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The Learning and Retention of Concepts of Psychotics

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THE LEARNING AND RETENTION OF CONCEPTS

BY PSYCHOTICS

being

A thesis presented to the Graduate Faculty
of the Fort Hays Kansas State College in
partial fulfillment of the requirements for
the Degree of Master of Science

by

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Date

Aug. 1, 1951

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Grateful appreciation is also extended to Dr. Floyd B. Streeter, Secretary of the graduate council of the Fort Hays Kansas State College, for his suggestions and help in this study.

DEDICATION

To the patients and members of the Staff of

Larned State Hospital

Without their kind cooperation the author would
not have been able to perform this experiment.

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HISTORICAL INTRODUCTION

The recognition of the problem of concept formation goes back at least as far as Plato. Men have for the most part followed this philosopher in placing the problem outside the sphere of natural science.

The early philosophers observed that a certain type of concept formation was the result of abstracting and generalization from the experiences of sense perception. There was another type which was formed by the faculty which ruled over the invisible or intellectual world, that is, reason. Possession of the first type did not presuppose possession of the second because reason is attained in many only after years of experience, and many men never attain this faculty.

A few writers of antiquity and of the Middle Ages attempted to approach this problem. Aristotle wrote of an essentially active side of mental life. In this virtue we abstract; and abstraction for Aristotle is the ignoring of the accidental and the retaining of the general.

Thomas Aquinas (11) advanced a doctrine which in its essential points resembles Aristotle's conception of mental activity. He believed that knowledge derived from the material of sense through the activity of the "intellectus agens," a higher agent which strips the object of understanding of its particular features, is the process abstraction.

Memory, which had previously resisted the efforts of the psychologists, became accessible to study after Ebbinghaus (1885) invented a suitable method. Hundreds of experiments followed because this seemed a satisfactory method that would provide a quantitative measure of the process of thought.

Fisher's experiment (4) (1912-1913) was largely subjective with the major emphasis on the introspections of the subjects. The results were valuable because they aroused interest in the quantitative measurement of the level and processes of concept formation.

The whole of Hull's study was based on the doctrine that concept formation can be studied by presenting to the subject a series of stimulus patterns in the form of Chinese characters each of which has a "common element" in certain strokes with other members of the group.

In the search for a quantitative measure of the mode of evolving concepts, Hull compared the performances of the patients at the Wisconsin State Hospital for the Insane with normal individuals.

He hoped that this experiment might throw some light upon the process of abstraction and upon the state of some of the higher mental processes among the characteristic types of insanity. The types of mental disturbances which Hull chose for this purpose were: (1) constitutional inferiority, (2) dementia precox, (3) paresis.

His results in general show the insane to be distinctly

inferior to normals in the formation of association and in generalization and abstraction, but they were apparently fully equal in retentiveness of associations once they were formed. The total time spent by Hull's abnormal subjects was nearly four times as great as that spent by normals.

A comparison of the efficiency of the two groups of subjects is shown by the number of successful reactions on the tests per unit of time spent on the concept series. The results were:

Abnormals - .45 successes per minute spent.

Normals - 2.81 successes per minute spent.

The results of Hull's experiment tended to indicate the following:

1. Constitutional inferior, dementia precox, and paretics showed a great disturbance of power to form associations. The disturbance seemed to be distinctly more marked with the paretics than with the other two groups.
2. Once the associations are formed the three types of abnormals retain them as well as the normals.
3. The average rate of evolving functional concepts was only about one-sixth as rapid for the abnormal as for the normal group.

Hull concluded that there was almost a total lack in the abnormal group of ability to define the concept by drawing, whereas normals show considerable ability to do this.

Bijour and Werner (1) found that brain injured mentally

retarded children had a wider vocabulary range; they employed more advanced modes of expression and they gave more complete definitions to the terms defined than the non-injured mentally retarded children matched on their Stanford-Binet M.A.'s and I.Q.'s.

The Russian psychologist, Vigotsky, made an attempt to apply theories and methods of genetic psychology and psychology of thinking to the investigation of schizophrenia. On the basis of clinical observation and experiments he arrived at the following conception. The essence of the schizophrenic thought disorder and an important characteristic of it is a loss of ability to think in abstract concepts and a regression to a more primitive level which he calls "thinking in complexes." On this level of thinking, Vigotsky believes that objects are not viewed under the general categories or concepts, as representative of certain classes of objects but are seen merely as individual objects.

According to Rapaport (12), the wealth or sterotypy of the subject's responses corresponds to the wealth or sterotypy of his everyday thinking. The greater the limitations of the conceptual realms available, the more general and non-specific the response, the stronger are the indications for sterotypy of thinking. Rapaport lists the following factors which may result in sterotypy in the Rorschach test:

1. Native limitations of endowment and intelligence may seriously limit the range of conceptual realms from which the content of the responses may be drawn.

2. A normal adjustment which derives its stability and safety from clinging to convention and the obvious, may also restrict the range of associative material.
3. The presence of strong anxiety may impair the fluidity of the subject passing from one realm of ideas to the next.
4. Extreme inhibition, depressive retardation or psychotic blocking may prevent free passage from content to content.
5. Compulsive rigidity may restrict the responses.

The Object Sorting Test was introduced by Gelb and described in detail by Weigl (17). Patients with cerebral lesions are characterized according to Weigl (11) and Goldstein and Scheerer (6) by the concreteness and inflexibility of their sortings. Bolles and Goldstein (6) report that a group of schizophrenics, most of whom showed evidence of retardation tend to respond in a concrete way. Bolles, Rosen and Landis and Zubin and Thompson used the test successfully in predicting the outcome of insulin treatment of schizophrenia.

Very few studies have dealt primarily with the vicissitudes of verbal concept formation in mental illness. Studies on scatter on the Bellevue scale for the most part did not show any special impairment on schizophrenics.

Wechsler (15) pointed out that the similarities test may or may not show impairment, depending upon the type of schizophrenia.

Verbal concept formation in schizophrenia was studied by Wegrocki (16) who concluded that some but not all schizophrenics "tend to manifest a disorder in the function of generalization." Paranoid patients showed least disturbance in such generalizing ability, and hebephrenics the most.

Cleveland and Dysinger (2) report that many of their senile and schizophrenic subjects were able to give what seemed to be abstract conceptual responses on the similarities subtest of the Bellevue Scale.

Goldstein's (6) study of cases of brain lesions led him to conclude that these patients suffered from basic impairments of their categorical behavior. He believed that they functioned on a concrete rather than an abstract level. Vigotsky and Goldstein used tests of concept formation to determine whether the patient functioned on an abstract or "concrete" level; other investigators followed suit.

Goldstein (6) showed that in the thinking of organics that the patients with a loss of "categorical behavior" have "lost the capacity to deal with that which is not real." They are unable "to transcend concrete experiences in order to act" and show impairment of the capacity to "comprehend the essential features of and event." In their Rorschach responses is to be found a lack of movement, inability to utilize suggested interpretations, and a failure to relate their general reactions to actual details on the card.

These concepts proved successful in differentiating between

the test performance of patients with organic pathology and normals; however, some psychotics who were not severely disorganized did not show any impairment.

Psychologists have done very little research in the field of concept formation in psychotics. It is desirable that more such investigations be made. It is particularly desirable that investigations be made with other types of concepts and that we investigate not only the differences between normals and psychotics but also investigate the possibility of using concept-formation tests for diagnostic purposes. The writer hopes to make a contribution in this direction.

General Problem

The following specific questions were formulated for investigation:

1. Do people suffering from mental disorders actually show a reduction of conceptual thinking as compared with healthy individuals of the same educational and intellectual level.
2. If such a reduction of conceptual thinking exists, is it found in all patients or is it limited to certain clinical groups?
3. Do different groups of patients manifest different degrees of disturbance?
4. To what degree is the performance in this test dependent

on the educational level of the subject.

Methods and Materials

The materials used in this experiment consisted of six nonsense syllables, each of which was represented by a familiar logical category.

One hundred sixty-eight words are grouped on 42 cards containing 4 words each. On the face of the 42 cards $3\frac{1}{2} \times 5$ was printed a set of four words, one of which belonged to a category symbolized by the syllable which was printed on the back of the card. Position habits were avoided by the key word occurring in irregular positions to make memorization difficult. The order of the syllables was different in every six cards and the same syllable never occurred on two adjacent cards.

Experimental procedure

In the experimental procedure the examiner presented the cards from behind a card board screen to the view of the subject at the rate of one card every seven seconds.

A metronome was used in measurement of time: on the third second the experimenter pronounced the nonsense syllable on the card and on the fifth second he withdrew the card in view and prepared to present the next card. When the card was named correctly by the subject, the experimenter replied, "Right". If the subject failed to name the card or named it incorrectly, the experimenter

prompted him. The 42 cards were always presented in the same order. One showing of the cards completed a trial after which there was a rest interval of 15 seconds except when introspective reports were recorded. The introspective reports on the process of learning or concept formation were regularly taken every third trial, and often if there was evidence of unusual progress. To secure these introspective reports the experimenter asked the subject the methods he used to learn the names of the cards.

To give the reader a more concrete idea of the material used in this experiment the name and content of each of the cards are presented.

NAME	CONTENT			
1. kun	horn	leaf	monkey	debt
2. vor	brook	leaf	claim	precious
3. yem	roses	suit	juice	plum
4. bep	club	picnic	reaches	beet
5. dax	answer	highest	airplane	red
6. jik	pine	hear	speak	chalk
7. yem	fight	tablet	chair	poppy
8. kun	fame	ought	tiger	saucer
9. bep	potato	careful	pasture	raised
10. jik	across	oak	floor	sorry
11. vor	lover	borrow	flower	point
12. dax	anywhere	green	aloud	apple

13. vor	honey	idle	breaking	bread
14. jik	pencil	cedar	just	crossing
15. yem	doesn't	spread	dandelion	stuck
16. bep	crawl	turnip	pleasant	closet
17. dax	board	beast	blue	butter
18. kun	line	people	elephant	sound
19. vor	broken	darling	load	pearl
20. kun	uncle	fried	sheep	pear
21. yem	enough	hitch	lily	tangle
22. jik	break	knee	maple	eyes
23. dax	building	purple	believed	plus
24. bep	call	c'clock	carries	spinach
25. yem	sunflower	ditch	shade	stir
26. jik	bid	know	file	walnut
27. vor	barrel	sweetheart	hurried	noisy
28. bep	coffee	pilot	clay	carrot
29. dax	bunch	brown	borrow	prince
30. kun	crowd	sail	deer	string
31. bep	berry	nickel	tomato	calm
32. dax	maid	arrow	lean	yellow
33. jik	because	sugar	elm	meat
34. kun	horse	circle	paid	scholar
35. yem	toward	leader	pansy	treated
36. vor	banana	haste	dear	minutes
37. dax	orange	beat	ankle	knives

38. yem	laden	daisy	disgust	cranky
39. vor	believe	cigar	owe	love
40. kun	varying	died	cow	ruler
41. bep	urn	cabbage	crown	swept
42. jik	air	hour	cheat	cottonwood

The following directions were given to the subject by the experimenter before the beginning of the experiment:

This is an experiment in learning concepts. A concept, you know, is a word or idea that stands for any one group of things. Thus the word chair stands for no particular chair, but for any one of a group of chairs. I am going to show you a number of cards, one at a time. Each of these cards will be named by a nonsense syllable such as jik, bif, or hex and each nonsense syllable is a concept. Look carefully at the words on the cards and try to learn the name of the card and what it stands for. At first you will not know the names of any of them and I shall have to prompt you. I will always prompt you when you fail to tell me the name of the card within three seconds after it has been shown. When I have given you the name of the card repeat it aloud after me so that I can be sure that you understand it. Your work will be finished as soon as you can name each card without any help.

Now will you answer these questions:

1. What is this an experiment in?
2. What is a concept?
3. In this experiment, is each nonsense syllable supposed to be a concept?

4. What are you to do?

As soon as the subject answered the questions to the satisfaction of the experimenter the learning process was begun.

One week after the learning test a retention test was given. Except for giving the directions the procedure was the same as in the learning.

After the experiment was finished, the subject was usually happy because successful achievement gave him a sense of accomplishment. While walking back with the patient to his ward, the writer carefully warned him not to tell others about the experiment as it would ruin the experimental findings. Each patient promised that he would not tell the others.

After every third trial the subject was asked what each of the syllables suggested to him. His remarks were used as basis of constructing the process of concept formation.

A record was kept of the number of promptings required to respond correctly to each card, of the incorrect responses, of the total time of the interview, and of the subjects comments made during the experiment.

How the Subjects for this Experiment were Selected and their Characteristics

From the files of the hospital the writer was able to get information about the education of the patient, his mental condition, and the diagnosis. Despite this information it was not infrequent that a person with good intelligence having a high school or college education would

be selected who would be too disturbed to follow directions. Many others failed to make comparable scores with college students because their mental condition would not permit them to perform; therefore, it was necessary to ask the attendants about the mental condition of the patient when a list was made up for the next day's testing procedures. The writer found it especially helpful to visit with the patients who were sitting outdoors and playing games. In this manner he found it most effective to detect those patients in the manic state by their pleasant facial expressions and sociability. Many of the patients were helpful in suggesting those patients who were better educated and the most intelligent. The head attendant of the men's department was helpful in selecting suitable subjects.

A number of patients whom the writer thought might well qualify refused to take part, others required much coaxing to get them to cooperate. The writer found they responded very readily to kindness and consideration which he tried to show them.

In selecting subjects for testing procedures the writer found it almost imperative that the subject had completed high school to make a comparable score on the Henmon-Nelson test because that particular form of test was standardized upon college students. A group of college students from the Fort Hays Kansas State College was used as a control group, and the writer attempted to get subjects who had comparable scores on the Henmon-Nelson test.

CHARACTERISTICS OF GROUPS USED

	Group 1	Group 2	Group 3
Henmon-Nelson Score	35.25	32.55	37.50
Mean Education	12.94	12.46	13.57
Mean Chronological Age	40.72	45.18	38.82
Number	51	11	22
	Group 4	Group 5	Group 6
Henmon-Nelson Score	27.55	37.65	42.25
Mean Education	12.00	12.94	12.94
Mean Chronological Age	39.10	43.00	20.3
Number	10	8	19

Group 1 = the total psychotic group

Group 2 = the organic psychotics

Group 3 = the schizophrenics

Group 4 = the manic depressive - manic

Group 5 = the manic depressive - depressive

Group 6 = the college group

RESULTS

After the completion of the tests the results were subjected to a statistical treatment. The writer calculated the mean promptings per concept for each group, the S. D. of each mean, and the standard error of the difference between the various group means, (S.D. Diff.). Table II presents the results.

TABLE II. AVERAGE PROMPTINGS PER CONCEPT

	Group 1 Total Psychotic	Group 2 Organic	Group 3 Schiz.	Group 4 Manic	Group 5 Depressive	Group 6 College
Mean	37.40	37.50	39.40	32.00	40.18	30.70
S. D.	18.05	15.55	22.15	8.50	14.75	13.40

DIFFERENCES BETWEEN MEANS OF GROUPS

1 and 2	1 and 3	1 and 4	1 and 5	1 and 6
Obt. Diff. -.10	-2.0	5.40	2.73	6.70
S. D. 5.80	5.59	3.95	6.14	4.04
t .017	.36	1.37	.43	1.66
	2 and 3	2 and 4	2 and 5	2 and 6
	Obt. Diff. 1.90	5.50	2.63	6.80
	S. D. 7.16	5.98	7.60	6.03
	t .28	.92	.35	1.13
		3 and 4	3 and 5	3 and 6
		Obt. Diff. 7.40	.73	8.40
		S. D. 5.78	7.44	5.83
		t 1.28	.10	1.44
			4 and 5	4 and 6
			Obt. Diff. 8.13	1.30
			S. D. 6.32	4.30
			t 1.29	.30
				5 and 6
				Obt. Diff. 9.48
				S. D. 6.32
				t 1.50

According to Table II schizophrenia causes a reduction of conceptual thinking and produces mental blocking. There are, however, some exceptions. An example is: Case 5647 diagnosis - schizophrenia - paranoid.

She was a very brilliant person who had a master's degree from Columbia University. She was friendly and showed evidence of having been reared in a nice home. She understood very clearly the meaning of a concept and completed the second trial with only three mistakes. During the third trial she began to criticize the test and point out what she thought were the weak points. She completed the concept learning test in four trials with mean learning promptings of 5.50 per concept. On the concept retention test there were 1.33 mean promptings per concept.

Table II also shows that organic psychosis results in reduction of conceptual thinking, but we have one example to the contrary. Case 6144 (multiple sclerosis) impressed the examiner as a very brilliant person. Because she was in a wheel chair it was necessary that the Henmon-Nelson be administered in her room. She completed the concept learning test in four trials with mean learning promptings of 6.33 per concept while the mean retention promptings were .33 per concept. It should be stated that at least one psychiatrist held that this patient was not psychotic.

Problem 1

Looking over total psychotic and college groups, Group 1 and 6, we see that the psychotic group on the average requires 6.7 promptings per concept less than the college group. This difference has an S. D. of 4.4 and a t of 1.66, which makes it significant at the 10% level. Although this difference is not wholly reliable it indicates a strong tendency for a psychotic condition to reduce ability in concept formation.

Problem 2

If we compare the differences between various psychotic groups we may state the following conclusions:

1. The difference between groups 4 (manic) and 6 (college) is not statistically significant.
2. The differences between the other psychotic groups are not statistically significant. This means that schizophrenic, manic - depressive - depressive, and psychotic states due to organic conditions produce an equal handicap for forming concepts.
3. The differences between Groups 2, 3, 5, and 4 on the one hand and Group 6 are statistically significant. This means that manic - depressives - depressive, schizophrenic, and organic psychotic states reduce conceptual forming ability to reliable amounts.
4. The difference between Groups 4 (the manic - depressive -

manic) and 6 (college) shows that manic - depressive - manic condition causes no deficiency in the ability to form concepts.

5. A comparison of Groups 3 (schizophrenis) and 5 (manic) with Group 6 (college) shows that of the various psychotic groups investigated, schizophrenia and manic depressive - depressive mania produce the greatest handicap in forming concepts.

The differences in Table II may be due in part to differences in intelligences. We were able to find psychotics equated in education but we were not able to equate them in intelligence. The mean Henmon-Nelson score of the total psychotic group was 35.25, S. D. 10.05, while the Henmon-Nelson score of the college group was 42.25, S. D. 9.46. This shows a difference of 7 points in favor of the college with an S. D. difference of 2.66 and a t of 2.63. The difference is significant at the one per cent level. On this basis we could say that the difference in concept forming ability is due to lower intelligence providing we assume that a psychotic condition does not reduce intelligence, but this is an unreasonable assumption. It is more reasonable to assume that the reduced concept forming ability and lower intelligence are both due to the psychotic condition; however, further investigation is required to establish this statement.

Problem 3

To what degree is the performance on this test dependent upon the educational level of the subject?

It is impossible to compare the organic psychotic group by educational level because there was only one member who had attended college, but such a comparison was possible for the schizophrenic and manic-depressive groups.

Table III shows that the college-educated schizophrenic group was superior in mean promptings per concept to the non-college schizophrenic group. The non-college manic depressives were superior to the college-educated manic-depressives. The writer observed that the manic - depressive group which was college educated, was more disturbed emotionally than the non-college group. It is assumed therefore that the difference in favor of the non-college manic-depressives is due to their freedom from disturbance. Other things being equal the better educated psychotics tend to be superior to the less well educated in concept formation.

TABLE III. A COMPARISON OF PSYCHOTIC GROUPS OF DIFFERENT EDUCATIONAL LEVELS

	College-educated Schizophrenics	Non-College Schizophrenics
Mean Henmon-Nelson Test Score	40.45	36.00
Mean Promptings per Concept	32.91	47.45
S. D.	18.25	
Educational Mean	15.11	11.8
Number	11	10

	College-educated Manic-Depressives	Non-College Manic-Depressives
Mean Henmon-Nelson Test Score	36.83	30.
Mean Promptings per Concept	37.85	34.1
S. D.	10.15	
Educational Mean	14.10	11.3
Number	7	11

GENERAL CONCLUSIONS

The following general conclusions are indicated:

1. According to this experiment the chances are 10 to 1 that a psychotic condition reduces an individual's ability to form concepts. This appears not to be true of the manic - depressive - manics but all others investigated show a reduction of concept-forming ability.
2. There are individual differences among psychotics, an individual schizophrenic or manic - depressive may be superior to the average college student in concept forming ability.
3. Schizophrenics and manic depressives suffer the most serious reduction in concept forming ability.
4. Among the psychotics the better educated have better concept forming ability than the less well educated.
5. The concept-formation test as used in this investigation can not be used to differentiate between various psychotic groups.

LIMITATIONS AND FURTHER RESEARCH

As previously pointed out we were unable to equate the psychotic and college group for intelligence. This leaves some doubt as to how much the difference of intelligence was a factor in concept formation. Future investigations should attempt to

find a psychotic group and a normal group of equal intelligence.

Our samples were very small and the results could be easily changed by using larger and more representative samples.

Observation showed in this experiment any one of a number of mental conditions such as day dreaming, depressive state, anxiety, and mania reduced the ability to form concepts. In the future an effort should be made to evaluate the amount of interference produced by each mental state.

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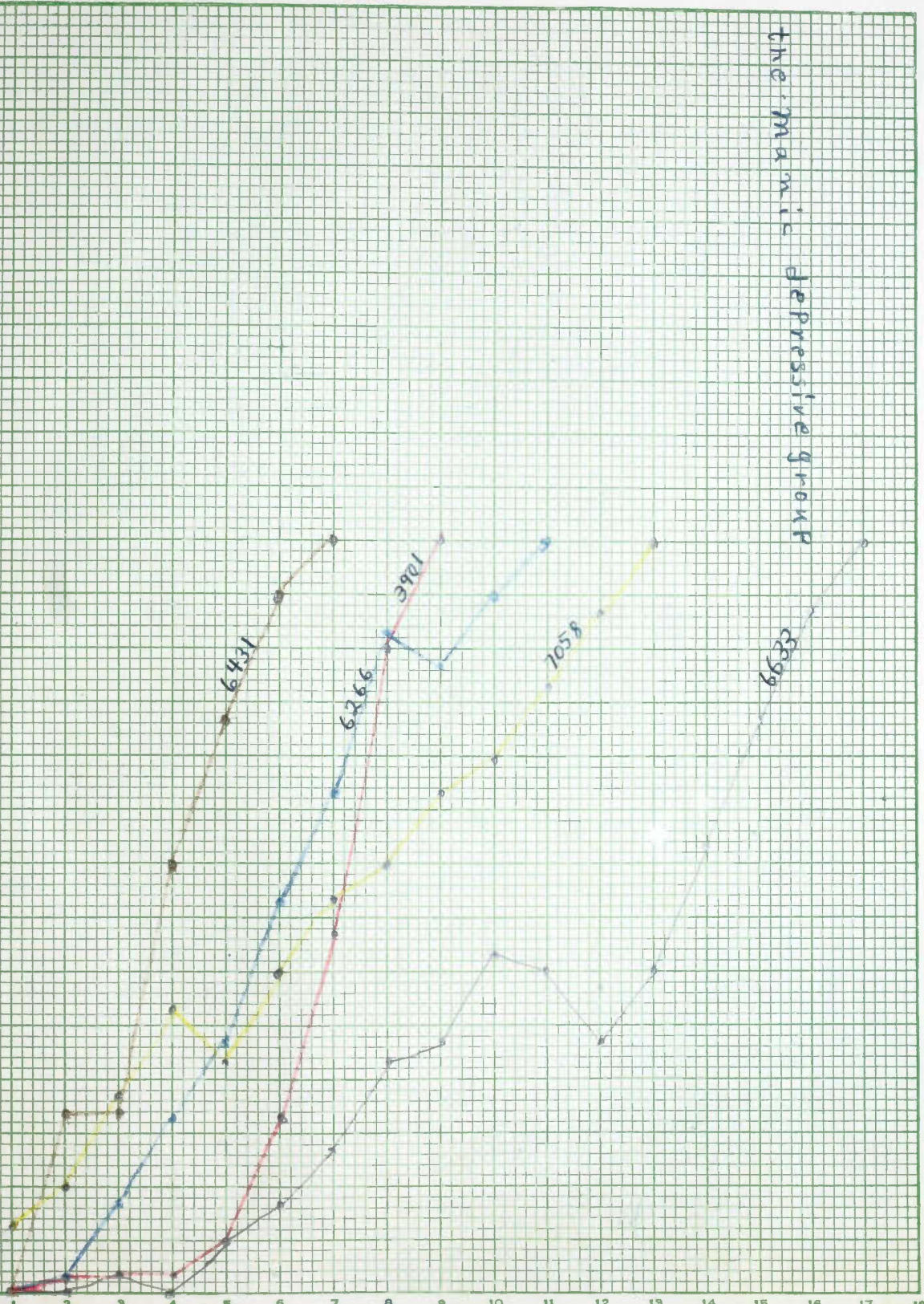
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APPENDIX

Graphs 1a, 1b, and 1c represent the records of individuals from three psychotic groups, namely: (1) the manic depressive group, (2) the organic psychotic group, (3) the Schizophrenic group. In psychotic individuals as well as in normal people individual differences occur in concept learning.

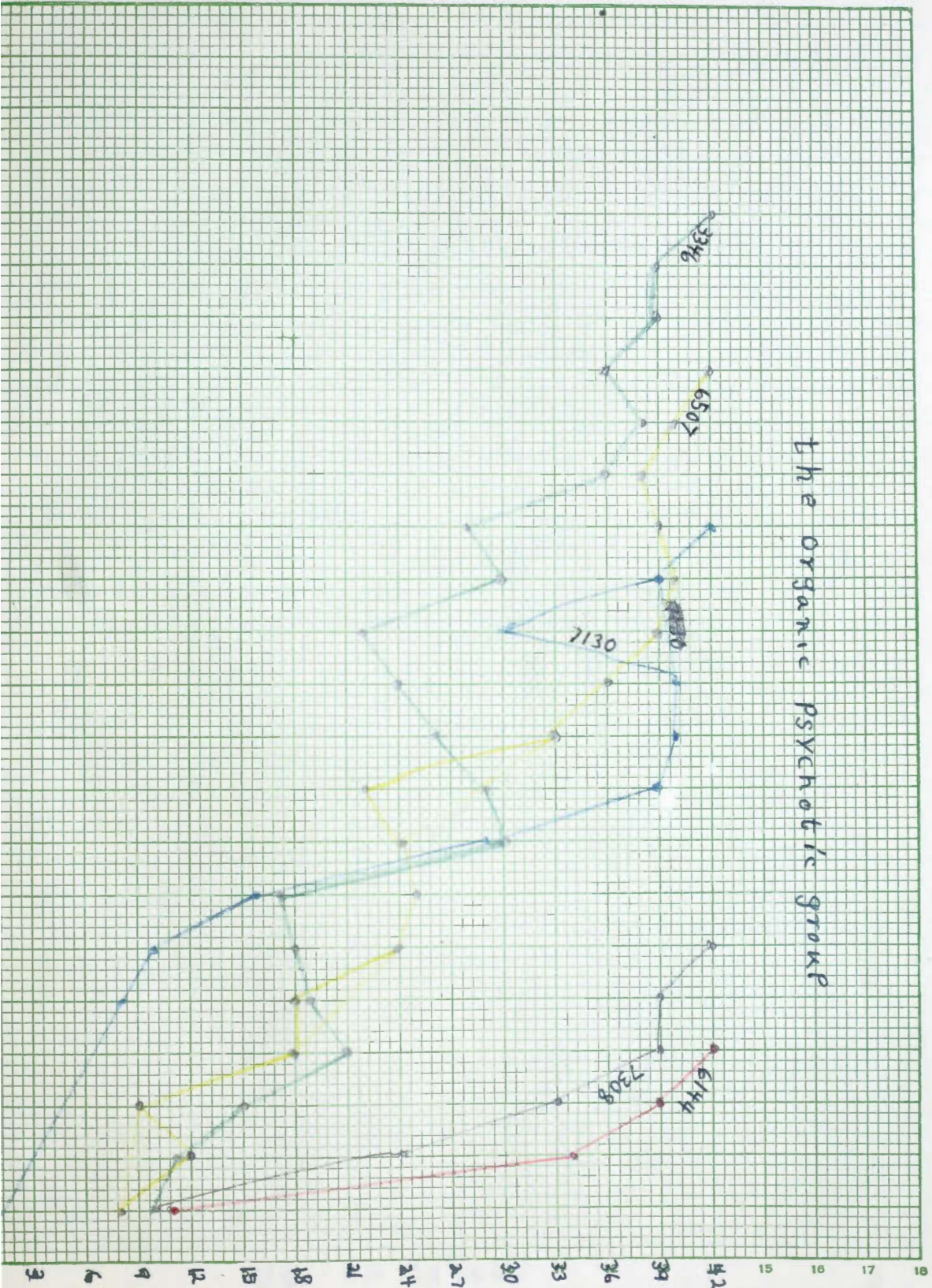
the manic depressive group



No. of trials

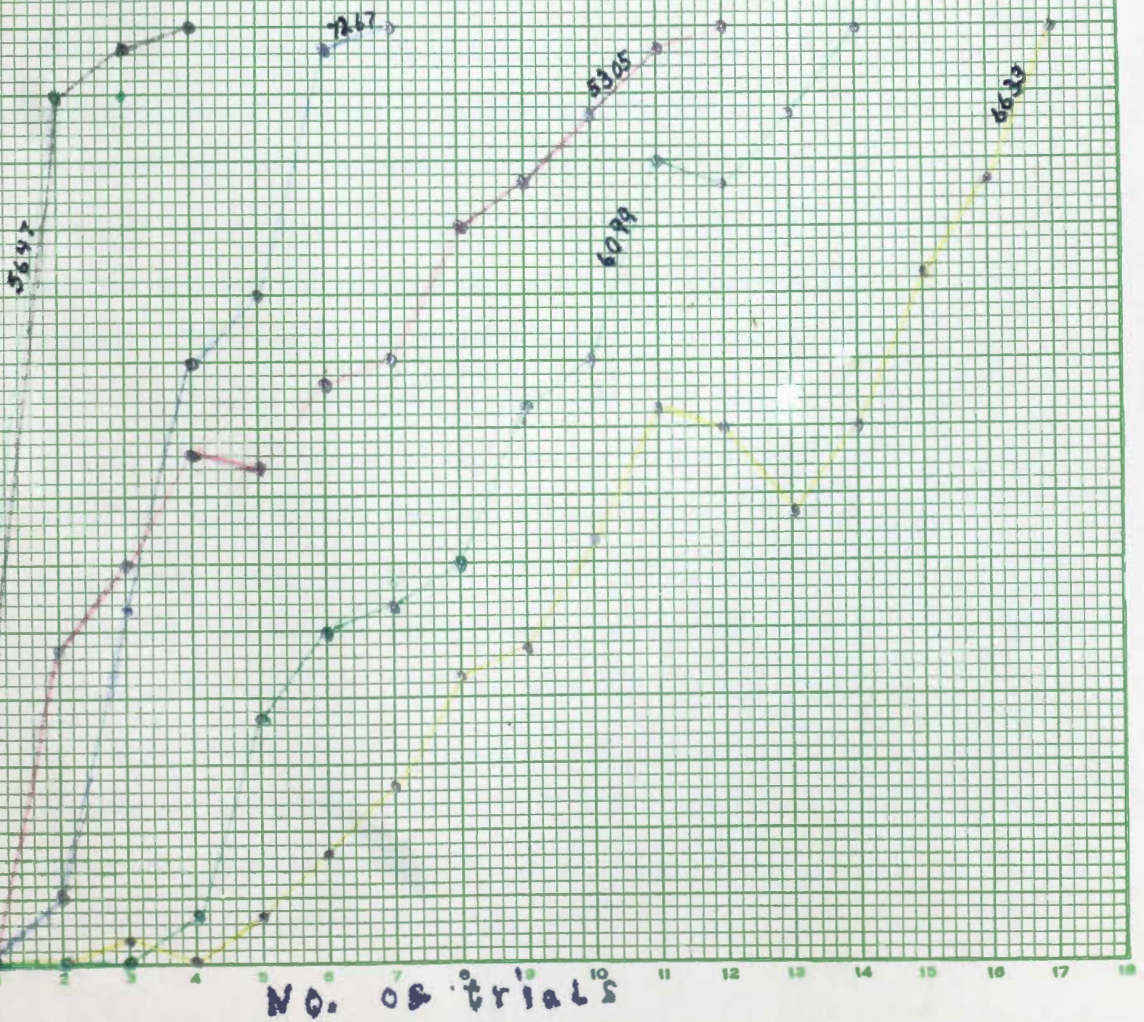
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

The organic psychotic group



Correct responses

the schizophrenic group



CHARACTERISTICS OF INDIVIDUAL CASES

Case 6431 - Diagnosis - manic depressive psychosis - depressive was friendly, cooperative, and conversational. She seemed slightly elated during testing procedures. There was no evidence of mental blocking or inability to concentrate. She completed the learning test in eight trials with mean learning promptings of 23.1 per concept, and the mean retention promptings were .50 per concept.

Case 7058 - Diagnosis - manic depressive psychosis - depressive was quite disturbed when she reported for the Henmon-Nelson test of mental ability. She complained at the top of her voice that the test and hospital was unfair. She also stated that the test was for college students and that she had not finished high school. I had one of the patients get an attendant to take her back to her ward. Later she hinted to another patient that she thought she would not do so badly on the Henmon-Nelson test. I asked her again to take the test and she said she did not care much about taking the test but if she were required to take it she would. She said it was a dreadful mistake that she was placed in the hospital. She only came for a check-up and was left here against her wishes. She believed that I might be able to help her and asked if I would not talk to the superintendent about her. She was slower than average on the concept learning test with mean learning promptings of 49.5 per concept. The

mean retention promptings were 3.50 per concept.

Case 3901 - Diagnosis - manic depressive psychosis - depressive was cooperative and friendly. She had difficulty with the concept learning test because she was not sure what she was expected to do and almost cried because she did not progress. When she discovered kun was an animal, the remainder of the concepts were easily learned. She completed the test with all concepts correct with mean learning promptings of 43.67 per concept. No retention test was given.

Case 6419 - Diagnosis - manic depressive psychosis - depressive was cooperative and slightly elated at the time the Henmon-Nelson test of mental ability and concept learning test was administered. I walked back to her ward with her and asked her if she would launder several of my shirts. She stated that she would gladly do this. I called for my shirts and an attendant brought them saying, "She says she has laundered your shirts but she won't come up to take any more tests." A week later I called to give her the retention test and she was still in depression. When I explained it would only take a few minutes she began to cry. After a little encouragement she agreed to take the test. She talked only when questions were asked her but was cooperative. She was very slow on the learning and retention tests with mean learning promptings of 73.3 per concept and mean retention promptings of 7.67 per concept.

Case 6390 - Diagnosis - manic depressive psychosis - depressive was somewhat suspicious of my motives in selecting him. He asked if the test has anything to do with his being released from the hospital. He was eager to know if I would use his name in my thesis. At all times he was rather distant and I was afraid he would not take the retention test. Like many of the subjects he believed yem to be a plant. Later he believed bep to be a plant. It was difficult to break down this concept and decide that bep was a vegetable. Other wrong concepts were that he believed bep and dax were something to eat and the syllable vor was a kind of fruit or people. The mean learning promptings were 31.50 per concept while the mean retention promptings were 2.83 per concept.

Case 7359 - Diagnosis - manic depressive psychosis - manic seemed to have little difficulty in forming concepts. She was calm, affectionate, and agreeable on this test but was reluctant, but after some conversation took the retention test. She was very manic at the time the retention test was given and delighted in teasing me. At the end of the fifth trial she refused to go no farther until I bought her a bottle of coke. During the time I was gone she placed her feet on the table and read aloud at the top of her voice from a magazine. She finished the concept learning test with little difficulty with mean learning promptings of 31.5 per concept. When I asked her to take the retention test she was very manic and began to curse. She could not concentrate even

though she knew the concepts and she did not state the names of the concepts but went cursing out of the building. The retention test taken a week later was completed with 33.1 mean promptings per concept.

Case 4609 - Diagnosis - manic depressive psychosis - manic was a pleasant looking person who was especially helpful in selection of subjects to be used in testing procedures. She had been at Larned State Hospital about a dozen times during the last ten years. She appeared quite normal. She stated all the concepts correctly in twelve trials with mean learning promptings of 32.50 per concept. On the retention test there were 1.33 promptings per concept.

Case 7205 - Diagnosis - manic depressive psychosis - manic had much difficulty concentrating upon the material to be learned. She frequently interrupted testing procedures by talking. It was scarcely possible to complete one trial without an interruption. She completed the concept learning test with 112.3 mean learning promptings per concept. She was very manic during the retention test and made no progress. She tried very hard but failed to concentrate and assumed such an attitude of indifference that there was no use to continue testing procedures.

Case 7136 - Diagnosis - pre-Schizophrenia - He was a former music instructor in a college in Iowa. He was about to be discharged from the hospital and was free to go about where he wished. He

seemed very introverted and regretted his mistakes very much. He apologized for missing the concept yem by saying "my father loved flowers and I had little use for them. I guess that's the reason I missed it." He seemed to be able to form concepts quickly and completed the concept learning test in five trials with 5.67 mean learning promptings per concept. At the time he was supposed to take the concept learning test he had been discharged from the institution and employed as their musical therapist.

Case 4028 - Schizophrenia - Paranoid - She was an elderly woman who was deaf and in order to administer the test it was necessary to show her the back of the card each time it was exposed. She seemed to have very little idea of the nature of a concept and it was very laborious to administer the test. It was not as difficult to get schizophrenic as the other types desired and I decided not to finish the concept learning test. She claimed to be a member of the Kansas Author's Society and stated that she had written an unfinished book "Schooldays on Boothill."

Case 5570 - Schizophrenia - Simple - He seemed to be a normal acting individual of good intelligence. He was allowed more freedom than many of the patients and was permitted to go to town in the evening. He did not know the meaning of the concept vor at the end of the tenth trial but knew the other concepts which enabled him to complete the test without this knowledge. There was no evidence of blocking or inability to concentrate. The

concept learning test was completed with mean learning promptings of 23.67 per concept. No retention test was given.

Cases 7351 - Schizophrenic -catatonic - She was a pathetically appealing small female who had a very helpless manner about her. When I asked her the meanings of the concepts she merely shook her head and smiled. She seemed to have little confidence in herself and she was only conversational when she was asked questions. There seemed to be considerable evidence of blocking because she did not seem to progress. I do not believe I realized how sick she was during testing procedures until I talked to her sister and her on July 4th. She thought she had been in the hospital about two weeks while her sister stated that she had been in the hospital about three and one half weeks. Her sister seemed to doubt any information which the patient gave regarding time. She completed the concept learning test in twelve trials with 36.5 mean learning promptings per concept. She was rather slow on the retention test with 4.17 mean retention promptings per concept.

Case 6749 - Schizophrenia - paranoid - She refused to take the Henmon- Nelson test of mental ability because she had heard all about Mr. Henmon. When I explained to her that Mr. Henmon was the author of the tests and I wished to have the information for my Master's Thesis. She asked me how much I would take for my thesis and added that she had two million dollars. I told her I would

take \$100,000 and she wrote on the top of the Henmon-Nelson test -- \$100,000 - Hollywood Fund. I pretended to ignore her, but I noticed she started on the test like the rest of the group. When she reported for the concept learning test she was friendly and conversational. She inquired about Mr. Henmon again. She seemed to do very well on the concept learning test. It seemed difficult material was a stimulus to her because it kept her from day dreaming. She stated that she learned the concepts vor and kun by association but would not explain what she meant. She stated that the concept yem was a flower and she learned that concept by the n's in the words. The rest of the concepts were learned by the names on the cards. She completed the retention test in nine trials. I believe that easy material is difficult for her because three seconds allows her too much time to day dream. The retention test was completed with mean retention promptings of 12.83 per concept.

Case 7330 - Diagnosis - Schizophrenia - resulting from a psychoneurosis was a very likeable person. She seemed to have some insight into her condition. She made a high score on the Henmon-Nelson test of mental ability but said with her mental condition she had difficulty earning a living. There was much evidence of mental blocking and she did not form concepts rapidly. She complained about her own inability to concentrate. She completed the concept learning test in twenty trials with 46.83 mean learning promptings per concept. The concept retention test was completed in three trials

with 1.67 mean retention promptings per concept.

Case 7350 - Diagnosis - Manic depressive - hypomanic was cooperative but talked persistently during the learning and retention tests. Despite the interruptions she finished the concept learning test with 32.5 mean learning promptings per concept. She completed the retention test with 5.18 mean promptings per concept.

Case 6639 - Diagnosis - manic depressive - manic was cooperative in the concept learning test. She was very manic during this period but it did not seem to interfere with her ability to learn. She completed the concept learning test with 27.4 mean promptings per concept. She flatly refused to take the retention test about four times. The head attendant of ward F threatened to send her with an attendant. She dared me to send her with an attendant. When I told her I would not treat her that way she walked rather unwillingly to the testing room to take the test. Her state of depression gave her difficulty in the relearning of the concept material. She completed the concept retention test with 6.17 mean retention promptings per concept.

Case 6605 - Diagnosis - manic depressive - manic was a pleasant looking girl who seemed fairly normal. She stated that she had no parents to sign her out, and it is rather hard to have to stay in the hospital when people who were not as normal as she went home. She was polite and cooperative and did not interfere with

testing procedures by talking. She thought the concept yem was a kind of fruit. She thought bep was a word of action and later changed her idea about the concept bep stating it was a feeling or an emotion. She stated all the concepts correctly at the end of fourteen trials with 38.00 mean learning promptings per concept while the retention test was completed with .66 mean retention promptings per concept.

Case 7130 - Diagnosis - Post Encephalitis - was very nervous and timid; however after the testing procedures she had less fear. I thought because of her poor health she might become too fatigued to finish the test in one sitting. She became less fatigued as she became more successful. She is paralyzed in the right arm and cannot use it in handwriting. She walks with a slight limp. She was slow on the concept learning test with mean learning promptings of 59.33 per concept while the mean retention promptings were 2.83 per concept.

Case 6144 - Diagnosis - Multiple Sclerosis - impressed me as a very brilliant person. Because she was in a wheel chair it was necessary that the Henmon-Nelson be administered in her room. She completed the concept learning test in four trials with mean learning promptings of 6.33 per concept while the mean retention promptings were .33 per concept.

Case 7299 - Diagnosis - Cerebral- Arteriorosis with Psychosis - was a kindly well-dressed man with whom I became acquainted in the

hospital store. I asked him his name and checked to find his education and diagnosis. He was surprised when I called him to the testing room for the Hermon-Nelson Test of Mental Ability and the concept learning test. He said he had been in the hospital two months and was unconscious at the time he entered. He believed he would be discharged in the next few days. He completed the learning concept test in eleven trials with mean learning promptings of 48.17 per concept. There seemed little evidence of mental blocking. When I asked for him to take the retention test I was informed that he had been discharged from the hospital and returned home.

Case 3346 - Diagnosis - Traumatic Psychosis - was a very likeable person. He stated that he had been in the hospital for fifteen years and he said it is terrible to have to spend your life locked up. He had a large scar on his forehead which was a result of an auto accident. On the concept learning and retention tests there was considerable evidence of blocking. Even when he knew what the concepts were he seemed to miss them. On the first trial he named sixteen nonsense syllables correctly. There was no progress the first six trials and progress continued to be slow. He completed the concept learning test in twenty-three trials with all concepts named correctly. There was no progress the first six trials despite the fact that on the first trial sixteen nonsense syllables were named correctly. He completed the concept learning test with mean learning promptings 54.27 while the mean retention promptings were 6.83 per concept.

Case 7373 - Diagnosis - Syphillis Meningo - Encephalitis - was a quiet modest person and she made apologies for the scars on her arm which resulted from the use of a hypodermic needle. She was cooperative in all testing procedures and frequently made apologies for her stupidity. She expressed the desire that I give the concept learning test to her husband who was also a patient. She told me that he was a doctor and a very brilliant man. She completed the concept learning in eleven trials with mean learning promptings of 35.83 per concept. The retention test was completed in three trials with mean retention promptings of 2.17 per concept. There seemed to be little evidence of deterioration which seems most pronounced in patients with this diagnosis. She seemed to have difficulty in organizing the correct concepts and there was little evidence of mental blocking.

Case 7308 - Diagnosis - Syphillis Meningo - Encephalitis - I was informed that case 7308 was rather uncooperative but the head attendant advised me to wait a few days because the patient was very much disturbed. He was angered by my asking his cooperation and informed me that he was a sick man and did not care to be pestered. It seemed to cheer him when I told him that I gave the tests to his wife. He asked several questions about my thesis, and then asked to look at the Hermon-Nelson test. He decided to take it and complained that it was laborious. The concept learning test was completed in seven trials with mean retention promptings of 17.83 per

concept. The retention test was completed in two trials with 1.50 mean retention promptings per concept.

Case 7267 - Diagnosis - Schizophrenia - Paranoid - was a rather attractive nurse. Her hair seemed prematurely gray. She spoke only when she was asked questions. She completed the concept learning test in six trials. For the concept vor she used the word courtship. She seemed to understand instructions and unusual words such as cottonwood gave her a clue to the meaning of many of the concepts. She completed the concept learning test in six trials with 22.4 mean promptings with all concepts correct. She stated that she recalled all concepts on the retention test from a previous learning. The retention test was completed with 1.50 mean promptings per concept.

Case 5305 - Diagnosis - Schizophrenia - Paranoid - was an attractive, neatly dressed, stenographer. She appeared to be considerably above average in intelligence and talked in an educated manner. Much coaxing was necessary to get her to take the concept learning and retention tests. She didn't talk much, but her conversation was limited to beliefs of persecution. She asked if the cigarettes which I offered her were doped, and if I had a wire recorder hidden to record what she said. She seemed to catch on quickly on the concept learning test. By the end of the sixth trial she knew all the concepts correctly yet it took twelve trials for her to complete the concept learning test. There was much evidence of mental blocking.

She could not think of the words in time even though she knew them. She completed concept learning test with 30.83 mean learning promptings per concept. She completed the retention test with 2.00 mean promptings per concept. She states that she recalled the correct concepts from a previous learning.

Case 6633 - Diagnosis - Schizophrenia - Paranoid - was a very likeable person who was committed to the criminally insane section because he killed a policeman who had arrested him for speeding. His father was the owner of a large farm and he had a college degree in agriculture. He seemed very slow on the concept learning test and there was considerable evidence of mental blocking. He believed that the concept kun was a geometrical figure because the word "angle" and "circle" appeared on that card. He believed that yem was a type of fruit because he remembered the names of several fruit bearing plants. He completed the concept learning test in seventeen trials with 75.33 mean learning promptings per concept. The retention test was completed in two trials with mean retention promptings of 1.17 per concept.

Case 6596 - Diagnosis - Schizophrenia - Paranoid - was a former grade school teacher who had been committed to the criminally insane section for attempting to kill a banker. He watched every movement which I made. The head attendant at the Dillon Building required an attendant in the room where the test was administered because

the patient was considered dangerous. He seemed to be able to form concepts well and enjoyed the concept tests immensely. He completed the concept learning test with 34.00 mean learning promptings per concept. He knew all the concepts correctly at the end of the sixth trial. He completed the concept retention test in three trials with 1.33 mean retention promptings per concept. He stated that he recalled them from the concept learning test.

Case 6099 - Diagnosis - Schizophrenia - Paranoid - seemed to be a very normally appearing individual of good intelligence. He talked very little but answered all questions sensibly. He was rather slow on both the concept learning and retention tests. He completed the concept learning test in fourteen trials with mean learning promptings of 54.00 per concept. He believed the concept vor to be people but did not explain how he arrived at that conclusion. He had difficulty with the concept bep because he did not analyse the situation enough to see that they belong to the vegetable category rather than plants. The retention test was completed in three trials with mean retention promptings of 3.67 per concept. He stated that he recalled the correct concepts from the concept learning test but had difficulty reorganizing them in his mind.

Case 7261 - Diagnosis - Schizophrenia - Paranoid - did not seem to like me very much. He did not progress very rapidly and was highly displeased. Several times he halfway rose from his chair to walk

out of the room and kept looking toward the door. His discovery of the concepts yem and kun gave him encouragement and when he saw what the other concepts were he became very much amused. As he walked back to his ward and he asked me if college was difficult. He seemed interested in attending college. He did not seem to understand the exact nature of a concept. He completed the concept learning test in seventeen trials with mean learning promptings of 68.00 per concept. He was among the only two subjects who correctly found kun to be a mammal.

Case 5647 - Diagnosis - Schizophrenia - Paranoic - she was a very brilliant person who had a Master's Degree from Columbia University. She was friendly and showed evidence of having been reared in a nice home. She did not do as well on the Henmon-Nelson as I had anticipated because she wanted to talk. She asked me if I had read the story of Jesus' treatment of Peter through psychiatry. She understood very clearly the meaning of a concept and completed the second trial with only three mistakes. During the third trial she began ~~to~~ criticize the test and point out what she thought were its weak points. She completed the concept learning test in four trials with mean learning promptings of 5.50 per concept. On the concept retention test there were 1.33 mean retention promptings per concept.

TABLE IV. THE SCHIZOPHRENIC GROUP

Subject's Case Number	Diagnosis	H-N Score	Learning Date	Total Promptings	Years of Schooling	Relearning Date	C.A. Yrs.	Total Promptings
7621	S-P	25	6-26-49	408	12	- - -	26	---
6315	S	30	6-23-49	114	13	6-30-49	30	12
7226	S-M	31	6-22-49	194	17	- - -	50	---
6749	S-P	26	6-22-49	170	12	6-28-49	44	77
6596	S-P	30	6-22-49	204	12	6-30-49	33	8
3944	S-P	34	6-22-49	237	15	7-1-49	47	5
4028	S-P	26	6-27-49	- -	14	- - -	65	---
5902	S-P	32	6-25-49	571	12 $\frac{1}{2}$	7- 1-49	41	30
5647	S-P	40	6-23-49	33	17	6-29-49	52	6
6099	S-P	58	6-22-49	324	10 $\frac{1}{2}$	7- 4-49	23	22
7351	S-C	38	6-16-49	219	13 $\frac{1}{2}$	6-23-49	29	18
5103	S-P	31	6-27-49	156	16	7- 3-49	42	10
7267	S-P	32	6-21-49	134	13	6-27-49	28	3
7330	S-P	41	6-27-49	281	11 $\frac{1}{2}$	7 -3-49	32	10
2929	S-P	29	6-27-49	208	14	7 -3-49	47	9
6843	S-P	27	6-19-49	439	11	6-26-49	41	3
5303	S-P	43	6-24-49	184	12 $\frac{1}{2}$	7 -2-49	34	12
6633	S-P	59	6-19-49	452	16	6-27-49	31	7
7136	S-P	58	6-25-49	35	17	- - -	43	---
4611	S*P	35	6-21-49	346	14	6-29-49	55	42
6112	S	60	6-23-49	181	14	- - -	38	---
5570	S-S	44	6-23-49	142	11	- - -	22	---
					13.57			

Summary of Original Scores

S = Schizophrenia S-C = Schizophrenia-Catatonic
 S-S = Simple Schizophrenia S-P = Schizophrenia-Paranoid
 S-M = Schizophrenia - Mixed type

TABLE V. THE MANIC DEPRESSIVE GROUP

Subject's Case Number	Diagnosis	H-N Score	Learning Date	Total Promptings	Years of Schooling	Relearning Date	C. A. Years	Total Promptings
6431	Md(d)	41	6-18-49	139	16	6-26-49	56	2
7316	Md(d)	27	6-17-49	166	12	6-26-49	24	4
6419	Md(d)	46	6-21-49	430	14	6-30-49	47	46
7058	Md(d)	32	6-26-49	249	11½	7- 3-49	28	26
6390	Md(d)	32	6-17-49	189	12	6-26-49	37	16
6266	Md(d)	33	6-28-49	230	12	7 -4-49	52	23
3901	Md(d)	54	6-18-49	262	14	- - -	49	--
5180	Invol. Mechol.	35	6-25-49	233	12	7- 1-49	52	12
6605	Md(m)	24	6-18-49	228	10½	6-26-49	23	4
4532	Md(m)	24	6-24-49	108	12	7- 3-49	41	13
7359	Md(m)	31	6-24-49	189	12½	7 -2-49	35	200
7350	Md(m)	23	6-19-49	195	14	6-28-49	48	31
4609	Md(m)	34	6-18-49	195	11½	6-27-49	49	8
7205	Md(m)	30	6-19-49	672	14	6-27-49	51	--
5678	Md(m)	29	6-17-49	184	9	6-26-49	33	10
4512	Md(m)	27	6-27-49	183	10	7 -3-49	37	23
6639	Md(m)	34	6-17-49	166	12	6-25-49	31	35
6189	Md(m)	30	6-21-49	307	14½	- - -	43	--

Summary of the Original Scores of the Manic Depressive Group

TABLE VI. THE ORGANIC PSYCHOTICS

Subject's Case Number	Diagnosis	H-N Score	Learning Date	Total Promptings	Years of Schooling	Relearning Date	C.A. Years	Total Promptings
6144	Multiple Sclerosis	56	6-29-49	38	12	7 -4-49	37	2
6554	Syphillis Meno Encephalitis	28	6-27-49	1110	12	7- 3-49	28	56
3346	Traumatic Psychosis	33	6-20-49	327	10	6-29-49	43	41
6286	Traumatic Psychosis	33	6-23-49	221	12	6-30-49	54	30
6257	Psychosis due to Circulatory Disorder	29	6-19-49	303	12	6-28-49	55	20
7373	Syphillis Meno Encephalitis	28	6-23-49	215	12	7- 2-49	46	13
7308	Syphillis Meno Cncephalitis	35	6-25-49	107	19	7- 3-49	50	9
6507	Congenital Syphillis	23	6-27-49	221	12	7- 2-49	24	23
7130	Post Encephalitis	28	6-27-49	356	12	7- 2-49	39	17
7299	Cerebral Arterio- sclerosis with Psychosis	40	6-27-49	289	12	- - -	65	—

Summary of Original Scores