THE ALLEGED SEDATIVE EFFECT OF THONZYLAMINE HYDROCHLORIDE (NEOHETRAMINE)*

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That there are wide differences among the various antihistaminic agents with respect to potency and duration of action is well known. That qualitative and quantitative differences exist in undesirable side effects, particularly sedation, produced by these various agents seems equally probable. That is, agents having a common therapeutic result usually differ widely in potency, duration and side effects. However, the entire group of antihistamines are frequently said to produce more or less sedation in many patients. For example, in their recent book, The Antihistamines, Feinberg, Malkiel, and Feinberg write as follows: "The sedative effect of the antihistamines is their most characteristic side action. Depending on the individual susceptibilities of the person, the nature of the specific drug and dose, this sedative action may assume varying degrees of severity. . . . In more severe effects the patient becomes groggy and, if still more severe, very sleepy. The sedative effect often reaches a stage comparable to that obtained from a soporific dose of a barbiturate and not infrequently the effect is even more pronounced. . . . This sedative action, except in its mildest form, is objectionable and endangers the patient as well as those who are dependent for their safety on his alertness" (p. 193). With respect to thonzyamine (Neoheramime) these authors state: "The commonest side action is sedation. With doses of 50 mg. we obtained an incidence of side actions of 9 per cent, with 100 mg., 16 per cent. Arbesman noted an incidence of 16 per cent, while Crip and Aaron reported 10 per cent, and the Friedlaenders' gave an incidence of 12 per cent for doses of 50 to 100 mg." (p. 201).

The only report that we have found of an objective attempt to measure side effects of antihistamines is that of Holtkamp, Hageman, and Whitehead who tested the effect of Benadryl, Pyribenzamine, and Hydriylin on ten students. As measures they employed a cancellation test, reaction time, two-point discrimination, blood pressure, pulse, and respiration. They also made a note of any subjective change that occurred. They found that there was no consistent effect produced on any test by any of the three agents. (Application of the chi-square test of statistical significance to their data indicates that no statistically significant differences were found.) However, they conclude their report as follows: "Care should be taken . . . to warn the patient of the dangers in-
herent in his reduced ability to react quickly. These factors are especially im-
portant in the . . . driving of an automobile." Their findings as reported gave 
no basis for this statement.

Since the blanket charge of sedation has been leveled at all antihistamines 
and has gained wide acceptance, it seemed worth while to investigate the point 
under properly controlled conditions where objective tests as well as the way 
the subject felt could provide evidence which could be tested by accepted sta-
tistical methods. Furthermore, the most crucial test of the sedation effect would 
involve an examination of those agents which have been credited with minimal 
side effects. Physiologic evidence and clinical experience indicated that thon-
zyamine hydrochloride (Neoheptamine) has a very low incidence of side effects, 
including sedation. Even so, several clinical reports, as noted above, mention 
that an average dosage (25 to 50 mg. of Neoheptamine every two hours) drowsi-
ness, excitement, dizziness, nausea, or diarrhea may occur in 5 to 15 per cent of 
patients.6

METHODS

We have published elsewhere a detailed account of an experimental study11 relevant 
to the lack of sedation produced by thonzylamine. Our purpose was that of obtaining by 
objective tests and introspective reports further knowledge of the effects of thonzylamine, 
phenobarbital, or a placebo under controlled conditions where no clue was available to 
suggest what, if any, effect might occur. 

In a preliminary experiment14 three doses of 25 mg. of thonzylamine and three of ½ 
grain of phenobarbital ingested during four hours before testing were employed with 
twenty-four normal subjects over four successive days. The results obtained indicated 
that either the dosages employed had been too small or the variability of the individual 
subjects too great, so that no single test score was changed in a significant fashion on the 
day the agents were taken. However, there was a clear tendency for the thonzylamine to 
approximate closely the placebo effects with each test employed. 

In the main experiment14 the dosage employed was three capsules of 50 mg. of 
thonzylamine or three of 50 mg. of phenobarbital. A three-day placebo-agent-placebo 
schedule was adopted so that all subjects received placebo on the first and third days. 
On the second day one-third of the subjects received placebo, one-third phenobarbital, and 
one-third thonzylamine. If P represents a placebo dose, Ph a phenobarbital dose, and T 
a thonzylamine dose, then the schedule of dosage was as follows: Monday night on re-
tiring—P; Tuesday four hours, two hours, and one-half hour before the tests started— 
P; Tuesday night before retiring—either P, Ph, or T, depending upon the experimental 
group to which the individual belonged; Wednesday four hours, two hours, and one-half 
hour before the tests started—P, Ph, or T; Wednesday night before retiring—P; Thursday 
four hours, two hours, and one-half hour before tests started—P. The dose one-half hour 
before the test started was given at the laboratory by the manager of the experiment. 
The doses were made up in appropriately labelled pill boxes so that each box indicated the 
exact time the capsules in the box should be taken. A schedule of dosage was given 
each person on which the following statement was printed:

We are investigating the effect of certain combinations of chemical agents 
which may affect psychological test performance. In order to avoid subjective 
effects such as fatigue, suggestion, and the like, the agents used are given in 
differing amounts. Part of the time the dose is a placebo, that is milk sugar 
which has no effect. The investigators doing the experiment do not know 
which agent is being employed at any particular time.

In order that our results may be as clear cut as possible we wish to avoid 
including in our study group anyone who is pregnant, has an allergy, or has a
heart condition. The schedule which we request that you personally follow with respect to time of taking capsules and pills, and for appearing for tests is as follows; etc.

In this experiment, we tested seventy-two normal persons (thirty men and forty-two women) of an average age of 30 years (range 21 to 41 years) who were of superior educational achievement (61 college or graduate students, 11 high school graduates). All were examined and interviewed by a physician before the beginning of the experiment. Any person who had heart disease, active allergy, or chronic or intercurrent disease, was using antihistamines at that time, or was pregnant, was excluded from the study by the physician.

As a result of our experience in the Columbia-Greystone Brain Research Studies we had at our disposal several tests and techniques which we believed might be indicative of loss of psychological efficiency or of sedation. We made use of seven of these tests on three successive days of this study. On each day after the tests were finished the subject was engaged in conversation for ten to fifteen minutes by a trained interviewer who attempted to get the subject to comment on how he felt, how the tests impressed him, and whether he thought the capsules he had taken that day had had any effect on the way he felt or on his test performance. The choice speed test (CST) we employed was one of reaction time involving some degree of attention and decision. The continuous problem experiment (CPE) tested the ability to bear in mind principles once learned in face of a minor stress situation (confusing spatial relationship and rapid performance) for two two-minute periods. The cancellation test (Can-A) has been employed in a wide variety of psychological experiments to indicate the efficiency of such functions as attention, discrimination, concentration, or fatigue. The tapping test is one of the simplest used in psychological experiments, but one that has long been recognized as reflecting a state of impaired psychological efficiency. We used it in two ways: (a) to indicate speed (Tap-S), and (b) to indicate endurance (Tap-E). Critical flicker fusion is one of the most sensitive indicators of functional efficiency of the retina and/or the central nervous system which is available. The flicker test has been used by many investigators as an indicator of fatigue or drowsiness.

The reliability of each test was determined by correlating the results of day 1 with those of day 2 after allowing for the differences between the means of the three contrasted experimental groups. This was accomplished in the course of an analysis of covariance by utilizing the "within group" cross products and sums of squares. Tests whose reliability exceed 0.75 are generally regarded as sufficiently reliable to warrant group comparisons. The reliability coefficient for tapping endurance was 0.86 ± .02; for tapping speed 0.83 ± .03; and for flicker sector-disk 0.75 ± .04.

The validity of the tests was measured by their degree of sensitivity to the influence of the two contrasting agents of known potency—the neutral placebo and the depressant phenobarbital. This was determined by comparing test performance under these two conditions. The results for Groups A (placebo-placebo) and B (placebo-phenobarbital) were analyzed by means of an analysis of variance and covariance. After correction (in light of the covariance analysis) for the possible influences of initial differences noted on the first day, the results indicated that there was a significant difference attributable to the depressant influence of phenobarbital, the mean performance for the latter showing significant decrements as compared to the placebo. These differences were significant at the 0.05 level for flicker, sector disk, and tapping (endurance), and at the 0.01 level for tapping (speed). It was concluded that these three tests were sensitive to the effects of a depressant drug, and hence were suitable instruments for detecting whether chonxyzamine had depressant effects in terms of these three tests.

*Two methods of measuring the flicker fusion point were used in our experiment. (1) CPE-S: a sector disk cutting the white light illumination in equal light-dark intervals. The 3 degree visual angle test patch was 27.6 ml (measured above fusion) viewed in a surround at 24 ml. (2) CPE-S: a General Radio Company Type 621-B Strobotac produced a reference test patch by a flashing neon lamp, each flash having a duration of 43 microseconds. The test patch had an apparent brightness of 6.2 ml and the surround 9.3 ml.
RESULTS

The objective test results indicated that the ingestion of 150 mg. (21/4 grains) of phenobarbital during four and one-half hours before testing significantly lowered the scores on tapping and flicker, while 150 mg. of thonzylamine had no more effect on the scores than did the placebo. It should be noted that the dosage employed was well above that used in the ordinary therapeutic situation in any four- and one-half-hour period.

<table>
<thead>
<tr>
<th>TABLE I. MEANS, DEVIATIONS, FOR THE SEVEN TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENTIRE GROUP</strong></td>
</tr>
<tr>
<td><strong>Day</strong></td>
</tr>
<tr>
<td>No.</td>
</tr>
<tr>
<td><strong>CST</strong></td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>S.D.</td>
</tr>
<tr>
<td><strong>CPE</strong></td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>S.D.</td>
</tr>
<tr>
<td><strong>Can-A</strong></td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>S.D.</td>
</tr>
<tr>
<td><strong>Tap-S</strong></td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>S.D.</td>
</tr>
<tr>
<td><strong>Tap-E</strong></td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>S.D.</td>
</tr>
<tr>
<td><strong>OFF-E</strong></td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>S.D.</td>
</tr>
<tr>
<td><strong>OFF-S</strong></td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>S.D.</td>
</tr>
</tbody>
</table>

The actual average scores for each of the three contrasted groups for all tests are given in Table I. Since as Table I shows the groups differed somewhat in their initial level, the absolute changes between the first and second days would not be accurate indicators of the influence of the three chemical agents. For three tests (Tap-S, Tap-E and OFF-E) appropriate corrections as indicated in Table II were made by means of the covariance technique. These corrections were applied to the results of the second day to adjust for the influence of the initial differences.

It is apparent from Table II that while the mean gains for the placebo and thonzylamine groups are never significantly different, the phenobarbital gains are significantly smaller for the three sensitive tests than the corresponding gains of the placebo and thonzylamine groups. It may be concluded that these three tests do show significant differences between placebo and phenobarbital, and that they do not show a significant difference between placebo and thonzylamine.

As mentioned a record was made of the daily interview with each subject after he had completed the objective tests. These interview reports were read
TABLE II. SECOND-DAY SCORES ON FLECKER AND TAPPING TESTS ADJUSTED BY THE METHOD OF COVARIANCE

<table>
<thead>
<tr>
<th>GROUP</th>
<th>FLICKER (OFF-R) CYCLES PER SEC.</th>
<th>TAPPING B 3-TEN SEC. SPURS</th>
<th>TAPPING E TAPS PER 60 SEC.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>M</td>
<td>GAINS</td>
</tr>
<tr>
<td>Placebo</td>
<td>24</td>
<td>88.46</td>
<td>0.52</td>
</tr>
<tr>
<td>Thonzylamine</td>
<td>24</td>
<td>88.58</td>
<td>0.64</td>
</tr>
<tr>
<td>Phenobarbital</td>
<td>24</td>
<td>87.33</td>
<td>-0.55</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>88.14</td>
<td>0.20</td>
</tr>
<tr>
<td>S.E.</td>
<td></td>
<td>0.49</td>
<td></td>
</tr>
<tr>
<td>Critical Ratio</td>
<td></td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Plac-Thonz</td>
<td></td>
<td>2.20*</td>
<td></td>
</tr>
<tr>
<td>Plac-Phenobarb</td>
<td></td>
<td>2.50*</td>
<td></td>
</tr>
</tbody>
</table>

*Indicates significance at the 0.05 level.

through by two of the investigators (who had no prior knowledge of the identity of the ingested agent) to try to see if any of the remarks about how the subject felt could be interpreted as indicative of either "no different from usual," "better," or "worse." Most of the evaluations agreed, but such disagreements as occurred between the judges were reviewed and an agreement reached. Since these evaluations were obtained from an interview in which the conversation had been directed to bring out specific information with supporting evidence, viz., how they thought the way they felt had influenced their test performance, and since the subject had no knowledge of any "expected" effect which the capsules might produce, the evaluations approximate objective measures. Ordinary clinical evaluation which is usually based on any answer to a direct question such as, "How did those pills make you feel?" has no such objectivity, since the effect of suggestion and expectation cannot be avoided. The reports for each day by chemical agent are shown in Table III.

TABLE III. DISTRIBUTION OF SUBJECTS BY FEELING-STATE JUDGMENT

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>DAY 2</th>
<th>DAY 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO DIFF.</td>
<td>BETTER</td>
</tr>
<tr>
<td>Placebo</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>Thonzylamine</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Phenobarbital</td>
<td>24</td>
<td>23</td>
</tr>
</tbody>
</table>

It will be noted that on both the first and third days (placebo days) most of the seventy-two subjects, with very few exceptions, reported that they felt no different from usual (neutral feeling tone), thus providing a firm base line against which changes on the drug day might be judged. On the drug day, there was a significant difference between the placebo group, on the one hand, and the two drug groups on the other (X² = 12.51, P < .01). Many more subjects reported a negative feeling tone in the two drug groups than in the placebo group.

When the data obtained from the interviews were tabulated by type of agent ingested, we found in 148 instances out of 168 (88 per cent) normal
subjects who received a placebo reported feeling "normal" or no difference. In the remaining instances twelve reports of feeling worse (three said sleepy) and eight of feeling better were obtained.

Of the twenty-four subjects who had had phenobarbital, two (8 per cent) felt better on the day of the drug; of the twenty-four who had had thonzylamine, two (8 per cent) felt better on the day of the drug.

Of the twenty-four subjects who had phenobarbital, seventeen (71 per cent) felt worse on the day of the drug, and eleven of the seventeen were sure or thought it probable that the feeling was related to the capsules they had taken. The judgment of worse was based on the fact that they said they felt dull, tired, or sleepy. Six actually said they were sleepy. Of the twenty-four subjects who had had thonzylamine, fifteen (63 per cent) felt worse on the day of the drug, and fourteen of the fifteen were sure or thought it probable that the feeling was related to the capsules they had taken. The judgment of worse was based on the fact that they said they felt uneasy, jumpy, queasy, or drowsy. In five instances the subject actually said he was drowsy or sleepy.

As shown above, the average scores on the objective tests of tapping and flicker were significantly reduced in the twenty-four subjects by ingestion of phenobarbital but not by thonzylamine. When the subjects felt better, worse, or no different after having had phenobarbital the average scores on tapping and flicker were significantly reduced. But when the subjects felt better, worse, or no different after thonzylamine the average scores on no one of the tests were significantly reduced. Otherwise stated, the subject might be conscious of feeling different after taking thonzylamine, but his objective test performance was unaltered.

One striking instance of "side effect" occurred during the course of the experiment which shows how easy it is for anyone to be misled about the effect of a drug. After having taken the capsule in the evening as directed, one woman became dizzy, nauseated, and vomited. Next morning there was some return of the symptoms which she thought at the time were exaggerated when she took the first capsule for the day. The next two capsules had no unpleasant effect. When she came to the laboratory she was overheard telling another subject, "Watch out for the purple capsules, they are dynamite." She told the interviewer about the episode and blamed it on the capsules. However, the third day she told the interviewer that she probably had been wrong the day before in blaming the capsules, since on thinking it over she remembered having felt queasy before taking the first purple capsule in the evening, and the third and fourth on the second day certainly hadn't disturbed her. The purple capsules were placebos!

DISCUSSION

It must be emphasized that the evidence which we have presented in relation to sedation attributed to antihistaminic agents runs contrary to common clinical opinion. We have clearly shown by objective tests that phenobarbital ingested under conditions where the subject could have no knowledge of what he had taken or what results might be expected, did reduce the average score.
from that which was to be expected to a level of statistical significance on three
of the seven tests. Also that nineteen of twenty-four subjects felt different after
taking the 150 mg. of phenobarbital, and this feeling was usually characterized
as drowsy, sleepy, or tired.

Under the same conditions the ingestion of 150 mg. of thonzylamine had
no greater effect on any one of the seven objective tests than did the placebo.
We call attention to the fact that seventeen of the twenty-four subjects felt dif-
ferent after ingesting thonzylamine, but this feeling was in only five instances
coupled with a report of sleepy or drowsy. Neither the feeling different for
seventeen subjects nor the sleepy feeling of the five subjects was associated with
a change in score on the tests greater than that produced by the placebo.

Why has clinical experience led to a belief that antihistamines have a seda-
tive effect? Our guess is that some one or more of these agents, but certainly not
thonzylamine, may give rise to definite reports of sedation. (Whether such
reports would be borne out by objective tests we cannot say.) But having heard
a number of patients say that this or that antihistamine pill made them sleepy,
it seems possible that the clinician has fallen into the trap of leading his new
patients to expect that every antihistamine which he gives may produce sleepi-
ness. The patients feel different and report the different feeling as sleepy
because the doctor has said it might make them feel sleepy or drowsy. We
cannot prove that this explanation is correct, but we believe it furnishes a
plausible account for the discrepancy between previous clinical reports and
our experimental findings.

SUMMARY

The alleged sedative effects of the ingestion of thonzylamine hydrochloride
(an antihistamine agent) and phenobarbital (a soporific agent) have been
studied. We utilized seven objective tests as well as a carefully designed
interview with the subject in evaluating the sedative effects. Special precau-
tions were taken to obviate in so far as possible variations which might be at-
tributed to suggestion and motivation. Following ingestion of 150 mg. of
phenobarbital over four and one-half hours before testing 80 per cent (nineteen
of twenty-four) subjects felt different, either better or worse. No matter how
the subjects felt, four of the seven objective tests showed impaired scores, three
of these tests to the level of statistical significance. Following the same dosage
over the same space of time 71 per cent (seventeen of twenty-four) of those in-
gesting thonzylamine felt different, but no matter how they felt the scores on no
one of the objective tests were impaired.

Thonzylamine hydrochloride does not give rise to true sedation. Clinical
opinion that all antihistamines have a sedative effect has probably grown out
of faulty and inexact reporting by patients.

REFERENCES
There was a discussion of wartime physiological research.

Dr. Stephenson stated it was difficult to know where cause and effect leave off.

W. Motivation and Temperament in Psychopathology

Dr. Joseph Zubin

Despite the fact that psychopathology is still in the descriptive rather than quantitative stage, recent developments in this field are beginning to provide objective measures in the general area of motivation and temperament. Feelings and emotion, the primary concern of psychopathology, are given but little attention by other fields of psychology. For the most part, the evaluation of the affective life of the individual is now in the hands of interviewers rather than testers. This is unfortunate because the interview technique is so difficult to standardize and because it does not yield measurable quantitative results which can be related to other factors. Nevertheless, the interview technique is the only one now available for the validation of the objective measures that are being proposed in this area. The provision of specially designed rating scales for the evaluation of the interview and the development of such specific interview approaches as those of Kinsey will perhaps help in establishing quantitative measures. For example, if the Kinsey technique were applied to such phenomena as anxiety or depressive moods, it might be possible to determine the incidence of anxious and depressed moods in the normal population. This could help in the evaluation of deviant personalities within the normal range, that is, individuals who though not mentally ill nevertheless give indications of sufficient deviations from the norm to warrant special attention with regard to job selection, efficiency, and other factors. The interview technique itself and its component processes may be objectified. The chief objections to interviewing (namely, the lack of reliability and validity which this technique presents) may themselves be investigated to determine under what conditions and in which manner the reliability and validity can be increased. Such factors as misinformation, prejudice, halo effect, stereotyped judgment tendencies, generosity bias, neglect of some outstanding characteristic, and improper integration or interpretation of the elements of the interview results, may in turn be investigated and examined experimentally so that the effect of each of these factors on the outcome of an interview may be determined (1). By providing objective and anchored rating scales for evaluating various personality characteristics, it may be possible to overcome some of these sources of difficulty. Recorded interviews carried out under carefully controlled conditions should yield information on how the interview can be made to yield more objective data. It is clear that such studies cannot be conducted on a mass scale, but a few well selected interviews recorded and analyzed ought to throw much light on the methods.
and techniques necessary for objectifying this instrument. One may perhaps liken the interview to the human eye. Mechanical instruments can measure carefully and accurately the presence of any quantity of light, but the human eye is by far more sensitive to variations in visual phenomena than any mechanical device thus far created. Similarly no test at the present time can be as discriminating as a skilled interviewer with regard to personality.

The more specific quantitative techniques which have been employed for the measurement of motivation and temperament in psychopathology have improved their usefulness as a result of recent developments in therapeutic procedures with the mentally ill. The abrupt changes in "personality" produced by the somatotherapies and newer psychotherapies have provided the experimental psychopathologists with criteria for evaluating concomitant variations in a variety of measures and techniques. In this brief report only a sampling can be made of the various techniques that have been found useful.

1. Measures of motivation and efficiency. One study of efficiency which involves motivation factors is that carried out by F. Hess (2). She compared work efficiency and satisfaction on serial tasks conveyed on an assembly line conveyor at an optimum tempo selected by the subject, with the efficiency and satisfyingness of the same type of work done under free conditions in which there was no movement of the conveyor belt except as the subject caused it to move forward by speaking into a microphone. The "free" work was not as satisfying and not as efficient as the "forced" work. Dueker (3) found that in the case of normal individuals the forced work rate is about 20 per cent and 25 per cent more efficient than the free work rate. In the case of abnormal individuals the rate for forced work is two to three times as high as for free work. It is possible that in this approach we have a method for investigating the degree of interference of incidental motivation with a task at hand. This method has been adapted to learning of syllables on the memory drum. Under the "forced" conditions the memory drum presents each new syllable at an optimal rate while under "free" conditions the subject himself pushes the drum ahead by means of a key so that he learns the list at his own speed. Here again it seems that the "free" method is not as effective as the forced, perhaps because it is more subject to fluctuations in motivation. Preliminary studies of psychosurgery cases indicate that the free work seems to suffer more after operation than the forced.

2. Measures of rigidity vs. flexibility. One measure of flexibility of mental set can be obtained by means of the multi-meaning word test, in which the subject is asked to give as many definitions as he can of such words as "note" or "bill." The rapidity with which a person can shift from one meaning to another, and the total number of different meanings which he is capable of giving seems to be a function which may be related to such general temperamental qualities as rigidity vs. flexibility.
3. Experimentally induced moods. The introduction of methods for the induction of such moods as sleepiness or anxiety by means of drugs provide the experimenter with an anchored criterion for determining the efficacy of tests in gauging the presence of such moods. In a recent study (4) the effects of phenobarbital, a new antihistamine (thonzylamine), and a placebo were compared on a group of normal individuals. The results indicated that several of the psychological tests reflected the influence of phenobarbital in producing a decrement in performance accompanied by a change in mood. The antihistamine however, produced no change in performance but did effect a change in mood. We have here a clear indication of a split between changes in mood and changes in performance. That changes in mood can be obtained without corresponding change in performance is further evidenced by such studies as the Columbia Greystone Study (5) on psychosurgery cases and studies in shocktherapies on mental patients. In both of these types of studies no psychological changes referable to intelligence or memory or perception have been obtained, but there were definite changes in the level of anxiety. Even such very pathological characteristics as hallucination or delusions are not eliminated by these somatotherapies but are reduced in their emotional quality. The patient reports that he still has the delusions or hallucinations but they no longer bother him. He can now take them in his stride. It is possible that moods induced by specific drugs can be used as anchoring points for the validation and calibration of tests sensitive to mood alteration.

4. Objectification of projective techniques. One of the claims of workers in the field of projective techniques is that they can measure temperament and motivational qualities indirectly through projective methods. They maintain that whereas tests and questionnaires are suitable for tapping the conscious level, the levels of suppressed mental content or repressed mental content which reflect motivational processes are not amenable to the usual type of psychological tests and can only be tapped by means of the indirect projective techniques and cognate methods. Unfortunately these techniques are far from being tests. The methods of scoring the results of these tests are far from standard and far from objective. The interpretation of the obtained results are usually based on clinical hunches which have thus far defied any objective verification. There are only a few trustworthy studies of an objective type in this field and of these the majority are found to be negative. Recently, several studies (6) have indicated that the formal scoring categories of the Rorschach are not related to personality directly. However, when a content analysis of the responses is evaluated along specific dimensions by means of scaling devices, a very definite relationship is found between these results and the ratings of personality characteristics by friends and acquaintances. In our own work (1) we have attempted to provide for the variety of projective techniques that are now available a systematic framework of objective scoring scales. By reviewing the literature we obtained for example as many as 70 different dimensions along which Rorschach performance can be evaluated. After providing a systematic scaling device for each one of these dimensions we were able to evaluate
every response on each of the 70 dimensions that are now in use. Similar scaling devices were developed for the TAT, for handwriting analysis, and for several other projective techniques. Thus far these scales have been applied only to mental patients and definite changes in the scale values have been noted after psychosurgery, especially with regard to anxiety. No changes were observed on the standard scoring methods but when these new techniques were applied it was possible to differentiate between individuals who increased in anxiety and those who declined. Since these scales provide a measure for each response, a matrix of 70 scales times N (N = number of responses) is available for factor analysis within the single individual. If there is such a thing as structure of personality reflected in Rorschach variables, a factor analysis or a pattern analysis of this matrix should yield the framework of the structure of the personality of the individual under scrutiny.

Another approach to the evaluation of projective techniques has emerged from the attempt to simplify rather complex tests like the Rorschach and the TAT. By taking only a limited number of perceptual factors (as, for example, shading and contours in the instrument known as the Levy Movement Blots) and giving specific directions for the perception of movement, a definite score can be applied to the degree of movement perceived by the subject. Such scales for the detection of the amount, variety, and type of movement have been applied to groups of normal individuals, neurotics, psychopathic personalities, and schizophrenics, and the results indicate that the score on the Movement Blots is highly differential in separating these deviant groups from the normal. Similar techniques based on contour alone and on color alone have been developed and applied to children, adults and patients with telling results.

Another variety of techniques that has been found useful is that of handwriting analysis. When the principles of contraction and release proposed by Klages are applied to the development of scales for measuring handwriting, it is possible to develop a scoring system to differentiate handwriting of mental patients from those of normals (7). Thus far only small groups of individuals have been examined with these techniques. The difficulty in the application of these techniques is that they require a detailed measure of many factors such as height, width, slant, distance between letters, etc. Recently, a suggestion has been developed for recording the movements involved in the formation of the script. This technique may lead to an over-all rather than a detailed analysis. The pattern of the actual movement of the pen gives rise to a series of wave-like undulations which can be evaluated in an over-all manner to determine the frequency of different wave lengths in the same manner as EEG records are analyzed for their spectrum by means of brain-wave analyzers.

5. Subdivision of a selected group according to patterns of motivation (motivational types). One of the problems raised by the conference was: how to determine the variety of motivational patterns that
underlie identical or similar scores on such instruments as Interest Blanks, Psychoneurotic Inventories, etc. For example, there are probably a wide variety of motivational patterns that produce equivalent total scores that indicate probable success in say, pilot training. It can be readily shown that on a yes-no questionnaire of 100 items, a total score of 10 for example, can be obtained in 17 trillion different ways. It is not impossible that at least some of these 17 trillion patterns represent different motivational patterns.

There are probably several approaches that are worthwhile investigating. A factor analysis of the items in the instrument can perhaps produce the underlyling factors. By computing factor scores for each individual the particular pattern of each individual's interests can then be evolved and individuals with like-structured patterns placed together into groups of potentially like-motivated individuals. These groups could then be studied further by interview methods to determine their patterns of motivation. A simpler approach, involving fewer assumptions is the method of "like-mindedness" measures (8). In this method, the pattern of answers of each individual constitutes a scoring key against which all of the other individuals' patterns are scored. This can be readily achieved by utilizing the IBM Test Scoring Machine and scoring each test paper on the basis of all other test papers in the group. This will give rise to a matrix of scores of like-mindedness. These like-mindedness scores can then be subjected to a factor analysis and the resulting factors will represent potential types. The individual factor scores for each person can then be computed. Individuals can then be segregated into like-minded subgroups in accordance with their factor scores resulting from the factor analysis.

REFERENCES


3. DUKKER, H., in Ach, N. op. cit.


X. Some Approaches to Temperamental Dimensions Through Perception

Dr. Robert C. Challman

The researches reported here have been carried out by Dr. George Klein and co-workers at the Menninger Foundation. The assumptions underlying the researches are as follows: (1) that each person has an ego control system through which tensions are resolved and a "steady state" reached, (2) that persons differ in their favored and stabilized means of tension reduction, (3) that these means appear to be "attitudes" which express the flavor of the person's approach to situations, the organizing theme he uses, (4) that certain people have "attitudes" in common with others, (5) that all part-systems of response-perception, motor processes, and thinking can be put to use in achieving the "steady state," and (6) that the perceptual apparatus may be used as a basis for discovering the manner of working of the entire ego control system.

The general method of approach has been the following: (1) Select a perceptual task which may be expected to show a range of individual differences in the "attitudes" adopted toward it. (2) Give the task to a number of persons on whom there are readily available sources of information. (3) Select from the group the extremes and study their behavior and experience as shown by their actions and their descriptions of what they thought they were doing. (4) Formulate a tentative description of an "attitude" to account for the differences. (5) Seek out and utilize other perceptual tasks which should elicit the same attitude and see if the separation of the original extreme groups is maintained and whether it is necessary to modify the original description of the "attitude." (6) Branch out into concomitant aspects of the "attitude" such as clinical descriptions and motor or physiological behavior.

Experiments with the Leveling and Sharpening Dimension

The subjects were 47 men and women, 41 of whom were patients and 6 of whom were employees for whom personality and clinical data were available.