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

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INTRODUCTION

SOME neurotic patients exhibit such a complex symptomatology that it is often difficult to determine, by present methods, which problems or areas of difficulty are fundamental. Much time may therefore be lost through the treatment of superficial rather than basic sources of difficulty.

In a previous paper (Walton, 1954) an attempt was made to discover whether an experimental technique, developed by Rosenstock (1951), could be modified so as to be of diagnostic assistance in such problems.

Rosenstock's investigation was concerned with the experimental validation of the psycho-analytic conception of repression. By means of a perceptual experiment he attempted to show that repression and perception were closely connected, and that the effects of repression could be observed in perception.

He hypothesized that:

(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 the 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 the material correctly will be greater than for the perception of material unrelated to previous repression.

In his experiment eight sentences were used. 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, while the first clause served as modifier. In order to hold constant "the structural difficulties" of the sentences each experimental sentence was matched with a control sentence on the number of meaning units contained in the second clause. The experimental sentences

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† In the absence of objective criteria for the assessment of repressible material *a priori* judgments were made of the repressibility of the experimental material. The construction of the sentences was guided by the relative agreement among psycho-analysts that sexual and aggressive attitudes towards the parents are those primarily repressed.

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contained sexual and aggressive impulses directed at one or both parents, whilst the control sentences comprised other non-pleasant material, though avoiding as far as possible sexual and aggressive meanings.

The subjects were all volunteers from first and second courses in elementary psychology. They were mainly sophomore and junior students, and, in general, knew little about basic psycho-analytic postulates.

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

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, among which are sexual and aggressive material."

A patient who, clinically, presented a series of difficulties centred round the parent-child relationship, sexual adjustment and correct vocational placement provided a difficult diagnostic and therapeutic problem (Walton, 1954). It was impossible in the early stages of the psychiatric investigation to determine the fundamental source of this patient's difficulties. From the discussion between psychiatrist and psychologist the main problem emerged, that of deciding which of the patient's difficulties was basic to his illness and consequently which should be treated the first.

It became at once apparent that there was no adequately standardized and validated test available to help in this problem. It was also apparent that the use of a standardized and validated test was not the only way of testing hypotheses formulated to account for the patient's behaviour. There was in fact the method of experimental investigation, a method about which Shapiro (1951) has unfortunately but rightly to say ". . . . in the field of diagnosis . . . is almost non-existent".

The literature was then searched in an attempt to find a technique which could be modified so as to be of diagnostic assistance in this problem. Rosenstock's work on the validation of the concept of repression was noted.

Subsequently all known additional clinical features presented by the patient, including his life history and medical history were integrated. Eight sentences directly relating to the known emotional difficulties of the patient were then formulated. Two matched neutral sentences were used as controls. Each sentence contained the same number of words and was at an approximately similar level of difficulty. A tachistoscopic projector with a 3-inch time exposure was used in projecting these sentences at seven graded steps of illumination. In a way somewhat similar to Rosenstock it was hypothesized that the basic source of difficulty should be clearly differentiated from the others by it giving rise to a significant increase of errors or distortions. The neutral sentences being non-emotional would be perceived earlier, at lower levels of illumination and with fewer errors than the matched affectively loaded sentences.

There was no significant difference between the correct score means of the neutral and affective sentences (variance ratio, ·309). The error scores, however, showed a difference between neutral and parent-child sentences which was

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highly significant (t=7·45, significant ·01 level). It suggested that the parent-child relationship might be the source of greatest difficulty. The validity of this tentative conclusion was supported by the results of subsequent detailed clinical exploration during the following year and supplemented by an investigation of the patient involving a home visit, and an interview with his employer. They pointed to an unsatisfactory parent-child relationship being the basic factor.

The above investigation, using only a single case, was supported on the grounds that it satisfied the three criteria essential to any experimental investigation (Shapiro, 1951; Zubin):

(1) The phenomenon was brought under control.

(2) Precise predictions of behaviour or experience under new conditions were made possible from the hypotheses which were developed.

(3) The hypotheses which were formulated provided a beginning of an explanation for the phenomenon concerned.

The criterion of "control" was met in that the increased error scores or distortions were related to the basic source of difficulty. In proportion as the material presented was non-emotional so was there a decrease of errors. With an increase in traumatic material so was there an increase in error scores.

On the basis of these results it is now possible to satisfy more adequately the second criterion. If the above findings are generally valid then it should be possible to predict that there would be an increase in errors and distortions in other patients providing the sentences refer to relevant emotionally traumatic and disturbing content. It was with this aim in mind that the present investigation was undertaken using a group of sexually disturbed subjects. The sexual sentences should clearly give rise to a significant increase in errors and distortions compared with the remaining sentences.

The Experiment

Material

Seven sentences were used in the experiment. Five of these served as experimental sentences, the remaining two as controls. The experimental sentences described difficulties in the parent-child relationship and in sexual adjustment. The control sentences were neutral. A list of the sentences appears in Table I.

Each sentence was matched for the same number of words and approximate level of difficulty. Each was photographed on a 2 inch $\times$2 inch slide. The sentences were in black on a white background.

A standard "Pullin" projector with a 250-watt lamp was used. A Compur shutter, fitted to the nose of the projector and used at full aperture, controlled exposure time. The timing, which remained constant throughout the experiment, was 3 seconds.

The light source or degree of luminosity was controlled by a "Variac" transformer, the increases in illumination being measured by voltage change. The lowest level of illumination corresponded to 35 volts. Each higher level of illumination was equivalent to an increase of 5 volts.

The sentences were projected on a ground glass screen.

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TABLE I

Control Sentences

1. The forecast for the winter months in London is one of extreme cold.
2. There is a very good film being shown at the Odeon cinema today.

Experimental Sentences

1. A very large number of people are guilty of very bad sexual conduct.
2. Many people wish that they were not bothered about sex and related matters.
3. When a man is with a woman he usually thinks of sexual things.
4. Many people treat their sons more like a child than a grown-up.
5. Many parents and people find much more fault with children than they should.

The Subjects

There were nine psychiatric patients, all suffering from sexual disorders or difficulties—obscene letter compulsion; inability to ejaculate, with a suggestion of homosexuality; inability to micturate in public; transvestism, passive homosexuality, exhibitionism; homosexuality; male prostitute; legal prosecution following mutual masturbation in a public place; exhibitionism; active homosexuality (sexually interfered with boys in his classroom—now imprisoned).

Three normal subjects took part in the experiment and acted as additional controls.

Procedure and Instructions

Each of the seven sentences was shown at the same level of illumination before going on to the next. At each higher level of illumination the order of presentation was varied to avoid practice effect. There were 10 grades of illumination, ranging in units of 5, from 35 to 80 volts. After each projection the subject folded his paper so as to avoid seeing his previous answers. He was allowed as long as he wished to write down what he saw of each sentence.

The instructions given to the subjects were "This is a test of visual perception. 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 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?"

ANALYSIS OF DATA

The subjects' responses were scored according to the following criteria:

(1) One correct score is equivalent to any word that is perceived correctly, irrespective of whether it forms part of a continuous sentence or not.

(2) One error score is the inclusion of a word not in the original sentence.

Examples of different reactions to the projected sentences, taken from the present investigation and the work of others, are:

(a) *Projective Errors*

This is where the original sentences are distorted and structured according to the needs and attitudes of the individual—". . . the obtained distortions can be interpreted much in the same manner as the data of projective techniques" (Rosenstock, 1951).

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The two most striking sets of "projective errors" in the present study were obtained from two homosexuals in response to the sentence, "When a man is with a woman he usually thinks of sexual things". The first subject's responses were:

Level of Illumination

1. . . . . man is with	6. *When a man is a woman hoax* .
2. When a man	7. Sexual . . . . . S . . . . .
3. When a man live	8. When a man is sexual . . . . .
4. When a man is a	9. When a man is with a woman .
5. *The man is a woman*	10. *The man is a woman for sex* . .

"Projective errors" from the second homosexual were: "*Man is a woman usually*"; "*Is a man with a woman usually?*"

A further example of a "projective error" is taken from Rosenstock. The projected sentence was, "As I clung helplessly to mother I was taken to school the first day". The subject reported seeing, "As I clung helplessly to mother—taken the alcohol".

(b) *Increase of Intensity of Attitude*

A good example of this was in relation to the sentence (Rosenstock), "Whenever I tracked dirt and mud in the house I was scolded by mother". This sentence became, "Everywhere I looked, dirt and mud". Another subject increased the intensity of the latter sentence for it to read, "Whenever I tracked dirt or mud in the house I was slapped by mother".

(c) *Decrease of Intensity of Attitude*

In general distortions appear more in the direction of the reduction of intensity. The projected sentence was, "Many people wish that they were not bothered by thoughts of sex and related matters". One subject reported seeing "They wish they were not gathered together . . . ". Similarly the word omissions are most significant for the sentence, "A very large number of people are guilty of very bad sexual conduct"—"Very large number of people are guilty of . . . sexual conduct"; "Very large number of people are guilty of . . . sex".

Rosenstock gives several interesting examples of "decrease of intensity". A common example concerned the sentence. "When I was young I often had happy dreams of sleeping with my mother." One subject reported seeing this as, "When I was young I often had happy dreams of mother". Affect was also reduced by changing the object of the attitude—"I hoped I would die an awful death". This sentence was reported rather than, "Though mother treated me well I sometimes hoped she would die an awful death".

A further example of reducing affect is changing the concept. The projected sentence was, "My parents were in bed and I jealously wanted to kill them for it". This was reported as, "My parents were not bad and I jealously felt". Eriksen (1951) using tachistoscopic presentation of scenes showing people in the act of expressing or gratifying certain needs noted certain trends. He found a common tendency, similar to Rosenstock's findings concerning the changing of concepts, to change the scenes in such a manner as to remove the threat. For example, two men fighting with knives was seen as two baseball players with large catchers' mitts in their hands. Another shows a man bent over from the waist, picking a flower. A man directly behind the first, is looking at the first

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man's buttocks. The man standing would be seen as having his back toward the man bending over—a distortion which obviously removes the implication of anal pre-occupations.

Results

Table II

Group Mean Correct and Error Scores at Each Grade of Illumination

Grade	Neutral Controls +	Neutral Controls −	Parent-Child +	Parent-Child −	Sexual +	Sexual −
1	5·7	·11	4·8	·05	3·7	·48
2	8·6	0	5·1	·22	5·8	·14
3	10·0	0	5·8	·22	6·7	·14
4	11·0	0	7·2	·22	7·7	·14
5	10·5	0	6·7	·14	7·8	·23
6	10·9	0	6·7	·08	8·2	·16
7	11·3	0	6·7	·30	7·9	·13
8	12·8	0	6·7	0	7·5	·41
9	12·5	0	12·0	0	10·3	·16
10	12·5	0	12·2	0	9·0	1·16

Table III

Mean Correct and Error Perceptions of the Three Groups of Sentences

9 Sexual Deviants	Mean Correct Score	Mean Error Score
Neutral Controls	10·58	·01
Parent-Child	7·39	·12
Sexual	7·46	·31

3 Normal Controls*	Mean Correct Score	Mean Error Score
Neutral Controls	10·72	·05
Parent-Child	8·57	·09
Sexual	8·31	·11

* Correct mean scores for P/C and sexual sentences significantly different from neutral but not between themselves. No significant difference established between neutral and P/C mean error scores for the psychiatric and normal controls. The psychiatric group score significantly higher on sexual errors than normal controls.

Table IV

(a) *Analysis of Variance of the Correct Scores to the Three Groups of Sentences*

Variance Ratio between and within groups = 7·3 (P = < ·01).
C.R. between Neutral and P/C sentence = 5·06 (P = < ·01).
C.R. between Neutral and Sexual sentences = 11·55 (P = < ·01).
C.R. between P/C and Sexual sentences = ·007 (not significant).

(b) *Analysis of Variance of the Error Scores to the Three Groups of Sentences*

Variance Ratio between and within groups = 4·8 (significant beyond ·05 level, but not ·01 level).
C.R. between Neutral and P/C sentences = 10·0 (P = < ·01).
C.R. between Neutral and Sexual sentences = 18·7 (P = < ·01).
C.R. between P/C and Sexual sentences = 1·9 (P = borderline ·05 level).

Discussion

(*a*) Present Results

The findings are consistent with the prediction that as a group the neutral sentences would be reported earlier and with fewer errors and distortions than

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the affectively loaded sentences. The results for the correct (+) and error (—) scores of the neutral, parent-child and sexual sentences are given in Table II. There is an almost complete absence of errors for the neutral sentences, whereas the parent-child and sexual sentences show differences which reach a high level of statistical significance. The sexual sentences show considerably more errors than do the parent-child ones. In the latter no errors were recorded after the 7th grade of illumination, whereas the sexual sentences showed, in fact, a large increase after them. In this respect the mean error score at the highest level of illumination is particularly striking. Neutral and parent-child sentences for the correct scores show a much more even increase with the progressively higher level of illumination than do the sexual sentences.

It is interesting to note some of the patients' responses to the sexual and parent-child sentences. For each response quoted, no errors were incurred by the particular subject to the neutral sentences at the equivalent grade of illumination.

Sexual Sentences (*See Table I*)

Response

1. "Very large number of people are guilty of . . . sex."
1. "Very large number of people are guilty of . . . sexual conduct."
2. "They wish they were not gathered together . . . ."
2. "Many wish they were not bothered by thoughts about . . . matters."
2. "Wish brought up . . . matter."
2. "Wish they were not together."
2. "Many wish they were not bothered by people."
2. "Many wish they were not bothered by thoughts."
3. "A man and a woman usually thinks . . . sex."
3. "Man usually thinks sexually."

Parent-Child Sentences

4. "Parents who treat young children like grown-ups."
4. "Parent treat son like grown-up."
4. "Many parents treat children like grown-up sons."
5. "Parents-People more at fault than children."

In line with a decrease of intensity is the omission of "very bad" in sentence No. 1 (sexual) for two subjects; the omission of "sex and related" in two responses to sentence No. 2 (sexual); the omission of "is with a woman" in sentence No. 3 (sexual) and the substitution of "when a man is with a woman *he*", by, "a man *and a* woman usually thinks".

There appears to be considerable "projective content" in the parent-child sentences in the direction of the expression of attitudes. This suggestion was not investigated to the extent of establishing its validity.

It will be noticed from Table IV that there is a significant difference between the report of correct words both for the parent-child and sexual sentences as compared with the neutral ones. Similar to the findings of the previous paper (Walton, 1954), it is not possible to utilize these results since the correct score mean for the sexual sentences is not clearly differentiated from the parent-child one ($t = \cdot 007$, not significant). The same occurred in the three normal subjects. The error scores occur significantly more often to the sexual

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sentences than to the parent-child ones. The value of t between the two group mean error scores is 1·9 (significant borderline ·05 level). As such this group of sexually disturbed subjects shows a tendency to record perceptual errors and distortions significantly more often to the sexual sentences than to the parent-child and neutral sentences. This difference does not hold for the correct means. These findings are consistent with the work of Schafer and Murphy (1943), Postman and Bruner (1948), Eriksen (1951) and Rosenstock (1951), all of whom came to the conclusion that threat tends to disrupt both accuracy and speed of perceptual report. It is in the interpretation of the causes of this disruption that disagreement is the greatest. It is nevertheless interesting to compare the present results with those from the previous paper. It will be remembered that whilst the correct scores for the parent-child sentences (sentences which referred to the later established area of greatest disturbance) were not clearly differentiated from the others, perceptual errors to these same sentences reached a high level of statistical reliability when compared with the neutral. This is important because it seems to indicate two things. One, that sexual material is not necessarily the only material to produce distortion. Secondly, the results of the two studies appear to show some agreement in that sentences which refer to either the basic source of difficulty or to the subject's presenting symptoms, show a tendency towards somewhat similar responses, i.e. errors and distortions.

The poor perception and distortion of the affective sentences do not appear, however, to be invariable amongst the present sample. Of the nine subjects, four showed distortion throughout all levels of illumination, three showed varying degrees of distortion but always ending by the fourth or fifth level and finally two subjects showed no distortion. Thus seven out of the nine cases show perceptual errors in accordance with their presenting symptoms. Of the four who "distorted" all the time for the sexual sentences, none showed distortion on the neutral sentences. Similarly the two subjects who showed no distortion to the sexual sentences showed no distortion to the neutral ones. Seven subjects showed no distortion, at any time, of the neutral sentences. The remaining two showed none after the first grade of illumination.

Whilst both these studies carried out by the writer suggest that perceptual errors occur significantly more often to relevant disturbing emotional content and that whilst there appears somewhat relative agreement that emotional content results in raised thresholds, distortion and fewer experimental responses reported to such material, this is not to suggest that this relationship is an invariable one. Explanations advanced to account for these differences are indeed many.

The failure to record a consistent relationship between the incidence of perceptual error and either presenting symptoms or basic source of difficulty might at first sight appear to decrease the range and applicability of this diagnostic approach. Nevertheless examination of the different conditions which might affect performance suggests its usefulness in terms of prognosis and the assessment of the degree and course of illness. Further, it is by the establishment of the conditions under which "distortion" does or does not occur both in normal and abnormal subjects that we may tentatively lead ourselves to understand better that which suggests itself as a basic facet of human behaviour—that of seeking psychological equilibrium. By the establishment of such laws we would be able to set ourselves the task of establishing the basic factors behind this need for equilibrium. A synthesis and re-valuation of recent experimental work on perception seems therefore the first thing to be done.

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(*b*) Review of Relevant Literature

Whilst the present study has been seeking to relate "perceptual errors" to basic sources of disturbance and presenting symptoms with a view to the development of a valid diagnostic test, it appears that this relationship, although high, is not an invariable one. To seek an explanation for these differences it is necessary to enquire into studies whose aim has been the investigation of the different conditions which affect perception or the basic determinants behind what we see. Thus by linking the two approaches it seems possible that the incidence of "distortion and error" may be explained under one or more headings which can be verified under rigidly controlled experimental conditions, just as can the similar explanations behind the absence of perceptual errors. Without this synthesis and re-valuation little advance will be made since many will interpret the perceptual phenomenon in terms of their own accepted yet still unproven theories. The following have been suggested by different experimentalists to account for perceptual changes, some in relation to perceptual defence, others in relation to more general perceptual phenomena.

(1) *The Delay in the Report and the Distortion of Emotionally Charged Words and Sentences Can be Explained in Terms of Perceptual Defence*

Positive support for perceptual defence has been given by Eriksen (1951, 1952, 1954), Lazarus (1954), Blum (1954a, b) and McGinnies (1949). The work of Eriksen seems of particular relevance in suggesting one reason why two of the present sample failed to respond with distortions and errors. Amongst the 45 white male psychiatric patients he used there were nine on whom pertinent behavioural data were available. Six of these showed definite evidence of a very strong aggressive need that was freely and openly expressed in consciousness and overt physical behaviour. They had a history of frequent arrests for fighting, assault and murderous intent, etc. The other three patients had histories of frequent overt homosexual experiences prior to hospitalization.

His experimental technique consisted of the tachistoscopic presentation of scenes showing people in the act of expressing or gratifying different needs. The eight needs chosen were those considered by Murray (1938) to be the most frequently latent or repressed in individuals (e.g. aggression, succorance, homosexuality, etc.). He found that five of the aggressive subjects had recognition thresholds for the two aggressive scenes that were lower than their mean recognition threshold for the ten neutral scenes. In the case of the sixth subject the threshold for the aggressive scenes was only slightly higher than the threshold for the neutral ones. He also found that there was a significant correlation between the disturbance scores on a word association test and the degree of perceptual threshold elevation for the corresponding need scenes. He concluded that, "*. . . these results present strong evidence that perceptual defence does occur for stimuli associated with unacceptable needs . . . and that the overtness is the expression of . . . respective needs by the nine patients suggests that the needs would not be defended against in perception*".

Similar findings to these are reported by Bitterman *et al.* (1953). From a sample of 348 undergraduate women at the University of Texas to whom the complete Minnesota Personality Inventory (1951) had been administered, 40 subjects were chosen. Twenty had low anxiety scores on Taylor's Scale of Manifest Anxiety (Taylor, 1951, 1953) while 20 others had high anxiety scores. Tachistoscopic recognition thresholds were obtained from two neutral practice words, four taboo words and four neutral control words. The results showed

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no relation between anxiety level and perceptual threshold. There was, however, a significant correlation between the Psychopathic deviate score and the size of the residual difference between taboo and neutral words. The Psychopathic deviate scale was selected as a measure of non-conformity, so as to test the hypothesis that the observed differences were a function of readiness to report. Their conclusions were that *the differences between neutral and taboo words (beyond those attributable to frequency of experience) could be understood in terms of differential readiness to report.*

Excerpts from some of the reports of subjects asked to report on the experiment are both relevant and revealing—"I hesitated to report the first one because I didn't expect to be shown that type of word"; "I saw the first one, I know, a few times before I reported it"; "I wanted to be sure I saw every letter of those words before I called them"; "I saw Kotex but I kept telling myself it can't be that"; "The first word was a surprise, and I hesitated to call what it looked like"; "I definitely saw the words but thought 'Oh no, it couldn't be that' and kept trying to see something else"; "I identified *raped* at the very first but hesitated to say it".

(2) *The Delay in the Report and the Distortion of Emotionally-charged Words and Sentences Can be Explained in Terms of ". . . Factors . . . Within the Individual Which Prevent the Appearance in Consciousness of Certain Kinds of Material . . ." (Rosenstock, 1951)*

The work of Rosenstock and others would appear to suggest an unconscious repression of certain kinds of emotional material. This has been more fully developed in the introduction to the present paper. He noted, for example, that women found it more difficult to report seeing primarily aggressive sentences. On the other hand men found it more difficult to report sentences which were primarily sexual in nature. These differences were very clear-cut. Rosenstock developed this to favour the existence of repression—". . . explanations for these findings can be advanced which are consonant with and predictable from psycho-analytic theory". Work with a similar orientation has been carried out by McGinnies (1949) and Lazarus and McCleary (1949, 1951). McGinnies put forward the controversial viewpoint that there existed *an autonomic discrimination of threat before perceptual report.* McCleary and Lazarus (1949) and Lazarus and McCleary (1951) attempted to control the factors of word frequency and inhibition of report of threatening words. They found a higher pre-recognition Galvanic Skin response deflection for shocked rather than non-shocked nonsense syllables. They also concluded that the autonomic responses indicated that a discrimination was occurring before conscious recognition. They referred to this process as "subception". In their study they attempted to minimize the danger of consciously withholding reports by the use of nonsense syllables rather than taboo and other meaningful emotional material. They noted that subjects gave a significant Galvanic-Skin response to the nonsense syllables which had been connected with shock. Since some subjects did not report the stimulus correctly yet gave a significant G.S.R. to those syllables associated with shock led them to conclude that "subception" or the process of *autonomic discrimination without awareness was occurring.*

(3) *Postman Has Suggested an "Hypothesis Theory" to Account for Perceptual Defence Data*

Postman (1953a, 1953b) later came to the conclusion that the concept of "perceptual defence" was an expendable one and argued that whilst perceptual

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defence was an undoubted property of certain recognition thresholds it was possible to consider certain mechanisms as mediating it. He defined a hypothesis as, "A predisposition of the perceiver to organize stimulus cues in specific ways . . . hypotheses vary in strength, i.e. they vary in the amount of stimulation necessary to arouse, confirm or deny them . . . perceptual defence . . . can now be economically conceptualized in terms of interference among competing hypotheses". He concluded that perceptual defence resulted from the dominance of strong alternative hypotheses, "rather than the active repression of the inimical or dangerous". The result of this is, "In the presence of partial information, strong hypotheses incompatible with the threatening stimulus may be evoked . . . if this is the case, the subject will appear to be defending himself against perception . . . If, however, hypotheses related to the negative stimuli are strong, the opposite of defence will appear to operate." For further discussion of the "hypothesis theory" the reader is referred to Bruner (1951).

(4) *Gestalt Psychologists Have Considered the Perceptual Data to be Explainable in Terms of the Gestalt Laws of Perceptual Organization*

The main references are those of Hochberg *et al.* (1949) and Luchins (1950, 1951). The Gestalt Psychologist sees perceptual organization as determined by autochthonous factors derived from the nature of the physical stimuli and the neural effects which they cause in the nervous system. The autochthonous determinants of perception, "reflect directly the characteristic electrochemical properties of sensory end organs and nervous tissue". Although the Gestalt Psychologist does not deny the importance of the effects of motivation, need and mental set on perception he emphasizes that sensory factors are of prime importance in accounting for perceptual organization.

(5) *The Delay in the Report and the Distortion of Emotionally-charged Words and Sentences Can be Explained in Terms of Suppression of Taboo Material*

Both Lysak (1954) and Murdoch (1954) have considered this interpretation. Lysak, using 144 students from undergraduate courses at the University of Wisconsin, found that his subjects avoided shock syllables and chose the non-shocked ones. Under different experimental conditions, punishment in the form of electric shock was thus responsible for directing behaviour and perception in the direction of raised visual recognition and lowered thresholds. He agreed that something very similar probably went on in McGinnies' experiment and that his experimental set-up was a punishing one—"the forcing of naïve subjects to report words like *bitch* and *whore*—and not merely a threatening one is suggested by the failure to obtain the same results when impending shock is merely a faint threat and not an actuality". Lysak quotes the work of Lacey *et al.* (1953) as supporting this point. They found that the more incomplete the subject's expectations were about the nature of the words they were going to see, the greater was the difference between their taboo and neutral words. It appeared that when the subjects were informed of what was going to happen they had less reason to suppress their responses. As Lysak says, ". . . the psychological climate is structured for them and the reporting of taboo words is made much less painful . . .". Postman, Bronson and Gropper also report data which indicate that relative thresholds for neutral and emotional words vary significantly with the preliminary instructions given to subjects. An uninformed group had higher alternative thresholds for taboo words than any of the groups

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favoured to expect taboo words. These authors conclude that, "set and selective verbal report contribute to the observed threshold differences. Response suppression is a form of selective verbal report."

(6) *The Perceptual Content is Determined by the Mental Set of the Subject*

Howes *et al.* (1950) have suggested that perceptual defence could represent a tendency on the part of the subject to withhold verbal report in a selective manner in a "difficult" experimental situation. As Freeman (1954) says, quoting the work of Postman *et al.* (1949), "The subject's predominant set may predispose him to try some alternative hypotheses, not the correct one, which necessarily results in an increased recognition threshold. In a situation in which the number of alternative hypotheses is reduced, e.g. by an appropriate set to expect emotionally toned material, the perceptual-defence phenomenon should be virtually eliminated."

Freeman's aim was to determine the effect of set, created by different sets of instructions, upon the perceptual defence phenomenon. He used 88 male students from the introductory psychology classes at Northwestern University and found that when the subject is set to expect taboo material perceptual defence does not occur. Where the subject is set to expect taboo words a "sensitization" of these words occurs, similarly, when the subjects were not set to expect taboo words, a "habituation effect" to successive taboo words occurred.

Howie (1949) has attacked the earlier formulations of Bruner *et al.* (1947, 1949a, 1949b) and Postman *et al.* (1948), especially when they formulated perceptual defence as a basic axiom—"Given a stimulus impact of a certain character, perceptual process operates to maximize current needs and expectations and to minimize percepts inimical to such needs and expectations". He agrees with Luchins (1950) that what has previously called for interpretation in terms of defence could be understood more simply in terms of set. In a later paper (Howie, 1952), he severely attacked the concept of "perceptual defence" operationally, logically and metaphysically. Following closely on Howie's paper, Postman (1953) agreed with Howie's conclusion that the facts could be subsumed under the general principles of perception. He believed Howie was right for the wrong reasons. Postman (1951), Postman *et al.* (1951, 1953*b*) are of relevance.

(7) *The Results Previously Described as Determined by Perceptual Defence Can be Explained in Terms of a Word Familiarity Interpretation*

The main exponents of this viewpoint have been Solomon *et al.* (1951), Postman *et al.* (1953) and Howes (1954). Postman *et al.* (1953) for example, hold the view that the differential frequency of usage of emotional and neutral words accounts for the perceptual selectivity found in experiments on perceptual defence.

(8) *The Presence or Absence of Perceptual Defence has been Interpreted in Terms of "Ego-strength, Adjustment and Defence-structure"*

Kurland (1954) investigated the specificity and generality of defence-mechanisms. He used 22 hospitalized patients with obsessive compulsive mechanisms, 15 with hysterical mechanisms and 21 normal subjects. All the subjects were presented with neutral and emotional words which had been recorded on a magnetic tape. There were increasing degrees of loadness so as to enable the experimenter to obtain the recognition thresholds. Kurland found

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no difference in perceptual thresholds for the two groups of patients. The two groups combined perceived the emotionally loaded words at lower thresholds than did the normal subjects. His conclusion was that there was a lack of generality in defence-mechanisms and that, "further study is necessary before we can accept with confidence the assertion that a subject will respond to anxiety in a perceptual situation with the same type of defence that he employs in a non-perceptual situation".

These results are supported by Goldstein (1952) and Belmont *et al.* (1951). Goldstein in a study of the constancy of defence mechanisms in normal subjects came to the conclusion that whilst generality does apply to a small group of subjects there are considerably more who use different defence mechanisms, in relation to different impulses. Similarly Belmont *et al.* (1951) found no constancy in the subjects' use of repression in learning, recall and re-learning of nonsense syllables, some of which were associated with shock.

Results somewhat contrary to these have been returned by Eriksen (1952). He found that subjects who remembered their successes returned higher recognition thresholds with a slower learning for words on which they gave evidence of blockage in the word association test used. This contrasted markedly with those subjects who showed a good recall of failure. This group showed no retardation of learning and manifested approximately the same recognition thresholds for words on which they blocked as those on which no blockage occurred. Lazarus and Longo (1953) similarly found that when subjects remembered their failures in one experiment, they recalled in another experiment predominantly nonsense syllables previously associated with electric shock. Those subjects who previously recalled mainly successful experiences subsequently avoided the electric shock by remembering mainly the non-shocked syllables.

Lazarus, Eriksen and Fonda used two neurotic groups—one using intellectualizing defences (obsessive-compulsive) or repressing defences (conversion hysterics). They listened to a tape recording of a number of sentences, some sexual, some aggressive and some essentially neutral in content. There was a masking noise to make correct perception more difficult. The conversion hysterics made more accurate perception of the neutral than either the sexual or aggressive sentences. The compulsive-obsessive heard both kinds of emotional material better than the neutral. Similar to this is the work of Kleinman (1954) who on the basis of defence-structure was able to predict the consequences in perceptual behaviour. The work supported that of Lazarus *et al.* Two groups, one of subjects suffering from psychogenic hearing impairments, the other with cases of organically produced hearing impairments. Both groups were tested for auditory perceptual recognition thresholds for a series of non-affective words. These words were then included in a playlet which contained a theme which was considered basic to the psychogenic deafness syndrome (i.e. conflict with authority, resulting in anxiety and defendency). The playlet was then given to the two groups. The perceptual recognition thresholds for the original words were then taken. The organic group showed an improvement reflected in a marked reduction of thresholds. The same degree of improvement did not occur in the psychogenic group.

Alper (1946) found that those individuals who were described on the basis of clinical judgment as having "strong egos" showed a tendency to favour uncompleted tasks in recall under "task-oriented conditions" whilst under situations which represented a threat to self-esteem they recalled completed tasks. On the other hand those subjects who had "weak egos" showed the

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opposite. They tended to recall their completed tasks under "task-oriented conditions" and the uncompleted tasks when their self-esteem was threatened by the experimental set-up. Eriksen (1954) draws the following implications from these results, ". . . weak egos are threatened by the objective, non-threatening, task oriented condition and bolster self-esteem by recalling successes. However, when the threat becomes objectively more severe they are overwhelmed by their inadequacy and recall their failures. Strong egos, on the other hand are less easily threatened, and when threat does occur they cope with it by emphasizing successes rather than being overwhelmed by their inadequacy."

Others rather than interpret these findings in terms of "ego-strength" have done so in terms of defensive processes. Glixman (1949) and Rosenzweig (1943) have compared differential recall with the defensive mechanism of repression. Rosenzweig and Sarason (1942) found that the tendency to recall completed tasks when self-esteem is threatened is correlated with hysteria. This appears correlated with the results of Eriksen (1954).

In his study of "Ego-strength", Eriksen (1954) found that it was related to the tendency to recall more often the uncompleted rather than completed tasks when the experimental situation was not "objectively self-esteem threatening" whereas when it was, the opposite obtained. Scores on the hysteria scale (M.M.P.I.) were inversely related to the tendency to recall more incompleted rather than completed tasks when the situation was "objectively self-esteem threatening". Relating these results to the work of Eysenck (1947) Eriksen says, "Eysenck reports that in level of aspiration experiments subjects high on the extraversive pole tend to overestimate their performances and are little bothered by failure, while subjects falling on the introversive pole tend to underestimate their performance and are preoccupied with their failures. Such reaction to failure and threat would, at least superficially, seem to be related to differential memory for completed and uncompleted tasks. By emphasizing the successful tasks and ignoring the failed ones, extraverted subjects would be expected to recall more completed than uncompleted tasks, while for the intraversive subjects this tendency would be reversed." He very rightly goes on to stress, "The relation of the present data to Eysenck's findings suggest some interesting possibilities and avenues for further research, but it must be stressed that these relationships have not been proven. There is still much to be desired, not only in identifying the present data with the neuroticism and extraversion-intraversion factors, but also in clarifying and substantiating the relationships obtained in the present study."

(9) *The Speed and Content of the Perceptual Report of Emotional Material is Partly Determined by the Needs and Mood of the Individual*

Both the work of Levine, Chein and Murphy (1942) and Bruner and Goodman (1947) have shown that the perception of ambiguous objects is related to the hunger needs of the subjects and the perceived size of coins was determined by the "differential goal character" of the coins for the poor and rich children. Sanford (1936, 1937) has shown that the need for food has a significant effect upon word association, the interpretation of "neutral pictures" (pictures having nothing to do with eating of food), completion of drawings or the completion of words where only the first two letters of the word are given. The interestingly relevant finding was that the direction of distortion was partly determined by need. For example, a picture of a baby with its fingers

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extended was interpreted to mean, "He's sticking his fingers in the pie", by some members of the hungry group, while other members from the non-hungry group interpreted it as, "He's pointing to a toy".

(10) *Perceptual Distortion May Result from the Presentation of Disturbing Material to Which the Subject is Forced to Give Responses, the Resulting Frustration Building Up Tension*

"The frustration of goal achievement and the failure of tension reduction may lead to a variety of adaptive or maladaptive behaviour" (Krech and Crutchfield, 1948). They stress that no matter how "bizarre" or "irreal" the resulting behaviour may be it can always be understood in terms of reduction of need tension. Whether need tension results in "maladaptive practices" depends on ". . . the strength of the need tension, the individuals' characteristic manner of responding to frustration, and the perception of the block to the goal".

Birch (1945) studied the influence of different degrees of food deprivation on the problem-solving ability of chimpanzees. The solution demanded the perception of the relationships between crossed strings and food attached to some of the strings. Success depended on different solutions such as the use of sticks to rake in the food, etc. The six chimpanzees were deprived of food for different times, 2, 6, 12, 24, 36 and 48 hours. The experimental results indicated that excessive tension caused by significant food deprivation interfered with the problem-solving ability so as to interfere seriously with the problem-solving efficiency—". . . Under conditions of very intense motivation, the animals concentrated upon the goal to the relative exclusion of other features of the situation which were essential to the solution of the problem. Also, the frequent recurrences of frustration responses, such as tantrums and screaming . . . hindered the animals in their problem-solving efforts" (Birch, 1945).

Dembo (1931) using human subjects carried out an important experiment. The subjects were asked to stand in a marked square from which they were not allowed to move. The experimental task was for the subject to reach a flower which was four feet from the marked square. There were only two ways of reaching the flower but the subjects were told that there were three. When they had tried the two possible methods the subjects were in a frustrating situation and when the experimenter insisted that there was a third method the tension increased greatly. Anger, very bizarre perceptions and distortions resulted. One subject reported "seeing the room filled with water, and the flower floating towards her". Rings, which had been placed near the square, were picked up and used many times, although plainly of little value in helping the subject.

(*c*) RE-FORMULATION TO ACCOUNT FOR PRESENT PERCEPTUAL CHANGES

Altogether some ten explanations have been advanced to account for the perceptual errors noted in the present investigation. Closer examination of these alternatives suggests, however, that there is considerable overlap and that the results can be subsumed under fewer headings. One thing does, however, appear certain. Personality dynamics do influence even relatively simple perceptual acts and the different conditions which produce these changes can be detected by controlled experimentation.

The first suggested explanation of the perceptual changes was that they resulted because of a perceptual defence process. The work of Eriksen, in

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particular, suggested that the delay in the report and the distortion of emotionally charged sentences would be greatest when the stimuli were unacceptable to the subject. Bitterman *et al.* (1953) contributed to a better understanding of this problem with results which suggested that the differences between neutral and taboo words could best be understood in terms of a *conscious differential readiness to report*. The psychiatrists in charge of the nine cases were therefore asked to assess the presence or absence of guilt at the time of the experiment.*

These results would suggest that patients in whom there existed no superficial need for "defence" in any particular area, though their behaviour may well be maladaptive, would be less likely to manifest hesitancy, perceptual defence and distortion, whereas those in whom there existed a need to defend against unacceptable stimuli would be more likely to respond in this way. The concept of guilt or the evaluation of self in relation to the laws of society seem therefore of importance. The hesitancy seems to suggest itself as being under the conscious control of the individual.

Both this conclusion and experimental trends appear at variance with Rosenstock's interpretations. It will be remembered that he was attempting to validate the psycho-analytic conception of repression. His work and that of others would not appear to suggest an unconscious repression of material, but as an alternative rather to suggest a conscious hesitation to report certain kinds of material. Rosenstock makes the point that the differences noted between men and women in their response to aggressive and sexual sentences were so clear-cut as to favour the existence of repression. Although one would agree that Freud (1933) has argued that in boys the Oedipus Complex is based on sexual attitudes and that it is repressed because of castration anxiety with the resulting formation of a strong super-ego, this is not to deny the possibility that avoidance of socially unacceptable material alternatively may not be beyond the conscious control of the individual. Similarly in girls Freud has argued that castration-anxiety or penis envy prepares the way for the Oedipus Complex and that its incidence is accompanied by the outbreak of pent-up hostility towards the mother. Since there is an absence of repression of sexuality the development of the super-ego suffers. This is again, however, not to deny the possibility that due to cultural and constitutional factors the girl is forced to give up her aggressive attitudes and assume a relatively passive role. As Rosenstock says, ". . . ordinary conventions prohibit her from manifesting hostile impulses". One can therefore perhaps look for a partial explanation in terms of a conscious "differential readiness to report" for which there is some experimental evidence, rather than seek explanations in terms of still unproven theory.

The work of McGinnies (1949), McCleary and Lazarus (1949) and Lazarus and McCleary (1951) which appeared to support the investigation of Rosenstock can be criticized on several counts. Solomon and Howes (1950) and Howes and Solomon (1951) failed to agree with the work of McGinnies in that there was a possible intervention of a conscious inhibition between the initial perception and report of perception. Thus, they argued, the perceptual

* Of the nine patients, four showed distortion throughout all levels of illumination. Three of these patients were reported to have guilt feelings at the time of the experiment, whilst the fourth (inability to micturate in public) is reported to have suffered more from self consciousness than guilt. Three patients showed distortion which always ended by the fourth or fifth level of illumination. Two of these were reported to feel guilty, the third was not. Two patients showed no distortion. Neither of these, clinically, showed evidence of guilt over their offences.

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thresholds for taboo words would be raised not because of an unconscious defence process, but rather because of a conscious withholding of the report. Their second objection was that the results may be accounted for by the fact that the selected neutral words, generally being more common ones, were more rapidly seen as a function of the subject's greater acquaintance with them. Similarly the conclusion of Lazarus and McCleary that there was a process of "subception" was reached without adequate experimental verification. Brickner and Chapanis (1953), as previously noted, have shown that when syllables are perceived incorrectly some information is conveyed to the subject such that he may be able to establish from which class of stimuli the particular stimulus comes, even though an incorrect verbal report is given. They suggest that the recognizable elements amongst the syllables used by Lazarus and McCleary may account for the G.S.R. effects which were obtained.

Cowen and Beier (1950) and Beier and Cowen (1953) used a threat-expectancy situation so as to try to reduce the possibility of inhibition of report. They demonstrated that subjects tended to require a large number of trials and more time for the correct report of threat words than neutral ones. In their third paper (Cowen and Beier, 1954) they tried to determine whether the delayed report of threatening words occurred under conditions of threat-expectancy in an experimental set-up which allowed them to determine the operation of possible conscious inhibition as well as differential word frequencies. Significantly more trials were required for the correct report of threat words compared with neutral ones. In addition no correlation was found between the number of trials required for the test words and word frequency. They carried out several checks to study the possible influence of conscious inhibition on the above findings. They agreed that since their relatively sophisticated experimental group (59 College undergraduates), on post-experimental enquiry, admitted few instances of deliberate inhibition, then the results were less likely to be explained on the basis of conscious inhibition but rather due to the probable operation of a perceptual defence process. This is a surprising conclusion since the advocates of perceptual defence never considered a defensive system existing apart from that directed by an individual. They certainly did not consider a defensive system existing within the perceptual process itself. Apart from these more obvious objections there is the one that can be inferred from the results of Bitterman *et al.* (1953). They used, it will be remembered, a group of 348 undergraduate women at the University of Texas, a presumably "sophisticated experimental group", yet the results show quite clearly a conscious differential readiness to report taboo words.

These studies would lead one to suggest that much of the work on perception which is at present interpreted in terms of the unconscious and related fields, can more readily and easily be interpreted in terms of a "differential conscious readiness to report".

Not many people would agree with the "exclusive" interpretation of perceptual organization in terms of the Gestalt laws. A major criticism against the Gestalt school is that they too frequently neglect to consider that the principle of perceptual organization may involve two major categories—those relating to the structural factors of perception and those relating to the *functional* factors. Often the Gestalt school neglects the findings from many well-known experiments. To quote but a few dealing with the effects of functional factors in perceptual organization—Bruner *et al.* (1947) studied two groups of children. One group came from a very poor slum area, the other was a rich

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group from the prosperous business and professional families in the same city. Both groups were asked to judge the size of various coins. The poor group overestimated the size of the coins considerably more than the rich children. Levine *et al.* (1942) presented ambiguous drawings behind a ground-glass screen to hungry college students. They were seen more often as food than when presented to college students who had just finished eating. This cannot be considered due to structural factors since the same pictures were presented to both groups. For an elaboration on this point the reader is referred to Krech and Crutchfield (1948).

Whilst the conclusions reached from experimental work on "suppression of taboo material" and the effect of "mental set" as partial or possible explanations of perceptual changes appear justifiable, when results are explained in terms of a word familiarity interpretation more doubt exists. Lazarus (1954) has criticized this approach and maintains that there are serious flaws in the arguments of its main protagonists and that they ignored a number of relevant studies. Correlations between word frequencies and visual recognition thresholds are minimal and most of the covariance occurs when words of minimal frequency were compared with words of slightly greater frequency. In support he quotes the data reported by Howes *et al.* (1951) and Solomon *et al.* (1952). In fact it appears that little covariance occurs when highly frequent words of different frequency value are used. He adds that these are the types of words usually used in perceptual studies.

Attempts to relate the presence and extent of perceptual defence to "ego" strength, adjustment and defence-structure seem to hold considerable promise, especially since the work of Chodorkoff (1954) provided a certain confirmation of trends deduced from previous experiments. He attempted to investigate the relationship between personal adjustment and perceptual defence. In general his hypothesis was supported inasmuch as perceptual defence shows a tendency to increase with a decrease in adjustment. If one can perhaps relate this work to that of Eriksen (1952a, b, 1954a, b), Alper (1946), Eysenck (1947), Glixman (1949), Lazarus and Longo (1953), Kleinman (1954), Rosenzweig and Sarason (1942) and Rosenzweig (1943), the suggested conclusion would be that those subjects who, as a group, manifested satisfactory adjustment would be less likely to manifest perceptual errors than the group characterized by poor adjustment. In addition, however, although experimental conditions of threat to self-esteem appear important to all, it is suggested that the group composed of maladjusted individuals, would react to conditions of threat to self-esteem in two different ways—one which would show little or no perceptual distortion, the other which would show a great deal of reaction to the same perceptual stimuli. The factors of over and under socialization and their possible inclusion within the framework of anxiety-dysthymia and hysterico-psychopathic disorders respectively (Eysenck, 1955) appear of relevance to a further understanding of this problem.

Preoccupation with the satisfaction of certain needs might lead to perceptual errors and distortion of sentences in line with these preoccupations. It will be remembered that Sanford (1936, 1937) showed that the need for food had a significant effect upon the interpretation of neutral pictures. The example was quoted of several hungry children interpreting a picture of a baby with its fingers extended as, "He's sticking his fingers in the pie". Similarly some of the recorded errors in the present investigation can be interpreted along the same lines. This point has already been mentioned in "Analysis of Data"—"Projective Errors". Examples were given of the response of two homosexuals to

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the sentence, "When a man is with a woman he usually thinks of sexual things". The distortions appear to be in accord with the needs or attitudes of the subjects.

The final point emerging from a consideration of the work of such as Krech and Crutchfield (1948), Birch (1945) and Dembo (1931) is that when emotional sentences are projected on a screen for ten exposures, this represents an increasingly difficult situation such that tension builds up with the result that perceptual distortion occurs, independently of that dictated by "defensive intentions" on the part of the subject.

From a consideration of the above alternatives, five explanations suggest themselves as being either of much greater import or supported by adequate experimental work. These alternatives can readily be subjected to experimental verification. Whilst the following are noted separately, this is in no way to imply independence of function.

(1) When perceptual stimuli are "unacceptable" the person may respond by trying to reduce the threat. The subject's own evaluation of the experimenter's attitude towards him in relation to the rapid report of either "socially taboo material" or material referring to adverse or difficult aspects of the patients' previous behaviour, appears of relevance. All in all when the situation is self-esteem threatening the subject may respond by distorting the perceptual stimuli in such a way as to reduce the threat to self. It is suggested that the response to such material is under the conscious control of the individual. When the perceptual stimuli refer to needs which are overtly and openly expressed distortion tends not to occur.

(2) Where the psychological environment is organized by relevant instructions to expect "threat" words, etc., the situation has less "catastrophic potentiality", the threat to self-esteem is lessened and there is less likelihood of defensive behaviour in relation to the threatening stimuli.

(3) It is suggested that a relationship exists between adjustment and a relative absence of perceptual error, just as those who show evidence of maladjustment are more likely when presented with disturbing perceptual material to record a proportionately greater increase in perceptual error. It is also suggested that there are some who can be deemed "maladjusted" yet will not show perceptual errors. The incidence of the latter seems to be dependent on the interaction between defence-structure, self-esteem and the "unacceptable" nature of such material. The work of Eriksen, in particular, appears to suggest that the response of those on the extravert dimension (hysterics and psychopaths) is likely to be quite different to a self-esteem threatening situation than by those on the introversive one (anxiety states, depressive states, and obsessional neuroses).

(4) Where the "need" or "mood" of an individual is strong, it is likely that perceptual errors will occur not because of defensive behaviour, but because of a projection of these self-same needs and moods into the perceptual stimuli. This material suggests itself as being understood in the same way as material gained from projective tests.

(5) When the emotional sentences are projected over ten grades of illumination it is considered to represent an increasingly difficult situation for those subjects who see personally relevant material. With an increase in difficulty so is there an increase in tension with a resulting perceptual distortion similar perhaps to intellectual impairment noted in some severe anxiety states. It is suggested that this may occur in only a section of the so-called maladjusted group, and that the dichotomy between extraverts and introverts may serve as a useful basis for investigating this point further.

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Experiment II

Problem

The initial experiment using the single case showed that perceptual errors occurred significantly more often in reaction to the report of sentences containing traumatic material. The second experiment attempted to predict that if this first observation was generally correct, then perceptual errors should occur significantly more often in other patients as a reaction to perceptual stimuli which either referred to their basic or underlying psychiatric disability or to their presenting symptoms. It was found that a group of sexually disturbed subjects did show this tendency but that it was not an invariable one. The presence of error, in this group, appeared superficially to be related to feelings of guilt whilst the absence of error was associated with an absence of guilt. From a review of the literature ten additional hypotheses were considered to account more fully for the incidence of perceptual error. It was found that these ten hypotheses could be subsumed under fewer headings. The present experiment was designed to enquire further into some of these factors and conditions which contribute to the incidence of perceptual error as suggested by the present study.

The prediction was made that the speed of report of perceptual material, relating to the field of a subject's psychiatric disability, can be made to vary according to a limited number of laws, each of which operates under the conscious control of the individual.

Material

Eighteen taboo and neutral words, controlled for familiarity and number of letters were typed on 5 inch × 3 inch white cards. The position of each word on each of these cards was identical. Control of familiarity of the words was achieved by matching the taboo words from McGinnies (1949) and the neutral words from Postman, Bronson and Grapper (1953) by means of the Thorndike-Lorge Semantic count (1944). The complete list of words appears in Table V.

Table V

Stimulus Words
(Taboo words are in italics)

Word	Frequency Value*
lotus	10
capon	10
Raped	13
lathe	11
Belly	47
noted	45
Whore	1
tiara	4
Kotex	4
mixer	1
terse	4
Penis	1
hilly	10
knack	13
Filth	3
clove	4
Bitch	4
Mean Taboo	10·6
Mean Neutral	10·3

* "Frequency of occurrence in 4½ million words according to the Thorndike-Lorge semantic count."

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The cards were presented in a drop shutter exposure device consisting of a card holder, obscured by a heavy brass shutter. On presentation the shutter dropped exposing each card. When the shutter was fully open an electric contact point was activated and immediately a Chronotron began recording in seconds. The subject's response was spoken into a microphone, amplified, the voice key was tripped and the Chronotron stopped immediately. An exact recording of the speed of response was thus shown. There were three other cards. One was marked with a dot in the exact centre, one had a neutral word whilst the third had a taboo word marked in exactly the same position.

Subjects

The nine patients who took part in the first experiment acted as subjects for the second experiment.

Procedure and Instructions

The subject was seated in front of a tachistoscope and told that he was to be shown three cards, one to have a dot to mark the point of presentation and the remaining two to have one word on each. They were asked to say the word into the microphone as soon as they saw it. On the basis of their reaction-time to the taboo word the nine subjects were divided into three matched groups. The mean reaction times of the three groups were ·88, ·90 and ·95 of a second.

Each of the three groups was given different sets of instructions to determine the subject's readiness to report taboo words which had some relationship to their psychiatric disability. Group "one" was given the usual instructions accompanying tachistoscopic recognition procedures. The subjects in this group were not warned that taboo material would be included. The second group was given the same initial instruction with the additional information that taboo words would be included among the stimuli and further information which was designed to increase the tendency to withhold reports of taboo words. The third group received instructions designed to facilitate the report of the taboo material. The instructions were:

Group 1. "This is a test in visual perception. You are going to be presented with words by means of this instrument. They are to be shown here (present the card marked with a dot only). As soon as you recognize the word, which will appear in exactly the same place as the mark on this card, I want you to repeat it aloud into the microphone in front of you. Are you clear?"

Group 2. The same initial instructions were given as to Group 1 with the following additional remarks—"Some of the words you will see, but not all, are those not mentioned in polite society".

Group 3. The same initial instructions as to Groups 1 and 2 with the following additional remarks—"Some of the words you will see, but not all, are those not mentioned in polite society. The ability to report seeing these words quickly is often found in people of good social adjustment and maturity. Most people report that they are somewhat anxious about reporting such material".

The complete set of taboo and neutral words was given twice. On the second occasion the order of presentation was varied.

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Results

Table VI

Mean for Card 1	1st Presentation		2nd Presentation	
	Taboo	Neutral	Taboo	Neutral
Group 1: ·88	1·07	·62	1·22	·79
Group 2: ·90	·89	·61	1·20	·54
Group 3: ·95	·60	·48	·49	·33

All decimals are fractions of one second.

Discussion

These results suggest that the prediction was not far from the truth. The three groups carefully matched on reaction time to a sexually taboo word show that their subsequent reaction-times to similar taboo and other neutral material is dependent on the nature of the initial instructions. When the psychological environment of the subjects in Group 1 is not structured to expect taboo material they show a slow reaction time relative to Groups 2 and 3. It is also interesting to note that the members who constitute this group had a quicker mean reaction-time to the one card prior to the experiment proper. On the second presentation of the taboo and neutral words the reaction times for this group were even slower. Where the instructions to those subjects in Group 2 give some idea of the content to be expected, the reaction times on the 1st presentation were considerably quickened. When, however, the preparatory instructions give both a warning of the content plus a facilitation to report such material (Group 3) the reaction time is very rapid. The rapid reaction-time is even more marked on the 2nd presentation. It is also noted that there is an inverse relationship between speed of reaction to the one card before the real experiment and under the three different experimental conditions.

The results, in addition to showing the influence of *mental set* on reaction-time to taboo material, suggest the importance of *conscious factors* and their relationship to self-esteem in directing the speed of response to such material as has been seen to bear a direct relationship to a subject's major area of disturbance or psychopathology. Self-esteem in this context refers to the individual's evaluation of his behaviour against a background of certain accepted rules governing sexual behaviour.

It leads one tentatively to formulate the next experimental step, that of more clearly defining the influence of guilt and its relationship with the suggested conscious differential readiness to report emotionally difficult perceptual material. The dichotomy of dysthymia and hysteria with its over- and under-socialization respectively (Eysenck, 1955) suggests itself as the framework against which to evaluate any future work on perceptual errors, provided that the perceptual content refers only to socialized drives.

Summary and Conclusions

Perceptual errors were first seen to occur as a reaction to the presentation of sentences referring directly to a basic source of difficulty. These errors did not occur to any significant degree as a reaction to either neutral sentences or sentences which were later established to refer to subsidiary difficulties.

On the basis of the results from the single case, it was predicted that if the incidence of perceptual error showed any generality at all, then other subjects would show a significant increase when the sentences refer either to a major source of difficulty or to presenting symptoms. It was with this hypothesis in mind that the second experiment was carried out using a group of sexually disturbed subjects. The results were in accord with the prediction. The mean error scores were significantly greater in number to the sexual sentences than to both the neutral and parent-child ones. The correct mean scores to the sexual sentences were not different from the remaining sentences. This finding is in agreement with the investigation

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using the single case. It will be remembered that although perceptual errors occurred significantly more often to the parent-child sentences, the subjects' correct responses to these same sentences did not show any significant difference to the correct scores from the remaining sentences.

The results of the tachistoscopic experiment show that the sample who record perceptual errors in the first experiment are also capable of different responses to similar sexual and taboo material according to the preliminary instructions. These findings would appear to suggest that not only is mental set and expectancy important in partially determining the subject's responses, but that the degree of hesitancy is under the conscious control of the individual, particularly when the factor of self-esteem is involved. These findings are of obvious relevance to a better understanding of the incidence of perceptual error.

Since such an encouraging start has been made it enables one to formulate more clearly future experimental trends on this subject. The first need is to establish more fully the conditions under which perceptual error does or does not occur. In this way the incidence of error can be related to one of several conditions, just as the absence of error would similarly suggest a limited number of possibilities. Once these conditions have been clearly defined and their significance fully understood then subsequent inquiry can set itself the task of controlling these conditions and noting the effects they produce either on the symptomatology or basic psychopathology.

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