the design that warrants discussion is the absence of a control group. Without a control group of normals there is no evidence that any of the diagnoses produced through disorder of any kind that was significantly different from normals. The inferences about diagnoses are limited to those differences between the specified diagnostic groups.

Furthermore, the results indicating that manics typically produced the most instances of thought disorder must be regarded as possibly an artifact of verbosity. Manics typically produced more speech, which provided more opportunity for instances of thought disorder to occur. Statistically part-correlations or partial correlations can be used to adjust correlations for the effects of verbosity.

Problems of Construct Validity

Finally, a word about the validity of the labels in the current study is necessary. While both instrument scoring systems and diagnostic systems were selected for their potential for highly reliable results, no similar guarantees were possible about validity. Although several of the "classical" measures of thought disorder are theoretically and clinically based in something of a nomological net, both the TLC ratings and the RDC diagnoses are descriptive rather than theoretical. Validity of both the diagnoses and the TLC ratings are therefore suspect. In order to provide reliable measures, the constructs were narrowed by their authors, somewhat arbitrarily at times, to simple operational definitions that were easy to rate reliably.

For example, what a clinician might think of as tangentiality might be clearly rated as circumstanciality and/or derailment under Andreasen's system, while tangentiality refers to the specific instance of answering a question with an irrelevant answer.

Similarly, many patients who were previously classified as reactive schizophrenics would not qualify for an RDC diagnosis of schizophrenia. With RDC, schizophrenics must have had their symptoms for a longer period than a typical reactive schizophrenic, who might be diagnosed in RDC under atypical psychosis, schizoaffective, (depressed or manic type), or manic (unipolar or bioplar). Consequently, diagnoses, while perhaps adequately reliable and equivalent across institutions, may nevertheless, lack substantive validity. The current study was a step towards describing similarities and differences in these modern diagnoses at two points in time for several measures of thought disorder and affect. To the extent that the endeavor contributed to construct validity, it was worthwhile. By no means, however, should the new diagnostic systems be naively accepted as valid, they are merely hypothetical constructs.

The following discussion of the results is to be considered, then, a qualified discussion. All conclusions, however tentative, are nevertheless threatened by problems of both internal and external validity. The problem of construct validity is not only acknowledged, but perhaps was the basic raison d'etre of the current research.

Discussion of the Results

Discussion of the results will be divided into separate sections for the effects of diagnosis, time period, energy level, written impulse control, spoken impulse control, observer ratings of affective interference, and self-ratings of affective interference. When an interaction occurred it will be discussed under the section in which the effect was predominant (as illustrated by the simple effects tests or graphic representation).

Diagnosis

The effects of diagnosis on the dependent variables can be summarized best by referring to Tables 22, 23, 62 and 63.

As Table 22 indicated, a post hoc analysis of the TLC variables revealed, almost consistently, that when a TLC symptom discriminated diagnoses, the order from most to least thought disordered was manic, schizophrenic, schizoaffective, and depressed. The exceptions were for illogicality and perseveration, where manics were less illogical and significantly less perseverative than schizophrenics.

In most cases, manics could not be significantly differentiated from schizophrenics, nor schizoaffectives from depressives. For manics and schizophrenics, the exception was that schizophrenics were more perseverative, and that manics had more pressure of speech. Schizoaffectives demonstrated significantly more thought disorder than depressives for only one variable (illogicality). Schizoaffectives also were not significantly different from schizophrenics on pressure of speech, tangentiality, derailment, and incoherence. They were not significantly different from manics on incoherence, illogicality, and perseveration.

The results for the main effects for diagnosis parallel, to a large extent, the findings by Andreasen (1979b), using patients tested during their hospitalization. Andreasen did not have a schizoaffective group for comparison, however. One major difference is that she found schizophrenics to be significantly higher on poverty of content than either manics or depressives. In the current study, although differences were not significant, schizophrenics had less poverty of content than manics or depressives. The results with pressure of speech, derailment, and the global rating of thought disorder, are identical to Andreasen's, and illogicality was different not in order, but in that the manics were significantly different from the depressives in the current study. For several other variables, better differentiation was obtained for the current diagnoses than Andreasen's (tangentiality, incoherence, loss of goal). The results differed most for perseveration, in which schizophrenics scored much higher than manics and depressives, and for distractibility, for which manics and schizophrenics were not significantly different.

Table 23 indicated that many of the classical measures of thought disorder were significantly different in post hoc analyses of diagnosis. For the three bizarreness measures, manics and schizophrenics were significantly more bizarre than schizoaffectives or depressives. Schizophrenics scored lower than manics (but not significantly so), and depressives scored lower (but not significantly) than schizoaffectives. The finding that manics are slightly more bizarre than schizophrenics parallels recent results by the Harrow research group with an earlier sample of manics (Harrow, Grossman, Silverstein, & Meltzer, 1980). In that study, testing was also during the patients' hospitalization.

For both measures of abstraction and the concrete score on the proverbs test, manics, schizoaffectives, and schizophrenics were all less abstract, abstract-correct, and more concrete, than depressives. Manics were the most concrete, followed by schizoaffectives, and then schizophrenics. These three groups, however, did not significantly differ from each other. Although the current study did not use a normal control for comparison, it did tend to indicate that depressives have less of a problem with concreteness or the ability to abstract than would be indicated by studies like that of Donnelly et al. (1980). One finding that might lend some support to thecontention by Donnelly et al. (1980) about concreteness in depression, is our failure to find significant differences (post hoc) among diagnostic groups for the object sorting measure of concreteness. Nevertheless, depressives were still the least concrete on this measure as well.

The results with overinclusion gave partial support to results by Andreasen (1974, 1975). In an earlier study comparing manics with schizophrenics, Andreasen (1974) found, using other measures, that overinclusion was more common in manics than in schizophrenics. In a later article (1975), Andreasen used the same scoring manual for the Object Sorting Test that was employed in the current study to compare manics, schizophrenics, and creative writers. Manics were significantly more bizarre, conceptually overinclusive, and behaviorally overinclusive. Additionally, they were significantly underinclusive compared to the schizophrenics. The current study replicated the results with conceptual overinclusion, but failed to replicate the other results, although the means were typically in the same direction. One puzzling result was the complete lack of relationship between behavioral overinclusion and distinctions of diagnosis. In addition to the importance of this variable in the Andreasen (1975) study, several studies by the Harrow research group have found it a highly important variable (e.g., Harrow et al., 1972).

The results with the four diagnoses provide interesting patterns of symptoms, however, a more in depth discussion of the importance of diagnostic distinctions will be deferred for a final discussion. For now, it is simply interesting to note that manics and schizophrenics both appear consistently to have the most severe thought disorder, and are more similar to each other than to schizoaffectives and depressives.

Discussion of the Course of Symptomatology

Despte the limitations of a cross-sectional design, the current study was perhaps the first to look at carefully operationalized measures of thought disorder at two distinctly different phases of the manic and schizoaffective disorders. Although Harrow et al. (1980) used a longitudinal design to explore differences for manics in bizarreness between early weeks of hospitalization and a period several weeks later (but during hospitalization), no systematic research has been done comparing the four diagnoses of the current study at the two stages of illness. The active phase (first four weeks of hospitalization), compared with the post-hospitalization phase (approximately two years later) should provide clues about the course of symptomatology for each diagnosis. Because the TLC variables have never been evaluated in either a longitudinal or cross-sectional approach, each symptom will be discussed separately. No data currently exists for comparison, however Andreasen (1979b) has theorized that manics' symptoms were reversible, while at least a subgroup of schizophrenics would have irreversible symptomatology.

Laconic speech, a negative symptom according to Andreasen, was supposed to differentiate schizophrenics (who would be highly laconic) from other groups. There was, however, no significant main effect for diagnosis. Rather, a main effect for time period indicated that it was more prevalent at the active phase of a patient's illness. Furthermore, an interaction between diagnosis and time period (Figure 2) indicated that the discrepancy between active and post-hospitalization was most pronounced in the schizoaffectives. Wile manics and depressives also had slightly less laconic speech during the post-hospitalization phase, schizophrenics were actually more laconic at the post-hospitalization phase.

As in laconic speech, no significant difference had been found for diagnosis (a trend at $p < .06$), but rather another interaction between diagnosis and time period for poverty of content was found. A significant effect was noted for time period. Figure 3 illustrates that there was significantly less poverty of content for both manics and schizophrenics at the post-hospitalization phase, while depressed patients, and schizoaffectives, to a lesser extent, actually produced more poverty of content at post-hospitalization, compared with the active phase group.

Time period was not an important variable for pressure of speech. There was apparently as much pressure of speech at the post-hospitalization phase as at the active phase of the illness. Although statistically nonsignificant, the result contradicts Andreasen's (1979b) predictions about the reversibility of positive symptoms, such as pressure of speech, in manics. Apparently, pressure of speech for the current sample was the same for both active and post-hospitalization phases. Table 62 illustrates the point further: while at the active phase of the illness, 82% of the manics had demonstrated at least mild pressure of speech, at the two year post-hospitalization phase, 80% of the manics had at least mild pressure of speech. While Table 62 does not speak to the question of decreases in severity, that would have been detected in the analysis of variance.

Although for the ANOVA with Energy Level as an independent variable there was no significant effect or interaction for the time period on the variable tangentiality, subsequent analyses without energy level as an independent variable, indicated a diagnosis by time period interaction. The difference indicates that for tangentiality, energy level was probably highly confounded with time period and diagnosis. Figure 10 illustrates the diagnosis by time period interaction for tangentiality. Apparently, schizophrenics produce considerably less tangentiality at the post-hospitalization phase than at the active phase of their illness. Table 62 indicates that while 60% of the schizophrenics tested at the active phase were at least mildly tangential, only 7% exhibited tangential communication at the post-hospital phase. Manics, on the other hand, were more frequently tangential at follow-up than during the active phase.

A main effect for time period was noted for derailment, with less derailment at the post-hospitalization phase for all diagnoses. However, for incoherence, there was no significant difference due to phase of illness. In addition to the main effect for diagnosis, phase if illness was an important variable for illogicality. Patients tested at post-hospitalization were less illogical, although at least mild illogicality was present in 60% of the manics, and 40% of the schizophrenics at the post-hospital phase (Table 62).

Circumstantiality was not affected appreciably by phase of illness. For loss of goal, phase of illness was not significant, except as it interacted with energy level (discu-sed in a later section). Perseveration was significantly different for patients tested at active and post-hospitalization phases. Subjects at the active phase perseverated more than subjects tested two years post-hospitalization, and this effect was true for all diagnoses.

For the infrequent TLC variables, there were typically few significant effects, due to both at times lower reliability and perhaps their insensitivity to all but severe disorganization. Distractibility, clanging, neologisms, word approximations, echolalia, blocking, and stilted speech, were all non-significant.

A significant main effect for the time period was, however, noted for the global ratings of thought disorder. Global thought disorder was higher for patients tested at the active phase of their illness than for subjects tested at post-hospitalization.

Of the three measures of bizarreness, only bizarreness on the object sorting test was related to phase of illness, when energy level was the third independent variable. Object sorting bizarreness was higher at the active phase of illness than for the subjects tested two years after hospitalization. Time period was involved in three way interactions when the impulse control variables were considered, but these interactions will be discussed under the section on impulse control. Time period was significant for comprehension-bizarreness in an analysis employing spoken impulse control, with less bizarreness at the post-hospitalization phase.

For the classical measures of thought disorder, only twice did the phase of illness variable have an effect. Although abstract responses to proverbs were related to diagnosis but not time phase, it appeared that patients in the post-hospital phase were more likely to give the correct abstract response than patients at the active phase.

The no-response category for scoring proverbs (e.g., "I don't know") was related to phase of illness, but not diagnosis. Patients at the active phase, relative to patients at the post-hospitalization phase, produced fewer responses to the proverbs test.

Concreteness on proverbs and object sorting, conceptual underinclusion, conceptual overinlcusion, and behavioral overinclusion on object sorting, were all non-significant for time period, as was the WAIS Digit Symbol difference score.

Energy Level

Most of the effects of energy level were noted for the TLC variables when it was used as an independent variable crossed with diagnosis and phase of illness. Energy level had a significant main effect on laconic speech, with a lack of energy associated with more laconic speech.

Although energy level was an irrelevant variable for poverty of content, for pressure of speech it produced a significant main effect, with high energy level associated with more pressured speech. There was, however, no significant effect for energy level on tangentiality.

Although there was no main effect for derailment, energy level proved to interact with phase of illness in accounting for derailment.

As Figure 4 illustrates, at the active phase, derailment was not related to energy level. However, at the post-hospitalization phase, subjects with high energy level produced significantly more derailment than those with low energy. Incoherence, illogicality, and circumstantiality were all unrelated to energy level. For loss of goal however, energy level interacted with phase of illness in a manner similar to derailment. As Figure 5 illustrates, it was primarily at the post-hospital phase that high energy level was associated with loss of goal. Perseveration was unrelated to energy level.

For the infrequent TLC measures, energy level was rarely a significant variable: distractibility, clanging, neologisms, echolalia, blocking, and stilted speech were all unrelated to energy level. High energy level subjects however, did produce more word approximations than subjects reporting low energy.

For the global ratings of thought disorder, there were significant interactions between energy level and diagnosis (Figure 6), and energy level and time period (Figure 7). As Figure 6 illustrates, global thought disorder was rated, on the average, mild to moderate for manics, and for schizophrenics at both energy levels. Depressives had little, if any, thought disorder at either high or low energy. It was the schizoaffectives who had mild thought disorder with high energy level, but with low energy level the schizoaffectives' global ratings were second only to manics in severity. Figure 7 demonstrates that overall, at the active phase of the illness, a low energy level was associated with more thought disorder than a high level. At post-hospitalization however, a lack of energy was associated with a better (less severe) rating for global thought disorder.

Energy level was not a particularly important variable for bizarreness or the classical measures of thought disorder. There was no independent relationship or interaction between energy level and any of the measures of bizarreness. Abstract, abstract-correct, concrete, and no-response scores on the proverbs tests were similarly unrelated. Similarly, object sorting conceputal overinclusion, underinclusion, and behavioral overinclusion, were unrelated to energy level.

The only classical measures of thought disorder that were related (by ANOVA) to energy level were concreteness on object sorting, (with low energy subjects more concrete), and the WAIS Digit Symbol difference score, with low energy associated with this index of generalized deficit.

In summary, energy level (dichotomized into high and low groups) was related to some aspects of thought disorder, particularly as it interacted with time and diagnosis. For diagnosis, it appeared a particularly important parameter in the understanding of schizoaffective symptomatology. It also was an important variable, interacting with time period, to explain variables associated with looseness of association (derailment, loss of goal). Lost in the analysis of variance approach was the reliability of the full scale, as well as any variance confounded with other independent variables. Tables 24, 25, and 26 document several modest but significant relationships between energy level and the dependent variables of the current study. Furthermore, the analysis in later tables demonstrate how these relationships vary within diagnoses. However, these relationships will be discussed in a later section.

Written and Spoken Impulse Control

In most instances, the results obtained for written impulse control were also obtained in the spoken impulse control task. The written task (Singer et al., 1956) has been used before, and the spoken task was developed especially for the current study, and it might have been expected that the written task was more reliable.

For the TLC variables, written impulse control was frequently relevant, either as a main effect, or as an interaction. The following variables, however, were not significantly related to written impulse control: laconic speech, circumstantiality, distractibility, clanging, neologisms, word approximations, echolalia, blocking, and stilted speech.

A significant interaction between diagnosis and impulse control, however, was detected in the ANOVA for poverty of content. Figure 8 illustrates that considerably less poverty of content occurred for high control subjects, compared to low impulse control subjects, particularly for manics, and to a lesser extent for schizophrenics and schizoaffectives. Depressives produced relatively little poverty of content whether they employed high or low impulse control.

For pressured speech, the more written impulse control, the less pressured speech. The same relationships between better control and decreased symptomatology occurred for derailment, incoherence, illogicality, and global ratings of thought disorder.

For tangentiality, an interaction between phase of illness and impulse control (Figure 9) was noted. At the active phase of the illness, low impulse control (written) was associated with greater tangentiality, while impulse control was not an important factor in the post-hospitalization phase.

Written impulse control was complexly related to bizarreness. A two-way interaction between control and time period for comprehension bizarreness was noted in Figure 11. Low impulse control was related to greater bizarreness at post-hospitalization, but not at the active phase. Figure 12 illustrates that this increased bizarreness with low impulse control was the result of manic and schizohprenic groups. High impulse control was relatively unrelated to group differences in the course of illness, with the extreme exception of manics who, during the active phase of their illness, could not inhibit bizarreness even with good control.

Although written impulse control did not relate to proverbs bizarreness, a three-way interaction was noted for object sorting bizarreness (Figure 13). Manics and schizoaffectives with low impulse control, and schizophrenics with high control, were significantly less bizarre at the post-hospitalization phase than the comparison group at the active phase. However, schizophrenics with low control, and manics with high control, were more bizarre at the post-hospital phase.

For the other classical measures, no effects for written impulse control were detected for concreteness and no-response scorings on the proverbs test, and conceptual underinclusion, and behavioral overinclusion on the object sorting test, nor for digit symbol difference.

For conceptual overinclusion, low written impulse control was related to more overinclusion, while high control was associated with less overinclusion.

A three-way interaction for object sorting concreteness was noted between written impulse control, diagnosis, and time period. Figure 14 indicates the complex interaction. Schizphrenics with high control were significantly more concrete than low control schizophrenics at the active phase, with that pattern reversed at the post-hospital phase. For schizoaffectives and manics, however, the low impulse control, the active phase group was more concrete, while the high impulse control group were less concrete, compared with subjects tested at the post-hospitalization phase.

For impulse control measures on the spoken task, there were several TLC variables for which no relationships were found in the ANOVAs: poverty of content, derailment, neologisms, word approximations, echolalia, blocking, incoherence, illogicality, circumstantiality, loss of goal, perseveration, distractibility, clanging, and stilted speech.

For laconic speech, however, a two-way interaction (Figure 15) between diagnosis and spoken impulse control indicated that with high control, schizoaffectives and schizophrenics produced more laconic speech. High impulse control was also related to less pressured speech, relevant to subjects with low spoken impulse control.

The only other TLC rating related to spoken impulsivity was the global rating. Low impulse control was associated with more severe global ratings, while high impulse control related to less severe ratings.

The relationships between spoken impulse control and bizarreness were as complex as for written impulse control. For comprehension bizarreness, there was an interaction between time period and control (Figure 16), and a three-way interaction, shown in Figure 17. Apparently, impulse control was not an important moderating variable at the active phase for bizarreness, however at the post-hospitalization phase, high spoken impulse control was associated with less severe bizarreness. Additionally, Figure 17 indicated that the primary effect of the three-way interaction was greater bizarreness at the active phase for high impulse control manics, and increased bizarreness for manics at post-hospitalization who display poor impulse control.

Bizarreness on proverbs also resulted in a complex picture with a two-way interaction (Figure 18) between phase of illness and impulse control, and another three-way interaction (Figure 19). Apparently, spoken impulse control was related to proverbs bizarreness, primarily at the post-hospitalization phase, when low impulse control was associated with more bizarreness relative to high control. The three-way interaction again suggests that manics with high control were more bizarre than other diagnoses at the active phase, but virtually without bizarre responses for the post-hospitalization group. Manics with low control were still more bizarre than other groups at the active phase, but at the post-hospitalization phase the level was higher.

A main effect for spoken impulse control was demonstrated for object sorting bizarreness, with low control associated with more bizarre responses, and high control with less bizarre responses.

The relationships between spoken impulse control and the classical thought disorder measures were rarely significant. For proverbs, the abstract-correct and no-response scores were unrelated, as well as conceptual overinlcusion and behavioral overinclusion on the object sorting tasks. Digit Symbol difference scores were also unrelated.

However, subjects who indicated high verbal impulse control produced more abstractions on the proverbs task, and less concrete responses on both the proverbs task and the object sorting task, relative to subjects with less spoken impulse control.

For conceptual underinclusion, spoken impulse control was related both as a main effect and as an interaction. High impulse control subjects were less underinclusive than low impulse control subjects. Figure 20 illustrated the interaction between spoken impulse control and diagnosis. Schizoaffectives and depressives who had low control were the most underinclusive, while with high control, schizoaffectives and depressives were less underinclusive than the other diagnoses.

Observer Ratings of Affective Interference

Causal relationships cannot be inferred from correlations, however they may document a relationship which is potentially interpretive as causal. Consequently, the current study was unable to answer directly questions about the effect of affective disturbance on thought disorder. Nevertheless, the relationships detected in the current study pinpoint significant relationships which are potentially interpretive as causal. Inferences of a causal relationship would require an experimental design or, if a correlational design, a longitudinal study in which a cross-lagged panel analysis would be employed.

Low to moderate correlations were noted between observer ratings and most of the frequent TLC symptoms. For laconic speech, the symptom was positively related to disturbance due to lack of energy, and bad feelings and excitement. Poverty of content was most related to emotional interference, but also related to excitement, good feelings, and bad feelings. The highest correlation among the variables is the correlation between excitement and pressure of speech. Moderate correlations were also noted between pressure of speech and good feelings and emotions, and a negative relationship was obtained between pressured speech and lack of energy. Tangentiality was significantly related to all variables, but most strongly related to excitement and emotional interference. Excitement also correlated higher than the other scales with derailment, however significant correlations were noted for all variables except lack of energy. Lack of energy also failed to correlate with incoherence; in contrast, bad feelings and excitement shared the highest correlations with incoherence. Emotional interference and bad feelings correlated most highly with illogicality. Circumstantiality was not related to many of the ratings, however a low but significant negative relationship was reported with lack of energy. Loss of goal was significantly related to all rating scales except lack of energy, however the highest relationship was with excitement. Perseveration was moderately related to all ratings except lack of energy.

Relationships between observer ratings of affective interference and the less frequent symptoms were typically low and usually non-significant. Distractibility correlated highest with excitement, but with a correlation that accounted for less than 5% of the variance. Clanging was associated with emotional interference, good feelings, and excitement. Neologisms were related only to lack of energy, as was also true of thought blocking. Lack of energy and bad feelings were the only ratings not associated with word approximations, and echolalia was related to bad feelings, lack of energy, and general emotional disturbance. Stilted speech correlated only with good feelings.

The global ratings of thought disorder were positively related to all ratings of affective disturbance. The highest relationships for global thought disorder were with general emotional disturbance and bad feelings.

The observer ratings of affective disturbance referred to the same sample of communication from which the TLC ratings were made, and consequently reflect at least two important characteristics of the rating situation. First, they represented a "state" rather than trait rating, or rather a situation specific rating. Additionally, however, particularly the interviewers ratings may have been partially affected by demand characteristics: raters probably rated the affective disturbance scales higher when they noted disturbed communication. Neither of these explanations however, can account for significant relationships obtained with the classical thought disorder variables. Often the object sorting or proverbs tests were administered on a different day, particularly for the patient tested during the active phase. Scoring was often done several months later by a separate rater.

Consequently, the relationships reported between observer ratings and classical variables represent considerable cross-situational consistency in the relationships between affective disturbance and psychopathology. The only bizarreness measure that was related to affective disturbance ratings was bizarreness on object sorting. It was related to emotional interference, excitement, bad feelings, and good feelings. The ability to abstract correctly on proverbs was negatively related to emotional disturbance, bad feelings, and excitement, and to a lesser extent good feelings.

Mild relationships were also noted between the no-response category of the proverbs test and observer-rated bad feelings, and lack of energy. The other classical variable which was related to observer ratings of affective disturbance was conceptual overinclusion. Overinclusion was significantly related to all ratings except lack of energy.

<u>Observer Ratings of Affective Disturbance for Four Diagnoses at Active and Post-Hospitalization Phases</u>

The correlations between observer ratings of affe-tive variables with the dependent variables were examined within each diagnosis and time period. Results were rarely significant because of the small number of subjects (degrees of freesom ranged from 13 to 5). Therefore, significant correlations were typically high. Two factors affect the stability of a correlation, the number of subjects (in the current case, small), and the magnitude of the correlation (the higher the correlation, the smaller the variance associated with its distribution).

The differences between diagnoses and time periods for the relationship between affective disturbance and TLC variables was striking. Observer ratings of good feelings were associated with less laconic speech for schizophrenics at the post-hospitalization phase. Bad feelings, however, were associated with more laconic speech for schizoaffectives and depressives at the acute phases. Additionally, observer rated lack of energy was associated with laconic speech for depressives at the active phase. For each diagnosis the relationships between observer rated low energy level and laconic speech was greater at the acute phase.

Poverty of content was related to observer ratings of emotional disturbance and bad feelings at the post-hospital phase for schizophrenics, however for manics at the acute phase it was related to observer ratings of emotional disturbance and excitement. At the active phase, ratings of excitement were also related to poverty of content for schizoaffectives, while at the post-hospital phase bad feelings of schizoaffectives were related to poverty of content, while excitement was negatively related (although not significantly).

Pressure of speech was significantly related to observer ratings of excitement for schizophrenics, schizoaffectives, and depressives at the post-hospitalization phase, and for schizoaffectives at the acute phase. For manics, observer ratings of lack of energy were negatively correlated with pressured speech at the active phase, while at the post-hospital phase, ratings of emotional disturbance were significant. Observer rated good feelings were also associated with pressured speech for schizoaffectives at active and post-hospitalization phases, and for depressives assessed at the post-hospitalization phase.

Observer ratings of affective variables were unrelated to tangentiality for either schizophrenics or depressives at either the active or post-hospital phase. At the acute phase however, ratings of excitement and good feelings were related to tangentiality for manics, and emotional disturbance was related to tangentiality for schizoaffectives. For the schizoaffectives at post-hospitalization, it was ratings of bad feelings that were related to tangentiality.

No observer ratings of affective disturbance were related to derailment for schizohrenic or depressed patients at the active phase, or manic and schizoaffective patients at the post-hospitalization phase. For both depressives and schizophrenics at the post-hospitalization phase, emotional disturbance, bad feelings, and excitement were related to derailment, and additionally for depressives, good feelings as well. For manics and schizoaffectives at the acute phase, derailment was related to excitement, and additionally for the manics, emotional disturbances.

Incoherence was unrelated to observer affective ratings for all four diagnoses at the active phase. For schizophrenics at post-hospitalization, incoherence was related to emotional disturbance, bad feelings, and excitement. For manics at post-hospitalization, incoherence was related to ratings of problems due to emotions, bad feelings, and lack of energy. For schizoaffectives at the post-hospitalization phase, it was good feelings that significantly related to incoherence.

Illogicality was unrelated to observer-rated affect at the acute phase for all diagnoses. At the post-hospitalization phase, illogicality was related to emotional disturbance and excitement for schizophrenics. For manics at the post-hospital phase, ratings by others of emotional interference, bad feelings, lack of energy, and excitement were all related to illogicality. For schizoaffectives at post-hospitalization, the only significant observer ratings was the relationship of bad feelings of illogicality.

At the post-hospital phase, observer ratings of affective disturbance were unrelated to circumstantiality for any diagnosis. At the acute phase, schizohrenics did not demonstrate a relationship between circumstantiality and the observer ratings. For manics, observer rated high energy was significantly related to circumstantiality. Good feelings were associated with increased circumstantiality for schizoaffectives, while for depressed patients emotional disturbance was related to circumstantiality.

Loss of goal indicated a complex pattern. For schizophrenics there was no relationship, either at active or post-hospitalization phases, with loss of goal. For manics at both follow-up and active phases, emotional disturbance was related to loss of goal, and in the active phase excitement was additionally related. For schizoaffectives, excitement at the active phase and good feelings at the post-hospitalization phase were related to loss of goal. Both good feelings and excitement were related to loss of goal for depressives at the active phase of illness.

At the active phase of the disorder, perseveration was related to observer ratings of excitement in depression, while there was no relationship at this phase for the other diagnoses between observer ratings and perseveration.

At post-hospitalization however, excitement, bad feelings, and general emotional disturbance ratings were all related to perseveration in schizophrenia. At this phase, there was no relationship for manics or depressives, however there was a strong relationship between both excitement and good feelings and the amount of perseveration noted in schizoaffectives.

No significant relationships were noted between observer ratings of affect and distractibility for any diagnosis at the post-hospital phase. At the acute phase, only manics and schizoaffectives produced distractible speech that was related to observer ratings. A lack of rated interference from bad feelings was associated with distractibility for manics, while for schizoaffectives, observer ratings of excitement were related to distractibility.

Clanging was the only TLC variable for which no significant observer ratings were found within diagnoses at each phase of the disorder. Neologisms were associated with observer rated lack of energy for schizoaffectives at the active phase of their illness. Word approximations were related to good feelings and excitement for schizophrenics at the active phase. Echolalia was related to observer rated bad feelings for the same group of schizophrenics. Similarly, schizophrenics at the active phase who produced greater stilted speech were also rated by observers as troubled by bad feelings. In contrast, stilted speech was related to good feelings for schizoaffectives and depressives at the active phase. Additionally, excitement was related to stilted speech for depressives at the active phase.

Global ratings of thought disorder on the TLC were related only to low energy for schizophrenics at the acute phase. At the post-hospitalization phase, global thought disorder for schizophrenics was related to excitement and emotional disturbance. At the active phase for manics, global thought disorder was related to observer rated excitement, while at the post-hospitalization phase, global thought disorder was related to emotional disturbance. Global thought disorder for schizoaffectives at both active and post-hospitalization phases was related to bad feelings, and at the active phase was also related to emotional disturbance. Global ratings of thought disorder for depressives at the acute phase were significantly related to observer-rated lack of energy and bad feelings. No relationships between ratings were noted for depressives at the post-hospitalization phase.

Observer ratings for affective disturbance were related to bizarreness in a complex fashion for different diagnoses and time periods. For schizophrenics at the active phase, comprehension-bizarreness and proverbs bizarreness were related to high energy level ratings. Observer affective ratings were not related to bizarreness for schizophrenics in the post-acute phase.

For manics at the acute phase, the only observer ratings related to a bizarreness score was between good feelings and proverbs bizarreness. At post-hospitalization, manics' bizarreness on comprehension was related to ratings of emotional disturbance, good feelings, and excitement. Proverbs bizarreness was related to emotional disturbance, bad feelings, and excitement for manics for post-hospitalization. For manics at post-hospitalization, object sorting bizarreness was significantly related to low energy and bad feelings.

For schizoaffectives at the active phase, there was no relationships between bizarreness ratings and observer ratings of affect. At post-hospitalization, observer ratings of low energy and emotional disturbance were related to bizarreness. For depressives, the only significant relationship between observer ratings of affect and bizarreness was between high energy and bizarreness on the comprehension task.

Observer affective ratings were not significantly related to many of the classical measures for active or post-hospitalization phase schizophrenics. For active phase schizophrenics, observer ratings of high energy and a lack of emotional disturbance were sociated with the production of correct abstractions to the proverbs task. For post-hospitalization schizophrenics, overinclusion was related to observer ratings of emotional disturbance.

Manics at the acute phase who were overinclusive were rated as more emotionally disturbed. Additionally, observer rated high energy was associated with more concreteness on the object sorting task. At the post-hospitalization phase, manics' abstract-correct responses to proverbs were related to lack of disturbance due to excitement, good feelings, or emotions in general. Proverb abstractions were related to lack of disturbance from excitement (or the greater the excitement, the less abstraction).

Overinclusion, for schizoaffectives at the active phase, was related to observer rated excitement. At the post-hospitalization phases, no relationships were significant between observer ratings of affective disturbance and the dependent variables.

Overinclusion, for depressives at the active phase, was related to observer rated excitement and good feeling. At the post-hospitalization phase, none of the observer ratings were significantly related to the classical measures.

Self-Ratings of Affective Disturbance and Thought Disorder for Diagnoses at Two Time Periods

Few relationships were demonstrated between self-rated affective disturbance and the dependent measures in the current study, when correlations were examined by diagnosis for each time period. In addition to self-ratings, the following discussion will also include correlations between the Berndt et al. (1980) energy level scale and the dependent measures.

For acute schizophrenics, self-ratings of emotional interference on the communication task were unrelated to any TLC variables or the global rating. Self-rated good feelings were significantly related only to word approximations. Self-rated bad feelings were significantly related to echolalia. Excitement was negatively correlated with laconic speech, and positively related to clanging and word approximations. Self-rated low energy for active phase schizophrenics were significantly related to poverty of content, derailment, illogicality, and loss of goal. The energy level scale was the only measures significantly related to global thought disorder, with less energy related to global disorder.

As for the classical measures of thought disorder, schizophrenics at the active phase indicated high energy level was associated with more abstract-correct proverbs. Additionally, self-rated excitement was related to concreteness on the proverbs task, and self-rated emotional disturbance was related to abstraction on the proverbs task.

Schizophrenics assessed at the post-hospitalization phase were rated on several TLC variables that were correlated significantly with self-ratings of affect. Self-rated emotional disturbance was related to word approximations. Self-rated good feelings were related to illogicality and perseveration. Loss of goal was negatively related to self-rated bad feelings. Self-rated excitement was related to pressure of speech. Self-rated high energy was associated with derailment, incoherence, and global thought disorder. Similarly, high energy on the energy level scale was associated with global thought disorder.

For the classical measures of thought disorder, post-hospitalization schizophrenics' self-ratings of affect were usually unrelated to the measures. Self-rated good feelings were related to overinclusion. Self-rated lack of energy was related to abstract-correct and abstract responses to the proverbs test, and negatively related to concreteness. Lack of energy was also related to behavioral overinclusion. Low energy level on the energy level scale was related to a greater deficit on the digit symbol difference score.

Self-ratings on affective disturbance for manics tested at the active phase of their disorder was occasionally significant related to TLC variables. Self-ratings of emotional disturbance were related to tangentiality and global ratings of thought disorder. Self-ratings of good feelings were related to loss of goal and negatively related to distractibility. Additionally, bad feelings were related to word approximations. For the classical measures, the only relationships were between self-ratings of good feelings and concreteness on proverbs and conceptual overinclusion.

For manics at post-hospitalization, the only significant relationship between TLC variables and self-rated affect was between self-rated excitement and tangentiality. At post-hospitalization, self-ratings of bad feelings were related to more abstract-correct responses to proverbs and more "no response" scores for the proverbs test. Self-ratings of excitement were related to higher scores on underinclusion. Self-rated low energy was related to overinclusion, and to less of a deficit on the digit symbol difference score. Lack of energy on the energy level scale was related to more abstraction and less concreteness on the proverbs test.

As was true of the other diagnoses, only a few of the self-ratings on affect were related to TLC variables for schizoaffectives at the active phase. Emotional disturbance was related to derailment, bad feelings were related to tangentiality, ratings of excitement were related to pressured speech, circumstantiality, and stilted speech. Self-rated low energy was related to neologisms, word approximations, and echolalia. For the classical variables, self-rated good feelings correlated with "no response" scores on the proverbs test, self-rated bad feelings were related to increased psychological deficit. Low energy (self-rated) was associated with more bizarreness on the comprehension test.

The only TLC variables that were significantly related to self-ratings of affect for post-hospitalization schizoaffectives were incoherence and laconic speech. Incoherence was related to self-rated emotional interference and self-rated good feelings. Laconic speech was significantly associated with self-rated bad feelings. Good feelings were related to a greater digit symbol difference. Bad feelings were related to more bizarreness on object sorting. Additionally, self-rated low energy was related to abstract-correct and abstract responses to the proverbs.

The active phase depressives indicated the most instances of self-reported affective ratings related to psychopathology. Self-rated emotional disturbance was related to tangentiality, incoherence, illogicality, global thought disorder, and concreteness on the object sorting task. Self-rated good feelings were related to overinclusion and less underinclusion. Self-rated bad feelings were related to tangentiality, incoherence, less abstraction on the proverbs, more "no response" proverbs, more underinclusion, and more concreteness on object sorting. Self-ratings of excitement related to more overinclusion and less underinclusion. Self-rated low energy was associated with more laconic speech, more tangentiality, more incoherence, more global thought disorder, and more concreteness on object sorting. High energy level on the energy level scale was related to more bizarreness on object sorting.

The final diagnostic group discussed in the current section is depressives at post-hospitalization. Since very little thought disorder occurred in this group, restricted range may have decreased the magnitude of some correlations. The only significant TLC variable was the one most frequent for this condition, and laconic speech was significantly related to low energy on the energy level scale. Self-rated good feelings were related to bizarreness on object sorting. Self-rated bad feelings were related to less abstraction and more concreteness on the proverbs . Finally, self-rated excitement was related to concreteness on the Object Sorting Test.

Construct Validity, or What About the Labyrinth?

Until now, much of the discussion has stuck close to a descriptive elaboration of the results. Thus, since there was a large volume of data, the discussion so far has been more compulsive than creative. At this point then, it appears time to climb above the labyrinth and embark upon the synthetic work of construct validation; within the metaphor: it is time Theseus sets out, with a little help, to find the bull and slay it.

Diagnoses as Hypothetical Constructs

The collection of data discussed so far usually has provided a complex set of results associated with each diagnosis. A fundamental question is: How valid and pragmatic are the four diagnostic distinctions; i.e., manic, schizophrenic, schizoaffective, and depressed?

The thought disorder data, especially as summarized in Tables 22, 23, 62, and 63, lead to several tentative conclusions: 1) All diagnoses demonstrated evidence of some thought disorder, however within each diagnosis, every individual did not necessarily produce disordered speech and communication. 2) The order of severity of thought disorder, for the current sample, from most to least, was manic, schizophrenic, schizoaffective, and depressed. 3) There was a general discontinuity, with manics and schizophrenics frequently more thought disordered, and schizoaffectives and depressives less thought disordered. 4) The discontinuity suggests that some factors other than diagnosis may be operating to produce disordered thought and communication, for the purposes of the current discussion. 5) One such factor might be acute disturbance, measured by the active phase of the illness, as several symptoms were more frequent and severe at the active phase, compared with the post-hospitalization phase. 6) Since time period differences did not account for all or even a large portion of the variance, other factors must be involved. 7) The factor accounting for the discontinuity between the manics and schizophrenics and the schizoaffectives and depressives will be labelled a "psychosis" factor. Psychosis, as used here, refers to the use of reality sense and perspective (Harrow & Miller, 1980) in making judgments about what verbal behavior is appropriate in a social context. The "psychosis" factor is merely a working hypothesis to explain an observed association of symptoms with manics and schizophrenics that persist beyond the active phase, and are less often present in depressives and schizoaffectives. 8) Manics and schizophrenics cannot be discriminated by symptomatology alone, however they may differ when the course of illness is considered. 9) Similarly, schizoaffectives were not typically distinguished from derpessives on the basis of symptomatology however the course of the disorder indicated it was a somewhat unique group. Others (e.g., Pope, Lipinski, Cohen, & Axelrod, 1980) have argued that schizoaffectives (manic type) were similar to manics but not to schizophrenics, and suggest that schizoaffectives may belong diagnostically with the affective disorders. However, they did not consider thought disorder or psychotic symptoms in their discussion, and focused only on the schizoaffective, manic, type.

Course of Disorder, Impulse Control, and Energy, and Affective Disturbances

Phase of the disorder, energy level, and impulse control will be discussed together because they interacted frequently. 1) Already discussed in #5 above, there was a tendency for the diagnoses to have less symptomatology at the post-hospital phase, suggesting that acute disturbance might be an important factor. Acute disturbance could be confounded with other aspects of the patient's condition, such as disruption of life routine due to hospitalization. 2) As Table 63 suggests, schizoaffective and depressed patients have almost no thought disorder at post-hospitalization (80% and 83% respectively), and including mild thought disorder, the cumulative percentages become 90 and 100%. 3) While over half the schizophrenics have either no or mild thought disorder at post-hospitalization, 70% of the manics have moderate to severe global thought disorder at the post-hospital phase. 4) Table 62 illustrates which frequent symptoms change with course of illness for each group. Schizophrenics evidenced more laconic speech and circumstantiality at post-hospitalization. The most significant decrease was in tangentiality. Symptoms which were observed to be higher in 25% or more schizophrenics at the active phase were: poverty of content, tangentiality, derailment, illogicality, loss of goal, and perseveration. 5) Manics were more frequently tangential, and more frequently exhibited loss of goal, at post-hospitalization. For most of the symptoms that were less frequent for schizophrenics at post-hospitalization, manics remained high, except poverty of content and perseveration. Significant decreases were also noted for circumstantiality and incoherence. These results fail to confirm Andreasen's (1979b) speculations about the reversibility of manic thought disorders with time. 6) Schizoaffectives were similiar to depressives at post-hospitalization, but during the active phase of their illness, the symptoms which occurred most frequently were laconic speech, poverty of content, derailment, illogicality, and perseveration. Although the frequencies were less, they were in general the same symptoms that were most frequent in schizophrenics. 7) In the classical measures of thought disorder and bizarreness, both schizophrenics and manics frequently had thought disorder at post-hospitalization, and the persistence of this at post-hospitalization was particularly true for manics. 8) The course of symptomatology was generally one of patients in the active phase more frequently having thought disorder, and thought disorder of a more severe nature than the post-hospitalization group. However, the time period effect typically interacted with diagnosis or another variable so that a straightforward decrease in symptomatology could be assumed. 9) For example, overall laconic speech was lower at the post-hospitalization phase; however, this was a phenomenon which predominated for schizoaffectives. Similarly, poverty of content was less at post-hospitalization, but this was true for manics and schizophrenics, but not the other diagnoses. Furthermore, schizophrenics had significantly less tangentiality at post-hospitalization compared with active phase, while manics had significantly more. The essential point is that acute disturbance might account for some of the thought disorder, but the effect varies with diagnosis and symptom. There was, overall, more consistent effect for acute disturbance with schizoaffectives and depressives. 10) In addition to acute disturbance, energy level of the patient was often related to psychopathology. While energy level had an independent effect on some variables, such as pressure of speech, it often was related to thought disorder primarily at one phase of the illness, or for specific diagnoses. For example, for derailment and loss of goal, high energy level was associated with increased symptomatology at the post-hospital phase, while having little effect at the active phase. 11) Impulse control was associated with less symptomatology for several variables: derailment, incoherence, illogicality, overinclusion, the ability to abstract, and to a lack of concreteness. It was also associated with increased global ratings. For some variables, such as poverty of content, the effect was primarily true for the manics. When impulse control interacted with phase of illness, it was usually at the active phase (c.f., tangentiality).

Affective Disturbance and Thought Disorder

So far, several factors relevant to thought disorder have been identified. Rather than diagnosis, a "psychosis" factor may have produced symptomatic differences. Acute disturbance, energy level, and impulse control, independently and interactively, also were often related to thought disorder. A remaining question was: could a relationship between affective disturbance and thought disorder be identified, and if so, were certain affective variables more important for some diagnoses or phases of a diagnosis? 1) Observer ratings of affective disturbances were more related to symptomatology than self-ratings, except for the depressives. The reliability of self-report from patients is questionable; however it is also true that observers were not totally "blind" to patient symptomatology when they made the ratings. 2) The strongest relationship between an observer rating and any TLC symptom was excitement and pressure of speech. For observer ratings, excitement and good feelings were consistently related to all but a few symptoms of the TLC and to bizarreness and the abstract and concreteness ratings from the proverbs. Low energy was the least related to most variables. 3) The most frequently significant self-ratings were between excitement and the several measures of thought disorder. 4) For schizophrenics, self-ratings frequently produced more significant ratings than observer ratings for both acute and post-hospitalization phases. 5) At the acute phase for schizophrenics, only observer rated lack of energy on the energy level scale was related to global thought disorder. Of the frequent TLC symptoms, only self-rated lack of energy was related to psychopathology. 6) For schizophrenics at the post-hospitalization phase, observer ratings of emotional disturbance and exitement were related to global thought disorder, while for self ratings it was high self-reported energy and increased energy on the energy level scale that was related to global thought disorder. Observer ratings of emotional problems, bad feelings, and excitement were related to frequent TLC symptoms, while self-reported high energy level was associated with psychopathology.

7) For manics at the active phase, observer rated excitement and self-rated emotional disturbance was related to global thought disorder. Self ratings were rarely related to frequent TLC symptoms, and for observer ratings, excitement and emotional disturbance was related to variables associated with looseness of association. 8) For manics at post-hospitalization, self-ratings were unrelated to global thought disorder, while observer ratings of emotional disturbance were related to global ratings of thought disorder. For observer ratings, bad feelings and lack of energy were associated with illogicality and incoherence. 9) For schizoaffectives at the acute phase, observer ratings of bad feelings and emotional disturbance were related to global thought disorder. Self-ratings were unrelated to global dysfunction. High relationships, however, were noted between both observer and self ratings of many affective scales with frequent TLC variables. 10) For schizoaffectives at the post-hospitalization phase, observer ratings of bad feelings were related to global thought disorder, while self-ratings were unrelated to the global measure. Observer rated excitement, good feelings, and bad feelings were all related to several TLC measures, while few significant relationships were noted for self-ratings. 11) For depressives at the acute phase, observer ratings of low energy and bad feelings were related to global thought disorder, while for self-ratings of lack of energy and emotional disturbance were related to global thought disorder. Lack of energy was highly related to laconic speech for both self and observer ratings. 12) Neither observer or self-ratings of affective disturbance were related to global thought disorder for depressives at post-hospitalization, however for depressives

at this phase there was a restricted range. 13) Summarizing the above, lack of energy, or bad feelings were related most frequently to thought disorder for depressives, schizophrenics, and schizoaffectives at the acute phase, and schizoaffectives at the post-hospitalization phase. Schizophrenic global thought disorder at the post-hospitalization phase, and manics at the acute phase were related to excitement or lack of energy. Most patients did not typically self-report strong relationships between affects and thought disorder, and often, when they did, patients used the more global "emotional" disturbance rather than specific ratings like good or bad feelings.

Construct Validity of the Measures of Thought Disorder

The relationship among the dependent variables of the current study was outlined early in the current study. A cluster analysis of these associations would be an appropriate way of reducing the data and future research should explore this. The strongest relationship among the TLC variables was between loss of goal and derailment, with both of these variables strongly related to tangentiality. These variables, with perhaps some of the others, form a cluster which corresponds to traditional concepts of looseness of association. These variables are also related to deficits on abstraction and excessive concreteness on the classical thought disorder measures.

No evidence in the current study clearly isolates another symptom pattern such as the positive/negative distinction by Andreasen (1979b). Laconic speech is however, somewhat related to concreteness and "no response" on the proverbs measure, and these associations may indicate an aspect of the negative thought disorder distinction.

The pattern of changes in the thought disorder variables for their course of illness, and the relationship to affective ratings might also provide indications of the relationship among variables. Here again, there appears to be consistent relationships between variables related to looseness of association. Furthermore, certain symptoms, for example, are more frequent at post-hospitalization (laconic speech for depressed and schizophrenic patients, and circumstantiality for schizophrenic and schizoaffective patients).

These symptoms may serve a restitutive function, or alternatively represent a regressed adaptation. Greater symptomatology for manics at post-hospitalization on both loss of goal and tangentiality indicates that looseness of association, while present in both manics and schizophrenics, is not always reversible, and perhaps deteriorates in manics, however, the same variables improve the most for schizophrenics when the post-hospitalization group is compared with the schizophrenics at the acute phase of the illness. These two symptoms represent the anchors of departure and return to the listener in cohesive discourse, and as such are perhaps the two symptoms most clearly associated with loss of discourse goal, a related, but not identical, concept to looseness of association.

Implications

The current research raised some important questions, but modified and extended replications and refined methodology would be required to begin to answer them adequately. Replication of the findings is currently underway at the same settings, however modified replications in a different setting would increase generalizability of the results.

The possible confounding effects of phenothiazines on the current study highlights the need for future researchers to obtain at least temporary control over medication for research subjects.

The need for a modified "patched up" institutional cycle design has been suggested to test other rival hypotheses in the current study, and the longitudinal approach to data collection is in place.

One question that was raised but never fully answered in the current study was the construct validity of the measurements. A cluster analysis of the thought disorder variables should reduce the data to a manageable number of constructs. These could then be related to diagnosis and affective ratings.

An additional need is to improve the validity of the diagnostic system. A step in that direction would be to use the composite scores from a cluster analysis of variables to perform a cluster analysis by cases. The graph-theoretic analysis presented by such an approach might clarify the picture considerably.

Furthermore, the assignment of individual cases to diagnostic categories should be based on more criteria than thought disorder. The affective variables of the current study might provide useful clues, but it would be even more important to include functioning in work, home, and social situations, presence of psychotic symptoms, premorbid functioning, and precipitating stresses.

Some of the rather surprising results of the current study could be profitably pursued. Do manics have thought disorder as severe as schizophrenics? The current study indicates that the answer is yes, but that the course of predominant symptomatology is different. These results should be cross-validated.

If so many manics are moderately to severely thought-disordered two years after hospitalization, how is it that they are functioning on the outside? Does Lithium control distress, or help them in other areas of functioning (e.g., social work) so that they are tolerated by society?

What is the long term couse of manic symptomatology? Does the manic have even more severe thought disorder as the years pass? Traditionally, schizophrenia has been thought to be the "deteriorating" disorder, but recent evidence by Bleuler (1968) and others have challenged that assumption.

Lack of energy was related to thought disorder at the acute stage for three of the four diagnoses. What does this mean? For future measures of affect, more precise instruments should be used, including Andreasen's scale for flat affect. It is possible that for the schizophrenics, lack of energy was the closest self-report to blunted affect. It may also be related to anhedonia and lack of motivation.

The results with measures of impulse control indicate that thought disorder, especially bizarreness, may be related to difficulties in controlling variation in verbal responses. Cognitive behavioral therapies such as the self-statements which have been used with impulsive children might be applicable to therapy with adult psychopathology.

The current results do not support the notion that affective excitement is a primary cause of manic thought disorder (Andreasen, 1979b). Verbal or somatic therapists who ascribe to that belief might re-examine their assumptions, since severe thought disorder, including pressure of speech, was still problematic two years after hospitalization, even though affective disturbance appeared less relevant at that time.

SUMMARY

The course of thought disorder was studied for manics, schizophrenics, schizoaffectives, and depressives at two time periods: the active phase of the disorder, and a period two years after hospitalization. The time periods were compared cross-sectionally, and diagnoses were made from the Research Diagnostic Criteria, from a heterogeneous sample of 121 patients.

Thought disorder was operationalized by ratings of instances on a tape-recorded communication interview designed to elicit relatively standard yet naturalistic communication. Tapes were rated for 17 categories of thought disorder on Andreasen's scale for the assessment of thought, language, and communication.

Following the interview, both subject and interviewer rated the interview for the degree of disturbance from emotions, good feelings, bad feelings, excitement, and lack of energy. Spoken and verbal impulse control were also assessed by having a subject speak and write phrases at normal speed, and as slow as possible.

Subjects also completed a self-report measure of energy level, and a standard test battery, consisting of the object sorting test, a proverbs test, and selected subscales from the WAIS. These measures provided several classical scores for thought disorder, such as overinclusion, abstraction, concreteness, and bizarre-idiosyncratic thought.

Results indicated that, even with a naturalistic interview, instances of thought disorder, as operationalized by Andreasen, frequently occurred, and that these were related to thought disorder on more classical measures. Manics and schizophrenics typically had more thought disorder than schizoaffectives and depressives. At post-hospitalization, symptomatology was nearly absent for depressives and schizoaffectives, decreased for schizophrenics, and still moderate to extreme for manics. Symptoms related to loss of goal were lower for schizophrenics at post-hospitalization, but were higher for the manics at a phase two years after hospitalization. Schizoaffectives (depressed type) resembled schizophrenics at the active phase of the disorder, however were highly similar to depressives at the post-hospitalization phase.

Energy level and impulse control both were usually related independently to measures of thought disorder, or interacted with diagnosis or phase of illness. Self and observer ratings of affective disturbance indicated low to moderate correlations with frequent thought disorder variables. For individual diagnoses, lack of energy, or bad feelings, were related to thought disorder at the acute phase for schizophrenics, schizoaffectives, and depressives, and at the post-hospitalization phase for manics. At the acute phase for manics, and at the post-hospitalization phase for schizophrenics, excitement, or high energy level, was related to thought disorder.

Methodological problems were discussed, as well as implications for future research, including further investigation of the course of thought disorder in manics and schizophrenics, with particular attention to the course of symptoms related to loss of goal.

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APPENDIX A

APPENDIX A

Relationships of Age, Education, IQ , and Medication to Andreasen's Thought, Language, and Communication Variables

TLC Variable	Age	Education	Medication	Intelligence
Laconic Speech	-.138	-.107	.020	-.184*
Poverty of Content	-.134	-.054	-.118	-.202*
Pressure of Speech	.080	-.210*	.041	-.267**
Distractibility	-.149	-.106	.080	-.199*
Tangentiality	-.146	-.191*	-.029	-.211*
Derailment	-.006	-.259*	.001	-.276**
Incoherence	.008	-.295**	.088	-.363***
Illogicality	-.091	-.194*	.019	-.378***
Clanging	-.178*	-.114	.078	-.064
Neologisms	-.097	-.193*	.063	-.179*
Word Approximation	-.188*	-.114	.099	-.324**
Circumstantiality	.177*	.041	-.157	.255*
Loss of Goal	.059	-.217*	.080	-.207*
Perseveration	-.024	-.238*	.042	-.282**
Echolalia	-.074	-.124	-.076	-.097
Blocking	-.092	.199*	.026	.104
Stilted Speech	-.119	.119	-.010	.165
Global Rating	-.075	-.283**	-.014	-.403***

*($\underline{p} < .05$); **($\underline{p} < .01$); ***($\underline{p} < .001$); based on $\underline{n}$ = 98.

APPENDIX B

APPENDIX B

Relationships of Age, Education, IQ, and Medication to Classical Measures of Thought Disorder

Measure	*n*	Age	Education	Medication	Intelligence
BIZCOMP	93	-.001	-.219*	.134	-.418***
BIZPROV	93	.111	-.194*	.175*	-.422***
ACPROV	91	.039	.329**	-.129	.499***
ABSPROV	91	-.038	.369***	-.118	.502***
CPROV	91	.066	-.404***	.217*	-.320**
NRPROV	91	.003	-.102	-.045	-.367***
NRLPROV	91	-.086	-.051	-.063	-.155
BIZOBJ	90	-.064	-.229*	.038	-.235*
COIOBJ	90	-.061	-.026	.173	-.011
UINOBJ	90	-.061	-.173	-.079	-.292**
CONOBJ	90	-.133	-.201*	.070	-.273*
BEHOBJ	92	.060	-.052	.159	.103

*($p < .05$); **($p < .01$); ***($p < .001$).

Note. BIZCOMP = Bizarreness-Comprehension; BIZPROV = Bizarreness-Proverbs; ACPROV = Proverbs-Abstract/Correct; ABSPROV = Proverbs-Abstract; CPROV = Proverbs-Concrete; NRPROV = Proverbs-No Response; BIZOBJ = Object Sorting-Bizarre; COIOBJ = Object Sorting-Overinclusion; UINOBJ = Object Sorting-Underinclusion; CONOBJ = Object Sorting-Concrete; BEHOBJ = Behavioral Overinclusion.

APPENDIX C

APPENDIX C

Please read each item very carefully and decide whether or not that item is true for you. There are no right or wrong answers; we are interested in how you usually feel. Answer each item either true (T) if it usually applies to you, or false (F) if it does not usually apply to you. Circle either (T) or (F) beside each item.

1.	It seems like I am always tired.	T	F
2.	As a rule I have a lot of zest and zip.	T	F
3.	I frequently feel drowsy and in need of a nap.	T	F
4.	I am usually full of vim and vigor.	T	F
5.	I often feel sluggish and slowed down.	T	F
6.	I often feel worn out.	T	F
7.	I often feel droopy and tired.	T	F
8.	I am usually full of pep.	T	F
9.	I usually feel lively and energetic.	T	F
10.	My vitality is usually high.	T	F
11.	I often feel weak and fatigued.	T	F
12.	My energy level is usually high.	T	F

APPENDIX D

APPENDIX D

INSTRUCTIONS AND INTERVIEW FORMAT FOR THE COMMUNICATION INTERVIEW

I. INSTRUCTIONS FOR GIVING THE COMMUNICATION INTERVIEW:

A) PURPOSE: The purpose of this interview is to elicit a representative sample of each subject's speech and communication in a relatively naturalistic communication task. However, in order to have comparable communicative activity across individuals, the procedure involves asking a set of standard topic questions, standard prompts (when necessary), and a specific routine of inquiry in all cases of unclear communication.

B) THE QUESTIONS: Each topic question should be asked in the order that it appears on the attached form. Before reading the instructions, the tape recorder should be on. Of course, you may ask the subject if it's O.K. to record the session since it would be difficult to have a record of it otherwise.

C) THE PROMPTS: The subject's verbalizations should ideally be a set of topic oriented, moderately long responses. Prompt questions should only be used in the event that the subject has not talked for an appreciable amount of time (approximately 3 minutes for each question) and/or has not answered the question fully. When to ask a prompt question and which prompt to ask is left to the judgment of the interviewer, since the appropriateness of the prompt will vary with what the subject actually says (or does not say!). For example, for question #1 (see form), if someone tells you all about the personality of the person he'd like to be like, prompt B would be highly redundant (and unnatural).

Also, there will be times when the subject obviously does not want to answer a particular question and no amount of prompting will change that. Don't feel obligated to go through all the prompts - this isn't the Spanish Inquisition! One and possibly two further questions will suffice.

Please notice that questions 3 and 4 have additional standard parts listed below the question prompts. These should be asked of all subjects.

D) INQUIRY PROCEDURES: If the subject says something that you don't understand or can't follow, you should ask an inquiry question as soon as possible (i.e., as soon as it is conversationally and situationally appropriate to do so). First, a general inquiry question should be asked (What? What do you mean? Could you say more? Could you say more about how that relates to what we were talking about? If the subject fails to clarify, then repeat back the particular work or phrase that was troublesome with a question intonation. (Sonactbulism?)

E) RATING SCALES: As soon as the interview is completed, please have the subject complete the interview rating scale. Please notice that under each question there's a rating scale that goes from 1 to 5.

INSTRUCTIONS: TODAY, I'D LIKE TO TALK WITH YOU ABOUT SOME OF YOUR THOUGHTS AND EXPERIENCES. I'M VERY INTERESTED IN YOUR ANSWERS TO A NUMBER OF EVERY DAY TYPE QUESTIONS AND WOULD LIKE YOU TO GIVE MODERATELY LONG ANSWERS TO EACH ONE. DO YOU UNDERSTAND? ALRIGHT, FIRST:

(WARM UP QUESTION) - COULD YOU GIVE A LITTLE BACKGROUND ABOUT YOURSELF?

SPECIFIC PROMPTS:

A) Where were you born?
B) Where did you go to school?
C) Have you ever lived outside Chicago?

1. PLEASE DESCRIBE SOMEONE YOU KNOW WELL WHO YOU WOULD LIKE TO BE LIKE. WHY WOULD YOU LIKE TO BE LIKE THAT PERSON?

SPECIFIC PROMPTS:

A) Why would you like to be like him/her?
B) Could you say something about his/her personality? What is he/she like?
C) What are some of his/her interests?
D) Could you describe something that you've done with him/her?

2. PLEASE DESCRIBE HOW YOU SPENT A TYPICAL DAY BEFORE YOU CAME HERE.

SPECIFIC PROMPTS:

A) Could you say a little more about your normal daily routine?
B) Could you give a little more detail about____(e.g., what you did at work)?
C) What did you typically do in your spare time?

3. FOR THIS QUESTION, I WILL FIRST TELL YOU A SHORT STORY. THE NAME OF THE STORY IS THE WOLF AND THE CRANE.

There was once a wolf. One day, the wolf was eating a fish when he got a piece of bone from the fish caught in his throat. And he ran around and he tried to get the bone out of his throat but he couldn't. So he decided that he had to do something to get the bone out of his throat. He went to the animals in the forest and he asked the animals to help him, but no one would. Then he came to a crane. He said to the crane: "If you would help me, I'll give you a reward." And the crane said: "O.K. If you give me a reward I'll help you get the bone out of your throat." And the crane took his head and he stuck his long neck down the wolf's throat. And he pryed at the bone and sure enough, he got the bone dislodged and pulled the bone out of the wolf's throat. After he did that and the wolf was fine again, he said to the wolf: "O.K., I fulfilled my end of the bargain, what will you give me as a reward?" The wolf said: "Your reward is having stuck your head in a wolf's mouth and being able to take it out again and still be alive!"

QUESTION: WHAT DO YOU THINK WAS THE POINT OF THE STORY? DID YOU LIKE IT? WHY OR WHY NOT?

SPECIFIC PROMPTS:

A) How did the story show the point?

QUESTION 3 (TO BE ASKED IN ALL CASES) COULD YOU RETELL AS MUCH OF THE STORY AS YOU REMEMBER?

4. (THIS QUESTION IS ALSO BASED ON THE WOLF AND THE CRANE) LET'S GO BACK TO THE POINT IN THE STORY WHERE THE WOLF GOT THE BONE CAUGHT IN HIS THROAT. WHAT OTHER THINGS COULD HAVE HAPPENED AFTER THAT?

SPECIFIC PROMPTS:

A) What else could the wolf have done?
B) What could have happened to_______(e.g., the wolf, the crane?)
C) Could you think of a somewhat different ending?

QUESTION 4 (TO BE ASKED IN ALL CASES) WHICH ENDING FOR THE STORY DO YOU LIKE BETTER? WHY?

5. SUPPOSE YOU WERE A MEMBER OF THE PRESIDENT'S STAFF AND IT WAS YOUR JOB TO FIGURE OUT HOW TO DEAL WITH THE PROBLEM OF RISING PRICES. WHAT STEPS WOULD YOU TAKE TO SOLVE THE PROBLEM?

A) What might you try to do first? ...next?
B) How would you keep down the cost of food?
C) What if that didn't work?

6. SUPPOSE YOU WERE UNHAPPY WITH SOME PART OF YOUR LIFE AND YOU WANTED TO CHANGE. WHAT WOULD YOU CHANGE AND WHY? HOW WOULD YOU GO ABOUT MAKING THE CHANGE?

SPECIFIC PROMPTS:

A) What would you do first?
B) What else might help you make the change?
C) How would that improve things?

7. PLEASE DESCRIBE THE PLOT OF ANY T.V. SHOW, BOOK, OR MOVIE THAT YOU'VE RECENTLY OR REMEMBER.

SPECIFIC PROMPTS:

A) Could you say a little more about what happened?
B) Could you tell as much of the story as you remember?
C) Could you give a little more detail about_____(e.g., the robbery?)
D) Could you say more about what happened to_____(e.g., the main character)

8. SUPPOSE SOMEONE YOU WERE CLOSE TO WAS SO UPSET WITH YOU THAT THEY WOULDN'T TALK TO YOU. WHAT STEPS WOULD YOU TAKE TO SMOOTH THINGS OVER?

SPECIFIC PROMPTS:

A) What would you do first? ...Then what?
B) What else might you do to make them less upset?
C) How would you explain your side to them?
D) What if that didn't work?

FREE VERBALIZATION QUESTION: IS THERE ANOTHER TOPIC THAT YOU WOULD LIKE TO TALK ABOUT?

APPENDIX E

APPENDIX E

Interviewer: Tell me a bit about yourself.

Subject: Well, there's not much to tell I was born in, in Bokin, MIssissippi. I came here when I was 3, and I, we lived in Zion before we moved to Chicago. And (uh) And I went to school at Daniel Webster And (uh) I graduated from John Marshall and I only took a year of mathematics...that's about all.

Int: What have you done after that?

Sub: I had a couple of jobs, not too many.

Int: What do you do?

Sub: I used to babysit, but I don't do nothing now.

Int: Is there anything else you could tell me that would help me to get to know you.

(laughs)

Int: O.K.

Int: I'd like to begin where we were yesterday when the batteries ran down and I'll ask you this question again. I'll be asking you questions about thoughts and experiences, question I'd like you to think about and give me a moderately long answer. O.K.?

Could you describe for me someone you know well...someone you would like to be like and tell me why you would like to be like them.

Sub: I'd like to be like Holly.

Int: O.K. Could you describe her to me.

Sub: Well, she's nice and she's pretty and she walks a lot but she looks good.

Int: What is there about her that makes you want to be like her?

Sub: Well, she's independent.

Int: (mmhmm) Could you say something more about her personality? Sub: Well, it's energetic, vigorous (coughs) And it's magnificient.

Int: Why would you like to be like her? Sub: I don't know.

Int: What do you most like about her? Sub: Her beauty.

Int: (mmhmm) Is there something that you would like? Sub: (mmhmm)

Int: Why is that? Sub: I don't know.

Int: D, suppose you were a member of the President's staff, and it was your job to try to figure out how to deal with rising prices, what steps would you take to solve the problem? Sub: Well, I start working, and (uh) see if I can help somebody.

Int: Well, if you were a member of the President's staff, if you were part of his cabinet in charge of dealing with rising prices, how would you deal with it? Sub: What did you say?

Int: If you were part of the President's cabinet that was in charge of dealing with the economy, of dealing with rising prices, what steps, how would you go about solving the problem? Sub: Well, I'd, could you read it again?

Int: (clears throat) Suppose you were a member of the President's staff, part of his Cabinet; and it was your job to figure out how to deal with rising prices, how to stop prices from rising, what steps would you take to solve the problem? Sub: I'd put more money in the United States.

Int: (mmhmm) How do you mean? Sub: Well, I'd make more money.

Int: How would that help? Sub: Well, people would live better.

Int: What would you do next? Sub: I'd build new buildings and get a jet, and (uh) buy new shoes.

Int: How does buying shoes relate to solving rising prices?

Sub: I guess it don't.

Int: How would you keep down the cost of food?

Sub: (clears throat) By planting more.

Int: (mmhmm) Planting more what?

Sub: Food.

Int: Can you think of another way?

Sub: (uh uh)

Int: What if that didn't work?

Sub: I'd go to the store.

Int: How would going to the store help you deal with rising prices?

Sub: I don't guess it would.

Int: O.K. Let me ask you a different question...suppose you were unhappy with some part of your life and you wanted to change it. What part of your life would you change and why?

Sub: Well, after I became a better person, I need some new clothes, and some new shoes, get a job.

Int: What part of your life would you be unhappy with?

Sub: When I was alone.

Int: You were alone?

Sub: (mmhmm)

Int: How would you go about changing that?

Sub: I'd get married.

Int: What would you do first?

Sub: Get a job.

Int: In order to get married, what would you do first?

Sub: Find a husband.

Int: How would you do that?

Sub: I'd go out.

Int: (mmhmm) How would you find him?

Sub: I'd go to different places.

Int: And...

Sub: Look for one.

Int: Other than going out, how else would you not be lonely?

Sub: What did you say?

Int: How else could you solve the problem?

Sub: Well, I'd, I'd ask.

Int: You'd ask?

Sub: A man.

Int: (mmhmm) And then?

Sub: Then we'd get married. (coughs)

Int: How would that improve things? Sub: I'd be happier.

Int: How? Sub: I'd have somebody.

APPENDIX F

APPENDIX F

To Experimenters:

For the next two tasks, be sure to bring a watch. In each case, the subject will be asked to either write or speak a phrase, and then repeat the task as slowly as possible. The initial normal speed serves as a baseline measure, and the second slower measure, when corrected statistically for the normal speed, measures impulse control. Additionally, for the written task, subjects are asked to write the phrase as quickly as possible. For the spoken task, you do not need to time them, if you leave the tape recorder going. However, if they manage to take longer than 1½ minutes in the slowed down version, they need not continue, and you can simply stop them with "that's fine." Do not assume they can last this long however, very few last more than 30 seconds. In the second written task, be sure and record all three times: normal, slow and fast. Again, anything slower than 1½ minutes can be stopped. This too occurs less than 5% of the time in patients so don't assume they can do it, even if they talk big.

Now I am going to read a sentence to you, and when I am finished I would like you to repeat it back, exactly as you heard it, OK? (When subject understands, read the sentence. If he changes, leaves out, or adds more than one word, repeat it and have him try again.)

The boys and girls chased the butterfly all around the park.

Good, now I'm going to repeat the sentence one more time, only this time, when you repeat it, I'd like you to say it very slowly, as slowly as you can, understand? (repeat it).

Next, I'd like you to write the phrase on the line right below it:

New Jersey Chamber of Commerce

Now, just as in the spoken task above, I'd like you to write the phrase you just wrote as slowly as you possibly can:

New Jersey Chamber of Commerce

APPENDIX G

APPENDIX G

RATING SCALE QUESTIONS

1. In general, during the interview we've just completed, how easy do you think it was for your hearer to understand you?

1	2	3	4	5
NOT EASY (HARD)		MODERATELY		VERY EASY

2. In general, how well did you understand the questions you were asked during the interview?

1	2	3	4	5
NOT WELL		MODERATELY		VERY WELL

3. During the interview we've just completed, did you feel your emotions in any way affected your ability to communicate?

1	2	3	4	5
NOT AT ALL		MODERATELY		VERY MUCH

4. During the interview we've just completed, to what extent did good feelings affect your ability to communicate?

1	2	3	4	5

5. How much did bad feelings affect your ability to communicate?

1	2	3	4	5
NOT AT ALL		MODERATELY		VERY MUCH

6. Did you feel that your ability to communicate was influenced by a feeling of excitement?

1	2	3	4	5
NOT AT ALL		MODERATELY		VERY MUCH

7. Did you feel that your ability to communicate was affected by a lack of energy?

1	2	3	4	5
NOT AT ALL		MODERATELY		VERY MUCH

APPENDIX H

APPENDIX H

NAME OF SUBJECT____________________

DATE OF INTERVIEW__________________

INTERVIEWER________________________

LOCATION AND TIME PERIOD___________

Please complete after the communication interview:
In analyzing the verbal behavior provided by the interview procedure, we would like to have various assessments about the interaction from the point of view of both the subject and the interviewer. Thus, in addition to asking the subject to evaluate a number of questions, we ask the interviewer to give their subjective impressions of the interview by considering the following rating scale questions. Please complete this form as soon as possible after the session is completed. Again, we are interested in your impressions and opinions. If possible, do not read the subject's answers before making your own ratings. Thank you.

1. In general, how easy was it for you to understand the subject?

1	2	3	4	5
NOT EASY (HARD)		MODERATELY		VERY EASY

2. In general, how well did the subject understand the questions asked?

1	2	3	4	5
NOT WELL		MODERATELY WELL		VERY WELL

3. Did the subject's emotions affect his ability to communicate?

1	2	3	4	5
NOT AT ALL		MODERATELY		VERY MUCH

4. To what extend did good feelings affect his ability to communicate?

1	2	3	4	5
NOT AT ALL		MODERATELY		VERY MUCH

5. How much did bad feelings affect his ability to communicate?

1	2	3	4	5
NOT AT ALL		MODERATELY		VERY MUCH

6. Was his ability to communicate influenced by a feeling of excitement?

1	2	3	4	5
NOT AT ALL		MODERATELY		VERY MUCH

7. Was his ability to communicate affected by a lack of energy?

1	2	3	4	5
NOT AT ALL		MODERATELY		VERY MUCH

IF THE ANSWER TO #1 ON THE PRECEDING PAGE WAS LESS THAN 4, INDICATE (if it's easy to remember) which questions were harder to understand.

ADDITIONAL RATER COMMENTS: Please include anything noteworthy or relevant about the quality of rapport, your own sense of the nature of the communicative difficulty (e.g., subject was not motivated, subject was close to catatonic, subject was talking to themselves rather than to me, etc., or anything else that you experienced as problematic or unique to this particular interview). Thank you.

APPENDIX I

APPENDIX I

Source Table for Analysis of Variance of Circumstantiality for Caucasians and Non-Caucasians

Source	SS	df	MS	F
Diagnosis (D)	.78	3	.26	.47
Time Period (T)	.42	1	.42	.75
Race (R)	3.32	1	3.32	5.95*
D x T	2.32	3	.77	1.39
D x R	1.76	3	.59	1.05
T x R	.02	1	.02	.04
D x T x R	.49	3	.16	.29
Error	45.77	82	.55	

*($p < .05$).

APPENDIX J

APPENDIX J

Source Table for Analysis of Variance of Pressure of Speech for Caucasians and Non-Caucasians

Source	SS	df	MS	F
Diagnosis (D)	33.98	3	11.33	15.48***
Time Period (T)	.06	1	.06	.08
Race (R)	3.95	1	3.95	5.41*
D x T	.52	3	.17	.23
D x R	.99	3	.33	.45
T x R	.05	1	.05	.06
D x T x R	7.29	3	2.43	3.32*
Error	59.98	82	.73	

*($p < .05$); ***($p < .001$).

APPENDIX K

APPENDIX K

Source Table for Analysis of Covariance of Laconic Speech with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	9.066	3	3.022	2.91
Time Period (T)	3.043	1	3.043	2.93
D x T	11.748	3	3.916	3.77*
IQ	1.375	1	1.375	1.33
Education	.018	1	.018	.02
Medication	.258	1	.258	.25
Age	.576	1	.576	.56
All Covariates	2.862	4	.715	.69
Error	89.222	86	1.037	

*($p < .05$).

APPENDIX L

APPENDIX L

Source Table for Analysis of Covariance of Poverty of Content with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	3.906	3	1.302	1.12
Time Period (T)	.828	1	.828	.71
D x T	11.027	3	3.675	3.15*
IQ	.642	1	.642	.55
Education	.034	1	.034	.03
Medication	1.325	1	1.325	1.14
Age	3.002	1	3.002	2.58
All Covariates	5.210	4	1.303	1.12
Error	100.236	86	1.165	

*($p < .05$).

APPENDIX M

APPENDIX M

Source Table for Analysis of Covariance of Pressure of Speech with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	41.255	3	13.751	17.65***
Time Period (T)	.049	1	.049	.06
D x T	1.596	3	.532	.68
IQ	3.709	1	3.709	4.76*
Education	.392	1	.392	.50
Medication	.814	1	.814	1.04
Age	.027	1	.027	.03
All Covariates	7.350	4	1.837	2.36
Error	66.994	86	.779	

*($p < .05$); ***($p < .001$).

APPENDIX N

APPENDIX N

Source Table for Analysis of Covariance of Distractibility With IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	3.653	3	1.217	5.36**
Time Period (T)	.079	1	.079	.35
D x T	.745	3	.248	1.09
IQ	.195	1	.195	.86
Education	.002	1	.002	.01
Medication	.154	1	.154	.68
Age	.132	1	.132	.58
All Covariates	.636	4	.159	.70
Error	19.528	86	.227	

**($p < .01$).

APPENDIX O

APPENDIX O

Source Table for Analysis of Covariance of Tangentiality with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	2.941	3	.980	2.69
Time Period (T)	.204	1	.204	.56
D x T	4.379	3	1.459	4.00*
IQ	.131	1	.131	.36
Education	.681	1	.681	1.87
Medication	.000	1	.000	.00
Age	.468	1	.468	1.28
All Covariates	1.747	4	.436	1.20
Error	31.352	86	.364	

*($p < .05$).

APPENDIX P

APPENDIX P

Source Table for Analysis of Covariance of Derailment with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	22.670	3	7.556	5.71**
Time Period (T)	2.611	1	2.611	1.97
D x T	1.008	3	.336	.25
IQ	1.433	1	1.433	1.08
Education	2.074	1	2.074	1.57
Medication	.013	1	.013	.01
Age	.020	1	.020	.02
All Covariates	6.424	4	1.606	1.21
Error	113.720	86	1.322	

*($p < .01$), **($p < .01$).

APPENDIX Q

APPENDIX Q

Source Table for Analysis of Covariance of Incoherence with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	7.873	3	2.624	2.61
Time Period (T)	1.224	1	1.224	1.22
D x T	1.005	3	.334	.33
IQ	5.114	1	5.114	5.08*
Education	1.363	1	1.363	1.35
Medication	1.053	1	1.053	1.05
Age	.245	1	.245	.24
All Covariates	12.364	4	3.091	3.07*
Error	86.575	86	1.001	

*($p < .05$).

APPENDIX R

APPENDIX R

Source Table for Analysis of Covariance of Illogicality with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	13.734	3	4.577	4.43**
Time Period (T)	5.298	1	5.298	5.13*
D x T	.537	3	.179	.17
IQ	6.685	1	6.685	6.47*
Education	.004	1	.004	.00
Medication	.196	1	.196	.19
Age	.025	1	.025	.02
All Covariates	8.587	4	2.146	2.08
Error	88.858	86	1.033	

*($p < .05$); **($p < .01$).

APPENDIX S

APPENDIX S

Source Table for Analysis of Covariance of Clanging with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	.285	3	.095	.97
Time Period (T)	.123	1	.123	1.26
D x T	.302	3	.101	1.03
IQ	.047	1	.047	.48
Education	.153	1	.153	1.57
Medication	.063	1	.063	.64
Age	.321	1	.321	3.27
All Covariates	.533	4	.133	1.36
Error	8.436	86	.098	

APPENDIX T

APPENDIX T

Source Table for Analysis of Covariance of Neologisms with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	.036	3	.012	.23
Time Period (T)	.025	1	.025	.48
D x T	.133	3	.044	.87
IQ	.043	1	.043	.82
Education	.064	1	.064	1.26
Medication	.003	1	.003	.07
Age	.046	1	.046	.91
All Covariates	.235	4	.058	1.14
Error	4.415	86	.051	

APPENDIX U

APPENDIX U

Source Table for Analysis of Covariance of Word Approximations with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	1.430	3	.476	1.23
Time Period (T)	.061	1	.061	.16
D x T	.361	3	.120	.31
IQ	2.946	1	2.946	7.59**
Education	.052	1	.052	.13
Medication	.210	1	.210	.54
Age	.465	1	.465	1.20
All Covariates	4.417	4	1.104	2.85
Error	33.373	86	.388	

**($p < .01$).

APPENDIX V

APPENDIX V

Source Table for Analysis of Covariance of Circumstantiality with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	.871	3	.290	.53
Time Period (T)	.591	1	.591	1.07
D x T	2.520	3	.840	1.52
IQ	2.840	1	2.840	5.14*
Education	.347	1	.347	.63
Medication	.674	1	.674	1.22
Age	.443	1	.443	.80
All Covariates	4.519	4	1.129	2.04
Error	47.539	86	.553	

*($p < .05$).

APPENDIX W

APPENDIX W

Source Table for Analysis of Covariance of Loss of Goal with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	12.165	3	4.055	6.03***
Time Period (T)	.119	1	.119	.18
D x T	2.221	3	.740	1.10
IQ	.536	1	.536	.80
Education	.695	1	.695	1.03
Medication	.822	1	.822	1.22
Age	.597	1	.597	.89
All Covariates	3.687	4	.922	1.37
Error	57.852	86	.672	

***($p < .001$).

APPENDIX X

APPENDIX X

Source Table for Analysis of Covariance of Perseveration with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	4.318	3	1.439	2.02
Time Period (T)	3.410	1	3.410	4.78*
D x T	1.542	3	.514	.72
IQ	1.156	1	1.156	1.62
Education	.827	1	.827	1.16
Medication	.584	1	.584	.82
Age	.094	1	.094	.13
All Covariates	4.322	4	1.081	

*($p < .05$).

APPENDIX Y

APPENDIX Y

Source Table for Analysis of Covariance of Echolalia with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	.033	3	.011	.54
Time Period (T)	.017	1	.017	.82
D x T	.028	3	.009	.45
IQ	.000	1	.000	.01
Education	.021	1	.021	1.00
Medication	.018	1	.018	.88
Age	.005	1	.005	.26
All Covariates	.041	4	.010	.49
Error	1.808	86	.021	

APPENDIX Z

APPENDIX Z

Source Table for Analysis of Covariance of Blocking with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	.701	3	.233	2.30
Time Period (T)	.049	1	.049	.49
D x T	.160	3	.053	.52
IQ	.012	1	.012	.11
Education	.264	1	.264	2.60
Medication	.000	1	.000	.00
Age	.058	1	.058	.57
All Covariates	.505	4	.126	1.24
Error	8.751	86	.101	

APPENDIX AA

APPENDIX AA

Source Table for Analysis of Covariance of Stilted Speech with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	1.473	3	.491	1.08
Time Period (T)	.145	1	.145	.32
D x T	.735	3	.245	.54
IQ	.867	1	.867	1.90
Education	.133	1	.133	.29
Medication	.334	1	.334	.73
Age	.355	1	.355	.78
All Covariates	2.235	4	.558	1.23
Error	39.222	86	.456	

APPENDIX AB

APPENDIX AB

Source Table for Analysis of Covariance of Global Thought Disorder with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	30.576	3	10.192	7.51***
Time Period (T)	13.180	1	13.180	9.71**
D x T	.717	3	.239	.18
IQ	8.222	1	8.222	6.06*
Education	.889	1	.889	.66
Medication	.000	1	.000	.00
Age	.058	1	.058	.04
All Covariates	14.624	4	3.656	2.69*
Error	116.727	86	1.357	

*($p < .05$); **($p < .01$); ***($p < .001$).

APPENDIX AC

APPENDIX AC

Source Table for Analysis of Covariance of Bizarreness (Comprehension) with IQ, Education, Medications, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	14816.728	3	4938.909	4.00*
Time Period (T)	934.229	1	934.229	.76
D x T	558.803	3	186.267	.15
IQ	12707.608	1	12707.608	10.29**
Education	10.807	1	10.807	.01
Medication	4549.854	1	4549.854	3.68
Age	950.229	1	950.229	.77
All Covariates	20427.020	4	5106.755	4.13**
Error	92636.789	75	1235.157	

*($p < .05$); **($p < .01$).

APPENDIX AD

APPENDIX AD

Source Table for Analysis of Covariance of Bizarreness (Proverbs) with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	44486.564	3	14828.854	5.52**
Time Period (T)	3186.880	1	3186.880	1.19
D x T	2942.024	3	980.674	.37
IQ	38860.770	1	38860.770	14.47***
Education	1035.501	1	1035.501	.39
Medication	24644.309	1	24644.309	9.18**
Age	14068.042	1	14068.042	5.24*
All Covariates	72322.972	4	18080.743	6.73***
Error	201357.811	75	2684.771	

*($p < .05$); **($p < .01$); ***($p < .001$).

APPENDIX AE

APPENDIX AE

Source Table for Analysis of Covariance of Bizarreness (Object Sorting) with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	140.606	3	46.868	5.43**
Time Period (T)	45.703	1	45.703	5.29*
D x T	26.343	3	8.781	1.02
IQ	.207	1	.207	.02
Education	13.301	1	13.301	1.54
Medication	4.399	1	4.399	.51
Age	2.059	1	2.059	.24
All Covariates	27.733	4	6.9333	.80
Error	647.927	75	8.639	

*($p < .05$); **($p < .01$).

APPENDIX AF

APPENDIX AF

Source Table for Analysis of Covariance of Abstract Proverbs with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	269.138	3	89.712	2.40
Time Period (T)	36.117	1	36.117	.97
D x T	54.190	3	18.063	.48
IQ	519.771	1	519.771	13.89***
Education	14.728	1	14.728	.39
Medication	16.207	1	16.207	.43
Age	30.766	1	30.766	.82
All Covariates	839.846	4	209.961	5.61***
Error	2806.947	75	37.426	

***($p < .001$).

APPENDIX AG

APPENDIX AG

Source Table for Analysis of Covariance of Abstract-Correct Proverbs with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	310.294	3	103.431	3.57*
Time Period (T)	182.382	1	182.382	6.29*
D x T	50.922	3	16.974	.59
IQ	390.056	1	390.056	13.46***
Education	3.386	1	3.386	.12
Medication	12.524	1	12.524	.43
Age	1.025	1	1.025	.04
All Covariates	569.796	4	142.449	4.91**
Error	2174.010	75	28.986	

*($p < .05$); **($p < .01$); ***($p < .001$).

APPENDIX AH

Source Table for Analysis of Covariance of Proverbs (No Response) with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	34.935	3	11.645	.66
Time Period (T)	80.973	1	80.973	4.56*
D x T	12.555	3	4.185	.24
IQ	135.249	1	135.249	7.62**
Education	10.339	1	10.339	.58
Medication	.607	1	.607	.03
Age	15.930	1	15.930	.90
All Covariates	157.088	4	39.272	2.21
Error	1331.680	75	17.755	

*($p < .05$); **($p < .01$).

APPENDIX AI

APPENDIX AI

Source Table for Analysis of Covariance of Concrete Proverbs with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	152.485	3	50.828	2.61
Time Period (T)	15.299	1	15.299	.79
D x T	24.327	3	8.109	.42
IQ	73.911	1	73.911	3.79
Education	52.696	1	52.696	2.71
Medication	30.068	1	30.068	1.54
Age	1.363	1	1.363	.07
All Covariates	276.244	4	69.061	3.55*
Error	1460.974	75	19.479	

*($p < .05$).

APPENDIX AJ

APPENDIX AJ

Source Table for Analysis of Covariance of Object Sorting-Conceptual Overinclusion with IQ, Education, Medication and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	68.423	3	22.807	6.58***
Time Period (T)	5.306	1	5.306	1.53
D x T	3.542	3	1.180	.34
IQ	1.924	1	1.924	.56
Education	.021	1	.021	.01
Medication	12.993	1	12.993	3.75
Age	1.630	1	1.630	.47
All Covariates	20.642	4	5.160	1.49
Error	260.077	75	3.467	

***($p < .001$).

APPENDIX AK

APPENDIX AK

Source Table for Analysis of Covariance of Object Sorting-Underinclusion with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	17.256	3	5.752	.77
Time Period (T)	5.026	1	5.026	.67
D x T	3.851	3	1.283	.17
IQ	30.302	1	30.302	4.05*
Education	.106	1	.106	.01
Medication	7.913	1	7.913	1.06
Age	1.781	1	1.781	.24
All Covariates	51.471	4	12.867	1.72
Error	560.814	75	7.477	

*($p < .05$).

APPENDIX AL

APPENDIX AL

Source Table for Analysis of Covariance of Object Sorting-Behavioral Overinclusion with IQ, Education, Medication and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	876.812	3	292.270	1.90
Time Period (T)	25.986	1	25.986	.17
D x T	1216.910	3	405.636	2.63
IQ	538.676	1	538.676	3.50
Education	148.413	1	148.413	.96
Medication	481.506	1	481.506	3.13
Age	10.275	1	10.275	.07
All Covariates	.079.290	4	269.822	1.75
Error	11546.291	75	153.950	

APPENDIX AM

APPENDIX AM

Source Table for Analysis of Covariance of Object Sorting-Concrete with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	33.050	3	11.016	1.29
Time Period (T)	8.585	1	8.585	1.00
D x T	5.708	3	1.902	.22
IQ	19.146	1	19.146	2.24
Education	1.487	1	1.487	.17
Medication	.091	1	.091	.01
Age	.574	1	.574	.07
All Covariates	34.610	4	8.652	1.01
Error	642.469	75	8.566	

APPENDIX AN

APPENDIX AN

Source Table for Analysis of Covariance of Digit Symbol Difference with IQ, Education, Medication, and Age as Covariates

Source	SS	df	MS	F
Diagnosis (D)	23.674	3	7.891	1.29
Time Period (T)	106.282	1	106.282	17.32***
D x T	19.225	3	6.408	1.04
IQ	499.824	1	499.824	81.44***
Education	13.144	1	13.144	2.14
Medication	7.735	1	7.735	1.26
Age	5.010	1	5.010	.82
All Covariates	563.847	4	140.961	22.97
Error	527.836	86	6.137	

***($p < .001$).

APPROVAL SHEET

The dissertation submitted by David J. Berndt has been read and approved by the following committee:

Dr. Alan S. DeWolfe, Director
Professor, Psychology, Loyola University

Dr. Thomas P. Petzel
Associate Professor, Psychology, Loyola University

Dr. Roderick W. Pugh
Professor, Psychology, Loyola University

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

4/21/81

Alan S. DeWolfe

Alan S. DeWolfe, Ph.D.