EMOTIONALITY AND PERCEPTUAL DEFENSE

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During the past decade, a number of experimental investigations have progressively revealed the so-called "dynamic," or motivational, aspects of perceptual behavior. No longer do we view perception as organized solely in terms of the structural characteristics of stimulus objects or the frequency with which the individual has been exposed to these objects. Perceptions are structured not only with respect to the limiting stimulus conditions, but also with regard to the possibilities of reward (11, 12), need fulfillment (1, 7), attitudinal orientation (10), potential anxiety (4), symbolic value (3), and release from tension (2), to mention just a few. In order to describe such facts as the perceptual selection and accentuation of valued objects and the elimination or distortion of inimical stimulus objects, it has been found convenient to invoke mechanisms of *sensitization, defense,* and *value resonance* (10), *vigilance* (2), and *primitivation* (4). Finally, playing host to these varied and intricate functions is the "ego," in whose service, presumably, the various perceptual adjustments operate.

It seems well established, then, that the perceptual "filtering" of visual stimuli serves, in many instances, to protect the observer as long as possible from an awareness of objects which have unpleasant emotional significance for him. Does this process, however, entirely insulate him from the emotion-provoking qualities of the stimulus situation? It is to this problem that the present discussion is addressed.

If we view emotion essentially as a motivating condition of the individual (6), the critical nature of the relationship between emotion and perception becomes apparent. Emotion does appear to represent a highly organized and directed state of the organism. Consequently emotion-inducing stimuli may be expected to initiate those perceptual responses which will be consistent with the general picture of emotional adaptation. Several exploratory investigations have indicated that the individual both perceives and reacts in a manner consistent with his emotional response to stimulation. That tension (defined as reactivity to threat, deprivation, or thwarting) will induce perceptual "accentuation" of objects previously associated with the anxiety-producing situation has been demonstrated by Bruner and Postman (2). More recently the same authors have shown that frustration, induced by sarcasm and criticism, will raise the perceptual thresholds of observers to tachistoscopically-presented words. When, on the other hand, individuals are faced with stimulus objects which are not actually threatening, but which represent for them areas of little interest or some antipathy, they also generally display raised thresholds of recognition (10). This process of perceptual "screening" apparently is acquired by the individual as a technique for organizing perceptions around value expectancies so as to produce maximum reinforcement of those expectancies.

One question intrudes repeatedly into interpretations of these experimental findings, namely: "How is a raised or lowered threshold of recognition for inimical stimulus objects accomplished before the observer discriminates them

and is thereby made aware of their threatening character?" While the answer to this question will follow eventually only from fuller knowledge of the neurophysiological processes underlying perceptual response, detection of any one aspect of physiological reaction accompanying perceptual behavior should throw some light upon the processes by which perceptual defense is effected. One might conjecture, for example, that stimuli of an appropriate sort will arouse autonomic reactions characteristic of anxiety or pleasure *prior* to conscious awareness of the nature of the stimulus. If this is the case, we might expect to find a change in galvanic skin response in reaction to visually presented stimuli with emotion-provoking connotations before the subject is able to report the exact nature of the stimulus. In short, autonomic reactivity may have a lower threshold to threat than do those neural systems which mediate consciousness. Study of such reactions, therefore, should hold significant possibilities for adding to our understanding of the process by which discriminatory evaluation of visually sensed objects is accomplished before accurate perception occurs.

THE EXPERIMENT

Because of the ease and precision with which it can be measured, the galvanic skin response was selected in the present study as an index of emotionality [1] in response to affectively-charged verbal symbols. A list of eleven neutral and seven critical, or emotionally toned, words was first devised. The words are listed in Table 1 in their order of presentation to the subjects. Exposure of the words was

[1] The term "emotionality" is employed here in the sense of autonomic response without regard to presence or absence of phenomenological content.

TABLE 1

STIMULUS WORDS USED IN THE EXPERIMENT IN ORDER OF THEIR PRESENTATION TO EACH OBSERVER

Critical, or emotional, words are in italics.

apple	*kotex*
dance	broom
raped	stove
child	*penis*
belly	music
glass	trade
river	*filth*
whore	clear
sleep	*bitch*

accomplished by means of a Gerbrand's Mirror Tachistoscope, which allowed controlled variation of the exposure interval from .01 second upward. This was done silently, since exposure duration in this apparatus is controlled by the activation of fluorescent tubes rather than by a shutter arrangement.

Subjects in the experiment were eight male and eight female undergraduates drawn from an elementary psychology class at the University of Alabama. All were naïve as to the purpose of the experiment. The procedure consisted, first, in seating the subject before the viewing mirror of the tachistoscope and strapping electrodes onto both his palms. These were connected in series with a potentiometric circuit described by Lacey and Siegel (5) for measuring galvanic skin response. A 32-centimeter scale microammeter accurate to .5 per cent made it possible to read current changes of one microampere with precision. The subject's threshold was first determined for four trial words in order to accustom him to the apparatus and to allow his level of resistance to stabilize. In all cases, thresholds were determined by exposing the stimulus word once at .01 second, once at .02 second, etc. until it was correctly reported by the subject.

Prior to experimentation, the subjects were told that they would be shown words which they might not be

FIG. 1. Group averages of galvanic skin response to neutral and critical words during pre-recognition exposures.

able to recognize at first. They were instructed to report whatever they saw or thought they saw on each exposure, regardless of what it was. One additional injunction was that they fix their hypothesis upon exposure of the stimulus, but withhold stating it verbally until they received a signal from the experimenter. In this manner we were able to expose the stimulus word, note the maximum deflection of the microammeter pointer during the six-second period following exposure, and then record the subject's response. Two experimenters cooperated in the procedure, one operating the tachistoscope, the other recording galvanic skin response and readjusting the current through the subject to 40 microamperes after recognition of each word.[2]

EXPERIMENTAL FINDINGS

Emotionality. Since we were interested primarily in the galvanic skin response of our subjects during the period *preceding correct recognition* of the stimulus words, we have based our analysis upon just those microammeter readings which were recorded on exposure trials up to, but not including, the trial on which recognition finally occurred. Assuming that the GSR may properly be considered an index of "emotionality," we have succeeded in measuring emotional, or autonomic, reactivity to verbal symbols during the period preceding accurate recognition of the stimulus. That emotionality, so defined, is significantly greater during pre-recognition exposures of the critical than of the neutral words is confirmed by statistical analysis of the findings. Testing the null hypothesis that no differences other than those attributable to random fluctuations in the data would exist between mean galvanic skin responses of the observers to the neutral and critical words, we obtained a t value of 5.10 for 15 degrees of freedom. This permits rejection of the null hypothesis at the .01 level of confidence, and indicates a highly significant relationship between GSR and word meaning during the pre-recognition period. The results are presented graphically in Fig. 1, while the experimental findings are summarized in Table 2.

Thresholds. Of equal interest are the data relating to thresholds of the observers for the neutral and critical words. The relationship here is depicted in Fig. 2. Without exception, the mean thresholds of the observers were greater for the critical than for the neutral stimulus words. The sig-

[2] Miss Billie Sue Talantis, a graduate student in psychology at Alabama, assisted in the experimental procedure. The author is also grateful to Rosemary T. McGinnies for her generous assistance in organizing the data.

TABLE 2

SUMMARY OF THE RAW DATA AND STATISTICAL TESTS FOR ALL OBSERVERS WITH RESPECT TO BOTH GALVANIC SKIN RESPONSE AND THRESHOLDS OF RECOGNITION FOR NEUTRAL AND CRITICAL STIMULUS WORDS

Observer	Mean microammeter readings during pre-recognition exposures		Mean thresholds of recognition	
	Neutral words	Critical words	Neutral words	Critical words
1	37.80	40.46	.055	.184
2	40.96	41.53	.044	.094
3	39.31	42.06	.054	.080
4	38.34	40.80	.103	.126
5	41.48	43.76	.040	.064
6	41.41	47.08	.070	.130
7	40.75	39.94	.057	.104
8	39.98	42.85	.063	.076
9	39.44	42.68	.059	.130
10	40.02	42.71	.049	.223
11	39.88	41.55	.046	.077
12	41.27	44.02	.057	.091
13	40.56	41.37	.033	.037
14	40.19	41.42	.034	.054
15	40.85	40.63	.046	.056
16	40.83	41.84	.036	.046
Mean diff. = 1.98 t = 5.10 P < .01			Mean diff. = .045 t = 3.96 P < .01	

nificance of the individual differences in thresholds between critical and neutral words was tested statistically, the results yielding in this case a t value of 3.96 for 15 degrees of freedom. In short, the observers displayed significantly higher thresholds of recognition for the emotionally-toned words than they did for the neutral words. The threshold measures are also summarized in Table 2.

A breakdown of the data with respect to sex of the observers was also done. The male subjects, on the average, had significantly lower thresholds for both the neutral and critical words. Since the factor of individual differences in visual acuity was not controlled, these results cannot be accepted as more than suggestive of a sex difference in threshold of visual recognition. The mean difference between thresholds for neutral and critical words, however, did not differ significantly in magnitude for the male and female observers. Neither group, in other words, displayed greater evidence of perceptual defense than the other. In addition it was found that no significant sex differences existed with respect to absolute magnitude of galvanic skin response to the critical and neutral words or to differential GSR to the two types of words. Emotionality during the pre-recognition period was of equal degree in both the men and the women.

Content analysis. Since the observ-

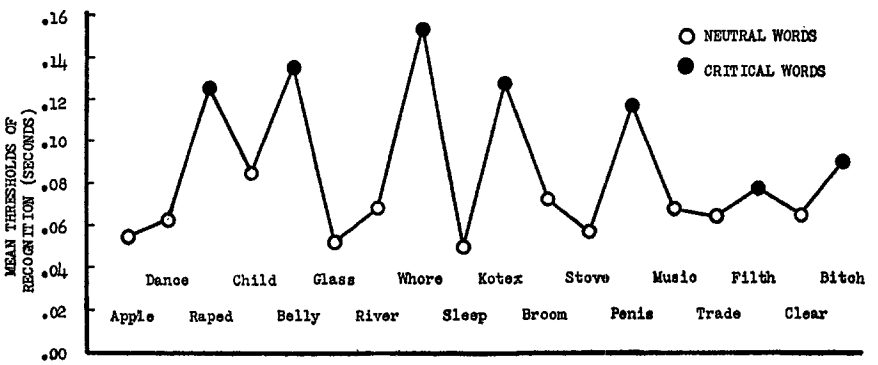

FIG. 2. Mean thresholds of recognition of the observers to the neutral and emotionally-charged words.

ers were instructed to report whatever they saw, they characteristically volunteered a number of pre-recognition "hypotheses" before recognition occurred. These were recorded and later analyzed in terms of four general response categories. In order to simplify and objectify as much as possible the coding of these perceptual "guesses," the content categories were limited to the following:

(1) *Structurally similar.* Hypotheses coded under this heading resembled in structure the stimulus word. For example, the observer may have guessed *trace* for *trade,* or *whose* for *whore.*

(2) *Structurally unlike.* Coded here were hypotheses that were unlike, or dissimilar, in structure to the stimulus word, as, for example, *roared* for *belly,* or *ideal* for *glass.*

(3) *Nonsense.* This category included responses that simply had no dictionary meanings. Such would be the case in guessing *egtry* for *kotex,* or *widge* for *stove.*

(4) *Part.* These were fractional, or incomplete, hypotheses consisting of any disconnected group of letters.

Figure 3 shows the percentage of responses in each of the content categories made to neutral and critical stimulus words for the group of observers as a whole. A Chi-Square test of independence between type of hypothesis and meaning of the stimulus words indicates a relationship significant below the .01 level of confidence. The tabulation of observed and theoretical frequencies with the obtained value of Chi-Square is reproduced in Table 3. Inspection of Fig. 3 in the light of the statistical evidence reveals that the observers made proportionately more *similar* and *part* responses to the neutral words and proportionately more *unlike* and *nonsense* hypotheses to the critical words. An additional breakdown of the *nonsense* category into re-

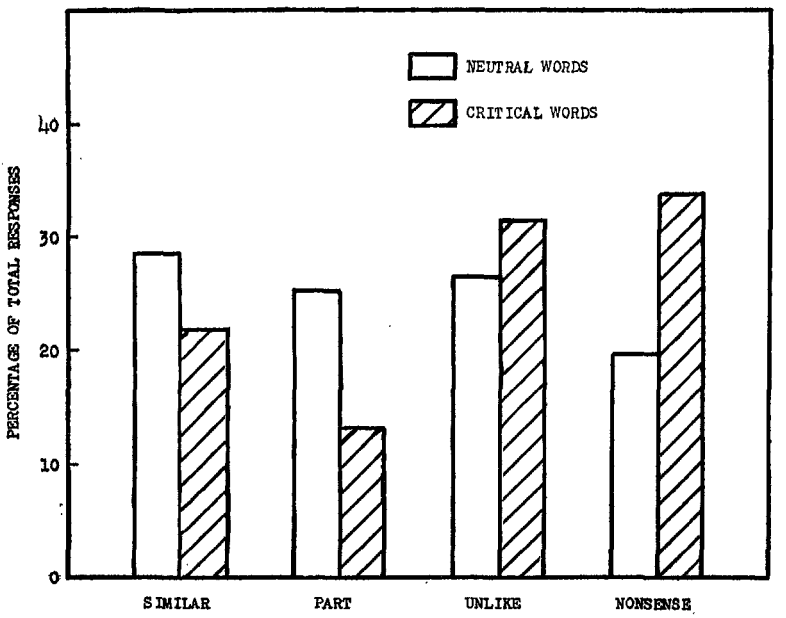

FIG. 3. Percentage frequencies with which hypotheses to neutral and critical stimulus words appeared in the response categories.

sponses which were similar to and those which were unlike the stimulus word failed to reveal any difference in frequency of occurrence to neutral and critical words. For this reason it was concluded that more detailed analysis of the content of responses would be unwarranted and would merely introduce an additional degree of arbitrariness to the scoring of the pre-recognition guesses.

The subjects were queried following the experimental session as to whether they had reported their perceptions of the words promptly and accurately. In all cases, they assured the experimenters that, with the occasional exception of the first charged word, they did not withhold or modify their verbal response because of reluctance to say the word. In measuring the GSR, then, we apparently were recording genuine pre-recognition reactions to the stimulus words.

IMPLICATIONS FOR PERCEPTUAL THEORY

Armed with the findings thus far reported, we can readdress ourselves to the problem of "discrimination without awareness," to employ a term used by J. G. Miller (8). It seems clear that emotional reactivity, as measured by the galvanic skin response, is an accompaniment of perceptual defense. The existence of such a state of affairs has previously been suggested by H. A. Murray who states that ". . . certain features of the object which the subject does not consciously perceive are nevertheless physically affecting his body, and though he may be unable to report upon these internal happenings, they are nevertheless affecting his conscious appraisal of the object" (9, 312). Although Murray was speaking without laboratory evidence, his phrasing of the matter in terms of emotional conditioning is essentially correct.

TABLE 3

CHI-SQUARE TEST OF INDEPENDENCE BETWEEN STIMULUS WORDS AND RESPONSE CATEGORIES

Theoretical frequencies are in parentheses.

	Neutral	Critical	
Similar	89 (76.36)	93 (105.64)	182
Part	79 (57.06)	57 (78.94)	136
Unlike	83 (91.89)	136 (127.11)	219
Nonsense	62 (87.69)	147 (121.31)	209
	313	433	746

$x^2 = 31.26$. $P < .01$.

Early in life, most individuals learn that words like "whore" and "bitch" are socially taboo. Since the use of such words by the child will generally result in chastisement by the parent, a conditioned emotional reaction to these verbal symbols is soon established. This pattern of conditioned emotional response may be considered one of fear or anxiety aroused by symbols having sexual, excretory, or otherwise unpleasant or "immoral" connotations. Despite the fact that these words may be employed frequently at a later age, especially when communicating with members of one's own sex, the early emotional reaction persists, as revealed by the GSR, even when overt signs of anxiety or embarrassment are not observable.

Despite evidence of unconscious emotional arousal, perceptual defense against these anxiety-arousing symbols is still accomplished, as witnessed by the heightened limens of our observers when they were confronted with the charged words. This poses a problem for neurophysiological explanation

which cannot be answered here. However, we might consider two possibilities: Is the galvanic skin response preceding recognition of critical words a result of "feed-back" from the cortical association centers? Or is autonomic response initiated as the visual impulses reach the optic thalamus? In this case, one might conjecture that "rerouting" of afferent activity then takes place in the several visual centers so that cortical integration is effectively modified in the direction of phenomenological distortion. Evidence for this latter hypothesis is found in the greater frequency of *nonsense* and *unlike* hypotheses in response to the charged words. Formulation of these pre-recognition perceptions represents tactics apparently designed to delay accurate recognition of the stimulus word. The relatively higher frequency of *part* responses to the neutral words, on the other hand, may indicate effort toward recognition. That is, hypotheses based upon the neutral words are not as frequently distorted into *nonsense* or *structurally dissimilar* percepts, but are based upon whatever fractional discriminations the observer can make. Such an explanation, of course, is *ad hoc* and is presented as such.

It has been suggested to the author by Dr. Jerome Bruner that an alternative explanation of the findings might be summarized as follows: The "critical" words appear less frequently in print, and the increase in thresholds for these words is a function of their unfamiliarity. Greater "effort" is required to recognize them, and this, in turn, causes a heightened GSR to the critical words. Such an explanation, however, seems untenable on several grounds. First, the critical words are quite common in conversational usage despite their infrequent appearance in print. Second, there is no reason why unfamiliarity with these words should generate a preponderance of *nonsense* and *structurally unlike* hypotheses. Third, if GSR is merely an accompaniment of the increased effort expended in recognizing words which show higher thresholds, one should expect a correlation between mean GSR's and mean thresholds for both the neutral and critical words. Pearson *r*'s were calculated in each case. Correlations of $-.002$ and $+.077$ were obtained between mean GSR's and mean thresholds for the neutral and critical words respectively. Clearly, no significant relationship exists within the two groups of words between GSR and threshold. The results, therefore, may be viewed as reflecting genuine emotional response rather than mere autonomic reactivity accompanying effort at recognition.

Perceptual defense apparently is based upon conditioned avoidance of unpleasant or dangerous stimulus objects. That the individual actually discriminates the stimulus before he fully perceives it is evident in his increased emotionality before recognition. Inimical stimuli, then, may serve as cues which are appropriately evaluated by the central nervous system even though integration of the afferent impulses is such as to delay recognition, either through distortion or an increase in threshold or both. Almost without exception, the galvanic skin response of the observers was greatest following the final exposure of the critical words; that is the one during which recognition occurred. Clearly, the process of perceptual defense is designed to delay the greater anxiety that accompanies actual recognition of the stimulus. As suggested previously, some integrational processes may occur at the thalamic level which are effective in delaying or modifying cortical integration of visual patterns, while at the same time causing autonomic reaction to emotionally meaningful stimuli. The conditioned response, anxiety, is not entirely circumvented, even though perceptual avoidance is in some measure achieved.

SUMMARY

Recognition thresholds and galvanic skin responses during the pre-recognition period were measured for sixteen observers presented tachistoscopically with eleven neutral and seven emotionally-toned words, randomly ordered. The observers reacted with GSR's of significantly greater magnitude during the pre-recognition presentation of the critical words than they did before recognizing the neutral words. In addition, the observers displayed significantly higher thresholds of recognition for the critical than for the neutral words. Hypotheses made before recognition of the charged words were of such a nature as to indicate resistance to recognizing these words. The findings are interpreted as representing conditioned avoidance of verbal symbols having unpleasant meanings to the observer. The stimulus word serves as a cue to deeply imbedded anxiety which is revealed in autonomic reactivity as measured by the GSR. Avoidance of further anxiety is contemporaneously aroused in the form of perceptual defense against recognition of the stimulus object.

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