

THE VERBAL SUMMATOR TECHNIQUE AND ABNORMAL MENTAL STATES *

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INTRODUCTION

THERE has been considerable interest during the last five years in the possible application of the verbal summator technique suggested by Skinner (4) to the study of personality problems, particularly those which are more serious in nature, including the psychoses. Briefly, the verbal summator [or tautophone, as it has been renamed by Shakow (2)] is a device for repeating small samples of elemental speech sounds in such a way as to elicit a verbal response from the listener. On a phonograph disc are recorded series of different vowel patterns variously accented which, when played at a very low intensity and repeated as often as necessary, can be rather easily perceived as actual spoken words. In the presentation of the sounds to a subject an attempt was made to maintain an illusion of genuine but indistinct or distorted speech in order to facilitate the responses.

Thus, the summator is a device for calling up verbal responses determined partly by the stimulus pattern presented and partly by the individual making the response. The possibility then exists of detecting the presence and direction of influence of the personality variable. The value of this possibility rests, of course, upon the ability of the test to bring out personality factors, presumably by differentiating between individual or group tendencies in the predominate or strong "latent" associations of the subjects or in other characteristic manners of response to the stimuli presented. The test is generally regarded as being of the so-called projective type.

To check on the above-indicated function of the test, one of the possible methods is to compare the responses of personalities known to vary greatly in terms of such associative and response factors.

* This study was directed by Wendell Johnson. The writer is grateful to Dr. Andrew H. Woods, Director, Iowa State Psychopathic Hospital, for permission to use patients in the hospital, to Dr. Jacques Gottlieb, admitting physician at the same hospital, for selection of subjects and many helpful suggestions, and to David Shakow for permission to use certain indices.

At least two attempts have yielded results in this direction. Shakow (2) has made a comparison of the responses of normal controls with those of patients suffering from schizophrenia through the use of certain indices which will be considered later in this paper. He found significant differences between the hebephrenic patients and normals in measures of "contact," "objectivity," and "egocentricity," and equally definite differences between the normals and the schizophrenic group as a whole in the number of responses failing to lie close to the stimulus pattern for various classes of sentence-structure responses. He also found a larger number of non-English responses among the schizophrenic patients, including a larger degree of apparent meaning attached to such non-English responses as were given.

In a study in which small samplings of subjects with various mental disorders were used, Trussell (5) found general differences between normals and abnormals in respect to the number of meaningless responses and the number of "main ideas" revealed by the responses. The psychotic patients in this case had relatively fewer such "main" ideas, but such as were present occupied more of the individual's attention than did those of the normal subjects. Here, measures of formal and thematic perseveration and number of egocentric responses gave insignificant differences between the groups.

While these two studies by no means definitely substantiate the value of this test in personality study, they do indicate trends which for the time being appear at least promising. Evaluation of their results is made difficult by the lack of standard measures and scoring methods, and the general "newness" of the technique.

PROBLEM

The differences which have been found to exist, particularly in the comparison of schizophrenic patients with normal subjects, seem sufficient to warrant a comparison of responses between different groups within the class of disordered personalities. If the test were ever to be employed as a diagnostic instrument, an ability for differentiating between classes of abnormal personalities might be one of the requisites. To perform a preliminary investigation of such possibilities with the summator was the purpose of this experiment.

Three specific groups of patients suffering from mental disorders were given the test in an effort to determine what differences in

responses might exist, both between individuals and between groups. Comparisons were relatively exploratory in nature in the sense that mere response differences were sought for the purpose of evaluating this technique as a method for the study of personality factors.

PROCEDURE

Subjects. The groups selected for comparison include 24 individuals suffering from schizophrenia, 18 from psychoneuroses, and 15 from manic-depressive psychosis, depressed phase. Age mean of the schizophrenic patients was 26 years with an average deviation of 5 years, for the psychoneurotic patients 29 years (AD of 5.5) and for the depressive patients 44 years (AD of 8). Of the first group 14 were male while in the last two the males numbered 6 and 9, respectively. All patients were of the same hospital (Iowa State Psychopathic Hospital), and all were diagnosed definitely on grounds other than the verbal summator data. Testing was done in a private room adjoining the wards by a single experimenter throughout a period of several months.

Administration of Test. Twenty-eight samples were administered to each subject from Skinner's phonograph records 5 AM and 6 AM, and the response to each sample was identified by the number corresponding to the order of its occurrence on the record. Verbatim responses were recorded, as was also the number of repetitions of the stimulus required to elicit each response. Other characteristics in the responses, such as overt reactions, were recorded only when they seemed to have particular relation to the specific response or to the test situation in general.¹

Instructions to each subject were administered orally as follows: "I have here a phonograph record upon which a man is talking. He is not speaking very plainly, but if you listen carefully you will be able to tell what he is saying. I'll play it over and over again so that you can get it, but be sure to tell me as soon as you have an idea of what he is saying." The subject was seated about eight feet from the phonograph and facing it. In only a few cases was there any difficulty in maintaining the illusion of actual speech.

For the sake of comparison of the results of the present study

¹ One note seems necessary in relation to the record of the number of repetitions required. On these new records in which the samples are repeated ten times in a series on the record and then, if necessary, the entire series is repeated again by hand, the tally of one repetition really means a series of ten presentations of the stimulus pattern.

with those of Shakow (2), and since his is the most adequate scoring method yet suggested for this device, we have made nearly complete use of his system as it is put forth in the reference quoted above. In respect to the formal nature of the responses, the considerations made include:

1. The complexity of structure of the sample—Was it composed of syllables (SY), meaningful words (WM), non-meaningful words (WN), phrases (P) or sentences (S)?²

2. Similarity of the responses to the sample—How closely did the response phonetically resemble the stimulus pattern? Was it close to it (c) or remote (r) from it?

3. Non-English nature—Was the response in English, or was it a foreign word or a neologism; and what proportion of the response was either (whole or just part)? If the response was neologistic, did the subject appear to assign meaning to it?

4. Personal reference—If personal reference was present in the responses, was it first (1), second (2), or third (3) person? Samples without personal reference are designated (4).

5. Grammatical structure of the sentences which occur—Were they interrogative (?), imperative (!) or declarative (.)?

From this classification of responses several indices, besides the scores representing the number or proportion of responses falling into each group, were derived. All were constructed according to the general formula $\frac{x-y}{x+y}$ in order to give comparable ranges, in this case from -1.0 to 1.0.³ The indices follow:

1. Index of "suggestibility," which consisted of the relationship of the number of sentence and phrase responses to the number of syllable responses; or $\frac{(S+P)-SY}{(S+P)+SY}$. This index may be assumed to indicate the degree of acceptance by the subject of the suggestion in the instructions that the samples are actually spoken words.

² It should be mentioned here also that in classifying responses in the fashion noted above, an effort was made to adhere closely to the general rule followed by Shakow (2), "that when a choice was possible, the 'higher' of the classifications was selected, *e.g.*, S in preference to P, W in preference to SY etc."

³ For a fuller account of this scoring system note reference (3). There the reasons for the construction and selection of each index are discussed at greater length, but for our purpose mere mention of the nature of each is sufficient. However, at least two questions should be raised regarding the use of the general formula $\frac{x-y}{x+y}$ for the indices. First, is comparability of range the only advantage of such a usage and, secondly, would expression of the measures in some different form, such as simple percentages, give the same results? The answers to these questions are beyond the scope of this study but they should nevertheless be considered in interpreting the results.

2. Index of "contact," secured by relating the scores on the close and remote responses in the syllable and non-meaningful word categories only. Limitation to these classes was made because these responses, Sy and WN, were virtually repetitions of the stimulus pattern and therefore should represent it accurately if contact with the stimulus existed. The mathematical representation of the index was $\frac{(SYc+WNc)-(SYr+WNr)}{(SYc+WNc)+(SYr+WNr)}$, where SYc was the number of syllable responses lying close to the stimulus, SYr the syllable responses failing to adhere to the stimulus, etc.

3. The index of "human reference" related the responses referring to inanimate material to those with human reference, or $\frac{(1+2+3)-4}{(1+2+3)+4}$, where 1 equals the number of responses with first-person reference, 2 the number with second-person reference, etc.

4. An index of "self reference," constructed by comparing the responses with first-person reference to the sum of the responses with second- and third-person references, as: $\frac{1-(2+3)}{1+(2+3)}$.

5. The index of "subjectivity" was again a relation between the close and remote responses but this time in the phrase and sentence categories, as $\frac{(Pr+Sr)-(Pc+Sc)}{(Pr+Sr)+(Pc+Sc)}$. This measure was based partly on the assumptions that these meaningful phrase and sentence responses might or might not have been influenced by personal problems of the subject. If they had been so influenced, the degree of phonetic similarity of responses to the sample should also have been affected, resulting in greater possibility for the responses to lie in the remote category when personal problems intervene. This was regarded as a measure of the degree of subjective influence upon the responses, and called "subjectivity."

6. An index of "interrogativeness" was constructed from the relation between the sentences which were in question form and the total number of sentences, as follows: $\frac{? - S}{? + S}$.

Because of their auxiliary possibilities certain other methods of analyzing the responses were employed, as follows:

7. Percentage of non-meaningful responses.

8. Relative length of sample.

9. The number of repetitions required in securing the responses.

10. A measure of formal perseveration was obtained by dividing the number of different words used by the total number of words employed. This was essentially the Type-Token ratio used by Johnson (1) with the exception of the fact that these responses were not entirely "free" in the sense of being undetermined by the stimulus, and the fact that no effort could be successfully made to keep the samples the same length from patient to patient.

11. For perseveration of themes, a ratio comparable to the one above, was constructed by dividing the number of different themes employed by the total number of meaningful responses.

12. Qualitative or content measures noted included a record of all "content" words persistently repeated throughout the test, a similar notation of all predominant perseverating themes and any unusual responses, such as blocking, etc. These

were recorded for their possible use as clues to dominating ideas of the subject. An effort was made to check most of these with case-history records for evidence of problems, conflicts, etc., and separate mention of this comparison will be made later.

QUANTITATIVE RESULTS

General Treatment of Data. The results on both the structure of the responses obtained and the measures employed are presented in tabular form. Statistical treatment, where used, consisted essentially of the following: computation of Fisher's *t* values for evaluat-

TABLE 1
STRUCTURE OF RESPONSES TO VERBAL SUMMATOR STIMULI

GROUP MEANS AND STANDARD DEVIATIONS					
MEASURE	SCHIZOPHRENIC	DEPRESSED	NEUROTIC	DIFFERENCE *	LEVEL OF SIGNIFICANCE † (Percentage)
Syllables (SY)	3.3±2.9		1.2±1.1	2.1	2
Non-Meaningful Words (WN)		4.3±4.8	1.2±1.1	3.1	2
	.4±.64	0±0		.4	
		0±0	.26±.58	.26	
Meaningful Words (WM)	.4±.64		.26±.58	.14	5
	1.8±2.4	1.8±1.3	2.3±3.7		
Phrases (P)	11.0±3.9	11.4±4.1	10.2±3.2		
Sentences (S)		9.0±4.7	14.0±3.7	5.0	5
	11.1±3.7				

* Differences are not listed for comparisons of means in which the level of significance is less than 5 per cent.

† Level of significance of 1 per cent, etc., as here used refers to the fact that the probability of these observed differences in response means or variability being attributable to chance factors is 1 in 100. For further information regarding the techniques used in deriving these figures, the reader is referred to Lindquist, E. F., *Statistical analysis in educational research*. Boston: Houghton Mifflin, 1940, pp. 57 and 60.

ing the differences between means and testing of the significance of the differences in variability by the use of the Fisher *F* test.

Structure of the Responses. The grammatical structure of the responses yielded some suggestive trends, particularly in the syllable and non-meaningful categories. Group means, standard deviations, and comparisons between means are given in Table 1. There were no meaningless words used by the psychoneurotic patients as a group, while the schizophrenic patients presented an average of .4 such responses per subject. Significantly, the psychoneurotic

patients likewise gave less Sy responses than either of the other two groups.

These tendencies were consistent with results obtained on indices mentioned later, such as the relative lack of suggestibility of the depressed subjects together with their relatively frequent production of Sy responses. This relation was inescapable, since the suggesti-

TABLE 2

COMPARISON OF GROUP AVERAGES ON THE FIRST SEVEN MEASURES

GROUP MEANS AND STANDARD DEVIATIONS					
MEASURE	SCHIZOPHRENIC	DEPRESSED	NEUROTIC	DIFFERENCE *	LEVEL OF SIGNIFICANCE (Percentage)
Suggestibility		.60±.47	.90±.10	.30	2
	.74±.22		.90±.10	.16	1
Contact	.74±.22	.60±.47		.14	30
	.78±.33	1.00±0		.22	
Human Reference	.78±.33		.96±.14	.04	5
	.07±.28	— .07±.34		.14	30
Self Reference			— .02±.28		
	— .08±.41	— .07±.41	— .17±.33		
Subjectivity	— .66±.22	— .85±.14		.19	5
Interrogativeness			— .75±.16		
	— .71±.19	— .57±.29	— .63±.26	.06	10
Percentage Non-Meaningful					
	21.0±14.2	21.5±18.9	6.5±6.3	14.5	1

* Differences are not listed for comparisons in which the level of significance is less than 30 per cent.

bility measure was dependent upon the number of Sy responses. On the other hand, the relatively infrequent use of S responses by this group was supported by a general survey of the records, for there appeared to be at least a tendency for them to employ shorter responses and more of the isolated word type (note highest mean WM record). While neither of these latter tendencies was statistically significant, they may have indicated trends.

Group Comparisons in Terms of Specific Measures. The group means, standard deviations, and comparisons between means are given in Table 2. In respect to the measure of suggestibility the psychoneurotic subjects, with a mean of .90, showed the most

acceptance of the suggestion in the instructions that there were actual spoken words being reproduced, while the depressed subjects, with an average of .60, showed the most unwillingness to accept this illusion of speech.

An outstanding result of the measure of *contact* was the fact that no depressed subject possessed an Sy response in the (r) category, and the group had a perfect mean score of 1.0. When this was coupled with the fact noted before, namely that the largest mean number of Sy responses was from this group, it tended to signify an excellent degree of contact with the stimulus. The average for the psychoneurotic patients was nearly as good (M of .96), while among the schizophrenic subjects contact was relatively poor (M of .78).

TABLE 3

GROUP AVERAGES ON RESPONSE LENGTH, NUMBER OF REPETITIONS OF STIMULI,
AND FORMAL AND THEMATIC PERSEVERATION

	LENGTH		REPETITIONS		FORMAL PER.		THEM. PER.	
	M	σ	M	σ	M	σ	M	σ
Schizophrenics	3.4	.45	1.7	.71	.64	.10	.84	.08
Psychoneurotics	3.4	.54	1.8	.54	.64	.10	.88	.14
Depressives	3.1	.71	1.7	.95	.68	.10	.89	.10

Results on the two measures of reference were not as indicative of group differences as the above. What small differences did exist might quite possibly be due to the operation of chance factors. The differences in *subjectivity*, particularly between the schizophrenic and depressed patients, were more suggestive in the direction of greater subjectivity in the former group. The last index, that of *interrogativeness*, gave smaller, less significant differences. A comparison of the schizophrenic subgroups, hebephrenics and paranoids, with the entire schizophrenic group yielded little of interest.

The proportion of meaningless responses gave a striking difference between the psychoneurotic subjects and the other two groups, both of which showed significantly larger numbers of non-meaningful responses.

Remaining measures, shown in Table 3, all failed to be discriminating. The average length of sample and the average num-

ber of repetitions of the stimulus required were nearly identical in all groups. The differences in formal and thematic perseveration were also practically negligible.

Summary of Results. Combining, then, the results of these observations we found the depressed patients to be quite unsuggestible but remaining in close contact with the stimulus. They exhibited a minimum of subjective influence in their responses with a maximum of interrogativeness. Their tendencies to human reference were the least of all groups tested. Their number of Sy responses was maximum for all groups as was their WM total, while the employment of sentences was minimal. Some non-meaningful words were present but not as many as was the case with the schizophrenic group. Only slight trends were seen with respect to shorter response length and minimal perseveration, both thematic and formal.

The schizophrenic patients, on the other hand, appeared moderately suggestible and considerably lacking in contact. Their subjectivity and human reference indices were perhaps the highest and their interrogativeness index was the lowest of the groups studied. In respect to length of response, repetitions of stimulus required, and formal perseveration they ranked quite close to the others, with perhaps a somewhat higher index for thematic perseveration. They gave a considerable number of neologisms and other meaningless responses and their proportion of Sy responses was quite high.

Suggestibility and contact were high among the psychoneurotic subjects, while both subjectivity and interrogativeness were moderate, this group having rated between the other two on these measures. This group was characterized by a significantly smaller percentage of meaningless responses than either of the other two. There was a complete lack of non-meaningful words in their reports, with a high number of sentences given and a minimum of syllables. In none of the other measures did they prove outstanding.

QUALITATIVE RESULTS

Overt Responses. In so far as the test situation was an unusual one, it seemed worth while to consider the general overt responses of the subjects to the task. In this respect the groups differed quite widely and characteristically, but it seems necessary to remember the fact that such overt responses might just as likely have occurred

in an ordinary psychiatric interview and hence were not strictly unique to the test situation. Nor did these responses show up typically in all instances but rather only in a majority of cases. However, such differences as did exist are presented for whatever value they might possess.

Most characteristic of the schizophrenic subjects were lapses of attention and unusual delay in responding, although in the hebephrenic patients the latter was often absent. As a group they were for the most part unconcerned and uninterested in the sense of not attacking their task directly. Such lapses of attention as did occur were usually accompanied by periods of blank staring at the experimenter, at the ceiling, or out the window. Often it appeared that the response words came to the subject as if "out of nowhere" and were accompanied by a degree of unfamiliarity to him, as was indicated partially by the fact that quite often such a patient was unable to repeat the response he had given after the stimulus pattern was stopped. This fact need not imply, however, that the responses were therefore not determined actually by the stimulus, for upon examination this particular type of reply was found to fit the stimulus pattern in most cases. This condition was almost entirely confined to the schizophrenic group, for the others acted as though directly toward the stimulus.

When the task of taking the test became unpleasant for the patient, the fact manifested itself differently in the various groups. While the schizophrenic patients usually lapsed into inattention or mere periodic concentration, the depressed subjects exhibited considerable concern for the difficulties they were having, often holding head in hands or shaking the head from side to side. They also showed tendencies to grumble or even move about under the "strain" of the task and frequently denounced the "nuttiness" of the sounds, etc. Thus, characteristically they displayed a resistance toward the experience, while the schizophrenic patients for the most part accepted it rather readily.

Typically enough, the attitudes of the psychoneurotic subjects varied widely. If there was any one trend that was most outstanding, it was that of skepticism and questioning. They usually showed a marked "What is this for?" attitude; and comments such as "Is this to see if I can go home?" or "Is this to see how good my hearing is?" were quite common.

In these respects it might be significant to note the number of failures, or patients who refused to complete the test, and the groups that they represent. Of the entire group of 62 psychiatric subjects tried only 5 were failed, of which 2 were schizophrenic, 3 depressed, and none psychoneurotic.

Content of the Responses. A second qualitative factor was that of the "content" of the responses. Ideally, as a diagnostic instrument the summator would bring forth indications of specific difficulties, problems, conflicts, complexes, etc., by means of the meaningful content of the responses. This should be true to some degree if the subject "projects his own personality into the responses," which is an implicit assumption of projective tests.

Unfortunately, it appeared that there was a minimum of such meaningful "content" in all the patients' responses. In an effort, however, to examine that which did appear, three factors were singled out and examined for possibly meaningful relation to the history and development of the case. They included, first, words upon which there was a great deal of perseveration; secondly, dominant themes, at least one of which was commonly present for each subject; and, finally, unusual responses, blocks, statements strikingly irrelevant to the stimulus, etc.

Two depressed subjects, both of whom showed consistent repetition of the word "God" and reference to the notion of "God," presented histories in which religious activities were featured considerably. One had been a church officer for 25 years, and the other sang in church choirs and belonged to many church groups. In the latter case the religious aspect was strengthened by the fact that the church groups were apparently the only ones with which the patient had identified herself to any degree.

Another, a schizophrenic patient, perseverating on "God" also, but even more on the word "Adam," revealed a history including a highly religious parental household, attendance at a sectarian college followed by several years of teaching there, and culminating in ministerial study. It was significant to note that no other subjects yielded this type of repetition and no others, with one exception, indicated in their histories a marked degree of religious attachment.

A word on which there was considerable and varied repetition was "love." While all of these cases responding with the word

"love" yielded evidences of sexual involvement, all of the subjects exhibiting such difficulties did not use the word "love" to excess in their verbal summator responses. Cases for whom perseveration on "love" was present included a psychoneurotic patient with anxiety over impotency, a hebephrenic patient with a background of promiscuity, a paranoid subject with delusions involving a past girl friend, and others.

The most striking example of extreme thematic perseveration was that of a male suffering from psychoneurosis who, for almost half of his responses, was concerned with ideas relating to "cars." His adjustment difficulties were related to fears and general discontentment connected with his position as a fireman, which he had held for nearly 20 years. For years it had been his specific duty to care for the engine.

"I believe in Freud and Spinoza," as a final response from a paranoid subject, proved to be completely and strikingly unrelated to the stimulus pattern. It was given in a defiant manner by the subject as if he were trying to inform the examiner of his acquaintance with the work of these men. His case history indicated a background of extreme egocentricity⁴ and withdrawal, including a tendency toward very extensive reading, possibly not too well selected or comprehended. In fact, his original reference by his parents was motivated by his peculiar withdrawing tendency to "sit around home and read rather than go to work."

The only truly vivid "block" was manifested by a paranoid individual who blushed, sputtered, and blocked for approximately three minutes on responding "Pull her hair" to sample No. 20. The only evidence obtainable from the patient's case records related to this response difficulty was the fact that the onset of his disorder centered around personal problems arising from worry after sexual intercourse with a girl.

These few examples mentioned are intended to be neither conclusive nor exhaustive. It is hoped rather that they may be suggestive of some of the possibilities for analysis existing in the test as well as of some of its more apparent limitations.

THE STIMULI

Since a very large portion of the responses on a test such as this were bound to be a direct result of the character of the various

⁴It was interesting to note that this social-history report of egocentricity was supported by the fact that this subject possessed the highest self-reference score of all schizophrenic patients tested.

stimulus patterns, it seemed imperative that some mention of stimuli be made in any discussion of results. For this reason a very brief analysis has been made of the sound patterns used in respect to their unique contributions to the test, differentiating possibilities, etc., and it should be noticed immediately that the specific patterns differed widely in these respects.

First, it might be well to cite the sound patterns of the 28 samples employed. They included:

(1) 'T'ah ⁵	(2) 'a'A	(3) 'aO'	(4) 'ahA
(5) a'a'	(6) 'ahI'	(7) 'O'a	(8) E'A'
(9) I'O	(10) 'OA'	(11) 'ooO'	(12) 'ia'
(13) EO'''	(14) 'oo'E	(15) ahO'''	(16) A'E'
(17) Eah'''	(18) ah''ah	(19) 'AE'	(20) O''a
(21) aE''	(22) 'ah'A'	(23) 'aI'	(24) Ia'''
(25) 'A'O	(26) 'I'I'	(27) 'ool''	(28) ah'A'

The results of two or three of these samples were outstanding in certain respects, which might likewise be found to be more or less true of others on closer analysis. The first of these, No. 27, proved to be completely undiscriminating. Sixty-three per cent of all the responses to this stimulus were identical ("Who are you?") while the remaining 37 per cent were to a large extent modifications of the same response. Of course, this sentence fitted the stimulus pattern very well; in fact it apparently fitted the pattern so well that it made the sample too easy and rendered it undiscriminating. Such an item might well have been discarded for one which is more functional.

The inclusion of such an "easy" item, however, did have some merit in that it tended to facilitate the maintenance of the illusion of actual speech. A patient who was becoming skeptical of the genuineness of the test or who was encountering general difficulty was often helped by this pattern, and in a few tests it was exchanged in order of presentation for some other item when such difficulties arose. On the other hand, there are some disadvantages to such a change in the order of items.

It could also be assumed that such an item as this might function well as an introductory or first stimulus, for the way that the test started was of special importance with regard to the establishing of

⁵ Capital letters have been used here to signify long vowels and lower case letters to signify short vowels; for example, "A" as in ale, "a" as in bad, "I" as in ivy and "i" as in tip. The apostrophe designates the neutrol vowel "uh." Others are spelled more completely as "ah" and "oo."

rapport and the illusion of speech. Generally speaking, if a subject got through the first few stimuli successfully, there was an improvement, presumably from set rather than from practice effect, although evidence for practice effects has been found by Skinner (4).

A related situation occurred in sample 8, an apparently "difficult" item which tended to destroy the illusion of speech and started the subject to responding with syllables rather than words. Evidence for such "difficulty" on sample 8 could be found in the fact that 24 per cent of all the responses given to it were syllables, while the average number of syllable responses given to any other stimulus was only 11 per cent; also, sample 8 was often followed immediately by other Sy responses when none had occurred in the seven preceding samples.

In the case of numbers 10, 11, and 12 a difficulty arose from the outstanding similarity between these items, particularly in their rhythm. It will be noted that all three possess the basic pattern of two neutral vowels followed by two dominants and ending with another neutral. This tended to promote both formal perseveration and disinterest or reversion to syllable responses. Since all were functional items otherwise, this situation could be remedied by a change in order of presentation.

These factors tended to indicate that, to a large degree at least, the responses received from psychiatric patients were influenced greatly by a large number of extraneous factors. Among these were the character of the stimulus pattern, the order in which samples are presented, as well as the general set of the subject as determined by the instructions and early impressions of the test situation. Any extended work with such an instrument, or critical evaluation of present results, would need to take such factors into account.

CRITICAL EVALUATION OF METHOD

One obvious question must be answered before an attempt is made to evaluate the verbal summator as a test of personality factors. This question would concern the direct purpose for which the technique is to be used. Two such purposes appear to be outstanding. First, the technique might be applied as a means of studying characteristics of certain classes of personalities, for example, various abnormal and normal groups. Secondly, it might be employed as

a diagnostic instrument in clinical work. On the basis of this investigation, the summator seems better adapted to the former of these two objectives.

As a test for the study of personality characteristics, the device seems to have certain advantages. It does indicate response differences between psychiatric groups and between normal and abnormal subjects. Interpretation of these differences hinges, of course, upon the assumption of the validity of the measures as formulated. Clinical criteria, however, tend to indicate that such validity might be established by further study and by standardization and selection of stimuli. Also, the summator presents a test situation with a certain degree of uniqueness capable, perhaps, of eliciting responses from patients when other methods fail. It likewise retains many of the advantages of projective techniques, even though the results in this connection are often not obvious and are difficult to analyze.

As a diagnostic instrument, on the other hand, it appears to fail in many respects to meet the criteria of a good clinical test. In most instances it yields nothing which could not be obtained in an ordinary psychiatric interview. The extreme individual variability of responses often renders difficult the interpretation of the single response record. Objection might also be made to the effect that, for the amount of usable information received, the test is too time-consuming.

SUMMARY

The verbal summator test, as devised by Skinner (4), was administered to three groups of psychiatric patients, 24 with schizophrenia, 18 with psychoneurosis, and 15 with manic-depressive psychosis, depressed phase, in an effort to compare their responses as scored in terms of several indices devised by Shakow (2) and others. Shakow's indices included measures of suggestibility, contact, human and self reference, subjectivity and interrogativeness; auxiliary measures consisted of average response length, number of repetitions required to elicit the responses, percentage of meaningless responses, and formal and thematic perseveration. Qualitative analysis of responses was attempted to some degree.

All three groups were found to differ significantly in the measure of suggestibility, the psychoneurotic group showing the greatest and the depressed subjects the least degree of suggestibility. Contact

differences between the depressed patients and those with schizophrenia were equally indicative, the higher degree of contact being shown by the former. Measures of human and self reference, response length, number of repetitions of stimuli required to elicit a response, and formal and thematic perseveration yielded only slight differences, indicating trends in some cases, but being for the most part indiscriminating.

A striking difference between the psychoneurotic and the other two groups was found in relation to the meaningful and neologistic qualities of the responses. No neologisms were given by the psychoneurotic subjects, and a minimum of non-meaningful responses was given by this group. Both of the other groups gave neologisms and a high percentage of meaningless responses, the highest number of the former coming from the schizophrenic group.

Differences in subjectivity between the schizophrenic patients and those depressed and between the psychoneurotic and depressed patients in interrogativeness are notable. The schizophrenic group showed the greater subjectivity and the depressed group the greater interrogativeness in these two comparisons.

With regard to the structure of responses, the largest number of syllable responses were presented by the depressed subjects, and this group also produced generally shorter responses of the mere "word" variety rather than sentences.

Qualitatively, certain reactions toward the test were expressed overtly by the subjects. Characteristic of the schizophrenic patients were lapses of attention, delay in responding, and acceptance of the task with apparent lack of concern for it. The depressed subjects for the most part exhibited concern for and some resistance to the situation. The typical attitude of the patients with psychoneurosis was a skeptical and questioning one.

Projective "content" in the responses was found to be scarce and hard to analyze, but an effort was made to relate some examples of such "content" to case-history data and psychiatric reports.

A short analysis was made of the responses in relation to specific stimulus patterns and to the significance of the stimuli in the general test situation.

On the basis of this investigation it was concluded that the verbal summator technique is a useful device for the study of personality

characteristics, but that its diagnostic value is probably rather limited.

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