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A VALIDATION STUDY OF A PICTURE-PREFERENCE TEST OF THOUGHT DISORDER.

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A VALIDATION STUDY OF A PICTURE-PREFERENCE TEST OF THOUGHT DISORDER

by

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ABSTRACT

Recent writers (Johnston & Holzman, 1979; Rudzinski & Auld, 1980) have pointed out that most of the currently available measures of thought disorder are unsatisfactory for the following reasons: They measure only a limited range of thinking disturbances, and they are unduly influenced by factors irrelevant to thought disorder. In order to overcome these inadequacies, Rudzinski (1979) developed the Picture-Preference Test (PPT) of Thought Disorder. Initial research on the validity of the test was encouraging and thus prompted the present cross-validation study.

Two versions of the PPT thought-disorder scale were used in the present study: the regular 31-item scale, and a revised scale made up of 20 of the original items, each presented twice. The scores of 45 schizophrenic inpatients were compared to those of 88 University of Windsor students. In addition the schizophrenics' PPT thought-disorder scores were compared to their performances on three criterion measures of disturbed thinking.

The results did not unequivocally support the validity of the Picture-Preference Test of Thought Disorder. Schizophrenics' scores on the regular PPT thought-disorder scale correlated significantly with only one of the criteria; their scores on the revised scale did not correlate significantly with any of the criterion measures. Nevertheless, scores on the regular PPT thought-disorder scale did discriminate the schizophrenics from the normals. The results of additional analyses suggest that PPT thought-disorder scores are

determined in part by a disposition toward making deviant responses. Also, this deviant-responding dimension showed some relationship to the severity of thought disorder among the schizophrenics. Further analyses focused on the consistency of subjects' responses on the 20 thought-disorder items that were presented twice. The inconsistency of the schizophrenics' performance discriminated them from the normals, and also proved to be a reasonably good predictor of thinking pathology.

Taking account of present findings, the author suggests several modifications that might improve the predictive power of the Picture-Preference Test of Thought Disorder.

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CHAPTER I

INTRODUCTION

Since the earliest studies of psychopathology, writers have observed that some conditions are characterized by a disorder of both the form and content of thought. Esquirol, in 1838, discussed a group of patients suffering from "dementia," and noticed that they couldn't "compare or associate ideas, nor have they the powers of abstraction." Kraepelin (1919) classified several types of psychoses under the term "dementia praecox," and claimed that incoherence and "derailments" of thought were manifested in these syndromes. Bleuler (1911) placed special emphasis on a "loosening of associations" in the thinking of such patients. Since he considered this symptom to represent a "splitting of the psychic function," Bleuler preferred the use of the term "schizophrenia" to Kraepelin's name.

Most writers today agree that the central defining symptom of schizophrenia is thought disorder (Chapman & Chapman, 1973; Wing, 1974). In addition, some investigators have discovered disordered thought among other conditions, such as severe affective disorders (Andreason, 1979). Harrow and Quinlan (1977) found that disturbed thinking is more common in, but not unique to, schizophrenia. Varying degrees of thought pathology were found among acutely ill patients from other diagnostic groups. Thus the importance of thought disorder in certain psychopathological conditions has provoked attempts

to describe the nature of thought disturbance, to determine the essential process that could explain it, and to devise clinical methods to analyze and measure it.

Chapman and Chapman (1973) assert that the study of thought disorder has importance far beyond its curiosity value. They point out that empirical research into the nature of thought disorder, schizophrenia's most prominent symptom, may eventually illuminate the nature of schizophrenia itself. The description and measurement of symptoms is the first step toward locating causes of a disorder and toward delineating subtypes. Also, the role of thought disturbances in psychiatric disorders other than schizophrenia needs to be elucidated (Harrow & Quinlan, 1977).

Obviously, in order to study thought disorder, it is first necessary to identify and measure it. However, investigators have lacked a valid, reliable, and convenient measuring instrument (Johnston & Holzman, 1979; Rudzinski, 1979). Clinicians, as well, seem to lack an adequate method of assessing thought disorder. Kreitman, Sainsbury, Morrisey, and Towers (1961) found that among a group of experienced clinicians who made ratings of psychiatric patients' symptoms, thought disorder was the feature least agreed upon.

The present study is concerned with an investigation of the validity of a promising new measure of disordered thinking: the Picture-Preference Test of Thought Disorder (Rudzinski & Auld, 1980). The limitations of current tests of thought disorder will be discussed. First, however, a review of the most prominent theories of disturbed thinking will be presented, since most of the currently

available measures are based on one or another of these concepts of thought disorder.

Theories of Thought Disorder

Different theorists have focused on different aspects of disturbed thinking, and have not agreed on which features are of principal or of secondary importance.

Bleuler (1911), influenced by the then dominant associationist psychology, proposed that the thought disorder he observed in his schizophrenic patients was the result of impaired associations among ideas. He described a "splitting" of the psychic apparatus: In the course of thinking or speaking, the patient's ideas and feelings become fragmented and separated from each other, and different levels of functioning compete or coexist, some showing deterioration, some preservation. Such "splitting" was due to the breaking of associative threads, which Bleuler considered to be the fundamental underlying defect represented in thought disorder. Other symptoms, such as hallucinations and delusions, he believed were secondary to the associative disturbance. From this single principle Bleuler attempted to account for the various manifestations of disordered thinking that he observed: word substitutions, neologisms, thought blocking, bizarre thought-content, condensations, displacements, symbolism, inappropriate generalization, illogic, perseveration, clang associations, and indirect associations.

Goldstein (1944) asserted that the primary defect in disordered thought involves an impairment of the abstracting function and a

concomitant increase in concrete thinking. Originally, Goldstein applied his concept of the abstract and concrete "attitudes" to the functioning of brain-damaged persons. Later he extended the principle to explain many of the cognitive symptoms of schizophrenics. However, he did assert (Goldstein, 1944, 1959) that the concreteness in schizophrenia is not identical to that seen in brain damage.

Goldstein viewed the "abstract attitude" and "concrete attitude" as distinctly different ways of perceiving and relating to the environment. The concrete attitude was said to be marked by a binding to immediate experience. An individual who has the concrete attitude is "stimulus bound," responding primarily to the literal and unique qualities of a specific object or situation. The abstract attitude, on the other hand, involves a transcendence of the immediate aspects of a situation, and is essential to the following abilities:

(1) the ability to assume a mental set voluntarily;

(2) the ability to shift voluntarily from one aspect of the situation to another;

(3) the ability to keep in mind simultaneously various aspects of a problem;

(4) the ability to grasp the essentials of a given whole;

(5) the ability to generalize, to abstract common properties, to plan ahead, to assume an attitude towards the "mere possible," and to think or perform symbolically;

(6) the ability to detach the ego from the outer world.

Goldstein believed that normal persons can combine both attitudes

in their behaviour and shift between them as the situation demands. Thought-disordered schizophrenics, he observed, were limited to the concrete attitude. Goldstein (1959) suggested that such disordered thought processes were a response to extreme anxiety and to overwhelming psychological problems.

Later investigators have modified Goldstein's formulations and have divided the phenomena he called "concrete" into several different kinds of responses. McGaughran and Moran (1956) substituted the dimensions "open-closed" and "public-private" for "abstract-concrete." With these dimensions they were better able to distinguish the responses of thought-disordered patients from those of other groups. Similarily, Tutko and Spence (1962) substituted a distinction between "expansive" and "restrictive" errors in conceptual sorting for an undifferentiated "concrete" way of responding. And Shimkunas, Gynther, and Smith (1966, 1967) maintained that autism is more characteristic of thought-disordered individuals than is concreteness. "Autistic" responses to their proverbs test were defined as "bizarre, idiosyncratic, inappropriate, and tangential to the meaning of the proverb."

Cameron (1938, 1944) also opposed Goldstein's hypothesis, and suggested that much of what appears to be inability to abstract is a tendency of thought-disordered schizophrenics to "overinclude" in their concepts things that do not belong there. Thus, for Cameron, overinclusion was the fundamental disturbance in thought disorder. Overinclusion was represented in the inability to maintain conceptual boundaries, so that irrelevant and tangential ideas are included

in the stream of thought.

Cameron also described several other features of thought disorder which he accounted for through the principle of overinclusion:

(1) asyndetic thinking, in which logical connections are missing, and the ability to restrict attention and to focus on a task is thus lost,

(2) the use of metonyms and personal idiom containing imprecise approximations or substitutes for more exact terms,

(3) an interpretation of themes, in which the person's fantasies mingle with more realistic concerns in a fragmented, disorganized way,

(4) a distortion of reality,

(5) an incongruity between words and actions.

Cameron initially used "overinclusion" to refer to certain kinds of responses on an object-sorting task, but later (Cameron & Magaret, 1951) he broadened the concept to refer to any response to an inappropriate stimulus, and even to the inappropriate response itself. Chapman and Chapman (1973) have criticized Cameron's definition as so broad that it can be used to account for almost any inappropriate behaviour. As a result of this breadth, different studies and measures of overinclusion have had little relationship to one another. Overinclusion as measured by a battery of tests developed by Payne, Matussek, and George (1959) seems to bear little resemblance to overinclusion as measured by Chapman and Taylor's (1957) conceptual-sorting test. Payne, Friedlander, Laverty and Haden (1963)

and Payne and Hewlett (1960) found overinclusiveness to be more characteristic of early acute schizophrenics, whereas Chapman's (1961) overinclusion seems to be a disorder of chronic schizophrenics. In attempting to explain some of the confusion in the research on overinclusion, Harrow, Himmelhoch, Tucker, Hersch, and Quinlan (1972) have pointed out that at least three different phenomena have been studied, with no attempts made to distinguish between them: (1) behavioural overinclusion, which involves the quantitative aspects of the subject's overt behaviour; (2) conceptual overinclusion, which deals with assessing the level of abstraction of concepts used; and (3) stimulus overinclusion, which refers to the difficulty in attending to relevant stimuli.

Von Domarus (1944) has attempted to describe thinking disturbance in terms of a disorder of formal logic or of syllogistic reasoning. He called such thinking "paralogical," have observed that it follows a "law of predicate logic," wherein identity of two things is accepted on the basis of a common predicate rather than on the basis of a common subject. Von Domarus presented the following example of such reasoning:

> Certain Indians are swift.
> Stags are swift.
> Therefore, certain Indians are stags. (1944, p. 110)

Arieti (1955, 1974) amplified Von Domarus's formulation within the context of his theory of schizophrenia, proposing that schizophrenics attempt to escape anxiety by regressing to a more satisfying, earlier stage of their cognitive development, at which level they show the pattern of logic Von Domarus described. In this

primitive stage of thinking, logic is ignored, differentiation is rudimentary, and a part cannot be dissociated from the whole.

Arieti suggested that the Von Domarus principle explains various features of thought disorder, including word substitutions, delusions of being a famous person, and confusion of one person with another. In each instance, the thought-disordered patient concludes that two or more things are identical on the basis of shared qualities. In fact, Arieti claimed, ideas that are associated in a variety of ways tend to become identified. Thus, ideas are connected through the sharing of sound properties (i.e., clang associations) or phonetic symbols, so that the words' meanings are ignored.

Some writers have criticized the views of Von Domarus and Arieti (Maher, 1966; Chapman & Chapman, 1973; Reed, 1970), claiming that reasoning by the Von Domarus principle is both common among normal persons and can be reality oriented. In their review, Chapman and Chapman (1973) point out that the empirical research has generally not supported the notion that thought-disordered persons conclude an identity of subjects from an identity of predicates any more readily than normal people. Nevertheless, various clinical phenomena appear to support the principle.

Chapman and Chapman (1964, 1973) have proposed that thought disorder results from the accentuated expression of normal response biases. This hypothesis was derived from a series of word-association studies that indicated that thought-disordered schizophrenics had difficulty in inhibiting from consciousness the "dominant" meaning of a multiple-meaning word. That is, these patients ignored the context

of the word and interpreted it according to the meaning that would be the strongest when that word is encountered out of context. They neglected to use weak aspects of meaning even though they could later demonstrate knowledge of those meanings. Chapman and Chapman (1973, 1977) have summarized a number of studies supporting their contention. They argue that many manifestations of thought disorder—such as concreteness, overinclusion, errors in formal reasoning, and loss of set—could be explained with this principle. They admit, however, that the process underlying accentuated response biases is not yet known, and that the theory doesn't account for many clinical phenomena, such as the bizarre and autistic quality often encountered in the thought processes of severely disturbed patients.

Theorists of various orientations have used concepts of "regression" to describe the thinking of schizophrenics. Heinz Werner (1948), working within a comparative-developmental framework, proposed that schizophrenic thought disorder reflects a regression in the direction of greater primitivization of cognitive functioning. He saw schizophrenia as a reversal of those patterns of thinking, perceiving, and so on, which are encountered in the normal course of development. Werner described schizophrenic thought as global and undifferentiated; in this way it resembles the thinking of children and of persons from primitive cultures. Arieti (1955) also saw similarities between schizophrenic thinking and the thinking of children and "primitives." Feffer (1967) also viewed schizophrenic cognition as regressive, and tried to apply Piaget's developmental stages to the description of schizophrenic thought pathology.

Psychoanalytic writers have typically treated the peculiar thought and language patterns of schizophrenia as manifestations of a regresssion to an infantile state of psychic development, wherein "primary process" thinking predominates. Freud (1911/1946) envisaged mental functioning as involving two kinds of thinking. Primary process thought has as its aim the immediate gratification of wishes without regard for reality. "Secondary process" thinking is logical, rational, and reality oriented, having been developed to facilitate adaptation to external reality. According to Freud, thought disorder in schizophrenia reflects a withdrawal of libidinal cathexes from objects and a return to an earlier narcissistic level. As a result, verbal symbols no longer represent their appropriate objects and become subjected to primary process thinking and its mechanisms, such as condensation, displacement, coexistence of logically incompatible ideas, and connection of ideas by indirect associations or similarity of sound.

More recent writers have questioned the idea that primary process thinking is in itself pathological and maladaptive (Arieti, 1974; Gill, 1967; Rycroft, 1975). They have pointed out that it is seen in normal thinking: in dreams, humor, imagination, and creativity. According to Arieti (1974) the pathological manifestation of the primary process can be distinguished from the adaptive in that:

(1) It involves a larger segment of the mental life.

(2) It is not corrected, neutralized, or rejected by the secondary process; rather, it resists

or overpowers the influence of the secondary process.

(3) It is not harmoniously integrated with the secondary process to form a creative product.

Another group of investigators have emphasized defects in attention and information processing as the central phenomena in thought disorder. McGhie and Chapman (1961) based their hypothesis upon the information-processing model developed by Broadbent (1958). They maintained that disordered thought reflects a defect in the ability to select appropriate stimuli and to filter out irrelevant information, resulting in a pathological distractibility. Salzinger (1971) suggested that the thought-disordered patient is controlled to an abnormal degree by those stimuli in his environment which are "immediate" (i.e., temporally recent, spatially immediate, strong, or unconditioned). While these theorists stressed the failure to filter or screen out irrelevant stimuli, others have attributed thought disorder to an inappropriate constriction of the range of stimuli to which the patient attends. Cromwell and Dokecki (1968) hypothesized that thought disorder involves an information-processing defect which is manifested in an inability to "disattend" from a strong stimulus and an inability to scan all available stimuli (of lesser strength) for purposes of screening potential responses to them.

Broen and Storms (1966) have attempted to integrate findings related to distractibility, breadth of attention, and overinclusion in thought disorder. They suggest that thought-disordered patients

have elevated drive levels, which results in a narrowing of attention so as to exclude some stimuli from awareness. Venables (1964) has marshalled considerable evidence to support his view that chronic, nonparanoid schizophrenics have heightened cortical arousal, which results in greater sensitivity and, therefore, a restriction of their attentional field. In contrast, the thought disorder in acute schizophrenics is related to their subnormal cortical arousal which results in an inability to restrict their range of attention.

Although the attentional hypotheses are appealing because they offer an explanation of the clinically obvious tendency of thought-disordered persons to respond to inappropriate stimuli, it does not seem that such defects can adequately account for all the manifestations of thought pathology (Chapman & Chapman, 1973; Shean, 1978).

Bannister (1962) has attempted to explain thought disorder within the framework of Kelly's (1955) personal construct theory, which maintains that all persons have their own repetoire of predictive constructs by which to codify the environment. Bannister and his colleagues (Bannister, 1962; Bannister & Fransella, 1966; Foulds, Hope, McPherson, & Mayo, 1967) have found that thought-disordered schizophrenics show a severe loosening of links between constructs, notably with regard to constructs related to "people" as opposed to "objects." They suggested that this may be the result of a history of early and/or repeated invalidations of predictions about people (i.e., the constructs). While the loosened construing protects the patient against further invalidations in the present, it also

makes it difficult for him to make stable predictions about others, or even make sense of interpersonal events. Additional support for Bannister's hypothesis comes from experimental evidence (Bannister, 1965) that serial invalidation of the interpersonal constructs of normal subjects produces movement toward the gross loosening seen in thought-disordered schizophrenics.

A few researchers have tried to explain disordered cognition in terms of learning theory. Mednick (1958) attempted to account for idiosyncratic associations by suggesting that the patient's anxiety (which he assumed acts as a drive) increases stimulus generalization and reduces stimulus discrimination. The high drive has the effect of increasing the probability of all associates in proportion to their initial probability of occurrence. So, if the associate chair is initially highly likely to the word "table", an increase in drive will soon bring it to its maximum. If drive level goes up high enough, then lower probability associates such as daisy will occur. Broen (1968) extended Mednick's formulations, suggesting that not only does high drive increase the response strength of inappropriate responses, but it also lowers the "ceiling" for response strength. Thus inappropriate, weaker responses come to have the same probability of occurring as do stronger, appropriate responses. These learning approaches to understanding thought disorder have been criticized by Shean (1978) and Chapman and Chapman (1973), who point out that many of the predictions to be derived from these theories are contradicted by clinical evidence. Also, like many approaches, the learning approaches are too limited

to account for all aspects of disordered thinking.

Although students of thought disorder have proposed a variety of theories to explain disordered thinking, each student typically has tried to fit thought disorder into a single conceptual scheme. None of these explanations seems to have been successful in accounting for the whole range of disturbances in disordered cognition. As a result, many of the currently available procedures for measuring thought disorder, focusing on limited aspects of the phenomenon, also do not deal adequately with the whole range of the subject.

Measures of Disordered Thinking

Proverb-interpretation and object-sorting tasks have been popular techniques for identifying thought disorder, especially by those who claim that the fundamental dysfunction involves abstraction, overinclusion, or formal reasoning.

Object-sorting tests have been developed by Feldman and Drasgow (1951), Payne et al. (1959), Chapman and Taylor (1957), and Goldstein and Scheerer (1941). Modifications of the latter test have been introduced by McGaughran (1954) and Rapaport, Gill and Schafer (1946). Benjamin (1944) developed a proverbs test, as did Gorham (1956).

However, there are problems with these tests as measures of thought disorder. A variety of evidence suggests that they are influenced by characteristics of the subject other than thought disorder. Performance on object-sorting tests has been found to be

affected by intelligence (Hemsley, 1976) and by memory skills (Hemsley, 1976; Price, 1968).

The object-sorting format has been used extensively by Payne and associates (1959, 1960, 1962, 1971, 1973) to study Cameron's concept of overinclusion. Payne et al. (1959) developed a battery of three tests to identify this aspect of disordered thinking: a modification of the Goldstein-Scheerer (1941) Object-Sorting Test, a proverb word count, and an Object-Classification Test. Gathercole (1965) criticized Payne's work, pointing out that high scores on all three tests can be obtained by excessive responding. Payne himself (Hawks & Payne, 1971) found empirical support for the suggestion that the tests measure overresponsiveness. Similarily, a study by Bromet and Harrow (1973) suggests that performance on object-sorting tasks does not measure "conceptual" overinclusion, but rather "behavioural" overinclusion (i.e., excessive behavioural output). Behavioural overinclusion may represent a personality-trait variable, independent of psychopathology, as suggested by these authors; or it may be a function of acute disturbance, as suggested by Harrow et al. (1972). Harrow et al. (1973) found object-sorting performance to be influenced by acute disorganization.

Performance on proverb-interpretation tests has been found to be correlated with education (Hanfmann & Kasanin, 1942) and with measures of intelligence (Harrow, Adler, & Hanf, 1974; Reed, 1968). Harrow, Adler, and Hanf (1974) have demonstrated the extent to which performance on a proverbs test is disrupted during the active or acutely disturbed stages of psychiatric illness, thus limiting the

usefulness of this test for assessing thought disorder in such patient groups. Thus these findings suggest that neither proverb-interpretation nor object-sorting tests are adequate measures of disturbed thought.

Some investigators have used word-association tests to study schizophrenic thought disorder, using as their rationale Bleuler's formulations about the centrality of an associative disturbance. A word-association test developed by Kent and Rosanoff (1910) has frequently been used. In their own study these authors found that thought-disordered patients gave more neologisms, more incoherent reactions, more repetitions of previously given responses, and more responses based on the sound of the stimulus word. Recent studies have also found that thought-disturbed individuals give more "individual" or idiosyncratic associations than normal subjects (Deering, 1963; Dokecki, Polidoro, & Cromwell, 1965; Goldstein & Acker, 1967; Johnson, Weiss, & Zelhart, 1964; Shakow & Jellinek, 1965). In contrast, Moran, Mefferd, and Kimble (1964) demonstrated that thought-disordered schizophrenics showed the same basic types of associations as normals.

O'Brian and Weingartner (1970) have questioned the use of word-association tests for measuring thought disorder, pointing out that many transient conditions affect performance, such as anxiety, speed of response, perceptual dysfunction, and response set. Moon et al. (1968) were able to account for many of the "idiosyncratic" associations given by thought-disordered subjects on the basis of mishearing, which they attributed to an attentional defect.

Bannister et al. (1966, 1971) devised the Grid Test of Thought Disorder as a way of measuring the intensity and consistency of the relationship between constructs. They have been able to discriminate thought-disordered patients from non-thought-disordered patients on the basis of test scores. However, Bannister's test has also been shown to be susceptible to influences by factors irrelevant to thought disorder. Hemsley (1976) and Romney and Leblanc (1975) have found grid-test performance to be related to memory--a skill likely to be disrupted by acute distress. A study by Presly (1969) has suggested that slowness of responding is related to thought-disorder scores on the Bannister test. Hill (1976) has argued that despite its statistical validity, the grid test has little clinical utility.

Whitaker (1973) developed a brief, objectively-scored, paper-and-pencil test of thought disorder: the Whitaker Index of Schizophrenic Thinking. Each of the 25 test items consists of a word or statement for which several response alternatives are available. The subject selects one. The response alternatives consist of an appropriate answer, a loose association, an association of reference, a clang association, and a nonsense association. These alternatives represent varying degrees of severity of thought pathology. Some of the stimulus items are intended to be emotionally stressful.

The Whitaker test contains a number of controls against irrelevant variables that may influence test performance. Test tasks are intended to be intellectually easy, so as to make variations in intelligence irrelevant. The multiple-choice

format minimizes the influence of variations in productivity and level of responsiveness. In the original version of the test, used in Whitaker's doctoral research, an "irrelevant" alternative provided a check on random responding and lack of attention. Whitaker's test has successfully discriminated thought-disordered from non-thought-disordered psychiatric patients.

Psychodynamically oriented approaches to defining and measuring thought disorder have focused on the pathognomic verbalizations evidenced by subjects in interview and testing situations. Many of these efforts have yielded measures capable of describing thought disorder in a more comprehensive, all-inclusive way. Such measures include: (1) scales for rating all indications of thought disorder as they occur in an interview, and (2) systems for scoring the Rorschach, and sometimes the WAIS, in order to obtain an overall score of indications of thought disorder.

Cancro (1969) has developed a four-point scale for rating thought disorder: (0) no formal signs; (1) circumstantially, literalness, and concreteness; (2) autistic intrusion, predicative reasoning, and loosening of associations; and (3) perseveration, echolalia, blocking, neologisms, and incoherence.

Grinker and Holzman (1973) developed a scale for rating "language problems" within their Schizophrenia State Inventory. Points on the scale were as follows:

0. Well-modulated, no impairment discernible.
1. Mild paucity of thought and reduced richness of language.

2. Language well-modulated in reference to impersonal things, but occasional impairment with reference to the self or a threat to the self.
3. Circumstantiality, literalness, concreteness.
4. Antithetical meanings manifested.
5. Autistic intrusions, predicative thinking, blocking, loosening of associations.
6. Perseverations, echolalia, neologisms, incoherence.

Both these rating scales conceive of thought disorder as occurring along a continuum of severity ranging from mild idiosyncracies of language and thought to bizarre incoherence. The scales also reveal considerable agreement among their authors as to what constitutes severe thought disorder. Chapman and Chapman (1973) suggest that a disadvantage of rating scales is that they lack specification of the stimuli that evoke the behaviour being judged. In addition, the free responses of thought-disordered subjects are immensely varied and do not easily fit into a limited set of categories.

A number of investigators have reviewed studies using the Rorschach to assess disordered thinking, and have concluded that the test is an effective instrument for detecting and measuring thought disorder and aspects of primary-process thinking (Johnston & Holzman, 1979; Quinlan et al., 1972; Silverman et al., 1962).

Holt (1956; Holt & Havel, 1960) has developed an extensive set of categories for the assessment of primary and secondary processes. Many categories of deviant responses, assessing both content and

formal organization, are scored and used in an overall estimation of "defense demand" and "defense effectiveness."

One of the most significant efforts to find indices of thought disorder from the Rorschach and other tests is represented in the work of Rapaport, Gill, and Schafer (1946/ 1968). They discussed Rorschach manifestations of disturbed thinking through a detailed and systematic examination of the verbalization of responses. They listed and illustrated various kinds of deviant verbalizations such as fabulized responses, fabulized combinations, confabulations, contaminations, autistic logic, peculiar and queer verbalizations, and self-references. The importance of the Rapaport group's contribution is presented in their own statement:

> Verbalizations...have been used by many investigators for interpretation of test results. But, what has been lacking thus far was a psychological rationale to systematize the conspicuous verbalizations and to attempt to explain the psychological processes leading to deviant verbalizations. (1968, p. 452)

Watkins and Stauffacher (1952) devised a system of quantifying the categories of pathological thinking described by the Rapaport group. Their "Delta Index" assigned weighted scores of .25, .5, .75, and 1.0 to Rorschach verbalizations, with higher weightings indicating greater pathology. The overall score was computed as the sum of all the weighted scores divided by the number of responses, expressed as a percentage. The authors found that the scale was able to discriminate thought-disordered schizophrenic patients from other groups, as did Pope and Jenson (1957) and Powers and Hamlin (1955). These studies have also found high inter-scorer

reliabilities for the overall score.

Johnston and Holzman's (1979) Thought Disorder Index (TDI) is a slightly revised version of the Delta Index. Some categories that did not provide evidence of thought disorder were eliminated, and other categories specific to the WAIS were added. The scoring categories of the TDI are as follows:

.25 level

1. Inappropriate distance
   a. Loss or increase of distance
   b. Tendency to looseness
   c. Concreteness
   d. Overspecificity
   e. Syncretistic response
2. Vagueness
3. Peculiar verbalization and responses
   a. Verbal combination/condensation
   b. Stilted, inappropriate expression
   c. Idiosyncratic word usage
   d. Peculiar expression
   e. Peculiar response
4. Word-finding difficulty
5. Clangs
6. Perseveration
7. Relationship verbalizations
8. Incongruous combinations
   a. Composite response
   b. Arbitrary form-color response
   c. Inappropriate activity response
   d. External-internal response

Intermediate .25, .5

9. Idiosyncratic symbolism

.5 level

10. Queer responses
11. Confusion
12. Looseness
    a. Distant association
    b. Loose association
13. Fabulized combinations, impossible or bizarre

.75 level

14. Fluidity
15. Absurd responses
16. Confabulations
    a. Details in one area generalized to larger area
    b. Extreme elaboration
    c. Tendency to confabulation (.5)
17. Autistic logic
    a. Tendency to autistic logic (.5)

1.0 level

18. Contamination
19. Incoherence
20. Neologisms (Johnston & Holzman, 1979, pp. 69-70)

Johnston and Holzman (1979) report the results of a validation study with the Thought Disorder Index. The instrument was able to distinguish between three groups: (1) psychotic patients, (2) acutely disturbed nonpsychotic patients, and (3) normal controls. The authors point out that it is important that the measure was able to discriminate thought-disordered psychotics from other acutely disturbed patients, ensuring that what is being defined as "thought disorder" can be differentiated from general psychiatric disturbance.

In addition, no sex, IQ, racial, or socioeconomic status effects were found on the TDI. The authors report that esimates of the internal consistency for both TD_R (thought-disorder score from the Rorschach) and TD_W (thought-disorder score from the WAIS) were appropriately high. TD_R and TD_W scores were found to be moderately correlated with each other. The authors suggest that the two tests may differ in the extent to which they elicit thought disorder. Therefore, testers should employ both measures for the most valid estimate of thought disorder.

Thus, Johnston and Holzman's Thought Disorder Index, employing the categories of deviant responses described by Rapaport et al.

(1946/1968), appears to be a valuable and effective instrument for the assessment of disordered thought. The advantages of the TDI over many of the currently available measures of disordered cognition are pointed out by the authors:

> its focus is not limited to one aspect of thought disorder; it recognizes that a variety and range of thought disturbances exist and that some categories (such as contaminations and neologisms) are more serious indicators of [thought disorder] than others (such as peculiar word usage). (1979, p. 56)

The Picture-Preference Test of Thought Disorder

A promising new measure of disturbed thinking has been developed by Rudzinski and Auld (1980), using a picture-preference format. The measure consists of 31 pairs of pictures. Subjects are asked to indicate which of the pictures in each pair they prefer. One picture in each pair was designed to represent an important feature of disordered thinking and to appeal to the subject who manifests this characteristic. Five aspects of disturbed cognition were represented in the thought-disorder pictures: (1) overinclusive thinking (Cameron, 1938); (2) idiosyncractic, overpersonalized thought (Bleuler, 1911; Goldstein, 1944); (3) clang associations (Bleuler, 1911); (4) regressive, autistic thought (Bleuler, 1912); and (5) fabulized combinations (Rapaport et al., 1946/1968).

Preliminary research on the validity and reliability of the Picture-Preference Test of Thought Disorder has been encouraging. The scale was able to discriminate a group of thought-disordered psychiatric patients from a group of patients judged to be non-thought

disordered, and from a group of non-patients (Rudzinski, 1979). Presence of thought disorder was judged on the basis of a composite of ratings from three scales of the Brief Psychiatric Rating Scale (BPRS) of Overall and Gorham (1962) deemed to be relevant to thought disorder: conceptual disorganization, hallucinatory behaviour, and unusual thought content. Thought-disordered patients were found to have significantly higher scores on the scale than other patients ($p<.001$). The correlation between the scores on the thought-disorder scale and the BPRS composite was moderate but significant ($r = .38$). In addition, among the psychiatric patients a significant correlation was found between the thought-disorder scale and the psychotic tendencies scale of the Differential Personality Inventory (Jackson & Messick, 1964). The internal consistency of the picture-preference scale was high.

The Picture-Preference Test of Thought Disorder was adopted from a format developed by Cowan (1967). The rationale for such an approach to measuring dimensions of personality is based on the projective hypothesis. Rapaport, Gill, and Schafer (1946 /1968) have explained that projective techniques of psychological assessment imply a projective hypothesis, which assumes that manifestations of a person's behaviour--from the least to the most significant ones—are revealing of his personality. These writers and others (Henry, 1973; Murray, 1938) take the position that the psychological structure of the individual is the principle governing all his behaviour. Projective techniques apply this assumption. They are:

> procedures in which the subject actively and spontaneously structures unstructured material, and in so doing reveals his structuring principles—which are the principles of his psychological structure. (Rapaport et al., 1968, p. 225)

Accepting such assumptions, one would expect that a person choosing a preferred picture--especially when he is not told on what basis to make the choice—cannot avoid revealing an aspect of his psychological functioning. Even though the choice between two alternative pictures may be affected by any of a variety of characteristics of the pictures, Auld (1979) suggests that:

> If the whole set of picture-pairs represents some latent disposition, then the whole set of choices of the person should measure—rather imperfectly—the amount of this disposition that the person has. (p. 24)

A number of studies have supported the validity of a picture-preference approach for the assessment of psychological dimensions. In 1926 Woodsworth (cited in Ryan, 1976) devised a picture-preference test of children's "moral turpitude," which correlated well with teachers' ratings of this trait. Several investigators have demonstrated a significant relationship between various personality traits and preference for certain abstract paintings and figures (Barron, 1953; Christensen, 1960).

Cowan (1967) constructed a picture-preference test designed to measure 10 traits characteristic of addicts. He developed 106 pairs of line drawings that were placed into 10 a priori scales. Pictures within a pair differed from each other in one psychologically important aspect: One picture in each pair was designed to portray a characteristic typical of addictive personalities, and theoretically

to appeal to the person harbouring such a trait. The test was able to discriminate alcoholics from normals, although not from neurotics.

Begin (1972) attempted to improve the internal consistency of Cowan's scales, and created four scales with improved reliability. Morrison (1975) then lengthened these four scales and developed three new ones which he believed would represent characteristics of the alcoholic's functioning. Differences in total score between the alcoholics and the neurotics--and between the alcoholics and the normals--were statistically significant in the expected direction.

Amin (1974) constructed a new Picture-Preference Test scale for measuring "avoidance of sexual intimacy." The 45-item scale showed a moderately high correlation with ratings of sex-anxiety derived from responses to five TAT pictures. Thus these studies indicate that a picture-preference test is a potentially useful technique for the assessment of personality variables.

A picture-preference format for measuring thought disorder possesses a number of advantages over many of the currently used tests. These advantages have been discussed by Rudzinski (1979), Rudzinski and Auld (1980), and Ryan (1976). In the first place, such an approach is capable of measuring a wider range of thought disturbances than many instruments currently in use. Also, a picture-preference format minimizes the influence of those variables which are unrelated to thought disorder, but which have been found to affect the test performance of severely disturbed patients. Such a format makes no requirements on subjects for language skills or verbal expressiveness. Little demand is made for memory and sustained

concentration. Variations in productivity and responsiveness to testing are not likely to have a great influence, because of the forced-choice format. Furthermore, this approach is probably less vulnerable to the response sets—such as social desirability and acquiescence—that afflict self-report inventories. In fact, Rudzinski (1979) and Ryan (1976) have found that the Picture-Preference scales developed so far are essentially free of influence from social-desirability response biases.

Ryan (1976) has indicated that the picture-preference task is an interesting one for subjects, and that it is able to hold their attention during testing. He also points out that the reliability of scoring such a test would equal or surpass that of most projective measures, and would equal that of structured personality tests.

Statement of the Problem and of Hypotheses

In view of the previous discussion, an approach for measuring thought disorder using a picture-preference format appears to be a promising one. The present study attempted to cross-validate Rudzinski's (1979) Picture-Preference Test of Thought Disorder on a new sample.

Schizophrenic inpatients served as subjects in this investigation. If thought disorder is a central feature of schizophrenia, as most writers assert, then it would be expected that this group as whole would score higher on a test of thought disorder than would a group of non-patients. The rationale for using normals as a control group in this study, as opposed to another

group of hospitalized patients, stemmed from considerations related to recent findings that acutely ill patients from other diagnostic groups show varying degrees of thought pathology (Andreason, 1979; Harrow & Quinlan, 1977). If no difference in PPT scores were to be found between schizophrenics and another group of patients, one could not know if this was so because the test was not a valid measure of thought disorder or because the groups were similar with respect to the presence of thought disorder. Differences or similarities between the scores of schizophrenics and normals would be less ambiguous because normals are presumably not thought disordered.

This study also compared schizophrenics' performances on the Picture-Preference Test of Thought Disorder with their performances on several criterion measures of disturbed thinking: the Thought Disorder Index of Johnston and Holzman (1979) and the Whitaker Index of Schizophrenic Thinking (Whitaker, 1979). It is suggested that these measures can provide a more comprehensive assessment of disordered thought than the criterion measure used in the original validation study: the Brief Psychiatric Rating Scale of Overall and Gorham (1962). In particular, the Johnston-Holzman system for assessing thought disorder is capable of generating a good deal of information on both the kind and the degree of thought pathology. It also possesses several other advantages over the method for assessing thought disorder that was used in the previous study (i.e., rating patients' responses in clinical interviews on various dimensions related to thought disorder). With respect to the Johnston-Holzman Thought Disorder Index, the stimuli that are to

elicit indications of thought disturbance (i.e., the Rorschach and WAIS tests) are standardized, and the criteria by which one categorizes responses are carefully defined. Thus this method of measuring thought pathology is likely less subjective than one which relies on rating behaviour in a clinical interview.

Some investigators have suggested that defects in attention and a pathological distractibility are characteristic of thought-disordered schizophrenics. Their observations suggest the possibility that in the original validation study of the PPT thought-disorder scale, thought-disturbed subjects obtained higher scores than normals because they were not paying attention to the task and perhaps making their selections haphazardly. Considering that the mean score for the normals (7) was quite low in relation to the maximum possible score (31), it is very likely that the thought-disordered group would obtain higher scores if indeed they were responding to the PPT thought-disorder items in a random way. In view of these considerations, this study attempted to evaluate the reliability of subjects' selections on the thought-disorder items of the PPT. Twenty of the 31 thought disorder items were presented a second time within the complete PPT, and subjects' choices during the first presentation of these 20 items were compared to their choices on the second presentation of these same items. The particular items that were presented twice were those that Rudzinski (1979) found to form the most internally consistent scale out of the total 31 items.

Two methods of scoring the PPT thought-disorder items were

used. The 20 items that were presented twice made up the "revised" thought disorder scale [PPT-TD (rev.)]. An item was scored in the keyed direction when the thought-disordered alternative was chosen on both the first and the second presentation of that item. The original 31-item scale was also used, and is referred to as the "regular" thought disorder scale [PPT-TD (reg.)].

The hypotheses that were tested in this study are as follows:

1. There will be a positive, statistically significant correlation between the scores that schizophrenic patients obtain on the two PPT thought-disorder scales [PPT-TD (reg.) & PPT-TD (rev.)] and the scores that they obtain on the Johnson-Holzman Thought Disorder Index.

2. There will be a positive, statistically significant correlation between the scores that schizophrenic patients obtain on the two PPT thought-disorder scales [PPT-TD (reg.) & PPT-TD (rev.)] and the scores that they obtain on the Whitaker Index of Schizophrenic Thinking.

3. Schizophrenic subjects as a group will obtain scores on the two PPT thought disorder scales [PPT-TD (reg.) & PPT-TD (rev.)] that are significantly higher than the scores obtained by a group of normal subjects.

Finally, this investigation sought to determine if scores on the PPT thought disorder scales could be explained by the tendency to select pictures that are chosen infrequently. Subjects' scores on the thought-disorder scales of the PPT were compared to their scores on a group of PPT items in which one of the pictures in each

pair has been determined to have (by Cowan, 1967) a very low probability of being selected. These particular items are not theoretically related to thought disorder.

CHAPTER II

METHOD

Subjects

The psychiatric patient sample consisted of 45 schizophrenics, of whom 43 were hospitalized at London Psychiatric Hospital, and two at Windsor Western Hospital Center. The procedure used to select patients for the study was as follows: Hospital records were used to identify those patients whose clinical record indicated a diagnosis of schizophrenia uncomplicated by organic brain pathology, chronic alcoholism, drug addiction, or lobotomy. Only persons who had at least a grade school education, and who were at least 18 years of age were considered. Patients at London Psychiatric Hospital were routinely administered the WAIS-Clarke Vocabulary Test shortly after admission; thus, subject selection was further restricted to those who had a verbal IQ of 80 or more. Finally, persons of foreign nationality who had lived in Canada less than 10 years were not considered for the study, since it was not known how their cultural backgrounds would influence their responses to the Picture-Preference Test.

There were seven patients who had agreed to participate in the study but had to be excluded because they did not complete all the test tasks. Two of these patients were discharged before testing could be completed; two changed their minds about being involved in

the study; and three patients were so distractible that the examiner eventually had to terminate the testing.

The age of patients in the final sample ranged from 18 to 59; the mean age was 29.98. There were 24 males and 21 females in the group. Various information about each subject was obtained from his or her clinical record: education and occupation, the diagnosis assigned by the attending physician, and the education and occupation of the head of the subject's household.

The non-patient sample was composed of 88 persons enrolled in undergraduate psychology courses at the University of Windsor. There were 27 males and 61 females in the group. Most of the subjects in this group were recruited from summer-session psychology classes, which typically have a higher percentage of women than men; thus, the preponderance of women in the sample. The ages of these subjects ranged from 18 to 57; the mean was 24.65.

All of the students received credit toward their course grade in return for participating in the research.

Instruments

The Picture-Preference Test of Thought Disorder. The Picture-Preference Test of Thought Disorder consists of 31 pairs of pictures. In each pair a picture representing bizarre, regressive, or irrational thinking is presented on one side, and a picture representing more adaptive thinking is shown on the other side. Subjects are asked to choose which of the two pictures they prefer, "A" or "B". These 31 items are embedded within the complete,

multiple-scale Picture-Preference Test, making for a total of 210 items, or picture-pairs.

Five characteristics of disturbed cognition are represented among the thought-disordered alternatives of the items. The following list presents these five characteristics, the number of test items for each, and an example of an item:

(1) Overinclusive thinking (seven items). Example: Item 71 (A) a saw and a screwdriver; (B) (thought-disorder alternative), a saw and a set of dentures.

(2) Idiosyncratic, overpersonalized thought (12 items). Example: Item 110 (A) (thought-disorder alternative), figure on television screen reaching out of set to viewer; (B) viewer watching figure on the television screen.

(3) Clang associations (six items). Example: Item 103 (A) a cake, a fork, and a drinking glass; (B) (thought-disorder alternative), a cake and a snake.

(4) Regressive, autistic thought (five items). Example: Item 127 (A) (thought-disorder alternative), childish drawing of a human figure; (B) well-drawn head of a man.

(5) Fabulized combination (one item). Example: Item 210 (A) a telephone receiver; (B) (thought-disorder alternative) a receiver with human lips on one end (Rudzinski & Auld, 1980, p. 371).

In order to minimize the possible effects of a tendency to choose pictures on the basis of their positioning, half of the keyed thought-disorder pictures have been assigned to the "A" position in

the item, and half to the "B" position.

As was described earlier, 20 of the thought-disorder items were presented a second time within the complete PPT. Twenty items that were not part of the thought-disorder scale were randomly deleted from the test, and were replaced by the repeated thought-disorder items.

The Johnston-Holzman Thought Disorder Index. Scores derived from the Thought Disorder Index (TDI) of Johnston and Holzman (1979) were used as criterion measures of thought disorder for the schizophrenic subjects in this study. The Thought Disorder Index is a system for scoring instances of deviant verbalizations on the Wechsler Adult Intelligence Scale (WAIS) and the Rorschach test. Mild indications of thought disorder receive low weights (.25), moderate ones obtain intermediate weights (.5 or .75), and the most serious examples of disordered thinking receive the highest weighting (1.0). The categories of pathological responses are based on those described by Rapaport, Gill, and Schafer (1946 / 1968). The TDI categories and their weightings have been described previously on pages 21 and 22.

The procedure recommended by Johnston and Holzman for administering the WAIS and Rorschach tests in order to obtain information regarding thought disorder will now be briefly described. The WAIS is administered according to the instructions in the WAIS manual (Wechsler, 1955), except that only the verbal subtests are given—Information, Comprehension, Similarities, Digit

Span, Arithmetic, and Vocabulary. Johnston and Holzman suggest that sufficient data on thought disorder can be obtained by using only these subtests. In addition, testing should proceed beyond the standard cut-off points even after a number of failures. This procedure is suggested because severely disturbed subjects often show inconsistencies and erratic fluctuations in performance.

The Rorschach is administered according to the recommendations of Rapaport, Gill and Schafer (1946 / 1968). Upon handing over the first card, the examiner asks, "What could this be? What does it look like to you?" The subject is allowed to give as many responses as he likes to the first card. On subsequent cards, responses should be limited to about five or six according to Johnston and Holzman. The inquiry into responses is done after each card, following Rapaport et al. The examiner tries to assess the thinking process that went into responses that suggest disordered thought. Pathological verbalizations or ambiguous responses are inquired into with questions like, "Can you tell me more about that?" or "I don't quite understand what you mean by (such and such)." Deviant responses that occur during the inquiry itself are also recorded.

The category and level at which each response is scored are recorded on a scoring sheet. Mutiple scorings are possible for any response or verbalization. If a response almost fits a particular category, it can be scored as "a tendency to ____". This kind of response would not be given the same weight as that category would normally receive, but would be assigned the next lower score. For

example, a "tendency to contamination" would be scored .75 rather than 1.0. The final scores are recorded as the TD_W score and the TD_R score. The author used the abbreviations JHW and JHR for these scores, in order to avoid their confusion with the abbreviations used for other variables in the study. The two scores are computed as follows:

JHW = the sum of the TDI scores on the WAIS;

JHR = the sum of the TDI scores on the Rorschach, divided by the number of Rorschach responses, multiplied by 100. (A ratio score is used in order to correct for differences in productivity).

The Whitaker Index of Schizophrenic Thinking. The Whitaker Index of Schizophrenic Thinking (WIST) was also used as a criterion measure of disordered thinking for the psychiatric patients in the study. It is a brief, objectively scored paper-and-pencil test consisting of 25 multiple-choice items. Essentially the test evaluates the degree of "unwitting illogicality" of responses to simple verbal tasks requiring the defining of words, the finding of semantic similarities between pairs of words, and the selecting of the most probable outcome of hypothetical inventions. These tasks are presented in three subtests: Similarities (nine items), Word Pairs (nine items), and New Inventions (seven items). The subject selects an answer to each item from five randomly arranged alternatives. The alternatives consist of a correct answer and, in order of increasing incorrectness and illogicality, a loose

association, a (self-) reference association, a clang association, and a nonsense association. For example, in the Similarities subtest, the subject is asked to choose the answer that is "most similar in meaning" to the word kill. The alternatives are: "cause to die" (correct), "stab" (loose association), "bloody me" (reference association), "mill" (clang association), and "bapple" (nonsense).

Two forms of the WIST are available. Form A contains many words, phrases and sentences which are inherently anxiety-provoking. Form B, while being structurally identical, contains only neutral verbal content. The WIST tasks are designed to be easily solved by anyone with at least an eighth grade education, and verbal intelligence above or within the dull-normal range.

Three scores are computed from the test results. The first, an error score, is determined by summing weighted error scores across all items. Weightings are based on the degree of illogicality of the incorrect response. The second measure, a time score, is the number of minutes required to give the initial set of answers. The third measure, the Index score, is the sum of the other two scores. Whitaker (1973) recommends the use of the Index score.

Whitaker's choice of the particular set of deviant response categories derived from his conception of disordered thinking as "illogical," "impaired," and "unwitting," and from judgments by clinicians who ranked the alternative answers to each WIST item in order of their "logical appropriateness." Also, items were selected which had a significant association with scores for pathognomic

verbalization from the Rorschach and Holtzman Inkblot Technique.

Evidence for the reliability and validity of the WIST is presented by Whitaker (1973). He demonstrated that WIST Index scores were able to significantly differentiate a schizophrenic group from a sample of nonschizophrenics. Whitaker reported a study indicating that a cutoff Index score of 20 on Form A correctly classified, as schizophrenic or not schizophrenic, 89 of 111 subjects, for 80% discriminatory efficiency. On Form B, a cutoff Index of 17 correctly identified 87 of 114 subjects for a discriminatory efficiency of 76 percent. Also, Whitaker reported Hoyt reliability coefficients of .80 for each form as estimates of intra-test reliability.

Fishkin, Lovallo, and Pishkin (1977) found a significant correlation between WIST Index scores and scores on the schizophrenia scale (Sc) of the MMPI for a group of process schizophrenics. Thus, available evidence offers support for the validity of the WIST as a measure of disordered thought processes.

Procedure

Non-patients. Prospective subjects were informed that the study concerned how people differ with regards to their preferences among sets of pictures. They were told that participation in the research would take about 40 minutes of their time, and that they would be asked to view pairs of pictures and indicate which picture in the pair they preferred. Subjects were administered the PPT by the author, in groups of 5 to 15. The PPT items were presented by a slide projector; each item was viewed for 10 seconds. Instructions

to the subjects were as follows:

> In taking this Picture-Preference test, your task is simply to choose which of the two pictures presented together you prefer. Fill in "A" on your answer sheet if you prefer the left-handed picture designated "A". Fill in "B" on your answer sheet if you prefer the picture on the right designated "B". A sample item is shown now on the screen. You would fill in "A" on the answer sheet if you prefer the picture on the left of the lamp. You would fill in "B" on the answer sheet if you prefer the picture of the tree on the right. Each of the pictures will be shown for 10 seconds. You should make your choice within this time period. Even if you find it difficult to make a choice, please make one. If you don't like either picture, choose the one which you dislike the least. The pictures will begin now.

Subjects were also asked to provide some information about themselves on a questionnaire attached to their PPT answer sheets. The data requested included age, sex, major field of study, education, occupation, and the education and occupation of the head of the household. This questionnaire is reproduced in Appendix D.

Patients. Psychiatric patients who were approached for the study were also informed that the research concerned peoples' preferences for certain kinds of pictures; they would be asked to look at pictures and indicate which ones they liked best. Later, they would be seen in individual sessions and administered several other tests. It was explained that the purpose of the additional testing was to learn more about how people made their choices among the pictures that were viewed. The examiner emphasized to subjects that their participation in the study was voluntary, and that their test responses would be kept confidential. Patients who agreed to participate were asked to read and sign a brief consent form, which

read as follows:

> I agree to participate in this study, and understand that my participation is voluntary, and that my test data will be kept confidential. The general purpose of this research and the procedures involved have been described to me.

The PPT was administered to patients by the author in groups of one to three. The instructions were the same as those given to the non-patients. After subjects completed the PPT they were seen individually and administered the WIST (Form A), the Rorschach, and the WAIS. Patients who could not complete all the tests in one sitting were seen on following days until all the materials were administered.

The procedure for administering the WIST followed the recommendations of Whitaker (1973). Instructions to subjects regarding the WAIS were those outlined in the manual (Wechsler, 1955). The Rorschach test was introduced to subjects in the manner recommended by Rapaport et al. (1946/1968). Patients' responses to the Rorschach and WAIS were tape recorded. Later, these recordings were transcribed verbatim in order to facilitate scoring of the responses.

All subjects, patients and non-patients, were promised that when the study was finished they would have access to the overall results, if they so desired.

CHAPTER III

RESULTS

Description of Subjects

Characteristics of the psychiatric patient sample are presented in Table 1. Twenty-four males and 21 females made up this group. Their ages ranged from 18 to 59 with a mean age of 29.98.

Subjects' social status was determined by the Hollingshead Two Factor Index of Social Position (cf. Myers & Bean, 1968). In this index occupation and education are ranked from 1 to 7 and weighted to arrive at a combined score which ranges from 11 to 77. This continuum of scores is divided into five social classes. A subject's Index of Social Position was based on the status of the head of the household or primary wage earner in the family. Thus, if a subject was self-supporting and living apart from his or her family, the score was based on his or her own occupation and education. If a parent or spouse was supporting the subject, it was the status of this supporting person that determined the subject's Index of Social Position.

Turning back to Table 1, the mean Index of Social Position for the patients was 52.42 which represents upper-lower class status. Approximately 44% of the patients were within this class level. Another 36% were within the lowest class level (lower-lower class), and only 20% of the group were from the three highest class levels.

Table 1

Characteristics of Psychiatric Patient and Non-Patient Samples

Variable	Mean	Standard deviation
Patients[a]		
Age	29.98	9.50
Index of Social Position	52.42	17.01
Educational level of subjects	4.80	.94
Non-Patients[b]		
Age	24.65	9.05
Index of Social Position[c]	38.22	17.72
Educational level of subjects	3.10	.40

[a] $n = 45$

[b] $n = 88$

[c] $n = 72$ for the non-patient group because of missing data.

The education of each subject was also collected and coded according to the scales of Myers and Bean (1968). Eighty percent of the patient group had partial high school education (code 5) or better. The mean educational level was 4.80. Five subjects had at least partial university training, and no subject had less than eight years of schooling. With respect to occupational level, 60% of the group could not be classified because they either had never been employed, or they had been employed only very briefly at some point in their lives.

Table 2 presents the frequencies of the different subtypes of schizophrenia represented in the patient sample. The classification system on which these are based is ICD-9 (World Health Organization, 1977). As shown, the most prevalent type of schizophrenia represented in this sample was the paranoid type (295.3), making up about 36% of the group. Schizoaffective schizophrenics (295.7) were the second largest subgroup, making up 20% of the sample. Catatonic schizophrenia (295.2) was the least common type in the group, which is not surprising considering the rarity of the disorder in recent years (American Psychiatric Association, 1980).

Each patient's diagnosis was also coded according to the DSMIII (American Psychiatric Association, 1980) classification system. For most of the schizophrenic types, the fifth digit of the DSMIII code is used to represent the course of the illness. The course is coded as follows: (1) Subchronic; (2) Chronic; (3) Subchronic with Acute Exacerbation; (4) Chronic with Acute

Table 2

Frequency Distribution for Psychiatric Diagnoses of Patients[a]

Diagnosis	No. of cases	Percentage
Hebephrenic schizophrenia (295.1)	3	6.7
Catatonic schizophrenia (295.2).	1	2.2
Paranoid schizophrenia (295.3)	16	35.6
Acute schizophrenic episode (295.4)	5	11.1
Residual schizophrenia (295.6)	6	13.3
Schizoaffective schizophrenia (295.7)	9	20
Schizophrenia, unspecified (295.9)	5	11.1

[a] $N = 45$

Exacerbation; and (5) In Remission. The frequency distribution for these types of course is presented in Table 3. Approximately 38% of the patients would be considered subchronic (i.e., showing signs of schizophrenia more or less continuously for less than two years, but for more than six months). About 31% of the group could be classified as chronic patients (i.e., showing signs of schizophrenia for more than two years).

The non-patient sample in this study consisted of 88 undergraduate psychology students from the University of Windsor. There were 27 males and 61 females in the group. A summary of the characteristics of this group is also presented in Table 1. Subjects' ages ranged from 18 to 57, with a mean age of 24.65. The mean Index of Social Position for the non-patients was 38.22, indicating status comparable to persons in the lower-middle class. The group was almost equally dispersed through social classes I-III and IV-V. The mean level of education for the group represents partial university training.

Comparison of the two groups of subjects indicates that the non-patients were younger, more highly educated, and from a higher social class than the psychiatric patients.

Table 3

Frequency Distribution of Types of Illness Course for Schizophrenic Patients[a]

Type		No. of cases	Percentage
(1)	Subchronic	14	31.0
(3)	Subchronic with Acute Exacerbation	3	6.6
(2)	Chronic	10	22.2
(4)	Chronic with Acute Exacerbation	4	8.8
(5)	In Remission	0	0.0

[a] $\underline{N} = 45$

Reliability of the PPT Thought-Disorder Scales

The internal consistencies of the 31-item PPT-TD (reg.) scale (i.e., the regular PPT thought-disorder scale) and of the 20-item PPT-TD (rev.) scale were analyzed. The PPT-TD (rev.) scale, the reader will recall, consists of 20 picture-pairs that are presented twice within the complete PPT. For this revised scale, an item is scored positively when the thought-disordered alternative is selected on both the first and the second presentation of the item. The 20 items included in this scale are those out of the original items that Rudzinski (1979) found to form the most internally consistent scale.

Item analysis for the two PPT thought-disorder scales were computed separately for the patient and for the non-patient groups, using the subprogram Reliability from the Statistical Package for the Social Sciences Update (Hull & Nie, 1979) and the program TESTSTAT (Morf, Note 1). Tables 4 and 5 present the alpha coefficients and the item-to-scale-remainder point-biserial correlation coefficients for the PPT-TD (reg.) scale (Table 4) and for the PPT-TD (rev.) scale (Table 5). The reliability coefficients for the PPT-TD (reg.) scale are as follows: Patients, alpha = .65; non-patients, alpha = .50. For the PPT-TD (rev.) scale the coefficients are: patients, alpha = .51; non-patients, alpha = .58. The reliabilities of the two PPT thought-disorder scales, although poor, might be considered marginally acceptable.

As had been described previously, some writers in the field of

Table 4

Item Analyses of the TD (reg.) Scale of the Picture-Preference Test

Item	Item-to-scale-remainder point-biserial correlation	
	Patients	Non-patients
1.	-.04	-.12
14.	.32	-.01
15.	.16	.32
16.	.03	.40
17.	—[a]	.43
20.	.15	.25
24.	.06	.17
27.	.17	.33
30.	.18	.16
32.	.50	.03
33.	.14	.03
38.	.38	.33
45.	.12	.10
54.	.25	.01
55.	—[a]	.14
59.	.13	.01
60.	.29	.17
61.	.17	.18
69.	.50	.38
71.	.32	.004
75.	.25	.25
78.	.36	-.07
86.	.42	.18
109.	.25	-.01
114.	.21	.10
115.	.22	.52
119.	.07	-.16
120.	.01	.07
142.	.18	.06
205.	.18	-.06
208.	.05	-.08
Scale alpha	.65	.50

[a]None of the patients endorsed the thought-disorder alternative on these items.

Table 5

Item Analyses of the TD (rev.) Scale of the Picture-Preference Test

Item		Item-to-scale-remainder point-biserial correlation	
		Patients	Non-patients
1.	(Items 15 & 206)	.03	.40
2.	(Items 16 & 138)	.35	.43
3.	(Items 17 & 98)	—[a]	.47
4.	(Items 20 & 210)	.23	.30
5.	(Items 24 & 112)	.23	.23
6.	(Items 27 & 127)	-.003	.29
7.	(Items 30 & 125)	.25	.14
8.	(Items 32 & 103)	.05	.002
9.	(Items 33 & 128)	.000	.02
10.	(Items 38 & 104)	.29	.25
11.	(Items 45 & 140)	.03	.09
12.	(Items 54 & 191)	.44	-.08
13.	(Items 55 & 136)	—[a]	.04
14.	(Items 59 & 202)	.000	.09
15.	(Items 60 & 88)	-.01	.07
16.	(Items 61 & 116)	.26	.33
17.	(Items 69 & 110)	.26	.33
18.	(Items 71 & 154)	.26	-.02
19.	(Items 75 & 192)	.24	.25
20.	(Items 78 & 133)	.33	—[b]
Scale alpha		.51	.58

[a] None of the subjects in the patient group answered both items in the keyed direction.

[b] None of the subjects in the non-patient group answered both items in the keyed direction.

schizophrenic thought disorder have commented that persons with this condition show a pathological distractibility. This observation suggests the possibility that thought-disordered subjects may obtain higher scores on the PPT thought-disorder scales than other groups as a result of random responding and lack of attention to the task. In order to assess further the reliability of subjects' choices on the thought-disorder items, the author calculated the correlation between subjects' total scores on the first presentation of the 20 items that were shown twice and their total scores on the second presentation of those 20 items. This correlation was computed separately for the two subject groups, in order to see if there would be a difference. For the patient group, the correlation between scores for the two sets of 20 items was significant, $\underline{r} = .55$, $\underline{p} < .0001$. Likewise, the correlation of the non-patients' scores for the two sets of items was statistically significant, $\underline{r} = .89$, $\underline{p} < .0001$; and was significantly larger than the corresponding correlation for the patients.

The correlations of subjects' scores on the first presentation with their scores on the second presentation of each individual item was also calculated. Tables 6 and 7 present the results of these analyses for the patient and for the non-patient groups respectively. In the patient sample 12 of the 20 correlation coefficients were statistically significant beyond the .05 level. Six pairs of items failed to show a significant correlation between the first and the second presentation. The correlations for two pairs of items could not be calculated because none of the patients had endorsed the thought-

Table 6

Correlation between First Presentation and Second Presentation of each Repeated Item: Patients

Item pairs	r	p
15 & 206	.70	.0001
16 & 138	.37	.007
17 & 98[a]	—	—
20 & 210	.50	.0001
24 & 112	.39	.004
27 & 127	.28	.033
30 & 125	.33	.013
32 & 103	.64	.0001
33 & 128	.51	.0001
38 & 104	.36	.008
45 & 140	.24	.053
54 & 191	.23	.064
55 & 136[b]	—	—
59 & 202	.17	.131
60 & 88	.57	.0001
61 & 116	.24	.056
69 & 110	.37	.006
71 & 154	.57	.0001
75 & 192	.15	.161
78 & 133	.24	.057

[a] No subject endorsed the thought-disordered alternative for Item 17.

[b] No subject endorsed the thought-disordered alternative for Item 55.

Table 7

Correlation between First Presentation and Second Presentation of each Repeated Item: Non-Patients

Item pairs	r	p
15 & 206	.70	.0001
16 & 138	.89	.0001
17 & 98	.93	.0001
20 & 210	.75	.0001
24 & 112	.68	.0001
27 & 127	.89	.0001
30 & 125	.59	.0001
32 & 103	.81	.0001
33 & 128	.49	.0001
38 & 104	.74	.0001
45 & 140	.84	.0001
54 & 191	.52	.0001
55 & 136	.57	.0001
59 & 202	.63	.0001
60 & 88	.87	.0001
61 & 116	.81	.0001
69 & 110	.73	.0001
71 & 154	.81	.0001
75 & 192	.81	.0001
78 & 133	-.02	.414

disordered alternative for one of the items in the pair. This made the variance of that item 0, and thus made it impossible to compute a correlation coefficient. The average correlation between the first presentation and the second presentation of the individual items (excluding the two pairs of items for whom correlations could not be computed) was .3811, $p = .005$. For the non-patient group 19 of the 20 correlations between the first and the second presentations of each item were statistically significant, $p < .001$. The average correlation was .70, $p < .0001$.

In summary, the above analyses indicate that the schizophrenic patients, as compared to the non-patients, were less consistent in their responses to the thought-disorder items of the PPT, although it is doubtful that they were responding to the items in a random fashion. In addition, the examiner asked patients—after they had completed the PPT—whether or not they had noticed items being repeated. Almost all claimed that they had, and many patients had made spontaneous comments during testing about the pictures being repeated. Patients who admitted to changing their selections on the second presentation of items were asked about their reasons for doing so. Their explanations included such statements as: "I just changed my mind when I saw it again", or "It looked different to me the second time." Some patients thought that their "first answer must have been wrong" because the item was presented once again.

Relationships between the Picture-Preference Test Thought-Disorder Scales and the Criterion Measures of Disordered Thinking

One of the main hypotheses of this study predicts that a positive statistically significant relationship would be found between patients' scores on the two thought-disorder scales of the PPT and three criterion measures of thought disorder. Before analyzing the data relevant to this hypothesis, the author evaluated the scoring reliability of the Johnston-Holzman system for assessing disordered thinking from the Rorschach and WAIS tests. Pearson correlation coefficients were computed between the scores assigned by the author to 20 Rorschach and WAIS protocols, and the scores assigned by another clinical psychology graduate student to those same protocols. The interscorer agreement for both measures was high: Rorschach (JHR), $r = .98$, $p = .0001$; WAIS (JHW), $r = .97$, $p = .0001$.

Table 8 presents the intercorrelations among the PPT scales and the criterion measures. A statistically significant correlation was found between scores on the TD (reg.) scale of the PPT and the Rorschach measure of thought disorder (JHR), $r = .43$, $p = .003$. However, the correlations of the PPT-TD (reg.) scale with the other two criterion measures of disturbed thinking did not reach significance. With respect to the PPT-TD (rev.) scale, there were no significant relationships found between this scale and the criterion measures. The criterion tests of thought disorder (JHR, JHW and WIST) were significantly correlated with each other.

The correlations between patients' scores for each of the

Table 8

Intercorrelations Among Tests

	JHR	JHW	WIST	PPT-TD (reg.)	PPT-TD (rev.)	PPT Infrequency
JHR		.78***	.62***	.43**	.24	.43**
JHW			.67***	.15	.03	.24
WIST				.03	-.03	.32*
PPT-TD (reg.)					.66***	.50***
PPT-TD (rev.)						.37*
PPT Infrequency						

*p < .05

**p < .01

***p < .001

Note. JHR -- Johnston-Holzman Thought Disorder Index (Rorschach)

JHW -- Johnston-Holzman Thought Disorder Index (WAIS)

WIST -- Whittaker Index of Schizophrenic Thinking

PPT-TD (reg.) -- Regular Thought-Disorder scale of Picture-Preference Test.

PPT-TD (rev.) -- Revised Thought-Disorder scale of Picture-Preference Test.

PPT-TD (reg.) items and their scores on each of the three criterion measures are shown in Table 9. The number of items that correlated significantly with each of the criteria are as follows: JHR, 6 items; JHW, 3 items; WIST, 5 items. The item-to-criterion correlations for the PPT-TD (rev.) scale are listed in Table 10. The number of significant correlations is as follows: JHR, 3 items; JHW, 1 item; WIST, 0 items.

Thus, the above findings provide limited evidence of a relationship between the PPT-TD (reg.) scale and other measures of disordered thinking. However, the evidence does not support the hypothesized relationship of the revised scale [PPT-TD (rev.)] to thought disorder.

Table 11 summarizes the product-moment correlations of the two Picture-Preference Test thought-disorder scales with characteristics of the patients. A positive, statistically significant correlation was found between scores on the PPT-TD (reg.) scale and scores on the Infrequency scale of the PPT; $r = .50$, $p = .0005$. Likewise, the PPT-TD (rev.) scale was significantly related to Infrequency scores; $r = .37$, $p = .011$. None of the other correlations reached statistical significance.

Scores on the Infrequency scale represented subjects' tendencies to respond to the PPT in an unusual way, i.e., by selecting pictures that are chosen infrequently by other people. The particular items in this scale are those that Cowan (1967) found to have a very low probability of being endorsed in a particular direction by normal subjects. In order to control for the possible

Table 9

Correlations of PPT-TD (reg.) Items with JHR, JHW, and the WIST

Item	JHR	JHW	WIST
1.	.06	.05	-.24
14.	.08	-.10	-.11
15.	-.005	-.21	-.25*
16.	-.14	-.17	-.28*
17[a]	———	———	———
20.	.12	.09	.22
24.	.02	.12	.04
27.	.24	.08	.08
30.	.15	.22	-.13
32.	.10	-.03	.07
33.	.21	.24	.21
38.	.40**	.18	.05
45.	-.06	-.16	-.11
54.	.06	-.03	.23
55[a]	———	———	———
59.	.24	.21	.19
60.	.43**	.38**	.36**
61.	.15	-.05	.11
69.	.15	.09	-.07
71.	-.12	-.29*	-.10
75.	.26*	.22	.16
78.	.47***	.16	.29*
86.	.13	-.17	-.19
109.	.04	.01	-.15
114.	.30*	.28*	.06
115.	.35*	.17	.02
119.	.14	.09	.04
120.	.17	.04	.25*
142.	.02	-.05	-.12
205.	.04	.06	.11
208.	-.07	-.07	-.06

*$p < .05$

**$p < .01$

***$p < .001$

[a]Correlations could not be computed for these items because no subject responded in the keyed direction on the items.

Table 10

Correlations of PPT-TD (rev.) Items with JHR, JHW, and the WIST

Item		JHR	JHW	WIST
1.	(Items 15 & 206)	-.01	-.16	-.24
2.	(Items 16 & 138)	.05	.005	.01
3.	(Items 17 & 98)[a]	—	—	—
4.	(Items 20 & 210)	.13	.00	.18
5.	(Items 24 & 112)	.0004	-.004	.05
6.	(Items 27 & 127)	.32*	.13	.004
7.	(Items 30 & 125)	.19	.20	-.15
8.	(Items 32 & 103)	-.006	-.07	.07
9.	(Items 33 & 128)	.20	.19	.23
10.	(Items 38 & 104)	.06	-.11	-.13
11.	(Items 45 & 140)	-.08	-.17	-.15
12.	(Items 54 & 191)	-.01	-.06	.01
13.	(Items 55 & 136)[a]	—	—	—
14.	(Items 59 & 202)	.15	.26*	.09
15.	(Items 60 & 88)	.26*	.19	.23
16.	(Items 61 & 116)	.38**	.14	.20
17.	(Items 69 & 110)	.11	-.10	-.10
18.	(Items 71 & 154)	-.11	-.22	-.20
19.	(Items 75 & 192)	.0004	.08	-.05
20.	(Items 78 & 133)	.23	-.06	-.03

*$p < .05$

**$p < .01$

[a]Correlations could not be computed for these items because no subject responded in the keyed direction on these items.

Table 11

Correlations of PPT-TD (reg.) and PPT-TD (rev.) with Characteristics of Patients

Variables	PPT-TD (reg.)	PPT-TD (rev.)
Sex	-.01	.04
Age	.21	.20
Index of Social Position	.21	.26
Educational Level	-.05	-.005
PPT Infrequency scale	.50**	.37*

*$p < .05$

**$p < .01$

effects of this response tendency, the author computed partial correlations between patients' thought-disorder scores on the PPT and their scores on the three criterion measures, controlling for Infrequency scores. The results of these analyses are presented in Table 12. Comparison of the results shown in Table 12 and in Table 8 shows that the partial correlation coefficients tend to be somewhat smaller than the simple correlations. Controlling for the effect of a deviant-response tendency reduced the magnitude of the correlation between the PPT-TD (reg.) and JHR. Nevertheless, it remained significant, $r = .27$, $p = .037$.

Multiple regression analyses were carried out in order to determine if JHR and JHW scores could be weighted and combined to predict the PPT-TD (reg.) and PPT-TD (rev.) scores with a reasonable degree of accuracy. The results of the regression analysis for the PPT-TD (reg.) scale are summarized in Table 13. The regression model was significant, $F(2,42) = 8.02$, $p = .0011$. Thus, it was able to account fairly well for the behaviour of PPT-TD (reg.) scores. The regression coefficients for JHR and for JHW both tested as significant: JHR, $F = 14.77$, $p = .0004$; JHW, $F = 5.36$, $p = .0256$. The R^2 value indicates that approximately 28% of the variation in PPT-TD reg. scores can be explained by their linear dependence on JHR and JHW. The multiple correlation (R) of PPT-TD (reg.) with JHR and JHW is .52, which is statistically significant ($p < .001$).

Table 13 shows that the regression coefficient for JHW was negative (-.50), suggesting that JHW was acting as a suppressor variable. The results that were summarized in Table 8 showed that

Table 12

Partial Correlations of PPT-TD (reg.) and PPT-TD (rev.) with JHR, JHW, and WIST, Controlling for PPT Infrequency Scores

	PPT-TD (reg.)	PPT-TD (rev.)
JHR	.27*	.09
JHW	.03	-.07
WIST	-.14	-.17

*$p < .05$

Table 13

Regression Analyses of PPT-TD (reg.) Scores and PPT-TD (rev.) Scores on JHW and JHR Scores

DEPENDENT VARIABLE: PPT-TD (reg.)

Source	df	SS	MS	F	p
Regression	2	166.25	83.12	8.02	.0011
Error	42	435.53	10.37		
Total	44	601.78			

	B Value	Std. Error	Type II SS	F	p
Intercept	5.62				
JHR	0.12	.03	153.12	14.77	.0004
JHW	-0.50	.22	55.58	5.36	.0256

R	Std. Dev.
.52	3.22

DEPENDENT VARIABLE: PPT-TD (rev.)

Source	df	SS	MS	F	p
Regression	2	18.11	9.06	2.91	.0655
Error	42	130.69	3.11		
Total	44	148.80			

	B Value	Std. Error	Type II SS	F	p
Intercept	1.67				
JHR	0.04	.02	17.99	5.78	.0207
JHW	-0.21	.12	9.67	3.11	.0851

R	Std. Dev.
.34	1.76

JHW correlated poorly with PPT-TD (reg.) scores, and JHR correlated significantly with those scores. Yet JHR and JHW were highly related to each other. Thus the correlation between JHR and JHW includes variance that is not related to PPT-TD (reg.). Consequently when this component of variance was subtracted from JHR in the regression analysis, the predictive power of JHR was enhanced.

The coefficients for JHR and JHW that were derived from the regression analysis were used to calculate a Johnston-Holzman Composite score (JHCOMP). The JHR scores and the JHW scores were multipled by their corresponding regression weights and added together to obtain a JHCOMP score for each subject. The correlation between JHCOMP and PPT-TD (reg.) scores is of course the same as the multiple correlation of PPT-TD (reg.) with JHR and JHW: $R = .52$, $p < .001$. A partial correlation between JHCOMP and PPT-TD (reg.), controlling for PPT Infrequency scores was then calculated. The relationship between JHCOMP scores and PPT-TD (reg.) scores remained significant when the effects of the tendency to respond to infrequently chosen items on the Picture-Preference Test was controlled statistically, $r = .39$, $p = .004$.

Table 13 also shows the results of the regression analysis of PPT TD (rev.) scores on JHR and JHW scores. This model was not statistically significant.

Comparison of Patients and Non-Patients

It was predicted that scores on the PPT TD (reg.)scale and the PPT-TD (rev.) scale would distinguish the group of schizophrenic patients from the group of non-patients. Table 14 lists the groups' mean scores on the PPT scales, and summarizes the results of t tests comparing the two groups' scores. The patients obtained a mean score of 7.22 on the PPT-TD (reg.) scale, which was significantly higher than the mean score (5.95) of the non-patient sample, t (131) = 2.18, p = .0311. The mean scores for the PPT-TD (rev.) scale were 2.06 and 2.27 for the patients and for the non-patients respectively. The difference between these means was not statistically significant; t (131) = .58, p = .5652.

The results presented in Table 14 also reveal that the patients endorsed significantly more infrequently chosen pictures on the PPT than did the non-patients. Mean scores on the PPT Infrequency scale for the patients and for the non-patients were 8.04 and 4.86 respectively. Thus, it was necessary to make further comparisons of the two groups' performances on the PPT-TD (reg.) while statistically controlling for the possible effects of the tendency to select infrequently chosen pictures.

An analysis of covariance was performed on PPT-TD (reg.) scores for the two groups, using scores on the PPT Infrequency scale as the covariate. Table 15 shows the results of this analysis. The mean scores on the PPT-TD (reg.) scale for the two groups, adjusted for the effects of the covariate were as follows: patients, $\bar{X}$ = 6.28; non-patients, $\bar{X}$ = 6.43. The difference between the adjusted group

Table 14

Comparison of Patients' and Non-Patients Mean Scores on the PPT Scales

Group Means				
	Patients[a]		Non-patients[b]	
Scale	Mean	Standard deviation	Mean	Standard deviation
PPT-TD (reg.)	7.22	3.70	5.95	2.87
PPT-TD (rev.)	2.06	1.84	2.27	2.00
PPT Infrequency	8.04	3.33	4.86	2.64

T Tests		
Scale	t	p
PPT-TD (reg.)	2.18	.0311
PPT-TD (rev.)	-.58	.5652
PPT Infrequency	6.01	.0001

[a] n = 45

[b] n = 88

Table 15

Analysis of Covariance: Patients' and Non-Patients' PPT-TD (reg.) Scores, Controlling for PPT Infrequency Scores

Source	df	SS	MS	F	p
Model	2	264.99	132.49	15.62	.0001
Error	130	1102.45	8.48		
Corrected Total	132	1367.44			

Source	df	Type I SS	Type IV SS	F	p
Groups	1	47.85	0.53	0.06	.8032
Infrequency	1	217.14	217.14	25.61	.0001

Group	Adjusted $\overline{X}$	$\overline{X}$
Patients	6.28	7.22
Non-Patients	6.43	5.95

means was not significant, $p = .8032$.

Inspection of individual patients' scores on the three criterion measures of thought disorder (i.e., JHR, JHW, and WIST) revealed that some patients had rather low scores on some or all of these measures, suggesting that they were not clearly thought disordered, or only minimally so at the time of testing. Although all the patients in the sample had been diagnosed as schizophrenic by their attending psychiatrists, and the author had agreed with these diagnoses after inspecting the relevant information on the patients, it is nevertheless possible that some patients had been misdiagnosed. Also, some patients, at the time of testing, may have already started to recover from the active phase of their illness, so that thought disturbances were less prominent. If in fact there were some subjects in the patient sample who were not clearly thought disordered, then any real differences in PPT scores between thought-disordered persons and non-thought-disordered persons would be obscured when the entire group of patients was compared to the non-patients. Thus the author divided the patients into a "high-thought-disorder" group and a "low-thought-disorder" group on the basis of JHR and JHW scores, and compared these groups' PPT scores with those of the non-patients. A cutoff score of 21 on JHR and a cutoff score of 5 on JHW were used to create the two patient groups. If a patient scored above the cutoff on either JHR or JHW, he/she was placed in the high-thought-disorder group. The cutoff scores for JHR and JHW were the means (rounded to the nearest whole number) of these two measures for schizophrenics in Johnston and Holzman's (1979) study.

Table 16 presents the three groups' means scores on the PPT scales, and summarizes the results of t tests comparing the groups. The high-thought-disorder group obtained a mean score of 9.00 on the PPT-TD (reg.) scale, which was significantly higher than the mean score (5.00) of the low-thought-disorder group , t (43) = 4.27, p = .0001; and significantly higher than the mean score (5.95) of the non-patients, t (111) = 4.44, p = .0001. The mean PPT-TD (reg.) score of the low-thought-disorder patients did not differ significantly from that of the non-patients, t (106) = 1.37, p = .175.

With respect to the PPT-TD (rev.) scale, there was a moderately significant difference between the mean score of the high-thought-disorder group (2.65) and the mean of the low-thought-disorder group (1.37), t (43) = 2.37, p = .022. Neither of the two other group comparisons revealed a significant difference in PPT-TD (rev.) scores.

Table 16 also indicates that there were again differences between groups with regard to mean scores on the PPT Infrequency scale. An analysis of covariance was carried out in order to see if differences between the groups' mean PPT-TD (reg.) scores would remain significant when the tendency to select infrequently chosen pictures was controlled statistically. Table 17 presents the results of this analysis. Mean scores on the PPT-TD (reg.) scale for the three groups adjusted for the effect of the covariate were as follows: high-thought-disorder patients, $\bar{X}$ = 7.71; low-thought-disorder patients, $\bar{X}$ = 4.98; non-patients, $\bar{X}$ = 6.32. The difference between the adjusted means of the two patient groups was statistically significant, p = .003. Neither mean of the two patient groups was significantly different from the adjusted mean of the non-patient group.

Table 16

Comparisons of High-Thought-Disorder Patients', Low-Thought-Disorder Patients' and Non-Patients' Mean Scores on the PPT Scales

Groups Compared	PPT-TD (reg.)				PPT-TD (rev.)				PPT Infrequency			
	$\bar{X}$	SD	t	p	$\bar{X}$	SD	t	p	$\bar{X}$	SD	t	p
High-thought-disorder patients[a]	9.00	3.52	4.44	.0001	2.64	1.68	.84	.405	9.68	2.85	7.92	.0001
Non-patients[b]	5.95	2.87			2.27	2.00			4.86	2.64		
Low-thought-disorder patients[c]	5.00	2.57	1.37	.175	1.35	1.81	1.89	.062	6.00	2.73	1.73	.087
Non-patients	5.95	2.87			2.27	2.00			4.86	2.64		
High-thought-disorder patients	9.00	3.52	4.27	.0001	2.64	1.68	2.37	.022	9.68	2.85	4.42	.0001
Low-thought-disorder patients	5.00	2.57			1.35	1.81			6.00	2.73		

[a] $n = 25$

[b] $n = 88$

[c] $n = 20$

Table 17

Comparison of High-Thought-Disorder Patients, Low-Thought-Disorder Patients, and Non-Patients on PPT-TD (reg.) scale, Controlling for PPT Infrequency Scores

Groups Compared	Adjusted $\bar{X}$	p
High-thought-disorder patients[a]	7.71	.0765
Non-patients[b]	6.32	
Low-thought-disorder patients[c]	4.98	.0597
Non-patients	6.32	
High-thought-disorder patients	7.71	.0033
Low-thought-disorder patients	4.98	

[a] $n = 25$

[b] $n = 88$

[c] $n = 20$

Additional Analyses Focusing on the PPT Infrequency Scale

Table 8 had shown that the patients' scores on the Infrequency scale of the PPT correlated highly with their scores on the PPT-TD (reg.) scale (r = .50, p = .0005), and correlated moderately with their scores on the PPT-TD (rev.) scale (r = .37, p = .011). Additional analyses focusing on the relationship between the PPT Infrequency scale and the PPT thought-disorder scales were performed. A stepwise multiple regression of patients' PPT-TD (reg.) scores on JHR, JHW, WIST, and Infrequency scores was carried out. A comparable analysis using patients' PPT-TD (rev.) scores was also done. The results of these regression procedures are summarized in Appendix E. They revealed that Infrequency was the best of the four predictors for both PPT-TD (reg.) scores and PPT-TD (rev.) scores in the patient group. The relationship between the PPT Infrequency scale and the PPT thought-disorder scales in the non-patient sample was also determined. The correlations of PPT Infrequency with the two thought-disorder scales were as follows: PPT-TD (reg.), r = .33, p = .0017; PPT-TD (rev.), r = .26, p = .0130. Thus, the findings described above would seem to suggest that the PPT thought-disorder scales and the PPT Infrequencey scale have a good deal in common, and may be measuring much the same things.

Returning again to Table 8, we see that the correlations of Infrequency scores with the scores of each of the three criterion measures of thought disorder are as follows: JHR, r = .43, p = .003; JHW, r = .24, p = .113; WIST, r = .32, p = .033. These correlations are substantially larger than those between the PPT-TD (rev.) scale

and the three criteria. Comparison of the correlations related to the Infrequency scale and to the PPT-TD (reg.) scale shows that the correlation between Infrequency and JHR was the same as that between PPT-TD (reg.) and JHR. The correlation between Infrequency and JHW was not significant, but it was slightly larger than the correlation between PPT-TD (reg.) and JHW. Finally, the Infrequency scale correlated substantially better with the WIST than did the PPT-TD (reg.) scale, suggesting that the Infrequency scale may measure an aspect of disordered thinking that the PPT-TD (reg.) scale does not. In summary, the above comparisons between the PPT Infrequency scale and the PPT thought-disorder scales indicate that the Infrequency scale correlated somewhat better with the criterion measures of disordered thought than did the thought-disorder scales.

Finally, the author wanted to discover if the PPT Infrequency scale would still be able to discriminate the psychiatric patients from the non-patients when the possible effects of age, sex, Index of Social Position, and education were controlled statistically. It was noted earlier in this chapter that the two groups differed with respect to these variables. Table 18 presents the results of the analysis of covariance comparing the two groups' Infrequency scores while controlling for age, sex, social status, and education. Mean scores for the Infrequency scale adjusted for the effects of the covariates were as follows: patients, $\bar{X} = 8.05$; non-patients, $\bar{X} = 4.93$. The adjusted means were very similar to the original mean scores, which were 8.04 and 4.86 for the patient group and for the non-patient group respectively. The difference between the adjusted means was significant, $p = .0005$. Therefore, the PPT Infrequency scale was able to discriminate the patients from the non-patients when the

Table 18

Analysis of Covariance: PPT Infrequency Scores of Patients and Non-Patients, Controlling for the Effects of Age, Sex, Index of Social Position, and Education[a]

Source	df	SS	MS	F	p
Model	5	316.57	63.31	7.82	.0001
Error	111	898.50	8.09		
Corrected Total	116	1215.08			

Source	df	Type I SS	Type IV SS	F	p
Groups	1	268.51	105.33	13.01	.0005
Index of Social Position	1	.01	.99	.12	.7276
Age	1	17.02	5.38	.66	.4166
Sex	1	30.57	31.02	3.83	.0528
Education	1	.46	.46	.06	.8128

Group	Adjusted $\bar{X}$	$\bar{X}$
Patients	8.05	8.02
Non-patients	4.93	4.86

[a] $N = 117$ because of missing data on social status for 16 non-patients.

possible effects of age, sex, social position and education were controlled statistically.

Consistency of PPT Performance

The analyses presented in this section focus once again on the consistency of subjects' choices on the 20 PPT thought-disorder items that were presented twice within the test. The author derived an "Inconsistency" score for each subject by counting the number of instances when the subjects' selection on the first presentation of an item did not match his or her selection on the second presentation of that same item. Inconsistency scores of the different subject groups were compared, and the relationship of Inconsistency scores to other variables was analyzed.

Table 19 presents the mean Inconsistency scores of the different groups. The results of t tests comparing the groups are also summarized. The mean Inconsistency score for the patients as a whole was 3.82, significantly higher than the mean Inconsistency score (1.08) for the non-patients, t (51.5) = 5.20, p = .0001.

High-thought-disorder patients obtained a mean Inconsistency score of 4.92, which was significantly higher than the mean (2.45) of the low-thought-disorder patients, t (43) = 2.57, p = .014. The mean of the high-thought-disorder patients was also significantly greater than that of the non-patients, t (26) = 5.24, p = .0001. Finally, low-thought-disorder patients and non-patients had significantly different mean Inconsistency scores, t (21.4) = 2.26, p = .034.

Table 20 presents the correlations between Inconsistency and other

Table 19

Comparison of Patients' and Non-Patients' Mean Inconsistency Scores

Groups Compared	$\bar{X}$	SD	t	p
All patients[a]	3.82	3.40	5.20	.0001
Non-patients[b]	1.08	1.37		
High-thought-disorder patients[c]	4.92	3.59	5.24	.0001
Non-patients	1.08	1.37		
Low-thought-disorder patients[d]	2.45	2.62	2.26	.034
Non-patients	1.08	1.37		
High-thought-disorder patients	4.92	3.59	2.57	.014
Low-thought-disorder patients	2.45	2.62		

[a] $n = 45$

[b] $n = 88$

[c] $n = 25$

[d] $n = 20$

Table 20

Correlations between Inconsistency and Other Variables for the Patients and for the Non-patients

Variable	Patients		Non-patients	
	r	p	r	p
PPT-TD (reg.)	.45	.002	.30	.004
PPT-TD (rev.)	-.04	.767	.02	.814
PPT Infrequency	.36	.015	.36	.0005
JHR	.52	.0003		
JHW	.41	.005		
WIST	.26	.084		

variables in this study, for the patient and the non-patient groups separately. As shown, Inconsistency scores were positively and significantly related to scores on the regular PPT thought-disorder scale and to scores on the PPT Infrequency scale. These relationships existed among both the patients and the non-patients. Furthermore, the psychiatric patients' Inconsistency scores were significantly related to two of the criterion measures of thought disorder: to JHR, $\underline{r} = .52$, $\underline{p} = .0003$; to JHW, $\underline{r} = .41$, $\underline{p} = .005$.

CHAPTER IV

DISCUSSION

Validity of the Picture-Preference Test of Thought Disorder

The main purpose of this study was to assess further the validity of a picture-preference test of disordered thinking devised by Rudzinski (1979). Schizophrenics' scores on the PPT thought-disorder scale were compared to their performance on several other measures of thought pathology. The regular 31-item thought-disorder scale was significantly related to indices of disturbed thinking elicited by the Rorschach test, but it was not related to thought disorder as evidenced in responses on the WAIS test, nor to scores on the Whitaker Index of Schizophrenic Thinking (Whitaker, 1973). The revised version of the PPT thought-disorder scale did not correlate significantly with any of the criterion measures of thought disorder.

The present results thus cast doubt upon the validity of the PPT scale as a measure of formal thought disorder. An alternate interpretation of the findings is possible, however. The fact that PPT thought-disorder scores, in the case of the regular scale, did correlate significantly with the Rorschach measure may attest to the validity of the thought-disorder scale; while, the lack of a significant correlation of the PPT scale with the WIST and the WAIS could suggest that the latter two tests are not valid measures of thinking pathology. After all, various writers have concluded, after reviewing research

on the Rorschach, that the test is an effective instrument for detecting disordered thinking processes (Johnston & Holzman, 1979; Quinlan et al., 1972; Silverman et al., 1962); whereas evidence for the validity of the WAIS and of the WIST as measures of thought disorder is not as solid. Nevertheless, the opposing interpretation of the findings does not appear to be supported in light of the high correlations that were found between Rorschach thought-disorder scores and both WIST and WAIS scores.

The significant relationship between the regular PPT thought-disorder scale and the Rorschach measure may be related to the projective nature of both tests, and their use of visual, pictorial stimuli. It may be that the processes involved in producing a pathological percept on the Rorschach have something in common with the processes underlying one's preference for a bizarre, irrational picture in place of a more logical, orderly one. The WIST and the WAIS differ from the PPT in that they present tasks for subjects which are highly structured, and that call for language and problem-solving skills. The poor correlation of the WAIS and WIST with the PPT thought-disorder scale may indicate that the aspects of disturbed thinking elicited by structured tasks such as the WIST and the WAIS are not tapped by the PPT thought-disorder scale.

The present results with respect to the relationship of the regular PPT thought-disorder scale with other indications of thinking pathology is less encouraging than the findings of the original validation study with the scale (Rudzinski, 1979). The internal consistency of the scale, both when evaluated for the patients

separately and when evaluated for the non-patients separately, was lower in this study than in Rudzinski's, again decreasing the confidence in the validity of the scale.

Differences between the present study and Rudzinski's with regard to the type of criterion of thought disorder used, may have contributed to some of the differences in outcome. Rudzinski interviewed patients, rated them on the scales of the Brief Psychiatric Rating Scale (Overall & Gorham, 1962), and derived a thought-disorder score for each patient by summing the ratings on three of the BPRS scales: Conceptual Disorganization, Hallucinatory Behaviour, and Unusual Thought Content. These three categories of disturbed thinking may not have been enough to encompass the variety of manifestations of thought disorder. The present study evaluated patients' thought disorder with instruments that were able to tap a wider range of the characteristics of "thought disorder" than seems possible with the BPRS. Employing a more comprehensive assessment of subjects' thinking, the present study was unable to substantiate the claim that the Picture-Preference Test of Thought Disorder can predict disturbed thinking.

Even though schizophrenics' scores on the regular PPT thought-disorder scale were not consistently related to other measures of thinking pathology, their scores did distinguish them as a group from the non-patients, although the difference between the groups was not as great as would have been liked. However, several considerations suggested that the real differences between thought-disordered persons and non-thought-disordered persons in PPT scores

may have been obscured by the procedure of comparing the entire group of schizophrenics with the non-patients. Although thought disorder is considered by many to be the central defining symptom of schizophrenia, a number of the schizophrenics in this study showed very little thought disorder as measured by instruments used here. Perhaps the role of thought disorder in schizophrenia needs to be reconsidered, as some writers have recently suggested (Andreason, 1979; Harrow & Quinlan, 1977). After all, schizophrenia appears to be an extremely heterogeneous groups of disorders some of which may share very little in common, according to several writers who have reviewed the recent research (Neale & Oltmanns, 1980; Shapiro, 1981). Arising from the problems with the construct of schizophrenia itself, are the well-known difficulties involved in diagnosing the disorder. Neale and Oltmanns (1980) have described psychiatric diagnosis as a "notoriously unreliable endeavor." Despite the precautions taken in this study to ensure that all schizophrenic subjects met the criteria for schizophrenia as described in DSM-III (American Psychiatric Association, 1980), it is still possible that some subjects were included in the group who shouldn't have been.

In view of the above issues, the author subdivided the schizophrenic sample into a "high-thought-disorder" group and a "low-thought-disorder" group on the basis of subjects' thought-disorder scores on the Rorschach and WAIS. Comparison of the two schizophrenic groups with each other and with the non-patients revealed some differences between groups that were more striking than when the entire schizophrenic group was compared to non-patients. High-thought-disorder

patients had significantly higher scores on the regular PPT thought-disorder scale than did both the low-thought-disorder patients and the non-patients. The latter two groups did not differ significantly from each other. Thus, markedly thought-disordered subjects tend to produce high scores on the regular PPT thought-disorder scale. However, the scale does not appear to be able to discriminate schizophrenics with lesser degrees of thinking pathology from normals.

Curiously, the low-thought-disorder group had a slightly lower mean score on the regular PPT thought-disorder scale than did the non-patients. Perhaps the low-thought-disorder patients were more defensive in their test-taking attitude than were the other groups. Presumably, some of these patients were those who had already achieved some recovery from the active phase of their illness. Compared to the high-thought-disorder patients, they probably possessed more control over their psychopathology, and had a sharper awareness of the thought-disordered alternatives as bizarre and irrational. Perhaps needing to deny psychopathology for fear that their responses could affect their discharge plans, or for other reasons, these low-thought-disorder patients tended to shy away from endorsing the thought-disordered alternatives in the PPT. Normals, on the other hand, were probably more relaxed and carefree in their approach to the test, realizing that their responses were completely anonymous. Thus, they were likely less reluctant to regress momentarily by endorsing one of the bizarre pictures.

The PPT Infrequency Scale

Although the regular PPT thought-disorder scale was not consistently

related to thought disorder as measured by the criterion tests used in this study, its relationship to the PPT Infrequency scale may provide some clues as to what the scale is measuring. PPT Infrequency scores were significantly correlated with both the regular and the revised PPT thought-disorder scales in both the patient group and the non-patient group. This suggests that the two PPT scales measure a common dimension. When Infrequency scores were controlled statistically, scores on the regular PPT thought-disorder scale no longer discriminated the patients as a group from the non-patients. When three groups of subjects were compared (i.e., high-thought-disorder, low-thought-disorder, and non-patient), and their PPT Infrequency scores were partialled out of the thought-disorder scores, the regular PPT thought-disorder scale could not discriminate either the high-thought-disorder patients or the low-thought-disorder patients from the non-patients. However, the two patient groups were still significantly different from each other.

As the reader will recall, a subject's score on the PPT Infrequency scale served as a measure of his or her disposition toward making deviant choices on the PPT. The literature on response sets in psychological assessment has identified the deviant response-tendency as one of these (Berg, 1957; 1967). The PPT thought-disorder scale, like the Infrequency scale, may be measuring subjects' tendencies to make deviant responses. Many of the keyed thought-disorder alternatives do have low probabilities of being endorsed by normal subjects (see endorsement proportions presented in Appendix E).

Response sets, although they are viewed by some writers primarily as sources of error in testing, are considered by others to be valuable indicators of personality. Berg (1967) contended that the deviant response tendency is an important dimension of personality and that it is very general across many different kinds of assessment instruments. In this view the content of test items is largely unimportant; rather, what is important is the fact of deviation from the social norm. Berg (1967) stated his deviation hypothesis as follows:

> Deviant behavior patterns are general in the sense that those responses that are regarded as being significant for identifying a particular category of atypicality in behavior do not exist in isolation. Those responses that are regarded as being significant for a particular category of deviant behavior are associated with a number of other deviant responses that are not regarded as being significant for that particular category of behavioral atypicality....These other responses explain why a large variety of stimulus materials...can be used to predict deviant behavior by means of psychological tests. (p. 190)

A number of researchers have demonstrated that deviant responses can be used successfully for assessment purposes. Barnes (1955) used the Perceptual Reaction Test (PRT) developed by Berg, Hunt, and Barnes (1949). This test is composed of 60 abstract designs, and subjects are to rate the degree of their liking for each design on a 4-point scale. Barnes developed a scale from the test by using only deviant responses, and was able to successfully discriminate a group of schizophrenics from a group of normals. Other investigators (cited in Adams & Butler, 1967) used the PRT and Barnes' approach, and were able to discriminate neurotics from normals (Hesterly, 1963),

depressed subjects from normals (Bradford & Adams, 1964), disturbed children from normal children (House, 1960), and mentally retarded persons from normal adults (Cieutat, 1960). Adams and Berg (1961) used auditory stimuli in a test similar to the PRT, and found that the frequency of deviant responses discriminated schizophrenics from normals.

In this study, schizophrenics as a group made significantly more deviant responses on the PPT (as measured by their Infrequency scale scores) than did non-patients. Infrequency scores continued to discriminate the two groups when differences between the groups in age, sex, education, and social status were controlled statistically. High-thought-disorder patients obtained significantly higher Infrequency scores than did both the low-thought-disorder patients and the non-patients. Like the regular PPT thought-disorder scale, the Infrequency scale did not discriminate low-thought-disorder patients from non-patients.

Furthermore, among the psychiatric patients in this study, the tendency to make deviant choices on the PPT showed some relationship with the severity of thought disorder. There was a significant and positive correlation between patients' Infrequency scores and their thought-disorder scores on both the Rorschach and the WIST.

The research on deviant responses described above, as well as the present findings, encourage further investigation of the PPT Infrequency scale to determine the psychological correlates of the tendency to endorse infrequently chosen pictures on the PPT, and to evaluate the ability of the scale to discriminate various groups. A

scale constructed of infrequently chosen responses may prove to be a useful assessment instrument. Such has been the case with the F-scale of the MMPI. The MMPI's F-scale was made up of items which 10 percent or fewer of the subjects in the Minnesota normative samples answered in a particular direction. Although the F-scale was intended as a check on the validity of a test record, subsequent research has demonstrated various personological correlates of scores on the F-scale. Dahlstrom, Walsh, and Dahlstrom (1972) have concluded that the F-scale can be used with considerable confidence as an index of the extent and severity of psychopathology.

While the PPT Infrequency scale may be measuring tendencies toward deviance, eccentricity, or non-conformity, one has the impression after looking at these items that this scale may also measure other dimensions. A number of the keyed infrequent alternatives portray damage to or destruction of persons or objects. For example, Item 36 shows a picture of a man crumpled on the ground at the bottom of a cliff (the keyed alternative) and a picture of the same man hanging from the cliff, holding onto a branch with one hand. Another item shows a man with his arm in a cast (the keyed alternative) and a man giving a speech to an audience. Still another item shows a girl thinking about a grave (the keyed alternative) and the same girl thinking about husband and child. Such items perhaps tap feelings of loss, depression, somatic concern, or feelings of disintegration. Other items may be related to feelings of isolation, or to social withdrawal. For example, one item pictures a window with its shade pulled down (the infrequent alternative) and the same window

with the shade up, showing an outdoor scene. Item 31 shows a bedroom with two figures in bed, and the same scene with one figure in bed (the infrequent alternative). Still other items may be related to aggressive and antisocial tendencies.

Possibly the schizophrenics in this study chose more of the keyed infrequent alternatives than did normals, because the content of many of these pictures was relevant to or meaningful to schizophrenics in that it represented feelings or difficulties that are common among schizophrenics--such as withdrawal from involvement with people and with the environment, and disturbances in the sense of self.

On the other hand, schizophrenics' preferences for the infrequent alternatives of the PPT Infrequency scale may have had less connection with the themes in the pictures than with the stimulus-strength of the pictures. Earlier it was reported that a number of theorists have proposed that defects in perception, attention, and information-processing underlie the cognitive disturbances seen in schizophrenics. Salzinger (1971) contended that schizophrenics are controlled to an abnormal degree by stimuli in their environment which are "immediate," including strong stimuli. A number of the keyed alternatives in the PPT Infrequency scale seem to have considerable emotional impact in that the scenes depicted are frightening, sad, repulsive, or sexually provocative. By contrast, the pictures with which these are paired are neutral in impact. Similarily, many of the keyed alternatives in the thought-disorder scale seem to have considerably more effect upon observers than do the pictures with which they were paired. Subjects in this study,

particularly the students, frequently showed strong reactions to the thought-disordered alternatives and to other PPT pictures—they laughed or made exclamations of surprise or displeasure. In view of these considerations, schizophrenics' higher scores on the Infrequency and on the Thought-Disorder scale of the PPT may reflect not so much the content of their psychological difficulties as their disturbances in attention and information-processing, which would include a tendency to be overwhelmed by strong stimuli.

The Consistency of Subjects' Choices on the PPT Thought-Disorder Scale

Several analyses comparing the performance of the schizophrenics to that of the normals on the 20 thought-disorder items that were shown twice within the PPT produced similar results: The schizophrenics were considerably less consistent in their choices than were the non-patients. However, the patient's mean scores on both the PPT thought-disorder scales and the Infrequency scale were considerably below the chance level, suggesting that most of the subjects were not responding randomly on the items.

Considering the inconsistency of the patients, it is not surprising that the revised thought-disorder scale was so poor at discriminating the subject groups. The reader will recall that the revised PPT thought-disorder scale was constructed of 20 of the thought-disorder items that were shown twice. For this scale, an item was scored positively when the keyed thought-disorder alternative was selected on both the first and the second presentation of the item. This method of scoring responses resulted in rather low scores for the schizophrenics, because of their considerable

inconsistency. In fact, the mean PPT-TD (rev.) score for the patients was slightly lower than that of the non-patients. The findings with regard to the inconsistency of schizophrenics' performance on the PPT suggest that a system of scoring responses such as the one used in the revised PPT thought-disorder scale may not be appropriate for use with schizophrenic subjects, as it fails to make use of much valuable information about their test behavior.

The author computed an "Inconsistency" score for each subject by counting the number of instances, among the 20 repeated thought-disorder items, when the subject's choice on the first presentation of an item did not correspond with his choice on the second presentation of that same item. The schizophrenic subjects as a group had significantly higher Inconsistency scores than did the non-patients. Inconsistency scores discriminated high-thought-disorder patients from low-thought-disorder patients and from non-patients. In addition, Inconsistency scores were able to discriminate the low-thought-disorder patients from the non-patients.

Within the patient group, Inconsistency scores were positively and significantly related to thought disorder as assessed by the Johnston-Holzman system of scoring pathognomic verbalizations on the Rorschach and on the WAIS. The relationship between Inconsistency scores and WIST scores approached significance. Overall, the psychiatric patients' Inconsistency scores were more strongly related to the criteria of disordered thinking than were their scores on the PPT thought-disorder scales.

The relationship between thought disorder and schizophrenics'

inconsistent performance on the PPT in this study is consistent with Shakow's (1962, 1974) theory about the fundamental disorder in schizophrenia. From the results of a series of studies of schizophrenics' performance on reaction-time tasks Shakow concluded that they are deficient in the ability to maintain a "major set" or a state of readiness to respond. Instead, many other sets, or ways of responding, interfere. Shakow suggested that schizophrenics substitute "segmental sets" for major sets. They respond to a segment of the stimulus and thus respond in ways that are only partially appropriate. Shakow believed that the loss of major set was the central deficit underlying the cognitive disturbances of schizophrenics.

In terms of Shakow's formulations, the schizophrenics in the present study may have tended to lose the major set to respond appropriately on the PPT. They retained the set to make a choice on each item, but may have lost sight of the need to do so according to their preference. They may have been making their selections on the basis of a variety of idiosyncratic, and changing, criteria.

Conclusions

Thought disturbances play an important role in psychiatric disorder. In the case of schizophrenia, they are considered a defining feature. Nevertheless, clinicians and researchers alike still lack a valid method of assessing thought disorder that is comprehensive and is not unduly influenced by factors irrelevant to thought disorder. The present study does not bolster the claims to validity of the Picture-Preference Test scale of disordered thinking developed

by Rudzinski (1979). However, the results do suggest that the picture-preference approach is a good one for future researchers to use to develop a test of thought disorder.

In this study the thought-disorder scale of the PPT was found not to be a good predictor of disturbed thinking as measured by the criterion measures. Likely scores on the thought-disorder scale are determined by a number of psychological dimensions in addition to disordered thought. One of these seems to be the tendency to choose deviant responses, which appears to be associated with the severity of thought disorder, but which probably is not an aspect of thought disorder or specific to persons with that condition.

The inconsistency of schizophrenics' performance on the PPT seems to be a reasonably good predictor of thinking pathology. Future research with the PPT may find it useful to devise a way of incorporating subjects' response-inconsistency into their scores for the thought-disorder scale, much like the system developed for the MMPI where the values of clinical scales are statistically corrected by scores on the K-scale.

Another promising direction for future research with the PPT involves the Infrequency scale. This scale, or another one composed of items having low endorsement probabilities, may prove to be a valuable instrument for detecting schizophrenia or general psychiatric disturbance.

APPENDIX A

DESCRIPTION OF ITEMS IN THE PICTURE-PREFERENCE TEST INCLUDING THOUGHT-DISORDER ITEMS

APPENDIX A

Description of Items in the Picture-Preference Test Including Thought-Disorder Items

A star (*) placed beside the item number designates a thought-disorder item.

Two stars (**) placed next to a picture description designates the keyed choice reflecting thought disorder.

Item No.	Picture A	Picture B
X.	Lamp on table	Tree
Y.	Triangle	Square
1.*	Woman with shoulder bag	Handbag and pair of shoes**
2.	Marquee advertising "Love Story" movie	Marquee advertizing the "Godfather" movie
3.	Woman in shower	Woman watering shrubs
4.	Frustrated boy sitting in front of math problems	Same boy being reprimanded by mother
5.	Owl on tree branch	Woman being fitted for shoes by shoe salesman
6.	Young man, arm-in-arm with woman	Same man walking hand-in-hand with parents
7.	A conservative appearing man	A masked man
8.	A male sword-swallower	A male fire-eater
9.	Couple just married, in a car	Couple being married
10.	Rear view of tenement and alley	A fun-house mirror with distorted reflection
11.	Boy climbing tree	Boy with pie on face
12.	A man and woman kissing	Scene inside theater
13.	Father reprimanding boy in a loving manner	Son kicking family cat

Item No.	Picture A	Picture B
14.*	Child walking under sun	Same child falling—cloud across sun**
15. & 206.*	Spoon, fork, sword**	Spoon, fork, knife
16. & 138.*	A tree and a key**	A key and a lock
17. & 98.*	Drooping flower**	Three upright flowers
18.	Refrigerator with door open	Refrigerator with door closed
19.	Couple entering motel	Secretary at desk
20. & 210.*	Telephone receiver	Telephone receiver with mouth on listening end of receiver**
21.	A boy being treated by a doctor	Boy escaping from scene of crime via window
22.	An upright baby bottle	Same bottle tilted down
23.	Medicine cabinet filled with toothbrushes, bandages, etc.	Medicine cabinet filled with pill boxes, bottles, etc.
24. & 112.*	Baseball and bat	Ball and child crawling**
25.	Mother feeding son	Father feeding son
26	A girl thinking about a grave	Same girl thinking about husband and child
27. & 127.*	Simplified, childlike drawing of a figure**	Well-drawn head of a man
28.	Couple looking at album	Couple dancing
29.	Modern Art figure representation—close up	Same figure at a distance
30. & 125.*	Nails and a pail**	Hammer and nails
31.	Bedroom with two figures in bed	Same picture with one figure in bed
32. & 103.*	Birthday cake, fork, and glass.	Birthday cake and snake**

Item No.	Picture A	Picture B
33. & 128.*	Girl standing; intact figure	Same picture of girl split into segments**
34.	Couple in motorcycle with sidecar	Couple on motorcycle
35.	A drunk being laughed at	Same man with family
36.	A man hanging from cliff, holding branch with one hand	Same man crumpled on ground at bottom of cliff
37.	A masked man with gun	A policeman
38. & 104.*	Two eyes behind a broken lamp**	Broken lamp on floor beside table
39.	A rose with thorns	A dead tree
40.	An escalator	An express elevator with door closed
41.	A road leading to town in the distance	Same scene with no town in sight
42.	A double bed	Twin beds
43.	Superman	A muscular stevedore
44.	A car parked by side of road with hood up	Same car being driven on mountain road
45. & 140.*	Mop and broom	Mop and ice cream cone that's dripping **
46.	Boy putting candy into his mouth	Boy looking thru telescope
47.	Stewardess greeting passengers	Man and woman reading from same paper
48.	Sleeping Beauty and Prince Charming	Snow White and Seven Dwarfs
49.	Man driving big car	Male graduate in cap and gown
50.	A car going over a bumpy road	Road showing "detour" sign

Item No.	Picture A	Picture B
51.	Boy holding hands with mother	Same boy holding hands with father
52.	Statue of man and woman embracing	Statue of a woman
53.	Woman in bathing suit	Woman cooking at stove
54. & 191.*	Woman talking with child	Woman with raised arm yelling at child**
55. & 136.*	Chair	Broken chair**
56.	Stethoscope	Package of dynamite
57.	Baby in crib	Couple in bed
58.	Car being pulled by tow truck	Car being pushed by tow truck
59. & 202.*	Train, chain, rain**	Train and car
60. & 88.*	Full length view of boy	Framed picture of same boy**
61. & 116.*	Milk carton, shaving cream, and razor**	Milk carton, coffee cup, and spoon
62.	Picture of mouth	Picture of eyes
63.	A buxom woman	A less buxom woman
64.	Couple at a zoo	Couple walking arm-in-arm
65.	Man walking across tattered rope bridge	Man moving heavy rock
66.	Couples dancing closely	Square dance
67.	Empty Garage—open door	A handgun
68.	Long line of people waiting to get into restaurant	An automat
69. & 110.*	Girl watching TV screen from which an arm is extended**	Same picture without arm extending out of TV
70.	A hospital (outside view)	Line of traffic waiting for train to pass

Item No.	Picture A	Picture B
71. & 154.*	Saw and screwdriver	Saw and set of false teeth**
72.	Union picketers outside office building	Negotiating men at table
73.	A medical journal	A detective magazine
74.	Window with shade pulled	Same window with shade up showing an outdoor scene
75. & 192.*	Pair of shoes and pair of sox	Pair of sox and a box**
76.	Woman talking to priest	Woman talking to man
77.	A secluded tree	A family house
78. & 133.*	Saw and apple**	Tree and apple
79.	Two men arguing	Same picture with men, backs toward each other
80.	Boy pulling girl's pigtails	Girl reading
81.	Man drinking out of a bottle	Man drinking out of glass
82.	Woman viewed at eye level	Woman being viewed from below
83.	Couple in drive-in	Couple planting trees
84.	Boy jumping off high rock with rubble below	Boy sitting and reading
85.	Couple receiving award	Woman giving message to man
86.*	Spool of thread with threaded needle	Eye of needle and an eye of a person**
87.	Baby with pacifier	Baby looking at mobile
89.	Boy and girl playing "doctor"	Boy and girl coloring in book
90.	Roller coaster seen from first car	Baby kangaroo in mother's pouch

Item No.	Picture A	Picture B
91.	A teddy bear	A duck pull-toy
92.	Woman with two other women	Woman with two men
93.	Man piloting airplane	Same man, flying himself
94.	Beggar sitting on side-walk holding cup	Man struggling to lift heavy weight
95.	Boy and girl drinking from same container with straws	Two girls sitting on swings
96.	Princess kissing frog—he changes into prince	Man proposing to woman
97.	Woman in bed being examined by male doctor	Same scene with female doctor
99.	Man and woman passing on street	Same scene, man turns head to look at woman passing
100.	Mouse watching cat from his hole in wall	Mouse approaching cheese in baited trap
101.	A neatly arranged room	Same scene, but room in disorder
102.	A man wearing a mask with a smiling facial expression	Same man—no mask—no expression on his face
105.	Couple watching TV from separate chairs	Couple embracing on couch
106.	Seaman being whipped	Seaman scrubbing floor
107.	Woman in "roman bath"	Lone woman under sun-lamp
108.	Masked man stealing money out of telephone box	Man reading at desk
109*	Young girl	Teddy bear**
111.	Boy throwing rock thru window	Same boy being caught by policeman

Item No.	Picture A	Picture B
113.	Couple playing tennis	Women playing volleyball
114.*	Lamp and light-bulb	Lamp and umbrella**
115.*	Child touching sun with hand**	Same scene but child is not touching sun
117.	A clock showing 10 a.m.	Clock showing 12 noon
118.	Boy standing in front of father saying "I promise" with fingers crossed behind his back	Landscape scene
119*	An "eight-ball" and a clock showing 8 o'clock**	Clock showing 8 o'clock, and a watch showing 8:30
120.*	Boat and a leaking faucet**	Boat and two oars
121.	Young boy feeding himself	Infant suckling at mother's breast
122.	Young boy and girl	Man and woman kissing
123.	Man smoking	Man whittling
124.	Woman in doctor's office	Woman being helped into bed by a nurse
126.	Construction worker staring at woman	Woman at bank talking to a female teller
129.	Couple at art gallery	Couple embracing on couch
130.	Man walking thru field	Man running thru field
131.	Woman in short skirt fitting man for suit	Woman alone
132.	Crime figure	A horse
134.	A dagger	Pair of scissors
135.	Number of men fishing	Couple on way to hay-loft
137.	Couples playing cards	Woman sitting on man's shoulder
139.	Couple on beach blanket	Family picnic

Item No.	Picture A	Picture B
141.	A palm tree	A cactus plant
142.*	Figure of a girl	Girl attached to puppet strings
143.	Boy buttoning shirt	Boy blowing bubble
144.	Snow White asleep	Girl reading
145.	Hand cutting knot with knife	Hand untying knot
146.	Roast turkey on platter	Baby chick emerging from shell
147.	Four letter "M"s— increasing in size from small to large	Four uniformly-sized letter "M"s
148.	A news magazine	A movie magazine
149.	Large "plus" sign and circle	Two large "plus" signs
150.	A man	A boy
151.	A man watching TV	Man sitting in chair thinking
152.	Older man feeding self	Older man being fed
153.	Shower room with several nude men	Woman ironing with child on floor
155.	Large cactus, desert scene	Large clock showing 4:15
156.	View from shoulder of a man who is giving a speech to audience	Man with arm in cast
157.	Man being whipped	Woman being whipped
158.	A painting	A mirror
159.	Piece of paper with small figure at the bottom	Paper with figure filling page
160.	Boys about ten years old playing football	Same boys playing baseball
161.	A beaver	A butterfly

Item No.	Picture A	Picture B
162.	Dog standing with no leash	Dog on leash
163.	A human heart	A human brain
164.	Woman buying cake at bakery shop	Same woman baking cake
165.	A strung bow	A bow, unstrung
166.	People throwing things at man carrying "peace" sign	Group of soldiers in combat
167.	Small dog running thru the woods	Cat curled up by fire
168.	Scarecrow	Robot
169.	Swans and a vulture	Group of vultures
170.	Mother duck with young ducks following	Mother hen with chicks under her wings
171.	A crib	A playpen
172.	Circle with square next to it	Circle and square overlapping
173.	Row of numbered telephone poles	Same poles without numbers
174.	Ten year old girl	Grown woman
175.	Two men wrestling	Two men boxing
176.	Football player catching a pass	Football player bent over ready to hike the ball
177.	Person sleeping—dream cloud shows non-descript scene	Same scene with no dream cloud
178.	Baby being fed bottle by happy mother	Baby being breast fed by mother with expressionless face
179.	Numbers: 13,14,15,16	Numbers: 2,4,8,16
180.	Apple with bite out	Orange with section removed

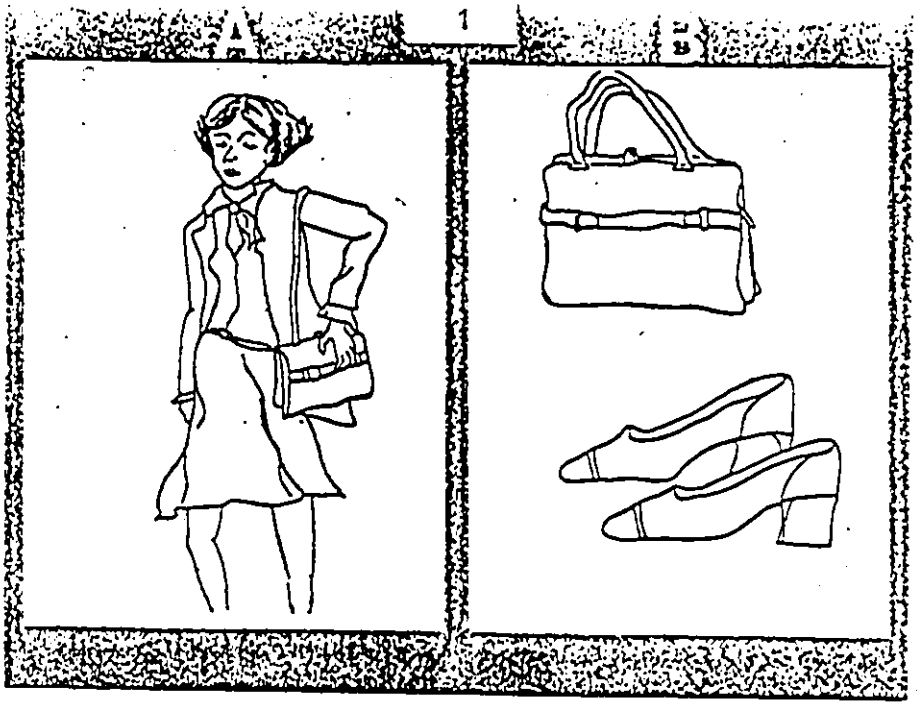
Item No.	Picture A	Picture B
181.	Toy top spinning	Large ball
182.	Roaring fireplace	Hot bath
183.	Person lying in sick-bed	Doctor with stethoscope
184.	Organ grinder and monkey	Freak show at circus
185.	Car wash--dirty car going in--clean car coming out	Caterpiller crawling into cocoon, and butterfly emerging
186.	Soldiers in combat	Line of men getting injections
187.	Man climbing rope with end of rope visible	Same scene with rope disappearing at top of picture
188.	Woman trying on shoes with male salesclerk	Woman being fitted for dress by female seamstress
189.	Child playing in sandbox	Child climbing tree
190.	Man sitting throwing cards into a hat	Man resting on hammock
193.	Man racing bike down hill	Man on exercycle
194.	Hamster in cage running wheel	Hamster climbing slope to ledge in cage
195.	Woman sitting on rock looking at reflection in pond below	Person sitting on log in woods looking down
196.	Christmas tree with presents	Birthday table with presents
197.	A ten dollar bill	Two five dollar bills
198.	Mother bottle feeding baby	Mother breast feeding baby
199.	Three men in shower room	Soldier peeling potatoes
200.	Man playing trumpet	Man playing drums
201.	Boy working on puzzle	Boy with broken bat
203.	Tennis player	Three men playing volleyball

Item No.	Picture A	Picture B
204.	Middle aged car	Sick man in bed
205.*	Letters: A,B,C,D,	Letters: M,E **
207.	Boy dressing himself	Boy being dressed by mother
208.*	Girl speaking to tree**	Girl speaking to boy by tree
209.	Man entering bar	Man entering business building

APPENDIX B

REPRODUCTION OF THE PICTURE-PREFERENCE TEST THOUGHT-DISORDER ITEMS*

*Printed by permission from Rudzinski (1979).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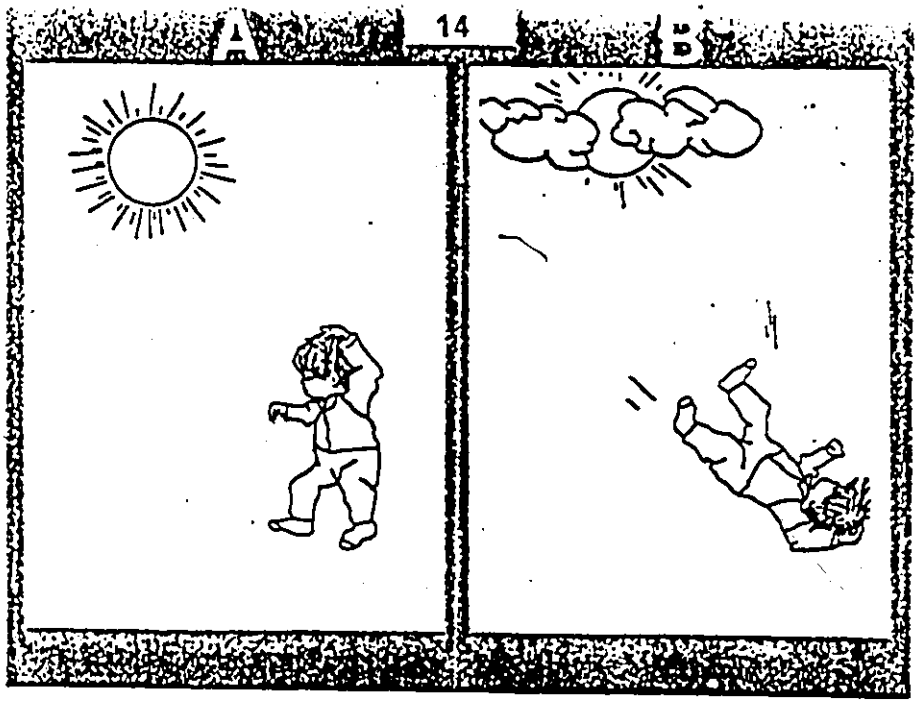
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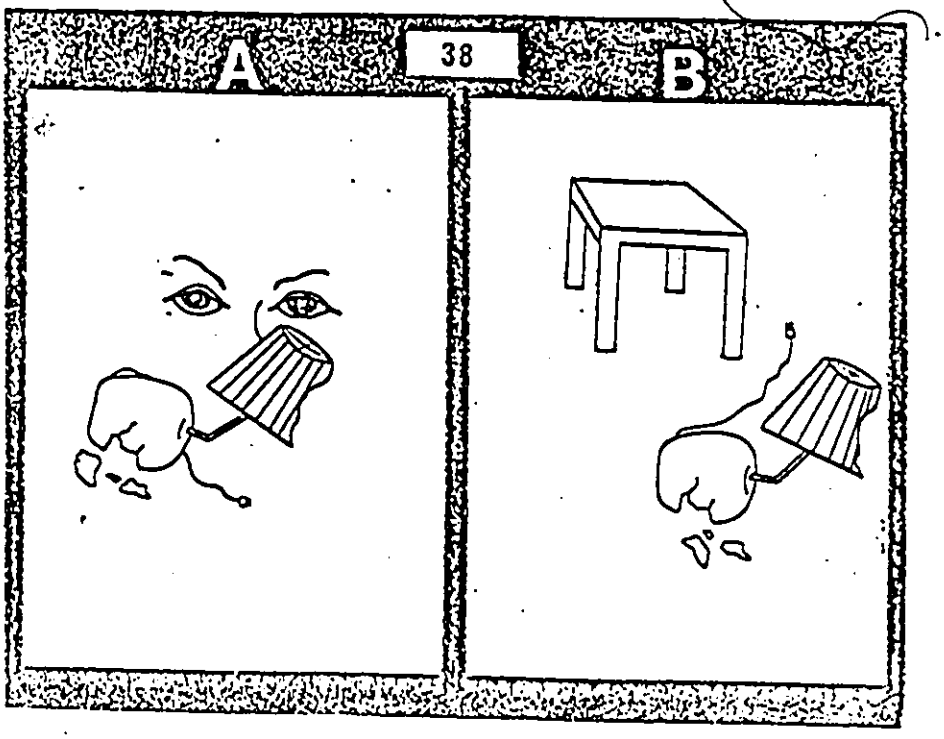
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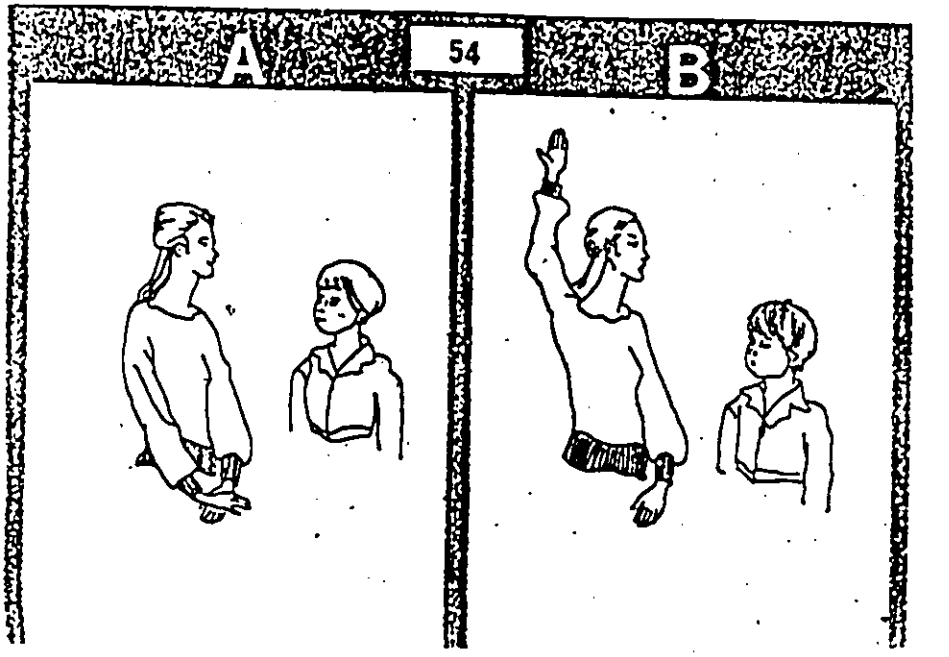
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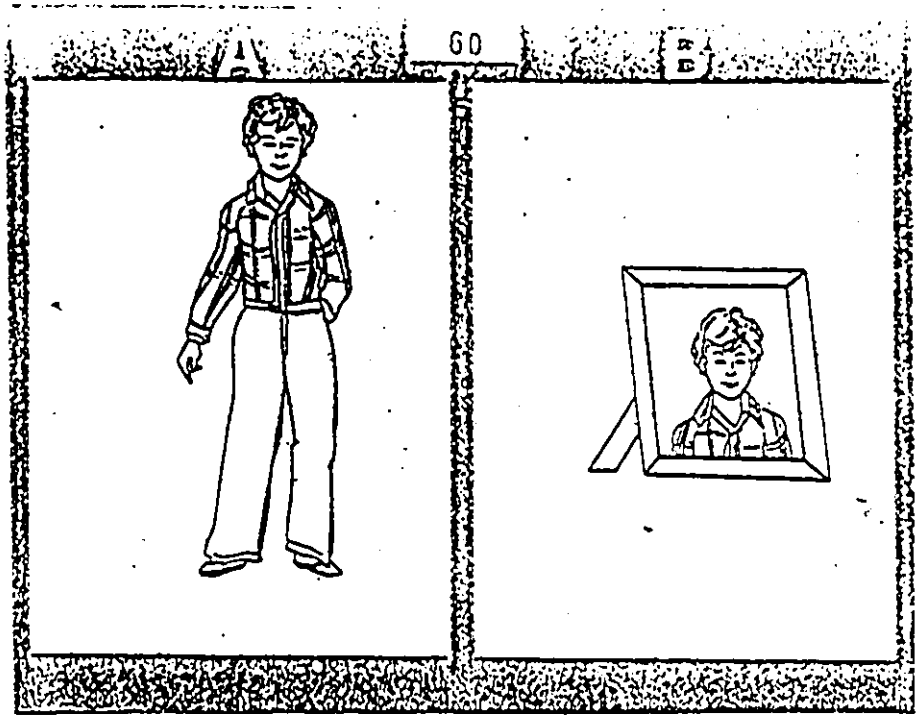
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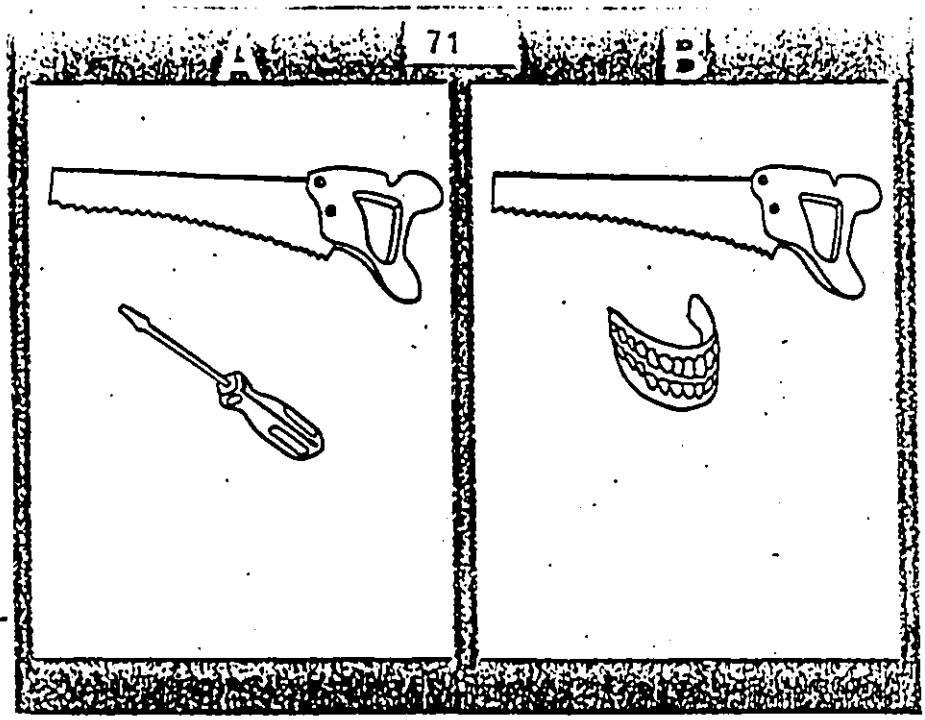
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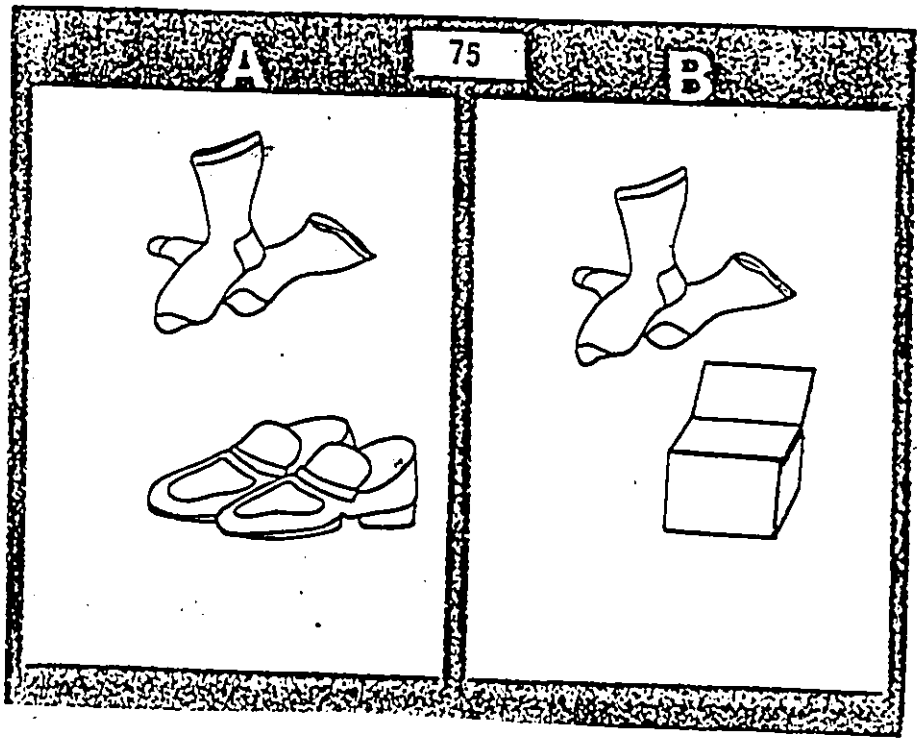
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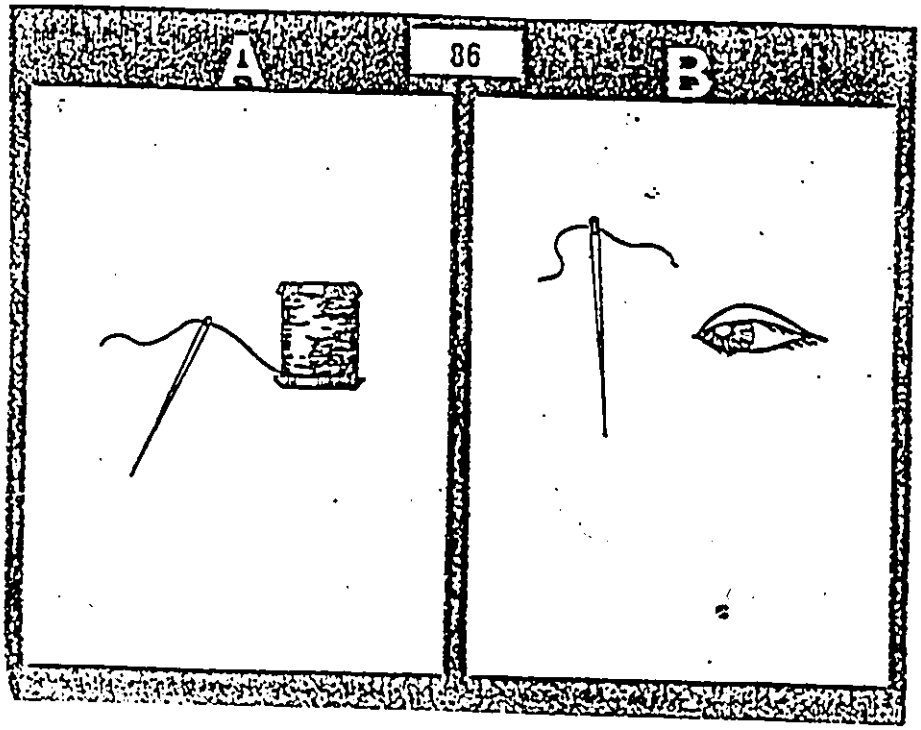
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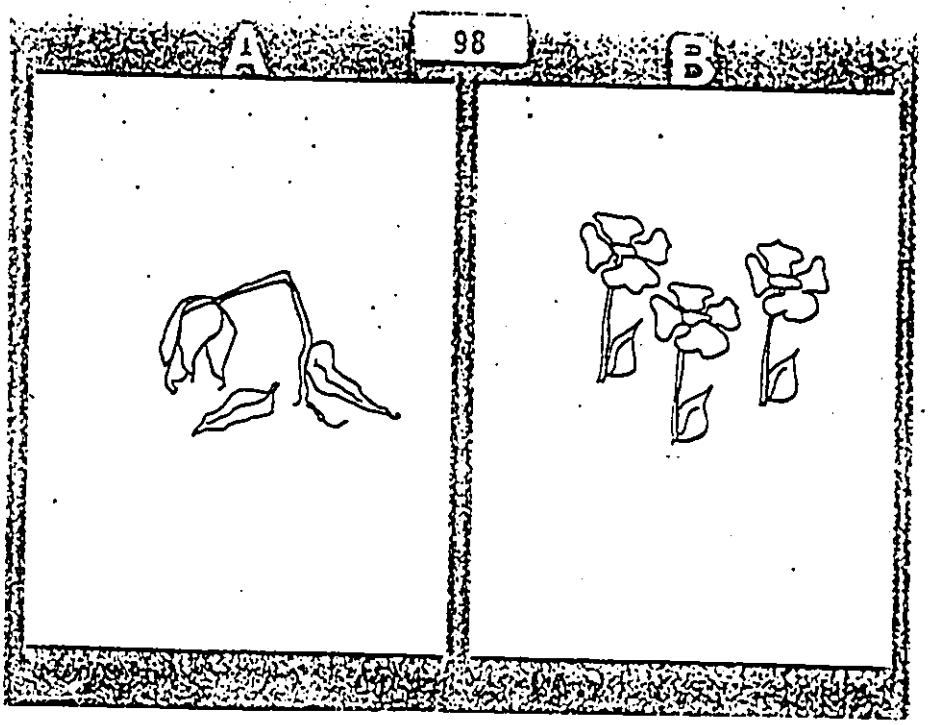
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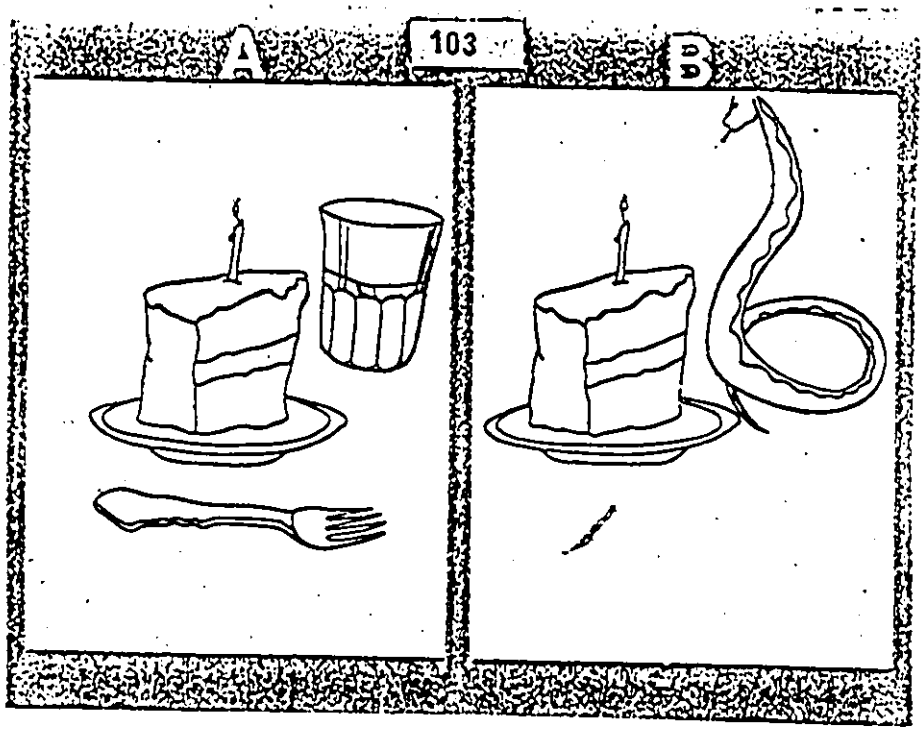
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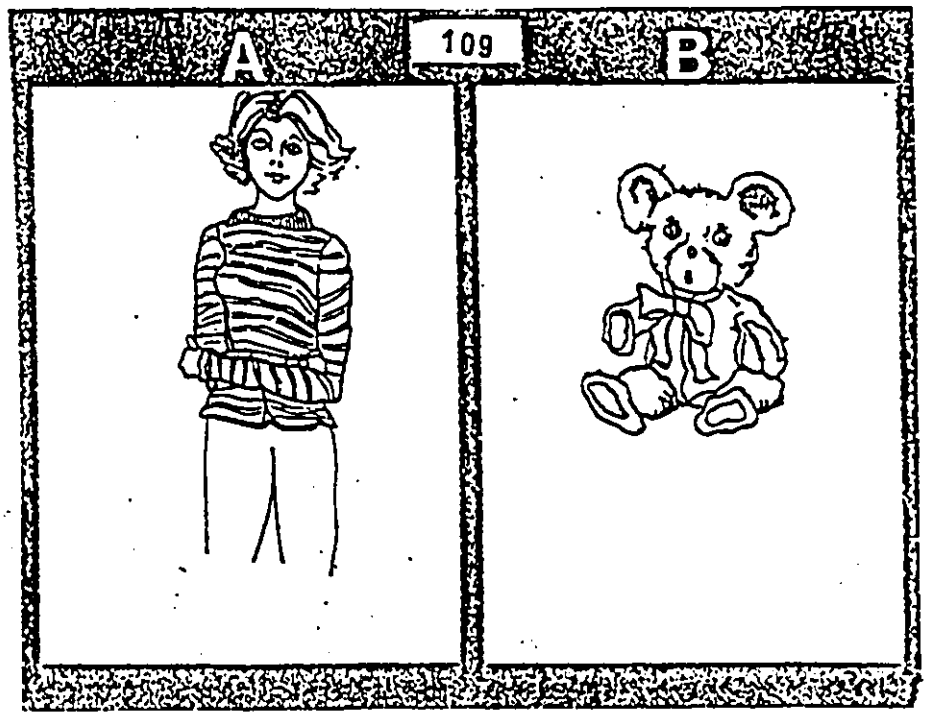
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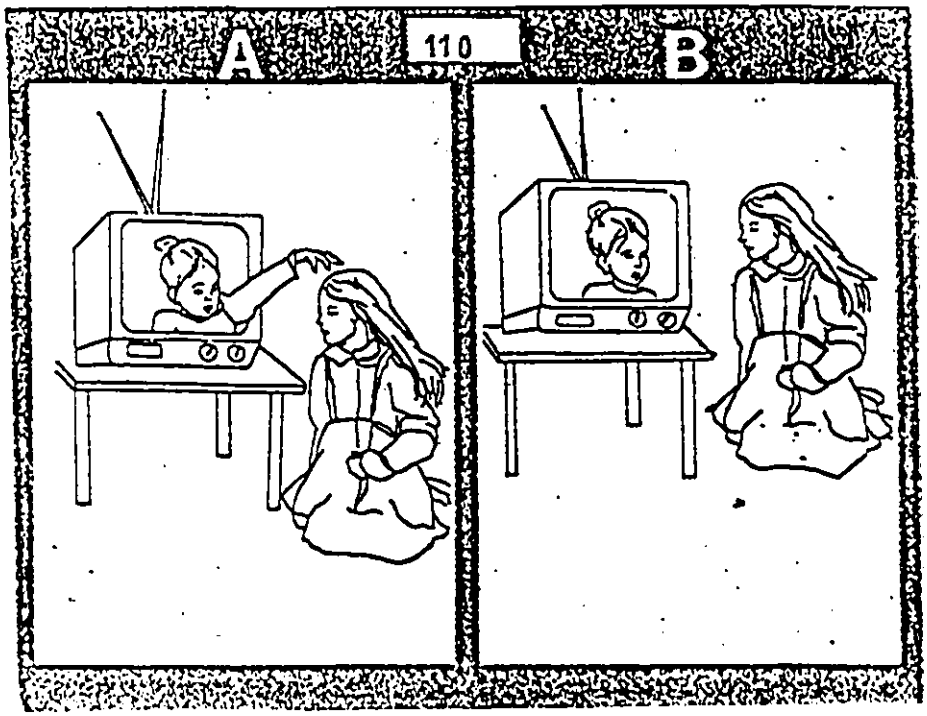
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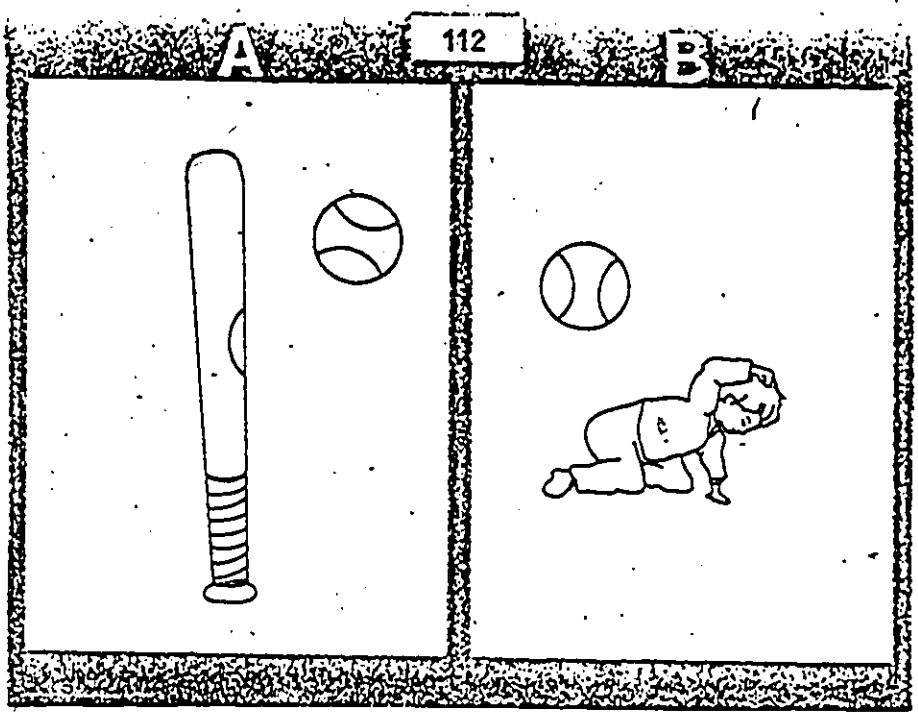
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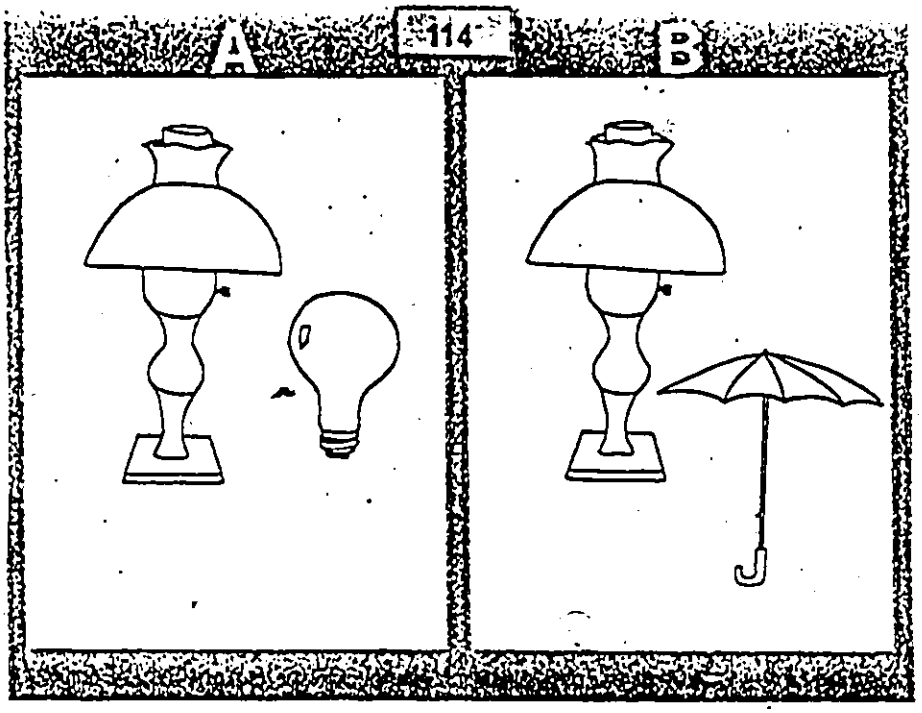
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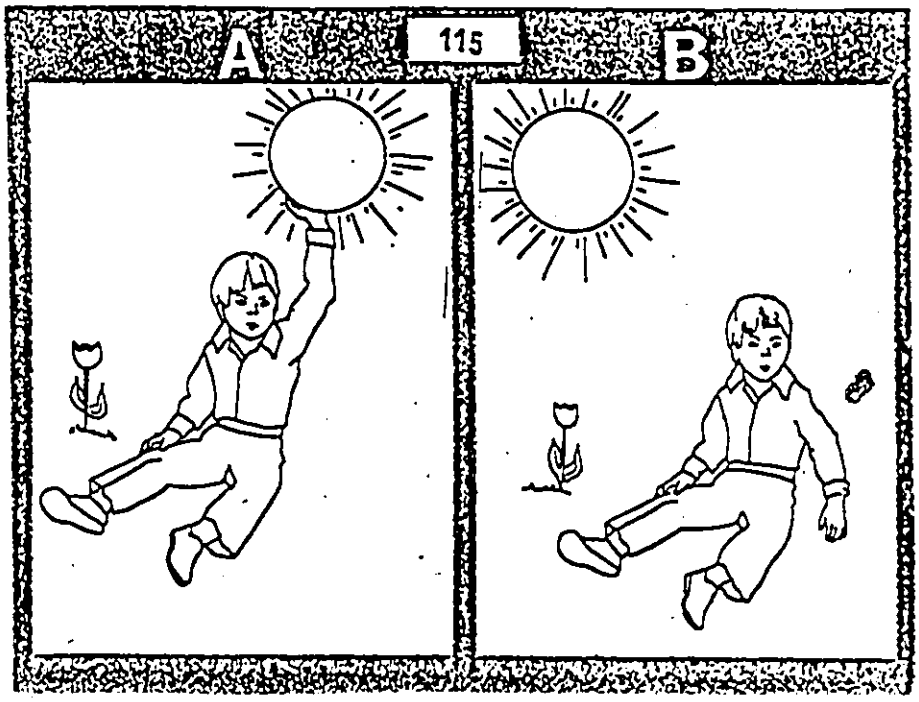
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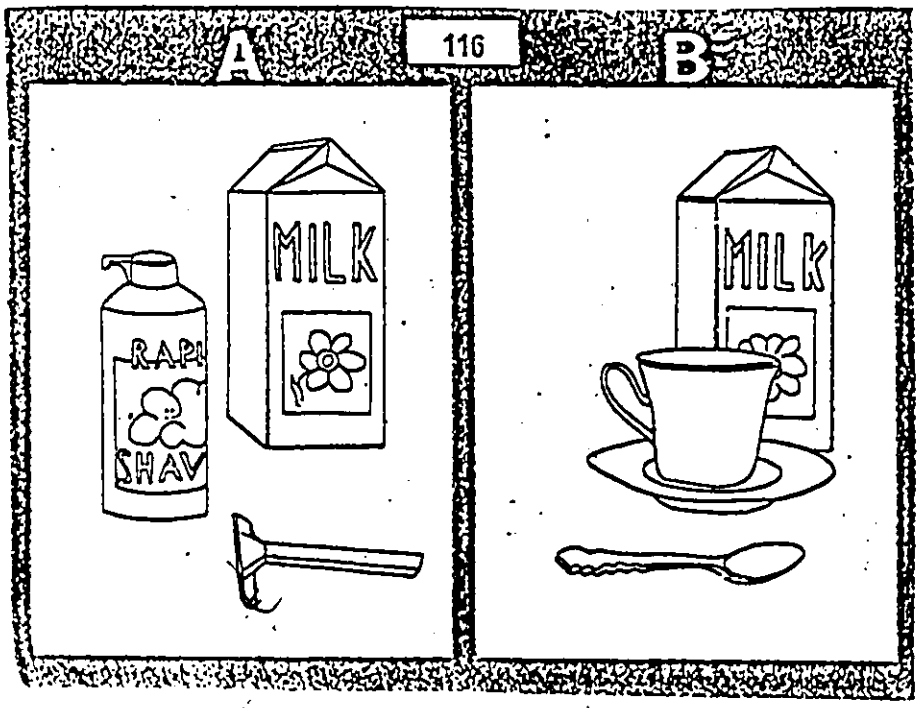
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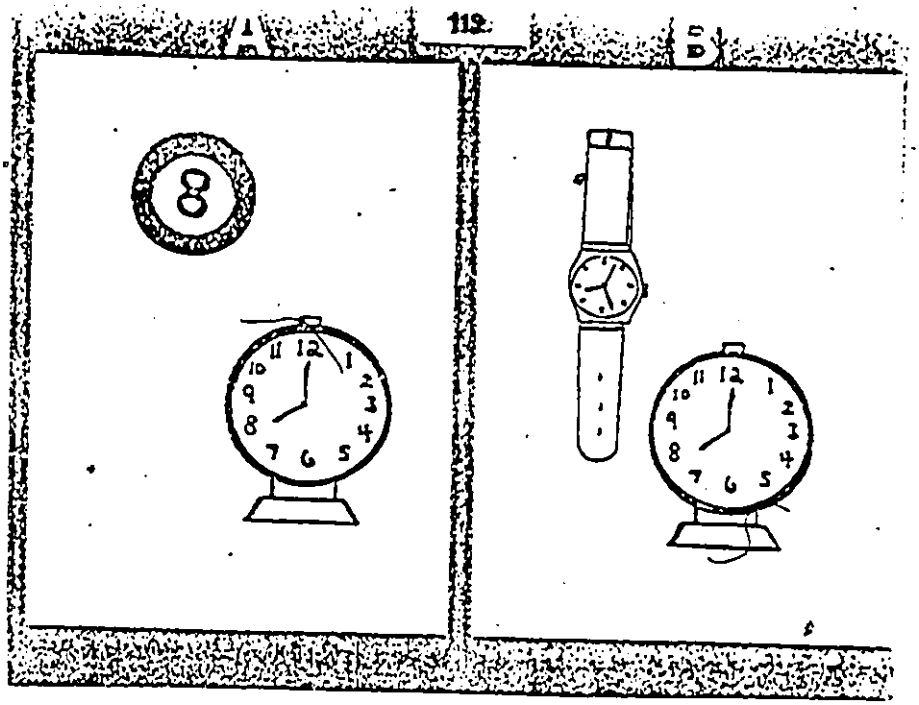

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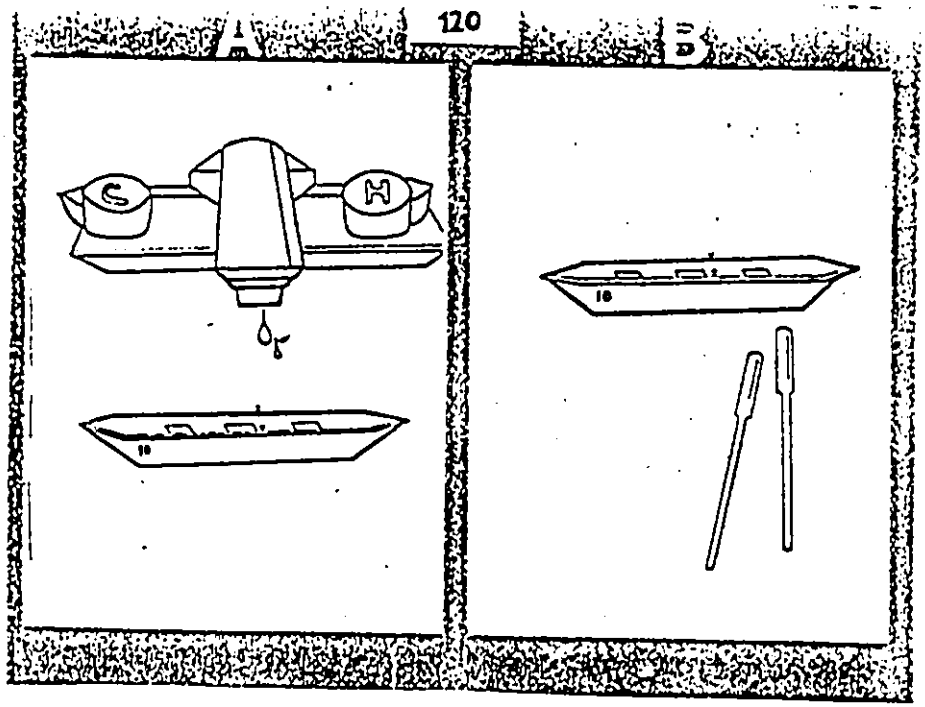

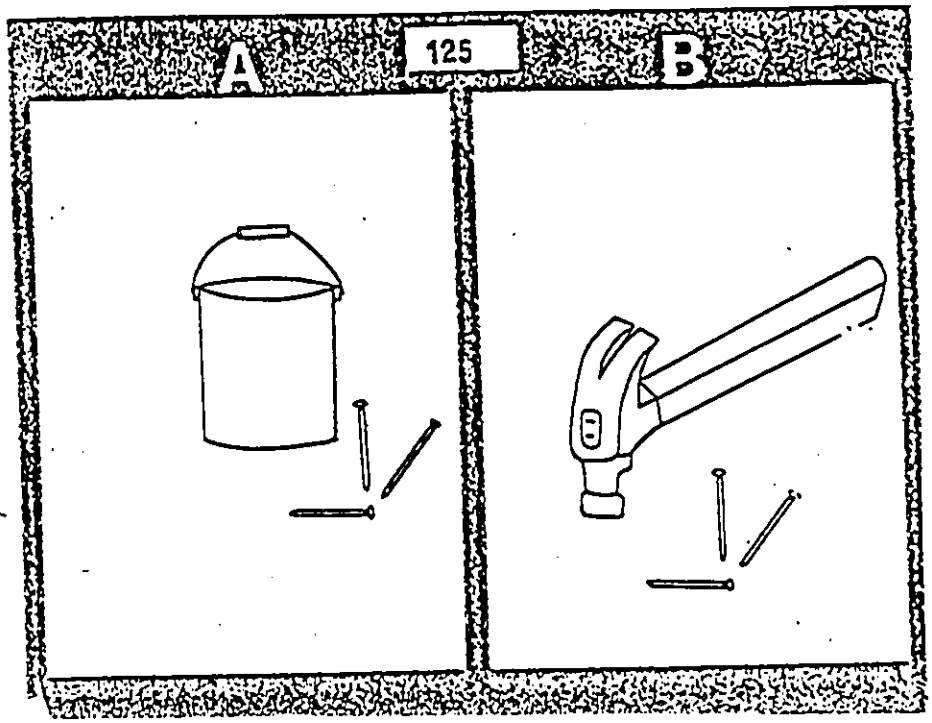
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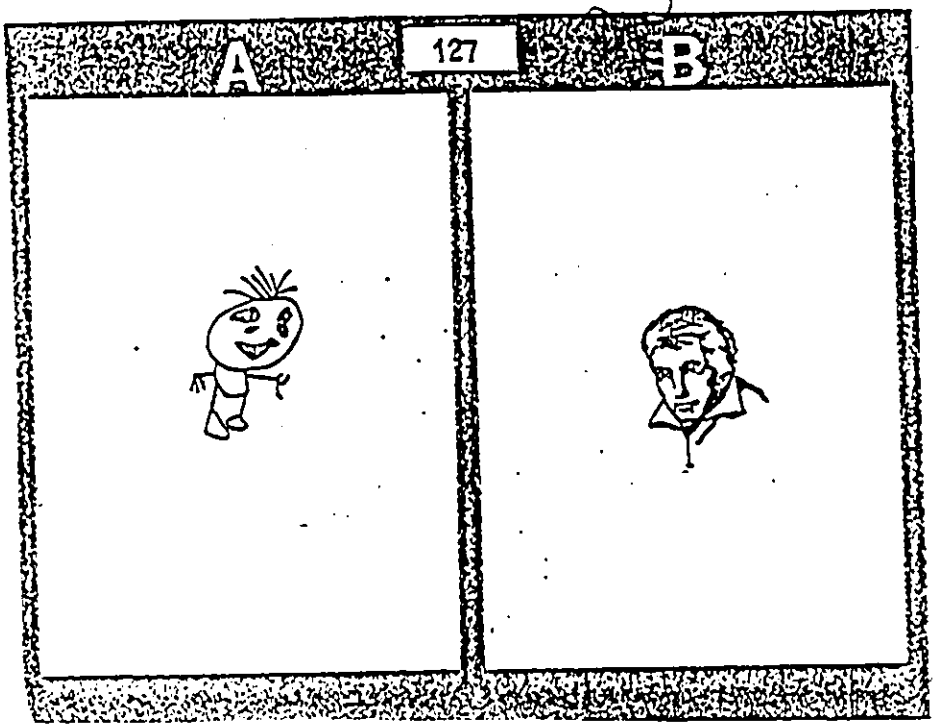
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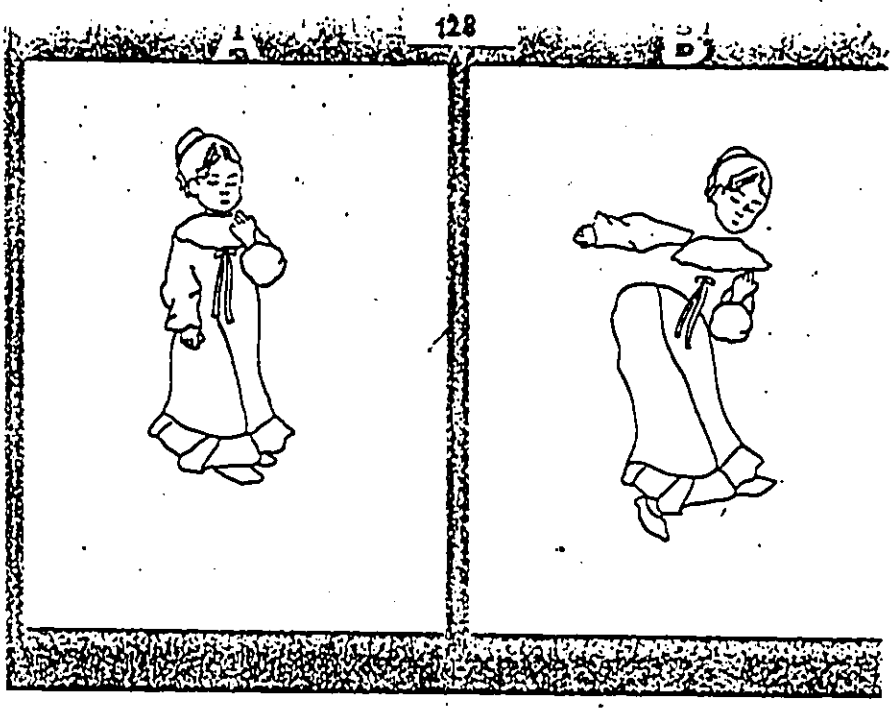
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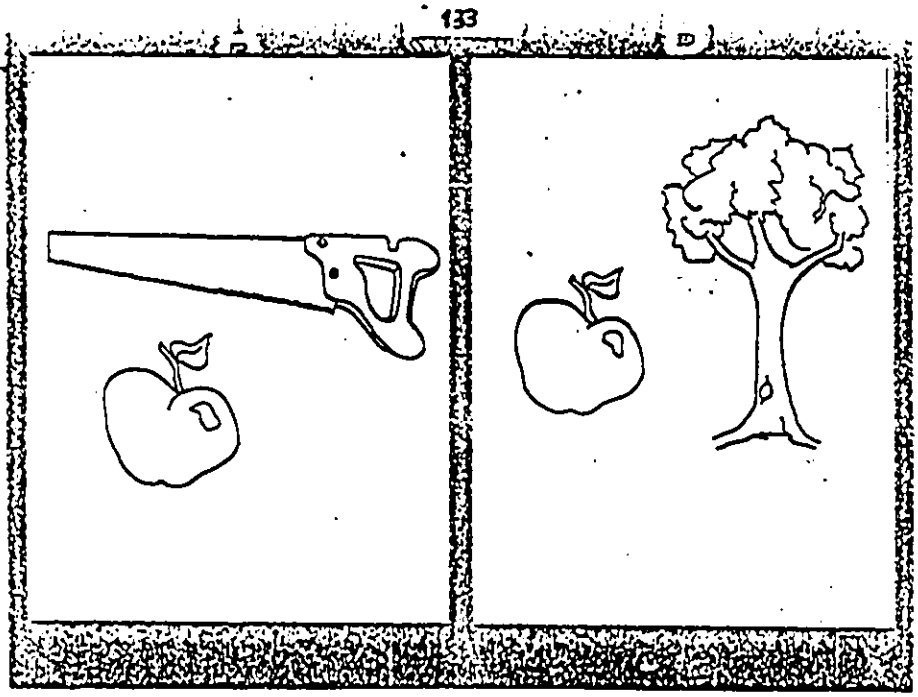
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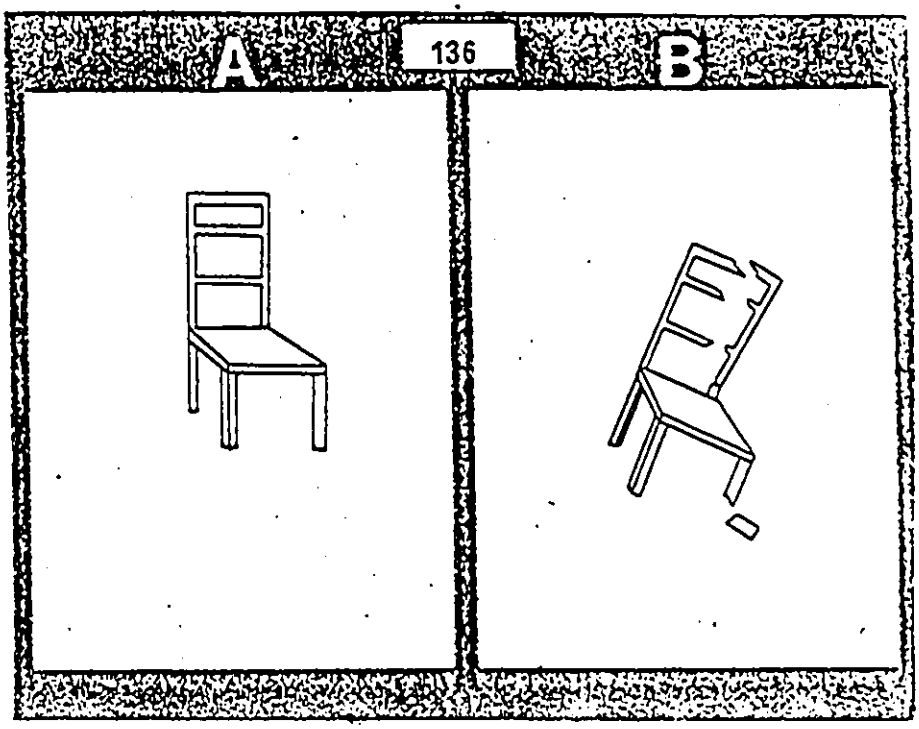
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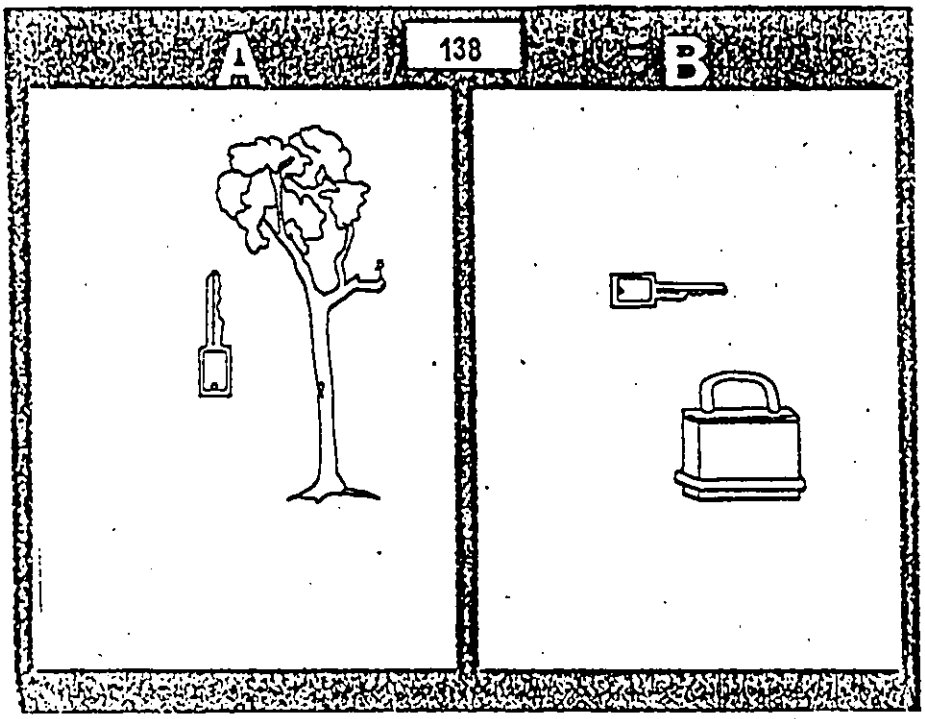
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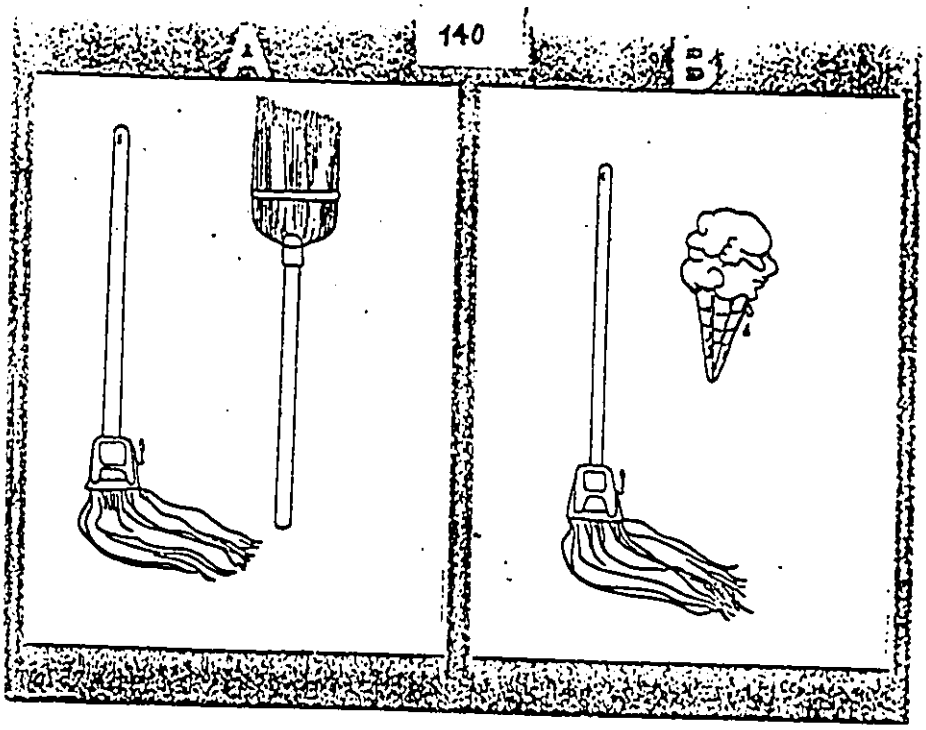

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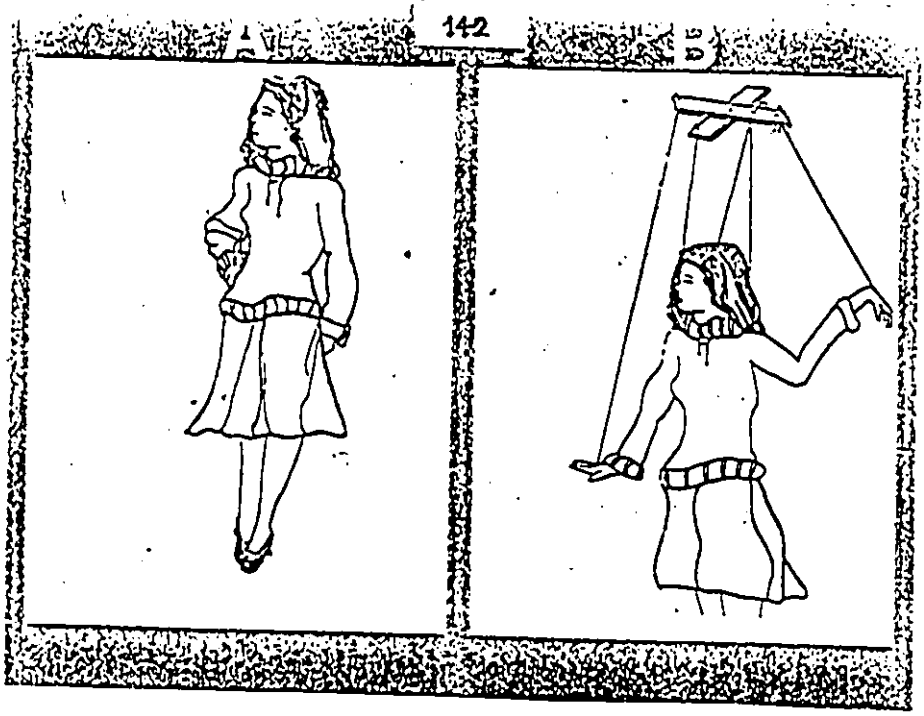

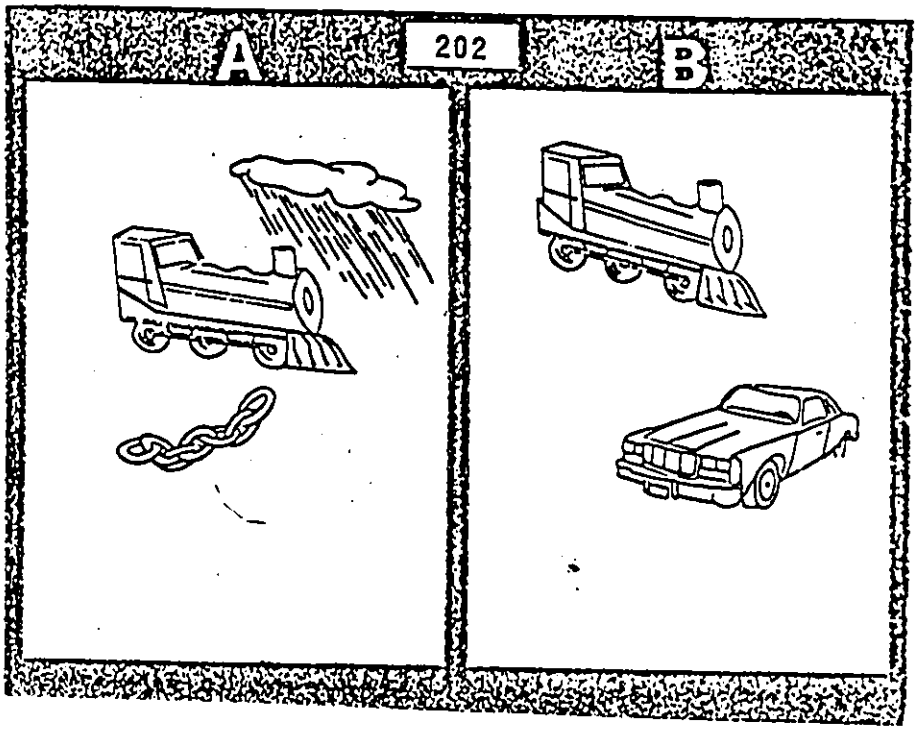
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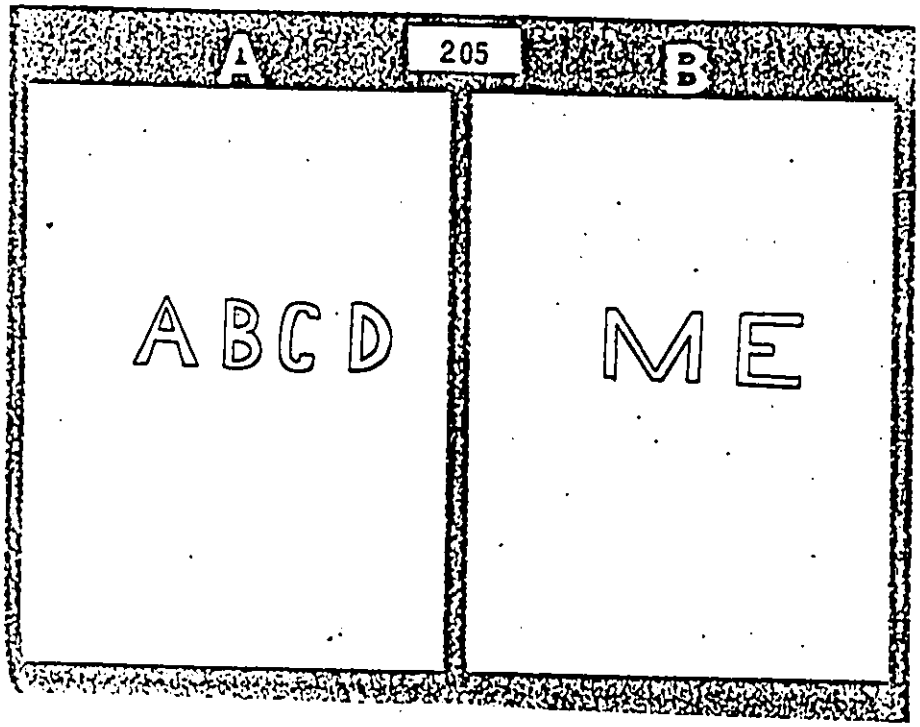
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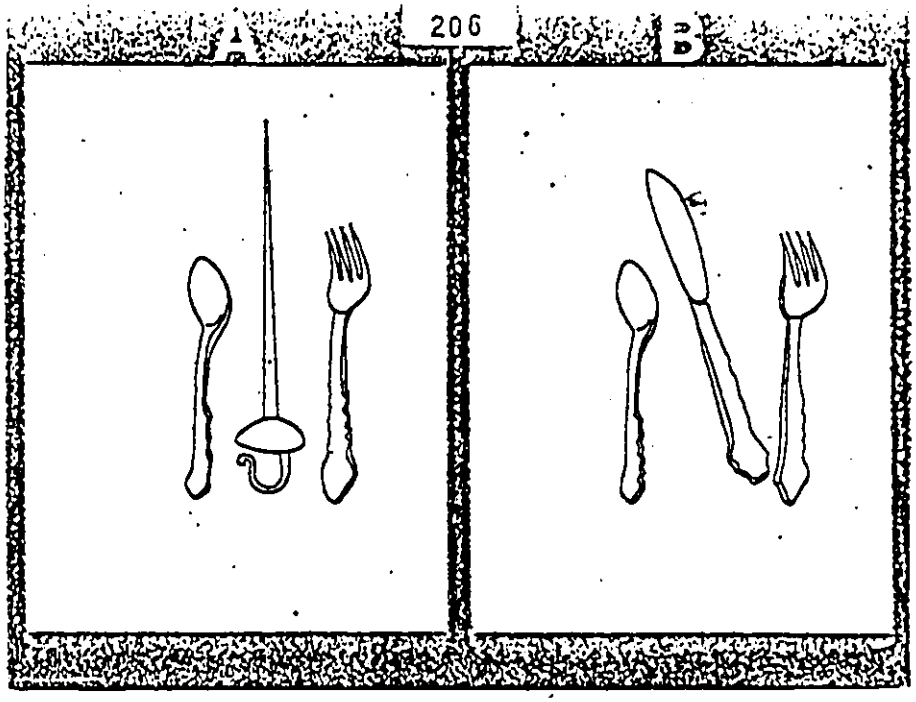

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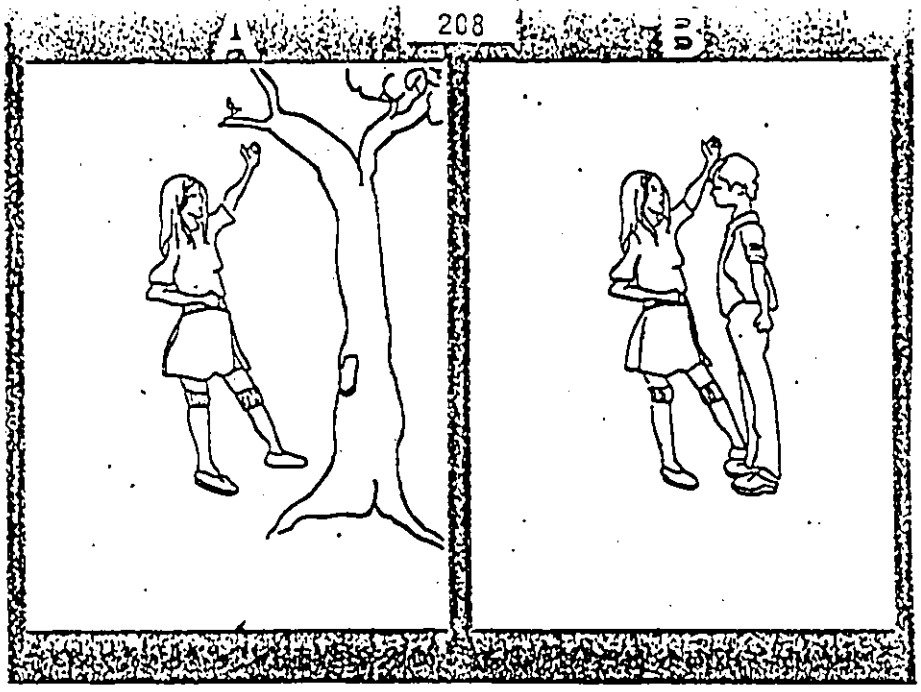

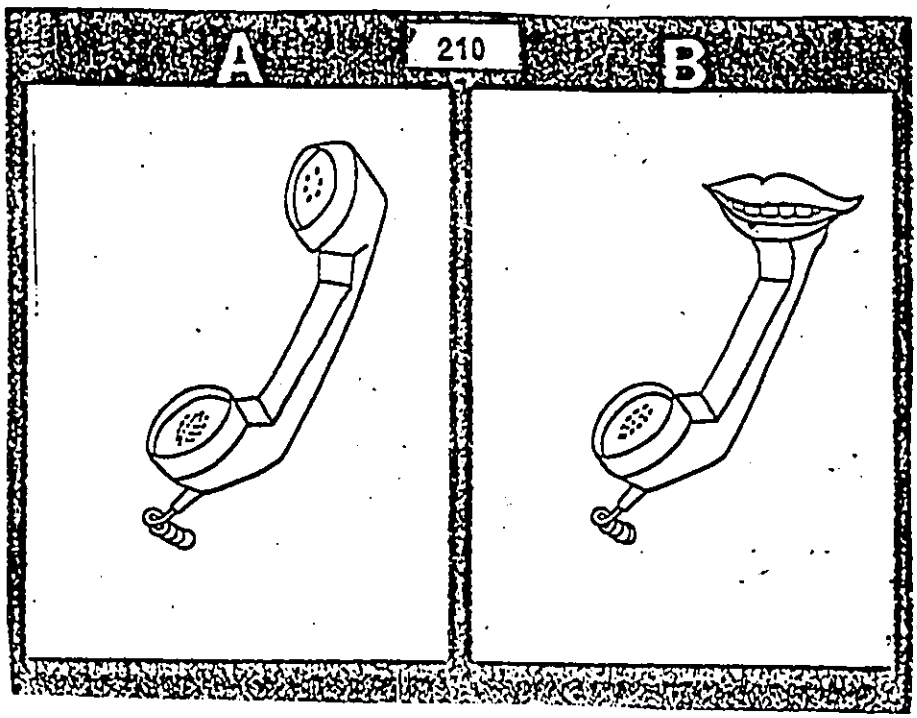
A
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APPENDIX C

DESCRIPTION OF ITEMS IN THE PICTURE-PREFERENCE TEST

INFREQUENCY SCALE

APPENDIX C

Description of Items in the Picture-Preference Test

Infrequency Scale

A star (*) placed next to a picture description designates the keyed alternative.

Item No.	Picture A	Picture B
26.	A girl thinking about a grave*	Same girl thinking about husband and child
31.	Bedroom with two figures in bed	Same picture with one figure in bed*
36.	A man hanging from cliff, holding branch with one hand	Same man crumpled on ground at bottom of cliff*
37.	A masked man with gun*	A policeman
39.	A rose with thorns	A dead tree
44.	A car parked by side of road with hood up*	Same car being driven on mountain road
49.	Man driving big car*	Male graduate in cap and gown
50.	A car going over a bumpy road*	Road showing "detour" sign
53.	Woman in bathing suit	Woman cooking at stove*
67.	Empty Garage—open door	A handgun*
74.	Window with shade pulled*	Same window with shade up showing an outdoor scene
79.	Two men arguing	Same picture with men, backs toward each other*
81.	Man drinking out of a bottle*	Man drinking out of glass
87.	Baby with pacifier*	Baby looking at mobile

Item No.	Picture A	Picture B
94.	Beggar sitting on side-walk holding cup*	Man struggling to lift heavy weight
97.	Woman in bed being examined by male doctor	Same scene with female doctor*
101.	A neatly arranged room	Same scene, but room in disorder*
102.	A man wearing a mask with a smiling facial expression*	Same man--no mask--no expression on his face
145.	Hand cutting knot with knife*	Hand untying knot
152.	Older man feeding self	Older man being fed*
156.	View from shoulder of a man who is giving a speech to audience	Man with arm in cast*
158.	A painting	A mirror*
159.	Piece of paper with small figure at the bottom*	Paper with figure filling page
164.	Woman buying cake at bakery shop*	Same woman baking cake
165.	A strung bow	A bow, unstrung*
174.	Ten year old girl*	Grown woman
176.	Football player catching a pass	Football player bent over ready to hike the ball*
183.	Person lying in sick-bed*	Doctor with stethoscope
184.	Organ grinder and monkey	Freak show at circus*
186.	Soldiers in combat*	Line of men getting injections
190.	Man sitting throwing cards into a hat*	Man resting on hammock
193.	Man racing bike down hill	Man on exercycle*

APPENDIX D

SAMPLE RORSCHACH PROTOCOL AND STUDENTS' QUESTIONNAIRE

Sample Rorschach Protocol

Card I

(1) An oak leaf--no--(2) that looks like a bug. A--what do you call it? Agmess diarrhea? Is that what it's called? It's a bug like that. It looks like that. (What is it?) Agmess diarrhea--it's called... (What?) Agmess diarrhea--just a word I heard, or read in a magazine or something,--in a newspaper. Somebody wrote to me about bugs. (Anything else in that card?) (1) Uh, a maple leaf, an oak leaf, (3) an anteater. (An anteater?) An eating ant. (Anything else?) No. (Where did you see the oak leaf?) Show you where I saw the oak leaf? (Yes) Okay, here's like half an oak leaf, like this was folded in half and,--an oak leaf in there, unfolded. Looks like two, two halves of an, of an oak leaf tree. There and there. (4) And that looks like one of those little birch tree things that are green in color--I don't know the name of it. (Where? A bug, you mean?) Yeah, a bug. (In the middle?) Well, not a bug, a bud. (A bud?) Yeah. (The part in the middle?) Yeah. (3) (Where did you see an ant?) Yeah, this part right here looks like an ant with its antenna. I saw a monster movie with an ant in it like that. (2) (Where did you see a bug called agmess diarrhea?) That's just a cricket. (And where is it?) It's the whole thing. (What about it made it look like a bug?) This part right here--this right here. (And what is that?) That's an ant-

eater, an ant. I'm not too sure where I seen the word, or where I picked it up from.

Card II

(5) I don't know what that looks like--looks weird--looks like a neck bone. (6) A mausoleum temple right there. That's all I can think of looking at it. (5) (Where's the neck bone?) Uh, right here. (The white?) Yeah, in between these two red things and the black thing right there. (Including the black?) No, just, just around here. (What made it look like a neck bone?) That made it look like a neck bone to me. (What's that?) Nothing makes it look like a neck bone!...(7) And it looks like a dog. (6) (Where's the mausoleum temple?) Right in here. (Just this?) Yeah,--this looks like the tower in Toronto,--that white tower--the CN Tower. (Same place you saw the temple?) Yeah.

Card III

I can't tell what that is...(8) Looks like two women standing there, (9) And this looks like a face and ribs and everything like that. (Face and ribs?) Yeah, and that look like an eye, and this looks like a person, and that looks like a person. Could be a car accident, with the red in it. (The red being blood?) Yeah. That's all I can think of. Like a neck operation, that looks like. (Why?) Well, with the head here and the body here--Looks like these two are working at the back of his mind--right on his neck bone, which is right there...Can I have a cigarette? It's hard for me to think because I've been doing rugs for three weeks

non-stop. And before that my mother and father--I went home and they sat there screaming at me when I was talking normal conversation with them. They'd start screaming and flipping right out on me. So, I've been sorta quiet since then on. And I can't get my speech going proper.

Card IV

I can't make it out...(10) Looks like a bear. That looks like a bear doing a back flip...(What about it...?) Well, that looks like his head up there--part of it. Part of it down here. This looks like his chest; backbone; chest; paw there; feet there. (11) Looks like a throat too. (Where?) The whole thing--right down the middle--like where you swallow. And there's his Adam's apple. (Do you mean it's the bear's throat?) Or, a human's. (How can his head be up here and down here at the same time?) That's all I see. I can't make it out any other way.

Card V

(12) Uh,...a butterfly; a black butterfly. That's all.

Card VI

Doesn't look like nothing....I can't figure it out....What does this represent? (What does it look like to you?) (13) Looks like a spinal cord going all the way up? (What about it...?) It just looks like that.

Card VII

(14) That look like a head with a ponytail--a ponytail. But, as for this, I don't know what it is...Doesn't look like anything...Looks like a human being split in half. (Where?)

They're Siamese twins--the whole thing. (Why do you say they're split in half?) Well, the only thing that's holding them together is right there. That's all I can see.

Card VIII

(15) That looks like a beaver--that looks like a woodchuck. (16) That looks like--uh--looks like a person. (Where?) It doesn't look like a person. (When you first said "a person" where did you see it?) Right there. Looks like an arm, and that looks like an arm. That looks like the top of a vest. That looks like a hat. That looks like the neck bone, backbone. The stomach. Legs. (What sort of a person?) Just looks like a person--any kind of a person--abstract art--artist person....(17) Looks like a mountain with a road going up to it. (Where?) Right here, along here. Looks like a mountain right there, and there's the road. That's all.

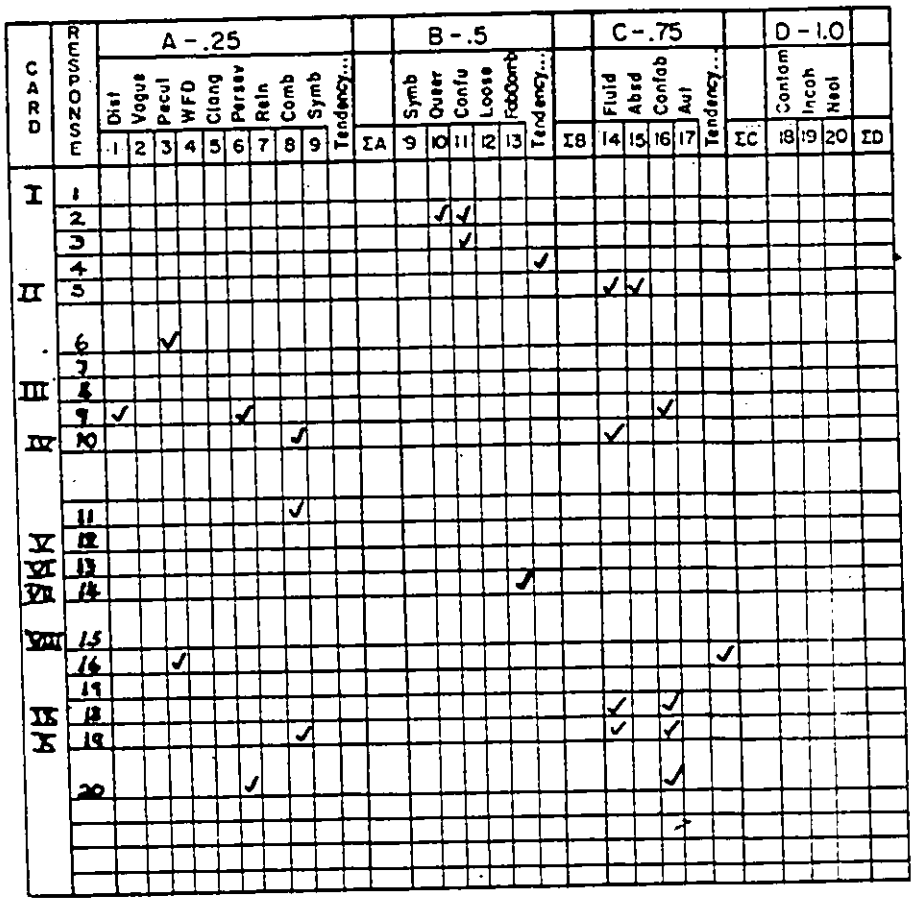
Card IX

Can't make nothing of that one...(18) That looks like a nude woman, and that looks like a nude woman. (The orange part?) Yeah. Can't think of anything. (What about it...?) Well, it doesn't now. (When you first saw it, what made it look like a nude woman to you?) Well, I thought that was a breast and that was a breast.

Card X

I don't know what--it just looks like an abstract art. (19) It could be a pregnant girl. I'm not sure about that, but this here--I don't know what that represents. That's all I can get out of it. (Show me the pregnant girl.)

Right here. (The green?) Yes. And this and this looks like her kidneys. Those are breasts. This is her aura, her aura--like soul--but it's attached to the body. Goes through your body, not--your soul, I guess. Did I get any of them right or are you just getting ideas out of my mind? (You're doing fine...What makes it look like she's pregnant?) I guess it doesn't look like she's pregnant. It just looks like--well, I thought the red was blood coming from her stomach--or pelvis, I should say. It's not coming from--it's coming from up here, whatever's up there. (What's up there?) (20) Looks like a face right in here. Looks like an operation of an,--like the spinal cord would come out the back of the head. The top of the head,--you'd draw with a scalpel,--pull out the bone. That's all I can see out of that one.



$$JHR = \frac{.25(A) + .5(B) + .75(C) + 1.0(D)}{R} \times 100$$

$$= \frac{.25(9) + .5(5) + .75(9) + 1.0(0)}{R} \times 100 = 57.50$$

Questionnaire for Students

Age: _____ Date of birth: _____

Sex: M F (Circle one)

Marital Status: S M W D Sep. (Circle one)

Major subject of study: _____

Faculty: _____

Full-time Part-time (Circle one)

How many years of university have you completed? _____

What is the highest secondary-school grade you've completed?___

Your occupation: _____

Occupation of the head of the parental household: _____

Highest level of schooling completed by head of parental household: _____

If you are married, what is your spouse's occupation? _____

_____; highest level of schooling completed by spouse? _____

If you are married, who is the head of your household?
Self Spouse (Circle one)

Your citizenship: _____

Have you lived in Canada or the U.S. for the past 10 years or more? Yes No (Circle one)

If not, please specify where you have lived: _____

APPENDIX E

SUPPLEMENTARY TABLES

Table A

Endorsement Proportions for Items in the Regular Thought-Disorder Scale of the PPT

Item No.	Patients	Non-patients
1.	.33	.39
14.	.04	.07
15.	.27	.23
16.	.38	.20
17.	.00	.08
20.	.13	.25
24.	.18	.14
27.	.13	.28
30.	.22	.07
32.	.11	.07
33.	.09	.03
38.	.51	.33
45.	.51	.43
54.	.13	.06
55.	.00	.03
59.	.22	.16
60.	.22	.23
61.	.18	.03
69.	.31	.31
71.	.13	.02
75.	.11	.03
78.	.16	.01
86.	.27	.22
109.	.29	.33
114.	.22	.08
115.	.33	.25
119.	.38	.44
120.	.31	.36
142.	.22	.06
205.	.40	.49
208.	.42	.27

Table B

Endorsement Proportions for Items in the PPT Infrequency Scale

Item No.	Patients	Non-patients
26.	.29	.05
31.	.27	.12
36.	.09	.09
37.	.07	.10
39.	.16	.14
44.	.27	.17
49.	.36	.19
50.	.20	.28
53.	.27	.26
67.	.13	.16
74.	.22	.08
79.	.24	.09
81.	.38	.27
87.	.44	.26
94.	.38	.22
97.	.49	.43
101.	.20	.05
102.	.31	.26
145.	.27	.23
152.	.27	.06
156.	.16	.09
158.	.22	.19
159.	.27	.15
164.	.38	.16
165.	.18	.05
174.	.22	.10
176.	.24	.12
183.	.38	.10
184.	.16	.18
186.	.24	.15
190.	.27	.03
193.	.09	.02

Table C

Stepwise Regression Analysis of PPI-TD (reg.) Scores on JHR, JHW, WIST, and Infrequency Scores

Best 1 Variable Model $R^2 = .25$

	df	SS	MS	F	p
Regression	1	148.92	148.92	14.14	.0005
Error	43	452.86	10.53		
Total	44	601.78			

	B	Std. Error	Type II SS	F	p
Intercept	2.78				
Infrequency	.55	.15	148.92	14.14	.0005

Best 2 Variable Model $R^2 = .30$

	df	SS	MS	F	p
Regression	2	182.39	91.20	9.13	.0005
Error	42	419.38	9.98		
Total	44	601.78			

	B	Std. Error	Type II SS	F	p
Intercept	2.63				
JHR	.04	.02	33.47	3.35	.0742
Infrequency	.43	.16	71.73	7.18	.0105

Best 3 Variable Model $R^2 = .40$

	df	SS	MS	F	p
Regression	3	240.08	80.03	9.07	.0001
Error	41	361.70	8.82		
Total	44	601.78			

	B	Std. Error	Type II SS	F	p
Intercept	4.07				
JHR	.07	.02	82.24	9.32	.0040
WIST	-.14	.06	57.68	6.54	.0144
Infrequency	.45	.15	80.29	9.10	.0044

Best 4 Variable Model $R^2 = .42$

	df	SS	MS	F	p
Regression	4	251.18	62.79	7.16	.0002
Error	40	350.60	8.76		
Total	44	601.78			

	B	Std. Error	Type II SS	F	p
Intercept	4.17				
JHR	.10	.03	81.53	9.30	.0041
JHW	-.25	.22	11.10	1.27	.2672
WIST	-.12	.06	32.66	3.73	.0607
Infrequency	.41	.15	63.84	7.28	.0101

Table D

Stepwise Regression Analysis of PPT-TD (rev.) Scores on JHR, JHW, WIST, and Infrequency Scores

Best 1 Variable Model $R^2 = .14$

	df	SS	MS	F	p
Regression	1	20.85	20.85	7.01	.0113
Error	43	127.95	2.97		
Total	44	148.80			

	B	Std. Error	Type II SS	F	p
Intercept	.40				
Infrequency	.21	.08	20.85	7.01	.0113

Best 2 Variable Model $R^2 = .16$

	df	SS	MS	F	p
Regression	2	24.63	12.32	4.17	.0224
Error	42	124.17	2.96		
Total	44	148.80			

	B	Std. Error	Type II SS	F	p
Intercept	.74				
WIST	-.03	.03	3.78	1.28	.2646
Infrequency	.24	.08	24.48	8.28	.0063

Best 3 Variable Model $R^2 = .21$

	df	SS	MS	F	p
Regression	3	31.24	10.41	3.63	.0206
Error	41	117.56	2.87		
Total	44	148.80			

	B	Std. Error	Type II SS	F	p
Intercept	.96				
JHR	.02	.01	6.61	2.31	.1366
WIST	-.06	.03	9.35	3.26	.0783
Infrequency	.19	.08	14.94	5.21	.0277

Best 4 Variable Model $R^2 = .22$

	df	SS	MS	F	p
Regression	4	33.23	8.31	2.87	.0349
Error	40	115.57	2.89		
Total	44	148.80			

	B	Std. Error	Type II SS	F	p
Intercept	1.00				
JHR	.03	.02	8.20	2.84	.0997
JHW	-.10	.13	1.98	.69	.4121
WIST	-.05	.03	5.17	1.79	.1884
Infrequency	.18	.09	11.92	4.13	.0489

APPENDIX F

RAW DATA

RAW DATA: PSYCHIATRIC PATIENTS

GROUP	= High-thought-disorder patient (1) Low-thought-disorder patient (3)
ID	= Subject's identification number
AGE	= Age
SEX	= Male (1) Female (2)
ISP	= Index of Social Position
EDUC	= Education of subject
OCCUP	= Occupational level of subject
ICD9	= Patient's diagnosis (ICD-9)
DSM3	= Patient's diagnosis (DSM-III)
JHR	= Johnston-Holzman Thought Disorder Index score (Rorschach)
JHW	= Johnston-Holzman Thought Disorder Index score (WAIS)
WIST	= Whitaker Index of Schizophrenic Thinking
TDREG	= Regular thought-disorder scale of PPT
TDREV	= Revised thought-disorder scale of PPT
INFREQ	= PPT Infrequency scale
CONS	= Number of consistent choices among the 20 repeated PPT thought-disorder items
COURSE	= Subchronic (1) Chronic (2)

GROUP	ID	AGE	SEX	ISP	EDUC	OCCUP	ICD9	DSM3	JHR	JHW	WIST	TDREG	TDREV	INFREQ	CONS	COURSE
1	101	25	1	55	5	9	295.3	295.32	46.00	02.00	21	03	01	06	20	2
3	102	34	2	11	2	2	295.4	295.40	04.81	00.50	10	07	01	08	14	.
1	103	22	2	55	6	9	295.1	295.11	22.58	02.25	17	03	01	08	20	1
1	104	21	1	22	5	7	295.3	295.31	21.25	01.75	10	13	03	10	16	1
1	105	45	2	55	4	9	295.6	295.62	41.18	01.00	14	13	02	12	16	2
3	106	18	1	26	5	9	295.3	295.31	14.47	02.75	18	04	01	07	20	1
3	107	23	1	55	5	5	295.4	295.40	04.46	02.25	08	06	03	04	19	.
3	108	19	1	51	4	8	295.3	295.34	06.25	00.75	24	05	01	11	17	1
3	109	42	2	26	4	9	295.4	295.40	03.13	00.75	18	02	00	05	18	.
3	110	32	2	26	5	9	295.6	295.62	06.25	00.75	05	04	01	05	19	2
3	111	59	2	69	5	7	295.7	295.70	18.27	04.25	23	09	06	11	19	.
1	112	41	2	55	5	9	295.3	295.31	38.39	04.50	21	09	01	11	09	1
3	113	19	1	55	5	8	295.9	295.93	17.71	04.00	21	02	01	07	17	1
1	114	32	2	69	5	7	295.7	295.70	37.50	06.00	15	09	05	06	20	.
1	115	31	1	73	6	7	295.9	295.94	73.75	04.25	19	09	05	13	18	2
3	116	28	1	69	4	9	295.9	295.93	10.00	01.50	12	09	03	06	17	1
3	117	27	2	26	3	9	295.3	295.31	01.92	01.00	04	04	00	05	19	1
1	118	22	1	77	6	9	295.4	295.40	27.08	03.50	25	11	01	09	15	.
3	119	34	2	51	6	9	295.7	295.70	02.68	01.75	07	03	01	03	20	.
1	120	32	2	44	3	9	295.7	295.70	59.37	11.50	18	07	01	09	12	.
1	121	26	1	37	5	9	295.3	295.34	57.50	07.25	24	13	01	11	09	2
1	122	23	1	55	6	7	295.6	295.62	36.03	01.25	20	07	00	10	13	2
3	123	22	2	55	5	9	295.3	295.31	13.23	01.25	21	04	01	07	20	1
1	124	22	1	69	5	7	295.1	295.12	30.43	02.00	11	08	04	14	18	2
3	125	47	1	58	4	6	295.3	295.31	13.89	01.25	12	05	01	01	16	1
1	126	32	1	22	3	9	295.3	295.34	24.07	01.50	15	07	04	13	18	2
1	127	26	2	44	3	9	295.7	295.70	42.00	06.50	10	08	04	06	17	.
1	128	30	2	69	5	7	295.7	295.70	97.32	08.75	25	11	02	06	08	.
1	129	36	1	55	5	5	295.7	295.70	36.22	03.75	13	14	04	10	15	.
1	130	23	2	73	6	9	295.1	295.12	60.42	13.25	36	05	02	12	15	2
3	131	32	1	66	6	6	295.7	295.70	20.71	03.00	08	04	00	06	10	.
3	132	44	2	55	4	9	295.3	295.32	11.90	05.50	11	06	00	09	13	2
1	133	24	1	55	5	9	295.7	295.70	23.75	02.00	15	09	03	06	19	.
1	134	27	2	69	5	7	295.3	295.32	90.00	15.25	49	09	01	08	18	2
1	135	37	1	62	4	9	295.9	295.91	74.04	09.75	39	12	04	11	10	1
3	136	39	1	69	5	7	295.3	295.31	16.67	06.25	15	05	00	05	17	1
3	137	48	2	66	6	7	295.4	295.40	00.00	01.50	14	03	01	01	19	.
1	138	42	2	69	5	7	295.6	295.62	40.00	02.00	16	18	07	15	12	2
3	139	26	1	15	5	9	295.6	295.62	17.31	03.50	21	03	00	07	18	2
3	140	33	2	48	5	9	295.6	295.61	14.29	00.75	08	12	06	04	19	1
3	141	19	1	62	5	7	295.3	295.31	01.92	01.50	29	03	00	08	20	1
1	142	20	1	66	5	9	295.2	295.23	31.25	04.00	42	07	03	08	14	1
1	143	18	1	55	6	9	295.9	295.91	20.69	04.50	19	07	02	05	17	1
1	144	21	2	51	5	9	295.3	295.34	81.82	11.50	44	05	02	10	13	2
1	145	26	1	44	5	7	295.3	295.31	41.41	07.50	20	08	03	13	15	1

RAW DATA: NON-PATIENTS

GROUP	= Non-patient (2)
ID	= Subject's identification number
AGE	= Age
SEX	= Male (1) Female (2)
ISP	= Index of Social Position
EDUC	= Education of subject
OCCUP	= Occupational level of subject
MAJOR	= Subject's major field of study (University of Windsor codes)
TDREG	= Regular thought-disorder scale of PPT
TDREV	= Revised thought-disorder scale of PPT
INFREQ	= PPT Infrequency scale
CONS	= Number of consistent choices among the 20 repeated PPT thought-disorder items

GROUP	ID	AGE	SEX	ISP	EDUC	OCCUP	MAJOR	TDREG	TDREV	INFREQ	CONS
2	201	29	1	22	4	8	46	01	00	03	20
2	202	26	1	55	3	8	46	03	02	09	18
2	203	21	1	11	3	8	71	06	02	06	20
2	204	21	1	26	3	8	46	02	01	05	20
2	205	22	1	11	3	8	55	06	03	08	19
2	206	43	1	26	3	2	27	02	01	06	20
2	207	19	1	37	3	8	.	10	03	09	16
2	208	18	1	18	3	8	55	08	02	10	18
2	209	21	1	29	3	8	47	04	01	06	18
2	210	21	1	48	3	8	40	03	01	04	19
2	211	19	1	33	3	8	70	05	03	03	20
2	212	19	1	11	3	8	70	04	00	04	19
2	213	19	1	66	3	8	60	09	04	01	18
2	214	20	1	22	3	8	55	04	02	03	20
2	215	20	1	11	3	8	55	06	04	10	19
2	216	19	1	18	3	8	47	08	05	06	19
2	217	19	1	55	3	8	43	04	02	06	20
2	218	22	1	44	4	8	40	09	03	11	17
2	219	19	1	22	3	8	46	07	02	06	19
2	220	19	1	40	3	8	45	04	01	08	19
2	221	19	1	11	3	8	95	08	04	08	18
2	222	21	1	70	3	8	.	06	03	05	19
2	223	19	1	44	3	8	55	04	00	05	19
2	224	35	2	56	3	8	47	05	02	02	20
2	225	37	2	30	4	2	46	04	01	02	19
2	226	20	2	30	3	3	32	07	03	02	20
2	227	20	2	36	3	8	44	07	03	03	20
2	228	48	2	51	3	2	63	04	01	04	20
2	229	19	2	52	3	8	46	02	00	04	19
2	230	21	2	51	3	8	32	05	01	05	20
2	231	36	2	15	3	3	26	05	02	06	19
2	232	19	2	59	3	8	63	05	01	06	19
2	233	39	2	59	3	2	29	04	01	01	20
2	234	19	2	70	3	8	63	06	03	06	20
2	235	20	2	62	3	8	63	06	01	02	19
2	236	37	2	66	3	8	47	06	03	05	20
2	237	33	2	44	3	8	44	02	00	01	20
2	238	19	2	22	3	8	46	08	03	06	18
2	239	19	2	44	3	8	63	07	02	01	19
2	240	20	2	58	3	8	43	05	01	04	19
2	241	33	2	51	4	5	27	06	02	04	19
2	242	19	2	40	3	8	70	01	00	05	20
2	243	19	2	15	3	8	46	07	03	03	20
2	244	25	2	22	2	2	82	05	02	01	20

GROUP	ID	AGE	SEX	ISP	EDUC	OCCUP	MAJOR	TDREG	TDREV	INFREQ	CONS
2	245	20	2	37	4	8	47	09	02	09	12
2	246	19	2	22	3	8	95	08	02	04	19
2	247	19	2	22	3	8	95	07	02	04	17
2	248	21	2	73	3	8	63	06	00	06	20
2	249	18	2	33	3	8	47	04	00	03	19
2	250	20	2	15	3	8	55	02	00	02	20
2	251	26	2	44	3	2	63	07	02	02	18
2	252	19	2	37	3	8	63	03	02	05	20
2	253	23	2	59	3	5	46	05	01	08	18
2	254	37	2	47	4	2	63	03	00	06	18
2	255	28	2	51	3	8	63	07	03	04	19
2	256	19	2	22	3	8	46	02	00	05	19
2	257	18	2	11	3	8	46	05	00	04	20
2	258	19	2	22	3	8	95	07	04	02	19
2	259	19	2	22	3	8	48	07	01	03	17
2	260	19	1	55	3	8	55	09	05	02	18
2	261	20	2	58	3	8	35	12	08	05	20
2	262	26	2	48	4	2	63	11	04	04	19
2	263	18	2	55	3	8	47	12	06	11	16
2	264	19	2	51	3	8	26	11	05	07	18
2	265	19	2	44	3	8	40	11	05	04	17
2	266	20	2	33	3	8	23	12	08	11	19
2	267	18	2	66	4	8	59	10	05	05	20
2	268	49	2	37	4	4	46	10	05	05	20
2	269	57	2	37	5	5	46	10	05	03	17
2	270	19	2	11	3	8	26	15	10	07	20
2	271	22	2	51	2	5	48	03	00	05	20
2	272	41	2	26	3	2	63	03	01	04	19
2	273	21	2	.	3	8	59	05	03	04	18
2	274	21	2	.	3	8	71	04	01	03	18
2	275	19	2	.	3	8	63	04	02	02	19
2	276	24	1	.	3	8	46	07	04	03	20
2	277	19	1	.	3	8	41	03	01	03	19
2	278	30	1	.	3	8	42	04	01	05	20
2	279	23	2	.	3	8	46	03	02	04	20
2	280	44	2	.	3	8	46	05	03	05	20
2	281	23	2	.	3	8	44	04	00	03	20
2	282	46	2	.	3	8	46	07	02	01	19
2	283	31	2	.	3	8	46	03	00	00	19
2	284	52	2	.	3	8	26	05	00	08	14
2	285	21	2	.	3	8	33	06	02	09	20
2	286	19	2	.	3	8	60	07	00	10	17
2	287	21	2	.	3	8	46	11	06	10	20
2	288	31	2	.	3	8	46	05	03	03	20

REFERENCE NOTE

1. Morf, M. TESTSTAT: A computer program to score tests and perform item analyses. Unpublished manuscript, University of Windsor, 1979.

REFERENCES

Adams, H. E., & Berg, I. A. Schizophrenia and deviant response sets produced by auditory and visual test content. Journal of Psychology, 1961, 51, 393-398.

Adams, H. E., & Butler, J. R. The deviation hypothesis: A review of the evidence. In I. A. Berg (Ed.), Response set in personality assessment. Chicago: Aldine, 1967.

Albott, W. L., & Gilbert, L. G. Comparison of non-brain-damaged schizophrenic and brain-damaged nonschizophrenic males on the WIST. Psychological Reports, 1973, 32, 187-194.

American Psychiatric Association. DSM-III: Diagnostic and statistical manual of mental disorders (3rd ed.). Washington, D. C.: American Psychiatric Association, 1980.

Amin, S. A picture-preference test to measure the trait of avoidance of sexual intimacy in females (Doctoral dissertation, University of Windsor, 1974). Canadiana, June 1976, 67. (National Library of Canada No. 23852)

Andreason, N. C. The diagnostic significance of disorders in thought, language, and communication. Archives of General Psychiatry, 1979, 36, 1325-1330.

Andreason, N. C., & Powers, P. S. Overinclusive thinking in mania and schizophrenia. British Journal of Psychiatry, 1974, 125, 452-456.

Arieti, S. Interpretation of schizophrenia. New York: Brunner, 1955.

Arieti, S. Interpretation of schizophrenia (2nd ed.). New York: Basic Books, 1974.

Auld, F. Studying personality through picture preferences. The Ontario Psychologist, 1979, 11(4), 24-25.

Bannister, D. The nature and measurement of schizophrenic thought disorder. Journal of Mental Science, 1962, 108, 825-842.

Bannister, D. The genesis of schizophrenic thought disorder: A retest of the serial invalidation hypothesis. British Journal of Psychiatry, 1965, 111, 377-382.

Bannister, D., & Fransella, F. A grid test of schizophrenic thought disorder. British Journal of Social and Clinical Psychology, 1966, 5, 95-102.

Bannister, D., Fransella, F., & Agnew, J. Characteristics and validity of the grid test of thought disorder. British Journal of Social and Clinical Psychology, 1971, 10, 144-151.

Barnes, E. H. The relationship of biased test responses to psychopathology. Journal of Abnormal and Social Psychology, 1955, 51, 286-290.

Barron, F. Complexity-simplicity as a personality dimension. Journal of Abnormal and Social Psychology, 1953, 48, 163-172.

Begin, P. E. A validation study of a picture-preference test of addictive traits (Master's thesis, University of Windsor, 1972). Canadiana, September 1975, 69. (National Library of Canada No. 19858)

Benjamin, J. D. A method for distinguishing and evaluating formal thinking disorders in schizophrenia. In J. S. Kasanin (Ed.), Language and thought in schizophrenia. Berkeley: University of California Press, 1944.

Berg, I. A. Deviant responses and deviant people: The formulation of the deviation hypothesis. Journal of Counseling Psychology, 1957, 4, 154-161.

Berg, I. A. The deviation hypothesis: A broad statement of its assumptions and postulates. In I. A. Berg (Ed.), Response set in personality assessment. Chicago: Aldine, 1967.

Berg, I. A., Hunt, W. A., & Barnes, E. H. The perceptual reaction test. Evanston, Ill.: Irwin A. Berg, 1949.

Bleuler, E. Dementia praecox or the group of schizophrenias. New York: International Universities Press, 1950. (Originally published, 1911.)

Bleuler, E. Das autistische denken. Jahrbuch fur Psychoanalytische und Psychopathologische Forschungen, 1912, 4, 1-39.

Bradford, J. T., & Adams, H. E. Deviant responses as indicators of depression and character disorder. Psychological Reports, 1964, 14, 235-238.

Broadbent, D. Perception and communication. Oxford: Pergamon Press, 1958.

Broen, W. E., Jr. Schizophrenia: Research and theory. New York: Academic Press, 1968.

Broen, W. E., Jr., & Storms, L. H. Lawful disorganization: The process underlying a schizophrenic syndrome. Psychological Review, 1966, 73, 265-279.

Bromet, E., & Harrow, M. Behavioral overinclusion as a prognostic index in schizophrenic disorders. Journal of Abnormal Psychology, 1973, 82, 345-349.

Cameron, N. Reasoning, regression, and communication in schizophrenics. Psychological Monographs, 1938, 50 (1, Whole No. 221).

Cameron, N. Experimental analysis of schizophrenic thinking. In J. S. Kasanin (Ed.), Language and thought in schizophrenia. Berkeley: University of California Press, 1944.

Cameron, N., & Magaret, A. Behavior pathology. Cambridge, Mass.: Riverside Press, 1951.

Cancro, R. Clinical prediction of outcome in schizophrenia. Comprehensive Psychiatry, 1969, 10, 349-354.

Chapman, L. J. A reinterpretation of some pathological disturbances in conceptual breadth. Journal of Abnormal and Social Psychology, 1961, 62, 514-519.

Chapman, L. J., & Chapman, J. P. Disordered thought in schizophrenia. New York: Appleton-Century-Crofts, 1973.

Chapman, L. J., Chapman, J. P., & Miller, G. A. A theory of verbal behavior in schizophrenia. In B. A. Maher (Ed.), Progress in experimental personality research (Vol. 1). New York: Academic Press, 1964.

Chapman, L. J., Chapman, J. P., & Miller, G. A. Postscript. In B. A. Maher (Ed.), Contributions to the psychopathology of schizophrenia. New York: Academic Press, 1977.

Chapman, L. J., & Taylor, J. A. Breadth of deviate concepts used by schizophrenics. Journal of Abnormal and Social Psychology, 1957, 54, 118-123.

Christensen, K. R. Methodology in preference testing. In M. R. Kare & B. P. Halpern (Eds.), The physiological and behavioral aspects of taste. Chicago: University of Chicago Press, 1960.

Cowan, L. A picture-preference test to measure the trait of addictiveness in personality (Doctoral dissertation, Wayne State University, 1967). Dissertation Abstracts International, 1971, 31, 6894-B. (University Microfilms No. 71-12, 024)

Cromwell, R. L., & Dockecki, P. R. Schizophrenic language: A disattention interpretation. In S. Rosenberg & J. H. Koplin (Eds.), Developments in applied psycholinguistics research. New York: Macmillan, 1968.

Dahlstrom, W. G., Welsh, G. S., & Dahlstrom, L. E. An MMPI handbook, Volume 1: Clinical interpretation (Rev. ed.). Minneapolis: University of Minnesota Press, 1972.

Deering, G. Affective stimuli and disturbance of thought processes. Journal of Consulting Psychology, 1963, 27, 338-343.

Dokecki, P. R., Polidoro, L. C., & Cromwell, R. L. Commonality and stability of word association responses in good and poor premorbid schizophrenics. Journal of Abnormal Psychology, 1965, 70, 312-316.

Durbin, M., & Marshall, R. L. Speech in mania: Syntactic aspects. Brain and Language, 1977, 4, 208-218.

Esquirol, J. E. D. Mental maladies: A treatise on insanity. London: Haffner, 1965. (Originally published, 1838).

Feffer, M. Symptom expression as a form of primitive decentering. Psychological Review, 1967, 74, 16-28.

Feldman, M. J., & Drasgow, J. A visual-verbal test for schizophrenia. Psychiatric Quarterly Supplement, 1951, 25, 55-64.

Fishkin, S. M., Lovallo, W. R., & Pishkin, V. Relationship between schizophrenic thinking and MMPI for process and reactive patients. Journal of Clinical Psychology, 1977, 33, 116-119.

Foulds, G. A., Hope, K., McPherson, F. M., & Mayo, P. R. Cognitive disorder among the schizophrenias. 1: The validity of some tests of thought-process disorder. British Journal of Psychiatry, 1967, 113, 1361-1368.

Freud, S. Formulations regarding the two principles of mental functioning. In E. Jones (Ed.), Collected papers (Vol. 4). London: Hogarth Press, 1946. (Originally published, 1911.)

Gathercole, C. E. A note on some tests of overinclusive thinking. British Journal of Medical Psychology, 1965, 38, 59-62.

Gill, M. M. The primary process. In R. R. Holt (Ed.), Motives and thought: Psychoanalytic essays in honor of David Rapaport. New York: International Universities Press, 1967.

Goldstein, K. Methodological approach to the study of schizophrenic thought disorder. In J. S. Kasanin (Ed.), Language and thought in schizophrenia. Berkeley: University of California Press, 1944.

Goldstein, K. Concerning concreteness in schizophrenia. Journal of Abnormal and Social Psychology, 1959, 59, 146-148.

Goldstein, K., & Scheerer, M. Abstract and concrete behavior: An experimental study with special tests. Psychological Monographs, 1941, 53 (2, Whole No. 239).

Goldstein, M. J., & Acker, C. W. Psychophysiological reactions to films by chronic schizophrenics: II. Individual differences in resting levels and reactivity. Journal of Abnormal Psychology, 1967, 72, 23-29.

Gorham, D. R. Use of the Proverbs Test for differentiating schizophrenics from normals. Journal of Consulting Psychology, 1956, 20, 435-440.

Grinker, R. R., & Holzman, P. S. Schizophrenic pathology in young adults. Archives of General Psychiatry, 1973, 28, 168-175.

Hanfmann, E., & Kasanin, J. Conceptual thinking in schizophrenia. Nervous and Mental Disease Monographs, 1942, 67, 1-115.

Harrow, M., Adler, D., & Hanf, E. Abstract and concrete thinking in schizophrenia during the prechronic phases. Archives of General Psychiatry, 1974, 31, 27-33.

Harrow, M., Harkavy, K., Bromet, E., & Tucker, G. J. A longitudinal study of schizophrenic thinking. Archives of General Psychiatry, 1973, 28, 179-182.

Harrow, M., Himmelhoch, J., Tucker, G., Hersch, J., & Quinlan, D. Overinclusive thinking in acute schizophrenic patients. Journal of Abnormal Psychology, 1972, 79, 161-168.

Harrow, M., & Quinlan, D. Is disordered thinking unique to schizophrenia? Archives of General Psychiatry, 1977, 34, 15-24.

Hawks, D. V., & Payne, R. W. Overinclusive thought disorder and symptomatology. British Journal of Psychiatry, 1971, 118, 663-670.

Hemsley, D. R. Problems in the interpretation of cognitive abnormalities in schizophrenia. British Journal of Psychiatry, 1976, 129, 32-35.

Henry, W. E. The analysis of fantasy. New York: Krieger, 1973.

Hesterly, S. O. Deviant response patterns as a function of chronological age. Journal of Consulting Psychology, 1963, 27, 210-214.

Hill, A. B. Validity and clinical utility of the Grid Test of schizophrenic thought disorder. British Journal of Psychiatry, 1976, 128, 251-254.

Holt, R. R. Gauging primary and secondary processes in Rorschach responses. Journal of Projective Techniques, 1956, 20, 14-25.

Holt, R. R., & Havel, J. A method for assessing primary and secondary process in the Rorschach. In M. A. Rickers-Ovsiankina (Ed.), Rorschach psychology. New York: Wiley, 1960.

Hull, H., & Nie, N. (Eds.) SPSS Update. New York: McGraw-Hill, 1979.

Jackson, D. N., & Messick, S. Differential Personality Inventory, Form L. Goshen, N.Y.: Research Psychologists Press, 1964.

Johnson, R. C., Weiss, R. L., & Zelhart, P. F. Similarities and differences between normal and psychotic subjects in response to verbal stimuli. Journal of Abnormal and Social Psychology, 1964, 68, 221-226.

Johnston, M. H., & Holzman, P. S. Assessing schizophrenic thinking. San Francisco: Jossey-Bass, 1979.

Kelly, G. A. The psychology of personal constructs (Vols. 1-2). New York: Norton, 1955.

Kent, H., & Rosanoff, A. J. A study of association in insanity. American Journal of Insanity, 1910, 67, 326-390.

Kraepelin, E. Dementia praecox and paraphrenia. Chicago: Chicago Medical Book Co., 1919.

Kreitman, N., Sainsbury, P., Morrisey, J., Towers, J., & Scrivener, J. The reliability of psychiatric assessment: An analysis. Journal of Mental Science, 1961, 107, 887-908.

Maher, B. A. (Ed.). Principles of psychopathology. New York: McGraw, 1966.

McGaughran, L. S. Predicting language behavior from object sorting. Journal of Abnormal and Social Psychology, 1954, 49, 183-195.

McGaughran, L. S., & Moran, L. J. "Conceptual level" vs. "conceptual area" analysis of object-sorting of schizophrenic and non-psychiatric groups. Journal of Abnormal and Social Psychology, 1956, 52, 43-50.

McGhie, A., & Chapman, J. Disorders of attention and perception in early schizophrenia. British Journal of Medical Psychology, 1961, 34, 103-116.

Mednick, S. A. A learning theory approach to schizophrenia. Psychological Bulletin, 1958, 55, 316-327.

Moon, A. F., Mefford, R. B., Jr., Wieland, B. A., Pokorny, A. D., & Falconer, G. A. Perceptual dysfunction as a determinant of schizophrenic word associations. Journal of Nervous and Mental Disease, 1968, 146, 80-84.

Moran, L. J., Mefford, R. B., Jr., & Kimble, J. P., Jr. Idiodynamic sets in word associations. Psychological Monographs, 1964, 78 (2, Whole No. 579).

Morrison, M. B. Evidence for distinctive personality traits in alcoholics using a picture-preference test of addictiveness (Doctoral dissertation, University of Windsor, 1973). Canadiana, September, 1975, 75. (National Library of Canada No. 19939)

Murray, H. A. Explorations in personality. New York: Oxford University Press, 1938.

Myers, J., & Bean, L. A decade later: A follow-up of social class and mental illness. New York: Wiley, 1968.

Neale, J. M., & Oltmanns, T. F. Schizophrenia. New York: Wiley, 1980.

Newmark, C. S., Simpson, M., & Jones, T. The discriminative validity of the Whitaker Index of Schizophrenic Thinking. Journal of Personality Assessment, 1978, 42, 636-643.

O'Brian, J. P., & Weingartner, H. Associative structure in chronic schizophrenia. Archives of General Psychiatry, 1970, 22, 136-142.

Overall, J. E., & Gorham, D. R. The Brief Psychiatric Rating Scale. Psychological Reports, 1962, 10, 799-812.

Payne, R. W. Cognitive defects in schizophrenia: Overinclusive thinking. In J. Hellmuth (Ed.), Cognitive studies (Vol. 2). New York: Brunner/Mazel, 1971.

Payne, R. W. Cognitive abnormalities. In H. J. Eysenck (Ed.), Handbook of abnormal psychology (2nd ed.). New York: Pitman Medical Press, 1973.

Payne, R. W., & Friedlander, D. A short battery of simple tests for measuring overinclusive thinking. Journal of Mental Science, 1962, 108, 362-367.

Payne, R. W., Friedlander, D., Laverty, S. G., & Haden, P. Over-inclusive thought disorder in chronic schizophrenics and its response to "proketazine." British Journal of Psychiatry, 1963, 109, 523-530.

Payne, R. W., & Hewlett, J. H. G. Thought disorder in psychotic patients. In H. J. Eysenck (Ed.), Experiments in personality (Vol. 2). London: Routledge & Kegan Paul, 1960.

Payne, R. W., Matussek, P., & George, E. I. An experimental study of schizophrenic thought disorder. Journal of Mental Science, 1959, 105, 627-652.

Pope, B., & Jensen, S. R. The Rorschach as a index of pathological thinking. Journal of Projective Techniques, 1957, 21, 54-62.

Powers, W. F., & Hamlin, R. M. Relationship between diagnostic categories and deviant verbalizations on the Rorschach. Journal of Consulting Psychology, 1955, 19, 120-125.

Presly, A. S. "Slowness" and performance on the Grid Test for thought disorder. British Journal of Social and Clinical Psychology, 1969, 8, 79-80.

Price, R. H. Analysis of task requirements in schizophrenic concept-identification performance. Journal of Abnormal Psychology, 1968, 73, 285-293.

Quinlan, D., Harrow, M., Tucker, G., & Carlson, K. Varieties of "disordered" thinking on the Rorschach: Findings in schizophrenic and nonschizophrenic patients. Journal of Abnormal Psychology, 1972, 79, 47-53.

Rapaport, D., Gill, M., & Schafer, R. Diagnostic psychological testing (Rev. ed., edited by R. R. Holt). New York: International Universities Press, 1968. (Originally published, 1946.)

Reed, J. L. The proverbs test in schizophrenia. British Journal of Psychiatry, 1968, 114, 317-321.

Reed, J. L. Schizophrenic thought disorder: A review and hypothesis. Comprehensive Psychiatry, 1970, 11, 403-432.

Romney, D., & Leblanc, E. Relationship between formal thought disorder and retardation in schizophrenia. Journal of Consulting and Clinical Psychology, 1975, 43, 217-222.

Rudzinski, D. J. Development and validation of a picture-preference test thought-disorder scale (Doctoral dissertation, University of Windsor, 1979). Dissertation Abstracts International, 1979, 40 (04), 1911-B.

Rudzinski, D. J., & Auld, F. Development of a picture-preference measure of thought disorder. British Journal of Social and Clinical Psychology, 1980, 19, 369-376.

Ryan, P. K. A construct validation study of a picture-preference test (Doctoral dissertation, University of Windsor, 1976). Dissertation Abstracts International, 1977, 38, 1903-B.

Rycroft, C. Freud and the imagination. New York Review, April 3, 1975, pp. 26-30.

Salzinger, K. An hypothesis about schizophrenic behavior. American Journal of Psychotherapy, 1971, 25, 601-614.

Shakow, D. Segmental set. Archives of General Psychiatry, 1962, 6, 1-17.

Shakow, D. Some observations on the psychology (and some fewer, on the biology) of schizophrenia. In R. Cancro (Ed.), Annual review of the schizophrenic syndrome 1973. New York: Brunner/Mazel, 1974.

Shakow, D., & Jellinek, E. M. Composite index of the Kent-Rosanoff free association test. Journal of Abnormal Psychology, 1965, 70, 403-404.

Shapiro, S. A. Contemporary theories of schizophrenia. New York: McGraw-Hill, 1981.

Shean, G. Schizophrenia: An introduction to research and theory. Cambridge, Mass.: Winthrop, 1978.

Shimkunas, A. M., Gynther, M. D., & Smith, K. Abstracting ability of schizophrenics before and during phenothiazine therapy. Archives of General Psychiatry, 1966, 14, 79-83.

Shimkunas, A. M., Gynther, M. D., & Smith, K. Schizophrenic responses to the proverbs test: Abstract, concrete, or autistic? Journal of Abnormal Psychology, 1967, 72, 128-133.

Silverman, L. H., Lapkin, B., & Rosenbaum, I. S. Manifestations of primary process thinking in schizophrenia. Journal of Projective Techniques, 1962, 26, 117-127.

Tutko, T. A., & Spence, J. T. The performance of process and reactive schizophrenics and brain injured subjects on a conceptual task. Journal of Abnormal and Social Psychology, 1962, 65, 387-394.

Venables, P. H. Input dysfunction in schizophrenia. In B. A. Maher (Ed.), Progress in experimental personality research (Vol. 1). New York: Academic Press, 1964.

Von Domarus, E. The specific laws of logic in schizophrenia. In J. S. Kasanin (Ed.), Language and thought in schizophrenia. Berkeley: University of California Press, 1944.

Watkins, J. G., & Stauffacher, J. C. An index of pathological thinking in the Rorschach. Journal of Projective Techniques, 1952, 16, 276-286.

Wechsler, D. Wechsler Adult Intelligence Scale Manual. New York: Psychological Corporation, 1955.

Werner, H. Comparative psychology of mental development. New York: International Universities Press, 1948.

Whitaker, L. C. The Whitaker Index of Schizophrenic Thinking. Los Angeles: Western Psychological Services, 1973.

Wing, J. K., Cooper, J. E., & Sartorius, M. Measurement and classification of psychiatric symptoms. London: Cambridge University Press, 1974.

World Health Organization. Manual of the international statistical classification of diseases, injuries, and causes of death, 9th revision (ICD-9). Geneva: World Health Organization, 1977.

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