

AN EXPERIMENTAL STUDY OF A METHOD OF USING PERCEPTUAL ERRORS AS AN AID TO DIAGNOSIS

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INTRODUCTION

WE have at present no reliable method for indicating the correct sequence of treatment in neurotic cases showing a manifold symptomatology. In such cases much time may be lost through attacking superficial rather than basic conflicts. It would therefore be an undoubted advantage to possess a means of indicating objectively and by experiment which problems are fundamental, and to the resolution of which treatment should be first directed.

The work of Rosenstock (1951), devoted to the experimental validation of the psycho-analytic conception of repression, would seem to provide a method, which, when modified for clinical purposes, would provide a means of accurately assessing the neurotic hierarchy of maladjustment. He attempted the proof of the concept of repression by means of a perceptual experiment.

His contention was that, “. . . new perceptions and memories relating to those already repressed can only be assimilated or perceived with a great outlay of energy . . . this expenditure of energy will be proportional to the degree of similarity between the new material and repressed memories—enough energy that is, to overcome the resistance of the field of these memories”.

He proposed to investigate this experimentally by formulating and testing the following hypotheses:

- “1. Under a sufficiently low degree of illumination repressible material will not be perceived.
- “2. Under a sufficiently high degree of illumination this material will be perceived by most subjects. Some subjects may be so affected that the external forces never become great enough to structure the perception in accordance with the stimulus distribution.
- “3. Between these two stages there will be areas of uncertainty during which the material will be distorted to a greater or lesser degree. The distortion will be of such a nature as to reduce affect, i.e. in the direction of the perception and report of material less charged with affect.
- “4. The threshold for perceiving this material correctly will be greater than that for the perception of material unrelated to previous repression.”

In his experiment eight sentences were constructed, four the experimental and four the control. Each was matched and contained 14 words and 18 syllables. The form of each sentence was the same, the second clause containing the affective meaning. The experimental sentences contained sexual and aggressive impulses directed at one or both parents. The control sentences avoided as far as possible sexual and aggressive meanings and comprised other non-pleasant material.

The procedure was for all the sentences to be projected on a screen at seven graded steps of illumination. All were presented at step 1 (minimum illumination), then all at step 2 and so on. To avoid practice effect the slides were presented in random order at each grade of illumination. Each sentence was exposed for 3 seconds. The subjects were allowed as much time as they wished to write down what they saw of each sentence.

The scoring was worked out according to omission of words; one or more words being perceived but insufficient to be scored correct; entire sentence correct.

His conclusions were: "Most subjects see the experimental material only after the external organizing forces become relatively great. It appears that forces exist within the individual which prevent the appearance in consciousness of certain kinds of material, especially sexual and aggressive material."

METHOD

Rosenstock's work, although directly concerned to objectify psycho-analytic theory, indicates also a method which might be the basis for further experimental investigations into emotional disturbance. It is the contention of this paper that the perceptual disturbance noted by Rosenstock is not specific to sexual sentences only, but applies to all sentences in which disturbing emotional material is involved.

To test the validity of the method, a patient whose case had already received an extensive and detailed clinical investigation was used. The extent of the agreement between the two methods constitutes a test of validity.

Sentences relating directly to the case-history were formulated whilst matched neutral sentences were included as controls. The subject matter involving the most serious disturbance should be clearly differentiated from other material by its giving rise to a significant increase of errors and distortions. The neutral material however would be perceived earlier, at lower levels of illumination and with fewer errors than the affectively loaded ones.

The patient chosen for the experiment had major difficulties in relation to:

1. The parent/child relationship.
2. Correct vocational placement.
3. Sexual adjustment.

The following sentences were constructed with reference to these difficulties:

1. Neutral: The forecast for the winter months in London is one of extreme cold.
2. Vocational: Many do not like menial types of jobs but rather white-collar ones.
3. Sexual: A very large number of people are guilty of very bad sexual conduct.
4. Vocational: He has several times had a change of heart over his life-work.
5. Parent/child: Many people treat their sons more like a child than a grown-up.
6. Neutral: There is a very good film being shown at the Odeon cinema to-day.
7. Sexual: Many people wish that they were not bothered about sex and related matters.
8. Vocational: Working for a living is a necessary evil which we have to tolerate.
9. Sexual: When a man is with a woman he usually thinks of sexual things.
10. Parent/child: Many parents and people find much more fault with children than they should.

Each sentence was matched for the same number of words and approximate level of difficulty. Each was photographed on a 2 in. × 2 in. slide and projected on a screen. The sentences were in black on a white background. The illumination was graded in 7 steps.

The method of scoring is different from Rosenstock's in that every word that is seen correctly is scored as a plus. All incorrect perceptions are scored and included in the final error score. Errors include such as misreading words and including words not in the original sentence.

PROCEDURE

Each of the 10 plates was shown at the same level of illumination before going on to the next. At each higher level the order of presentation was varied to avoid practice effect. There were 70 presentations. Each was exposed for 3 seconds, after which the subject was given as much time as he wished to write down what he saw of each sentence. After each projection the subject folded his paper so as to avoid seeing his previous answers.

The instructions given to the subject were: "This is a test of visual acuity. I am going to present you with a series of sentences which will be projected on to a screen. You will see each one for approximately three seconds. After each exposure I want you to write down what you saw of the sentence. If you cannot read the whole of the sentence and only part of it write down what you saw. I am going to start at the lowest level of illumination and gradually work higher. Are you ready?"

RESULTS

The following are the subject's reproduction at each graded step of illumination. It will be noticed that the order of the sentences has been randomized.

<i>Plate No.</i>		<i>Content</i>
	1	Neutral (N)
	2	Vocational (V)
	3	Sexual (S)
	4	Vocational
Illumination	5	Parent/Child (P/C)
Grade I	6	Neutral
	7	Sexual
	8	Vocational
	9	Sexual
	10	Parent/Child

<i>Plate No.</i>	<i>Content</i>
	2 V
	4 V
	6 N
	8 V for a evil
Illumination	10 P/C
Grade II	1 N forecast cold.
	3 S very bad
	5 P/C frost or crest
	7 S they were
	9 S is with

<i>Plate No.</i>	<i>Content</i>
	3 S A very large number of people are guilty of
	8 V living
	9 S is with a woman
	6 N is very good at the door
Illumination	2 V special types
Grade III	4 V several cases had

1	N	..... in London extreme cold
7	S	..... they were not
10	P/C	..... visit with should.
5	P/C	(Not given.)

<i>Plate No.</i>		<i>Content</i>
	4	V He has several times had a change of heart
	9	S When a man is with a woman sexually
	5	P/C Good parents treat children like sons
	2	V like mental types'
	3	S A very large number of people
Illumination	6	N There is a very good film on at the Odeon to-day.
Grade IV	8	V Working for a living is a necessary evil which we
	7	S they were not
	10	P/C parents and people find fault with the children which they
	1	N The weather forecast for the winter in London is extreme cold.

<i>Plate No.</i>		<i>Content</i>
	5	P/C Where parents treat a child
	10	P/C Many parents and people find a child
	3	S A very large number of people are guilty of bad sexual conduct.
	1	N The weather forecast for the winter in London is extreme cold.
	6	N There is a very good film being shown at the Odeon to-day.
Illumination	4	V He had several times had a change of heart over his
Grade V	7	S Many wish they were not bothered about thoughts of sex and money matters.
	2	V Many do not like mental types of jobs but rather white collar ones.
	9	S When a man is with a woman he usually thinks of sexual things.
	8	V Working for a living is a necessary evil which we have to tolerate.

<i>Plate No.</i>		<i>Content</i>
	6	N There is a very good film being shown at the Odeon cinema to-day.
	1	N The weather forecast for the winter in London is one of extreme cold.
	10	P/C Many people find fault with children
	3	S A very large number of people are found guilty of bad sexual conduct.
	2	V Many do not like menial types of job but rather white collar ones.
Grade VI	9	S When a man is with a woman he usually thinks of sexual things.
Illumination	5	P/C Many parents treat sons more like a child than a grown up.
	8	V Working for a living is a necessary evil which we have to tolerate.
	7	S Many wish they were not bothered about sex and related matters.
	4	V He has several times had a change of heart over his life-work.

Plate No.	Content
7	S Many people wish they were not bothered about sex and related matters.
10	P/C Many parents and people find much more fault with children than they should.
1	N The forecast for the winter months in London is one of extreme cold.
5	P/C Many people treat their sons more like a child than a grown-up.
4	V He has several times had a change of heart over his life-work.
8	V Working for a living is a necessary evil which we have to tolerate.
3	S A very large number of people are guilty of very bad sexual conduct.
2	V Many do not like menial types of jobs but rather white collar ones.
9	S When a man is with a woman he usually thinks of sexual things.
6	N There is a very good film being shown at the Odeon cinema to-day.

The following tables show the correct and incorrect perceptions for each group of sentences at the seven grades of illumination.

TABLE I

Neutral Sentences

Grade of Illumination	Plate No. 1		Plate No. 6		Total	
	Correct	Errors	Correct	Errors	Correct	Errors
1	0	0	0	0	0	0
2	2	0	0	0	2	0
3	4	0	5	1	9	1
4	11	0	10	1	21	1
5	11	0	12	0	23	0
6	13	0	13	0	26	0
7	12	0	13	0	25	0
					106	2

TABLE II

Vocational Sentences

Grade of Illumination	Plate No. 2		Plate No. 4		Plate No. 8		Total	
	Correct	Errors	Correct	Errors	Correct	Errors	Correct	Errors
1	0	0	0	0	0	0	0	0
2	0	0	0	0	3	0	3	0
3	1	1	2	1	1	0	4	2
4	2	1	9	0	10	0	21	1
5	11	1	11	1	13	0	25	2
6	12	0	13	0	13	0	38	0
7	12	0	13	0	13	0	38	0
							129	5

TABLE III

Sexual Sentences

Grade of Illumination	Plate No. 3		Plate No. 7		Plate No. 9		Total	
	Correct	Errors	Correct	Errors	Correct	Errors	Correct	Errors
1	0	0	0	0	0	0	0	0
2	3	0	2	0	2	0	0	0
3	9	0	3	0	4	1	16	1
4	6	0	3	0	7	1	16	1
5	12	0	10	3	13	0	35	3
6	12	1	11	0	13	0	36	1
7	12	0	11	0	13	0	36	0
							139	6

TABLE IV

Parent-Child Sentences

Grade of Illumination	Plate No. 5		Plate No. 10		Total	
	Correct	Errors	Correct	Errors	Correct	Errors
1	0	0	0	0	0	0
2	0	3	0	0	0	3
3	Not given		3	1	3	1
4	3	3	8	2	11	5
5	4	1	5	2	9	3
6	12	0	6	0	18	0
7	12	0	12	0	24	0
					65	12

TABLE V

Mean correct and error perceptions of the four groups of sentences

				Mean Correct Score	Mean Error Score
(a)	Neutral	..	..	53.0	1
	Sexual	..	..	46.3	2
	Vocational	..	..	43.0	1.6
	Parent/Child	..	..	34.0	6.5
(b)	Neutral	..	..	53	1
	Affectively loaded sentences	..	..	41	3.3

TABLE VI

Analysis of Variance of the correct scores to the four groups of sentences

	Total Variance of the sub-groups	=	1749.978		
	Total Variance of the groups combined	=	1832.435		
Variance	D.F.	Sum Square	Mean Square	Variance Ratio	
Within groups	59	1749.978	29.661	.309	(not significant)
Between groups	9	82.457	9.162	—	
	68	1832.435			

TABLE VII

Means and S.D.'s of the correct scores per presentation of the neutral, affective and P/C sentences

	Mean	S.D.
Neutral	7.57	4.975
Affective	6.36	5.106
Parent/Child	5	3.742
C.R. between Neutral and Affective Sentences	=	.79
C.R. between Neutral and Parent/Child Sentences	=	1.49
(Neither is significant)		

TABLE VIII

Means and S.D.'s of the error scores per presentation of the neutral, affective and P/C sentences

	Mean	S.D.
Neutral	1	0
Affective	1.625	.854
Parent/Child	2	.818
C.R. between Neutral and Affective Sentences	=	1.336
C.R. between Neutral and Parent/Child Sentences	=	7.45
(Significant at 1 per cent. level)		

DISCUSSION

One important finding emerges from the results. It is that it is necessary to concentrate on error scores rather than correct perceptions. Although the results using correct perceptions are in the direction posited by the hypotheses (see Table V), they are not statistically significant (Table VI). The perception of affectively-loaded sentences seems to result in both a lowered correct-mean score and an increased error score. Both scores seem to be manifestations of the same disturbance though the latter is the only one that can be used experimentally, it alone being statistically significant.

The mean error score of the Parent/Child sentences reaches a level of statistical significance when compared with the neutral mean error score, whilst the mean correct score for the same sentences does not. The explanation seems in part to be that the correct-score means for all groups contain a large number of correct perceptions of non-emotional words. Because these words seem less traumatic they are seen earlier, consequently the means for all the groups are raised, whilst the significance of the differences between them and the neutral sentences is lowered. If only the errors are scored, the non-emotionally charged words are less likely to have any effect.

The incorrect perceptions of the Parent/Child sentences show highly significant results when compared with the neutral ones and argue for this being the area of greatest disturbance. The validity of this conclusion is supported by the results of the detailed clinical exploration supplemented by a later investigation of the patient, involving a home visit, an interview with the father and mother, a visit to his place of employment and an interview with his employer. It pointed to the Parent/Child relationship as the most basic factor.

Perceptual errors seem thus to have been brought under experimental control and shown to be related to a definite emotional disturbance or maladjustment.

Having tentatively shown that a perceptual disturbance occurs and that it seems greater when associated with traumatic material, we need to seek an answer to the question as to whether the formulated hypotheses provide us with a beginning to an explanation of the phenomenon observed.

The excellent reproductions of neutral sentences and the relatively poor perceptions of the affectively coloured remainder point to the following alternative conclusions:

1. The perceptual inferiority is a defensive expedient adopted by the subject against this type of stimulus, i.e. the individual, through distortion and evasion attempts to avoid the disturbing elements in the sentences. If this hypothesis is proved to be correct, we still do not know whether certain individuals adopt other types of defence when faced with the same material.
2. Emotional blockage occurs when disturbing stimuli are presented visually. During the period of blockage no further words are perceived, yet a portion of the 3 seconds allowed for each sentence has passed. There is a consequent reduction of the total number of words perceived. The emotional blockage might possibly result in perceptual distortion, almost in the same way as a frightened and tense pupil, with a teacher standing over him, is incapable of doing his best.

The contribution of several possible simultaneous variables to the incidence and frequency of perceptual errors needs to be investigated. As yet we do not know the effect of embarrassment. The unusual nature of some of the sentences or the experimental design will presumably have an effect. We need to know the extent to which the instrument is capable of evaluating the effects of guilt-feelings, or how to separate this type of disturbance from that caused by embarrassment, if indeed there is a difference. We need to be able to assess the influence of varying degrees of familiarity with the material and the variable levels of subjective confidence which different individuals demand before they verbalize presented "affective" material. In the same way we need to know the influence of certain attitudes such as inferiority or irritability; does a "bravado" attitude reflecting itself in an attempt to master the material result in adequate perceptions of all groups? And finally, whether the subject's perceptions are changed or whether the changes are only in his verbal responses.

METHODOLOGICAL IMPLICATIONS

Three criteria govern the validity of this investigation, using a single case (4, 5, 6). These are:

1. The phenomenon must be brought under control.
2. Precise predictions of behaviour or experience under new conditions must be made possible from the hypotheses which have been developed.
3. Any hypotheses which are formulated must provide a beginning of an explanation for the phenomena observed.

The criterion of "control" has been met in that the increased error scores have been related to a definite area of maladjustment. In other words in proportion as the material presented is non-emotionally disturbing the error scores decrease. With an increase of traumatic content so also is there an increase of error scores.

Likewise definite predictions were made as to the experimental behaviour of the subject. The validity of these hypotheses was confirmed in the case of perceptual errors. They showed a significant increase in an area, commonly agreed after long and intensive investigation, to be the most disturbing.

The beginnings of an explanation of the phenomenon and the possible operation of simultaneous variables have been discussed. Testable hypotheses can now be formulated to give a better idea of the conditions affecting performance. In this way a start will be made in the development of hypotheses which are more specifically concerned with process.

Thus the requisites demanded by experimental investigations of large numbers, i.e. control, predictive power and concern with process, have been met by this single case. Its findings can be considered as equally valid as the results from large numbers. In addition, however, to prove the validity of a method of this kind it is preferable to "overinvestigate" the criterion of validity, rather than be concerned with large numbers, which it would be very difficult to investigate with the same thoroughness.

SUMMARY

It has been shown that a "disturbance" occurs when the subject is asked to reproduce traumatic material projected on a screen. It is reflected in a significant increase of error scores. The error scores are capable of objective measurement.

Having tentatively demonstrated the validity of a method of this kind the main problem appears to be the explanation of the perceptual disturbance. It has been suggested that it is a defensive expedient adopted by the subject. Several other possible variables are discussed.

With greater experimental refinement it is hoped that sentences presented in this way will provide an objective criterion of the relative seriousness of a patient's disturbances. It is hoped that its results will later be able to guide treatment in those patients manifesting a very varied symptomatology.

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