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SUBLIMINAL STIMULUS RECALL IN PERSONS
WHO ARE AND ARE NOT AWARE OF THE STIMULUS

A Thesis Submitted to the Graduate Division in Partial
Fulfillment of the Requirements for the
Degree of Master of Science

By
DeLayne Hudspeth

KANSAS STATE TEACHERS COLLEGE
Pittsburg, Kansas
June, 1958

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ABSTRACT

In this study an effort was made to determine, in part, if the fears of persons who have been decrying the use of subliminal stimulation in advertising were realistic.

Accepting the work of other scholars that this phase of perception does exist, this writer attempted to explore one facet of the problem with this hypothesis: persons who receive subliminal stimuli will be more apt to consciously recall the stimuli if they are aware that the stimuli are being given.

Research on this phase of subliminal perception was done with visual stimuli on students in beginning psychology courses. Given a pre-test and post-test to match nonsense syllables, the differences were compared on two pairs of randomly chosen syllables to see if there would be an increase in groups who did, and who did not know, that such stimuli were being given.

The experimental group who did not know they were receiving the stimuli showed no change in the number matched, matching two on the first set, and none on the second set for both the pre-test and the post-test.

The experimental group who did know they were receiving the stimulus matched one on the first set, and none on the second set for the pre-test, and matched ten on the first

set and one on the second set for the post-test. Furthermore, the subject who matched the second set on the post-test also matched the first set correctly.

Chi Square analysis revealed a significant difference at the one per cent level in response using subliminal stimulus on students who were aware that the stimulus was being shown.

This study therefore, indicated that a greater proportion of persons from similar populations will be able to consciously recall the subliminal stimulus if they are aware that the stimulus is being used than if they are not aware of such stimulation.

CHAPTER I

INTRODUCTION

Purpose and Background for the Study

The phase of awareness that is called "subliminal perception" has only recently made headlines and become an item of concern to legislators, advertisers, and the general public. This occurred primarily because of James Vicary, a psychologist who developed this field commercially for the purpose of "reminding" the "willing" about some article which they may want to buy.¹

Research in the field of subliminal perception was done as early as 1900 when Knight Dunlap published the results of an experiment in which he used Muller-Lyer Illusion and substituted the visible arrow marks with lines too small to be seen at a conscious level.² Other work followed both with vision and with audio signals which seems to have culminated in its "practical" use of helping merchants sell their wares.

The purpose of this paper then was to investigate one phase of the overall problem of perception below the

¹Marya Mannes, "Ain't Nobody Here But Us Commercials," The Reporter, XVII (October 17, 1957), 36.

²Knight Dunlap, (work not cited), Psychological Review, VII (1900), 435, cited by Joseph Bressler, "Illusion in the Case of Subliminal Visual Stimulation," The Journal of General Psychology, V (1931), 244.

conscious level. Since today's debate over subliminal advertising concerns for the most part the fear that unscrupulous persons will try to create desires where no normal desire exists, we must look at the procedure used in a commercial venture of this kind.

First, a stimulus must be presented in such a way that the person will receive it enough times for it to be effective. While other ways may be developed, at present the most practical way to do this is visually. This can be done with a wave length that is not consciously seen, such as ultra-violet or infra-red light, or the stimulus may be of such duration or intensity that it is not consciously seen. To date a combination of the last two, that of short duration and low intensity, have been most often used. The writer felt, then, that a pertinent study should also use this combination.

Second, this stimulation must in some way influence the subject so that he moves in the direction the operator desires. This usually means action of some kind: buying, voting, moving, thinking, etc. If the subject is already willing to agree with the idea presented, then some psychologists feel such stimulation will be effective. If, however, the subject does not agree with the idea presented, then "There is no better chance of putting something over on this preconscious mind than there is of hoodwinking his conscious mind."³

³Wesley S. Griswold, "TV's New Trick: Hidden Commercials," Popular Science, CLXXII (April, 1958), 97.

Statement of the Problem

Of major interest is the area where, for various reasons we want to give an idea subconsciously, but want the subject to have when the occasion arises a conscious recall of this stimulus. Does this occur best when the subject is aware that stimulation is occurring, or when he is totally unaware? It was toward this understanding that this paper was written.

Three null hypotheses were to be tested in the study. The first was that there would not be a significant difference between the number of persons who chose the correct stimulus words either before or after being subjected to a motion picture which, for two groups, contained no subliminal stimulus words, but for two other groups contained the stimulus, one group in each category not being aware of the presence of the subliminal stimulus. The second major null hypothesis to be tested was that there would not be a significant difference between either of the control groups, with one of the control groups knowing that they were receiving the stimuli, and the other not knowing they were receiving subliminal stimuli.

The third null hypothesis to be tested in the study was that there would not be a significant difference between either of the experimental groups, one of the experimental groups not knowing that they were receiving subliminal stimuli, and the other experimental group knowing that they were receiving the subliminal stimuli.

Research Design

Two experimental and two control groups were studied. All four groups were administered the same pre-test using identical instructions. The four groups used will be referred to as Group A, receiving pre-test, film, and post-test; Group B, receiving pre-test, film, and subliminal stimulus, and post-test; Group C, receiving pretest, instructions as to what the test was attempting to prove, film and post-test; and Group D, receiving pre-test, instructions as to the nature of the test, film and subliminal stimulation, and post-test.

Selection of the Stimulus. The nonsense syllables used to make two groups of twelve, were taken from a psychology workbook which was originally intended for use in learning experiments.⁴ These were selected without design, taking care to avoid making the lists with too many similar-sounding combinations. While trained subjects soon learn to avoid looking for associations connected with nonsense syllables, the naive subject will relate even the most remote and abstract association.⁵ It requires but a glance at any set of nonsense syllables before it becomes apparent that persons can usually find something out of their past

⁴John B. Morgan, Workbook in Psychology (New York: Forrar and Rinehart, Inc., 1941), 68.

⁵J. A. Glaze, "The Association Value of Non-sense Syllables," Journal of Genetic Psychology, XXXV (1928), 266.

experience to associate with one or more syllables. Not only does the problem of association matching occur, but also persons tend to match by sight and sound as well.

The selection of the two sets of nonsense syllables that were to be used as stimuli was accomplished by numbering all those matches which occurred only as frequently as chance⁶ allowed with Group A's pre-test, numbering them on slips of paper, and having a disinterested person draw the number that was to be used.

Selection of Groups. The four groups used consisted of four classes of students taking a beginning psychology course at Kansas State Teachers College, Pittsburg, Kansas. Table I shows the composition of the groups by number, age, and sex.

TABLE I

BREAKDOWN OF GROUPS FOR AGE AND SEX

Group	Number	Male	Female	Age Range	Mean Age
A	42	34	8	18-28	20.48
B	39	33	6	18-30	20.51
C	44	26	18	17-42	20.34
D	55	40	15	18-32	20.48
Total	180	133	47	17-42	20.45

⁶The chance of single pairs being matched within Group A was 3.5 times.

The number of subjects within the various groups ranged from thirty-nine to fifty-five in Groups B and D respectively. The ages ranged from seventeen to forty-two, the median age being 20.45. The sexes of the subjects were divided into 133 males and 47 females.

The sampling method was roughly systematic, i.e., it was assumed that the groups were fairly representative of other lower division students taking a first course in psychology at this institution. Personal characteristics of the groups which were supposed to affect perceptions of subliminal stimuli⁷ were assumed to be randomly distributed in the groups. Other relevant variables were controlled by the experimental design, which is described below.

Procedure on Pre-test. The pre-test was given to the subjects at the beginning of a regular class period. Oral instructions were approximately as follows:

You have in front of you two lists of nonsense syllables. Nonsense syllables are used in psychological tests because they are felt to have little prior association. In other words, these are used because they don't make sense and you will be less inclined to be attracted to one more than another. This is the type of test where you could, for example, tell if males were more apt to match the hard sounds like k's and c's than the soft ones. What I want you to do is to take any nonsense syllable from Column B (see Figure 1) and match it with whichever nonsense syllable in Column A you think it goes with best. There are no right or wrong answers.

If questions were asked, the examiner would reply, "You

⁷Infra, Ch. II.

may or may not match them by the way they sound. Put whichever you choose at the bottom with one at the top--however you think is best." The pre-test was always given on a day preceding the showing of the film and stimulus, when it was used.

Setting and Equipment. A few ideas about the logic of using the particular instruments that were used in the experiment may be pertinent. With this, as with most experiments, the materials at hand, both in subjects to use, and in the details of equipment, determined limitations of the study. The researcher was, however, able to follow closely Wundt's requirements⁸ for a satisfactory tachistoscope. The duration of the chosen flash at 1/220 of a second was too fast to be seen while the pre- and post-field exposure were nearly the same intensity.⁹ The timing of the flash could not be made to coincide with the shutter opening of the film projector and, as Vicary demonstrated, this could at times enable persons to "see" the subliminal stimulus if they are consciously looking for it to occur.¹⁰ The writer felt, however, that both experimental groups had an equal chance to see the subliminal flash during the time that the shutter of the movie projector was closed; therefore, both groups would be equally affected.

Except for Group A, who saw the movie and were tested

⁸Infra, p. 20.

⁹Infra, p. 19

¹⁰Infra, p. 43.

in their classroom, all experimentation was conducted in a room located in the Audio-Visual Center. Here, the presence of the strobe projector would arouse less curiosity in the group who was not to know they were receiving stimuli. This also enabled the experimenter to place the counter (see Figure 2) in a separate control room where the noise it made in counting would not distract the subjects. The sound of the counter and strobe unit operation was carefully deadened in order to eliminate the possibility that hearing the mechanical noise of the unit in operation would increase visual perceptive ability. With the strobe lens capped and the projection unit and sound amplifier running, as when a movie is shown, an interested observer six feet from the projector could not tell when the strobe unit was operating. The movie projector and strobe projection unit were both placed on a forty-two inch high projector stand at the rear of the room.

Movie Used. The movie shown was entitled "Conflict," an eighteen minute black and white movie illustrating four basic types of conflict resulting from typical problems of high school and college students. The film showed how the same type of conflict could be induced into rats under laboratory controlled situations.¹¹

¹¹"Conflict," Educational Film Guide, (New York: Annual Supplement by H. W. Wilson Co., 1957).

This movie was used because it pertained to what most of the classes were studying at the time. The writer and the instructors were of the opinion that the students thought it an interesting movie.

Film Procedure. Procedures for showing the movie to Groups A and B consisted of (1) showing the film immediately after class roll had been taken, (2) giving the subjects instructions similar to those of the pre-test, and (3) administration of the post-test.

Procedures for Groups C and D, who were to know that they were receiving the subliminal stimulus during the movie, consisted of (1) instructions for the film as follows:

You lucky people. You get to take the nonsense syllable test again. This time though, you get to know why you're taking this test. I'm doing my experiment in a field called subliminal perception. Some of you may have read about the commercial use of this called "subliminal advertising" where they flash on the screen during a movie, "Buy popcorn," and "Drink Coca Cola."

What I'm doing is to flash on the screen two sets of these nonsense syllables, which were picked at random, in hopes that you will be able to match them at the end of the movie when you will be taking this test again. In other words, from here to here (pointing to areas on the screen) will be the picture. In this area, from about here to here, will be shown two sets of the same syllables which you matched before. Now these are going to be flashed at about 1/1000 of a second which is much too fast for you to see, but it is my hope that subconsciously, you will be able to discriminate which nonsense syllables they were.

I might add that these were not necessarily chosen because they seemed the same either by sight or because they match because of the way they sounded. There were very few of you that chose these

matchings in the pre-test, and those of you who did don't know who you are. Any questions? (In both cases there were no questions.) All right, enjoy the movie.

(2), showing of the movie (along with the subliminal stimulus), and (3), administration of the post-test.

Scope and Limitations of the Study

Any study dealing with this part of man's mind we call "unconscious" has numerous obstacles with which to contend. Not the least of these is being able to record the effects of subliminal perception. If it were possible to pry into the unconscious minds of the subjects one might well find that all of them perceived the flashes containing the stimulus words. Since even such a tool as hypnosis was not practical in this situation, the study was limited by the number of subjects who perceived and who reported their recall of such stimulation. This researcher made no attempt to measure the motivation of either those who did or did not have the right pairs matched. This is not to deny, however, the very pertinent argument that motivation and the results of studies similar to this go hand in hand.

While the scope of this study seemed narrow by one standard, it does raise questions for which further study is needed. Furthermore, this study was done with an accessible sample which may not necessarily represent a population similar to those in which advertisers are interested. Also, it may be that the relationships between

personal values and the ability to report one's recall needs to be studied. It may be that meaningful material would show a different result from that shown by the supposedly meaningless nonsense syllables. In this study the writer presumed that such meaning as isolated nonsense syllables would have for individuals would be (1), negligible in the size groups used, and (2), be the same from pre-test to post-test, thereby making little difference in overall results.

Every experimenter faces the problem of measuring or controlling variables in the experiment which may, or may not, play an important part in his study. This is especially true of those variables which do not play a direct part, or have a direct connection to the problem being studied. Such a limitation in any study can only be recognized and taken into consideration when the results of the study are analyzed.

CHAPTER II

STUDIES IN THE FIELD OF SUBLIMINAL PERCEPTION AND RELATED AREAS

In any type of study it becomes necessary for a certain amount of foundation to be laid before attempting research concerning specific material. The writer hopes that this chapter may supply the foundation and other basic information useful in the explanation and interpretation of the present hypothesis. Since terminology is an integral part of interpretation a few of the ambiguous and technical words merit clarification as to their psychological meaning, especially as they are used in this paper.

Definition of Terms

Subliminal, as defined by Webster refers to that (a) below the threshold, i.e., too weak to arouse sensation; (b) too small to be perceived; (c) existing or occurring outside of the personal consciousness; or (d) the subconscious.¹ The New Dictionary of Psychology, however, interprets subliminal as that which does not elicit a response.² Throughout this

¹Webster's New International Dictionary of English Language (Springfield, Mass.: G. and C. Merriam Company, 1949), p. 2511.

²Phillip Lawrence Harriman, The New Dictionary of Psychology (New York: Philosophical Library, Inc., 1947), p. 316.

paper, when the term subliminal is used the writer is referring to Webster's (a) definition: below the threshold of sensation or awareness. Generally this is limited to the visual threshold rather than other sensory receptors.

Subliminal projection may be described in terms of an analogy: there are sounds of such high frequency that the human ear cannot hear them, yet tests have proved their existence and penetration of some area of the human consciousness. Likewise, subliminal projection projects images at such a speed and of such faint luminosity that the viewer is not aware he has seen them,³ yet many of the reports cited in this paper suggest their stimulation upon the unconscious area of the brain.

Supraliminal differs from subliminal in that it lies above the threshold of consciousness or within the conscious.⁴ The threshold or limen, is a term which was first used by Herbart in 1816 to denote the point at which ideas rise into consciousness. Later, Fechner gave the term its modern denotation by applying Herbart's concept to measurements of the magnitude of stimuli which elicit sensations.⁵ Three types of thresholds are distinguished: (a) absolute threshold or stimulus threshold which signifies the lower

³Marya Mannes, "Ain't Nobody Here But Us Commercials," The Reporter, XVII (October 17, 1957), 36.

⁴Webster's New International Dictionary of English Language, op. cit., p. 2536.

⁵Harriman, op. cit., p. 332.

limit of stimulus magnitude that arouses visual sensation from the eye; (b) difference threshold or the smallest difference between two stimuli that gives a difference of response; and (c) terminal threshold--the upper limit of the stimulus, beyond which no further increase in specific response can be obtained.⁶ Any reference to threshold by the writer means absolute threshold as defined by Webster.

By nonsense syllable the writer refers to a combination of letters, vowels and/or consonants, which do not form any known English word. Perception is limited to the visual sense in its usage unless otherwise noted. The types of equipment frequently mentioned in studies of this nature include tachistoscope and Muller-Lyer Illusion.

The tachistoscope is an apparatus used for the visual presentation of perceptual material for an extremely short time, so as to afford a single glance. There are various forms used, ranging from the simplest, which depends upon a falling screen or shutter, with an aperture which momentarily discloses the material being presented, to the more complex which are incorporated into film projectors.⁷ Throughout this paper, reference to the tachistoscope does not denote any specific type as it was used with the earliest experiments and is still being used in a more complex form.

⁶Webster's New International Dictionary of English Language, op. cit., p. 2635.

⁷James Dreyer, A Dictionary of Psychology (Baltimore: Penguin Books, Inc., 1956), p. 287.

The Muller-Lyer Illusion is one of the geometrical optical illusions generally known as the "Arrow-head and Feather" illusion. These present the illusion of length or distance in which two objectively equal lines appear unequal when the other lines are drawn, making acute angles at the ends of one and obtuse angles at the ends of another.⁸

Fundamentals and Factors of Perception

The phenomenon of perception involves stimulus-response mechanism which develops along structural lines broadly limited by the conditions of physical excitation. Depending upon these conditions of physical excitation, stages of visual awareness develop. The first stage of perception or the vague awareness that there is something present in the visual field, becomes differentiated into a detailed and comprehensible pattern. There is a general shaping which appears to all individuals at all times. Peculiar channels are laid down through the previous development of similar percepts in past experiences. Random influence of mood, attitude, mental and physiological efficiency, etc., of the moment add to this pattern, while, in experimental situations, the particular and narrowly defined course structured by experimental conditions and instructions give dimension to the pattern. Thus there develops this feeling of awareness.⁹

⁸Ibid., p. 175.

⁹M. D. Vernon, Visual Perception (Cambridge: At the University Press, 1937), p. 214.

The second stage connects some kind of objectivity with the visual awareness while the third stage results in full recognition of form characteristics of the field or of the relevant and important parts of it. With the fourth stage comes understanding of the meaning and thus an integration of the visual stimulus with past experiences.¹⁰

Vernon mentioned "random influences" of perception. Besides the nature of visual acuity within the individual there are other factors which tend to aid or limit the initial stage of awareness and the following stages. One of these factors is familiarity with the visual stimulus. According to Vernon, "Familiarity with the experimental material, or with some particular aspect or part of it, may modify not only the phenomenal extent of the percept, but also its phenomenal nature."¹¹ Foreknowledge or prior usage of the stimulus material increases the familiarity. Thus any type of material used to test perception which is familiar to the subject because of usage will tend to lower thresholds of recognition.¹² This, of course, is the main reason the writer has chosen nonsense syllables as a stimulus.

¹⁰Ibid., pp. 8-9.

¹¹Ibid., p. 52.

¹²Richard L. Solomon and Leo Postman, "Frequency of Usage as a Determinant of Recognition Threshold for Words," Journal of Experimental Psychology, XLIII (January, 1952), 200.

The individual threshold level of the subjects would naturally tend to vary to some tolerable extent. On the basis of Solomon and Postman's work, any type of meaningful material would increase this variance and lower the experimental control.

Feingold has pointed out that the subject may become aware of the presence of something, but it remains unfamiliar. Without some sort of familiarity the stimulus remains in the first stage of awareness but is not remembered in its exact position or essential nature. It may present itself as a vague feeling within the subject that something is different or unfamiliar within the total perception.¹³

Foreknowledge is another factor of "random influence." In an experiment performed by Lacy, Lewinger, and Adamson using taboo and non-taboo words as stimuli, it was demonstrated clearly that, "The effect of foreknowledge serves to reduce recognition thresholds more rapidly and more markedly in the case of taboo stimuli."¹⁴ Because the subjects in this experiment were aware of the stimuli being present they were able to discriminate early between the taboo and non-taboo words.

In another experiment thresholds of recognition for

¹³Vernon, op. cit., p. 51.

¹⁴0. W. Lacy, Natalie Lewinger, and John F. Adamson, "Foreknowledge as a Factor Affecting Perceptual Defense and Alertness," Journal of Experimental Psychology, XLV (January, 1953), p. 173.

words varying in length and frequency were determined for twenty subjects. Despite individual differences in slope and level of perceptual acuity, regression equations determined for each subject indicated that duration thresholds for neutrally-toned words are a decreasing function of word frequency and an increasing function of word length. In other words, the relationship seems to be one in which an increase in frequency lowers recognition thresholds more for long words than for short words. On the other hand, an increase in word length raises thresholds more strikingly for low frequency words than for high frequency words.¹⁵ Thus the third factor of "random influence" is word length.

Cattell, in his well-known experiments, found that during a tachistoscope exposure of one-thousandth of a second the average reader could perceive three to four single letters or digits, two disconnected words containing up to twelve letters, or a sentence of four words. The increase was due in part, however, to the fact that the letters in the words were grouped together, and the words in sentences. Cattell feels that grouping is as important a factor as length of word. He went on to show that the number of letters perceived at a single glance when grouped as nonsense syllables is less

¹⁵Elliott McGinnes, Patrick B. Comer, and Oliver W. Lacy, "Visual Recognition Thresholds as a Function of Word Length and Word Frequency," Journal of Experimental Psychology, XLIV (August, 1952), 69.

than the number perceived when grouped as words; if the words are familiar, the number perceived will be larger than if they are unfamiliar. Thus it is the familiar act of reading and understanding words and sentences which enables the observer to note and report the larger number of letters.¹⁶ On the basis of Cattell's findings the writer chose nonsense syllables of three letters to insure maximum recognition with a minimum of association.

A fourth factor is that of personal value of selectivity. "What one sees, what one observes, is inevitably what one elects from a near infinitude of potential percepts. Perceptual selection depends not only upon the 'primary determinants of attention' but is also a servant of one's interests, needs, and values."¹⁷ The subject responds in terms of objects of stimuli which are valuable to him even when such objects are absent from his immediate environment. These processes of selectivity must be considered in any perceptual theory which lays claim to comprehensiveness.¹⁸ Any type of experimentation which uses meaningful material as a stimulus must take into consideration the subject's predisposition to respond to some values more readily than to others and not to ascribe

¹⁶Vernon, op. cit., pp. 49-50.

¹⁷Leo Postman, Jerome S. Bruner, and Elliott McGinnes, "Personal Values as Selective Factors in Perception," Journal of Abnormal and Social Psychology, XLIII (1948), 142.

¹⁸Ibid., p. 154.

these differences merely to "chance fluctuations in the measurement of the span of attention."¹⁹

In another experiment done by Postman on personal values, the following findings are reported: (1) duration thresholds for frequent words are significantly lower than for infrequent words; (2) for frequent words there is little relationship between value rank and duration threshold although there is some slight trend in the expected direction; and (3) for frequent words the relation between value rank and duration threshold is much more pronounced, and the difference between thresholds in the highest and lowest value areas reaches statistical significance.²⁰ Postman believes personal values to be a significant variable in both perceptual threshold of the subject and his ability to recall the projected stimuli.²¹

Lazarus and McCleary contend that, if a subject is capable of recognizing some words faster than others due to personal values, then it seems necessary to postulate that the subject is somehow identifying the significance of the different words prior to his reported recognition of them.²²

¹⁹Ibid., p. 152.

²⁰Leo Postman and Bertram H. Schneider, "Personal Values, Visual Recognition, and Recall," Psychological Review, LVIII (May, 1951), 275.

²¹Loc. cit.

²²Richard S. Lazarus and Robert McCleary, "Automatic Discrimination Without Awareness: An Interim Report," Journal of Personality, XVIII (September, 1949-June, 1950), 171.

Illumination and speed become the fifth and sixth factors of stimulus influence. Since these are physical in nature they are no longer considered "random" influences, but rather as factors which must be taken into account when stimulation is to be expected.

Wundt has described some of the requirements necessary for the satisfactory tachistoscope. The duration of the exposure of the stimulus material must be short, to avoid eye movements and wandering of attention; moreover, it must be the same for all parts of the stimulus, and all parts should be equally clear and bright. There must be a fixation point to show where the stimulus will appear and ensure that the latter is in focus and at the center of vision. The retina must be adapted to the same light intensity as that of the stimulus; that is to say, the brightness of the pre-exposure and exposure fields must be equal. The post-exposure fields should also be of approximately equal brightness to avoid persistent after-images.²³

If very short periods of exposure are given to the subject, the perceptual process can sometimes be completely arrested at one of his intermediate stages.²⁴ With exposures of geometrical figures of 1/1000 second, Brigden found that

²³W. Wundt, Human and Animal Psychology: Lecture 16, (London: Swan Sonnenschein, 1901), as quoted by M. D. Vernon, Visual Perception (Cambridge: At the University Press, 1937), 217.

²⁴Supra, p. 14.

the perception might reach only the second stage of perception, with a gross differentiation of general outline and shape but no attempt made for seeing detail. However, with an increase of exposure from 1/100 of a second all the way to 1/5 of a second to two seconds, the accuracy of perception was actually decreased, for subjects usually attempt, unsuccessfully, to perceive further detail in order to develop the specific object and the whole of the object is less accurately perceived.²⁵ The perceptual flashes or exposures are influenced by both the amount of light used and the field illumination. For instance, the retinal effects of an exposure of 30/1000 of a second with the pre-exposure, exposure, and post-exposure fields equally bright, is equivalent to an exposure of 1/1000 of a second with the pre-exposure and post-exposure fields black. In other words, there will be a strong after-image, so that if this is to be avoided, the pre- and post-exposure fields must be approximately of the same brightness as the exposure field.²⁶ If the pre- and post-exposure fields are dark, and the illumination of the exposed field sufficiently strong, perception of a sort can take place in a fraction of one 1/1000 of a second.²⁷

Tehrer is more explicit in the statement that the number of exposures necessary for perception of line figures of varying complexity decreases steadily as the time of exposure

²⁵Vernon, op. cit., p. 12.

²⁶Ibid., p. 217.

²⁷Ibid., p. 12.

increases from 40/1000 of a second to 680/1000 of a second. Carl states that with simple pictorial material, the generalized cognition act may be completed with an exposure as short as 27/1000 of a second. Zieler obtained tolerably complete perception of letters and short easy words in an exposure of 10/1000 of a second.²⁸

Some of the most extensive research with these factors was done by King, Landis, and Zubin. They projected geometrical figures, (circle, square, and triangle) upon a glass screen and obscured their visibility by a flood of higher illumination. The subjects were then asked to identify the figure being shown. This illustrates another method of achieving subliminal projection. The summation of their work lends information relevant to the factor of illumination.

No one experimental factor (or interaction of factors) was found to be present which might account for the observed success. The degree of accuracy held throughout the visual range was investigated. No relation between the intensity of the subliminal stimuli and the accuracy of responses was found; forms were identified equally well at levels just below the threshold (10 to 60 foot candles). The form of the stimuli themselves did not effect the accuracy of the response, though the triangle was most often correctly identified.

The introduction of a red filter, originally intended to pass only deep red, allowing central cone vision but offering only minimal stimulation to the rods and perifoveal vision, completely changed the nature of the results, raising the accuracy of response to the order of 50 per cent as compared to 33 per cent expected by chance. Cues of a symbolic sort which

²⁸Loc. cit.

aid the S, and which did not appear under daylight vision, were identified.²⁹

A seventh and final factor to be discussed concerns visual acuity of the individual subjects used. The writer is interested in that phase or spectra of perception which will be used in advertising where no exceptions or allowances are made for individual visual corrections. It is to be noted, however, that on the basis of Chapin's research that the "Very young and very old persons do not have as good acuity as those between the ages of fifteen and fifty."³⁰ It must be noted then that any selection of subjects from a specific range of ages will show some discrimination by the nature of the groups used.

Measurement of Subliminal Perception

Once it has been established that subliminal stimuli are being received by the subjects, the major concern becomes that of providing some way for these subjects to indicate that such a phenomenon has taken place. This is often very difficult due to the nature of the unconscious. Because these stimuli have been administered beneath the threshold of

²⁹H. E. King, Carney Landis, and Joseph Zubin, "Visual Subliminal Perception Where a Figure is Obscured by the Illumination of the Ground," Journal of Experimental Psychology, XXXIV (1944), 68-69.

³⁰Alphonse Chapins, "Relationships Between Age, Visual Acuity and Color Vision," Human Biology, XXII (1950) as cited in Psychological Abstracts, XXIV (1950), 577.

awareness it follows that conscious response may not always be exhibited. A conscious response, however, is what is desired. Many experiments have measured the response to subliminal stimulation by physical reactions such as GSR, (which will be discussed later).³¹ Other experiments tend to support the hypothesis that pure subliminal stimulation (that of which the viewer is completely unaware) will not elicit a conscious response, at least in a verbal sense. Prince overcame this obstacle by inducing verbal responses through hypnosis. In one typical experiment several different objects were successively brought into the field of vision, but so far toward the periphery that they could not be sufficiently clearly seen to be identified. In hypnosis they were accurately described, showing the conservation of perceptions that did not enter the vivid awareness or clear perception of the subject. The point he stresses is simply that subconscious perceptions which never enter the awareness of the personal consciousness may be conserved by freeing the subconscious.³² The parallel is drawn between hypnotic suggestion and subliminal suggestion. Both involve the same basic principles. By transferring Prince's theory to any type of subconscious suggestion we can assume that

³¹Infra, p. 34.

³²Morton Prince, The Unconscious, The Fundamentals of Human Personality Normal and Abnormal (New York: The Macmillan Company, 1929), p. 57.

ideas or stimuli become dormant within the mind. Later, the idea arises and the subject puts the idea into execution. In other words, some conscious stimulation is needed to stimulate the unconscious suggestion. Take, for instance, the experiment performed by Vicary with flashes of EAT POPCORN and DRINK COCA COLA. It is reported that though totally unaware of this, patrons of a movie house did respond by buying popcorn and "coke" to the extent of 57.5 per cent to 18.8 per cent more, respectively.³³ As in post-hypnotic suggestion it was suggested to these patrons that they should buy "coke" or popcorn. Later, walking past the stand, smelling the popcorn, or many other conscious stimuli prompted the activation of these suggestions.

Here, again, our first factor of "random influence"³⁴ comes into the picture. It has been proved that familiarity with the stimulus is an important determinant of response given.³⁵ In the Vicary experiment cited above, the Coca Cola and popcorn stimuli were items which are highly familiar to persons attending picture shows; thus the tremendous increase of sales of those two items. It is doubtful that if some unfamiliar item were flashed on the screen the persons subjected to the flashes would respond as readily as was done

³³"Ads You'll Never See," Business Week, September, 1957, p. 30.

³⁴Supra, p. 15.

³⁵Postman-Schneider, op. cit., p. 275.

to the familiar items.

Retention and recall of material is not only contingent upon ability to consciously respond, and the familiarity of the subject with the stimulus, but also upon the subject's attitude or his will to learn. Particular adjustments of this attitude show themselves in highly differentiated fashions. It was found, for instance, that if the subject made it his intention to get the meaning as distinctly as possible (when words were used as the stimulus) he obtained a much better reproduction. The following experiment was set up to demonstrate this theory.

Twenty words were written on the board. A class of psychology students was asked to copy them on the left hand edge of their papers. When they had finished, they were instructed to fold that portion of the paper under so that no words were visible, and then they were asked to rewrite as many of the words as they could remember. The experiment was then repeated using a different list of words. This time the students expected to be asked to recall the words. Two days or precisely forty-eight hours after the first impression, the students were again asked to write down all the words of either list that they could recall.

In summing up the results, Peterson says,

It is important to note that the gain in delayed reproduction is considerably greater than in immediate reproduction, being about 50 per cent as against 14 to 30 per cent. It is well known

that unassociated content, such as nonsense syllables, fades from the mind more rapidly at first than meaningful or associated material. It is natural, therefore, to expect a greater gain with the active attitude, as we actually obtained in the delayed reproduction than in the immediate reproduction."³⁶

The additional stimulus in the experiment cited above that brought about the will to learn was the statement to the students before giving the active or second list of words that they would be asked to reproduce the words. This statement produces a much more definite response set than was possible in connection with the passive or first list, and thereby made possible certain definite associations. This same method was employed in the writer's experimentation in an adapted form. Groups A and B were functioning with very little will to learn, whereas it is hoped that Groups C and D were aided in their retention or recall of material by this induced will, i.e., instructions by the examiner that a subliminal stimulus would be flashed and that they would be asked to recall, if possible, the stimulus. The actual way in which this will to learn functions is not clearly understood other than it does tend to increase retention and recall.³⁷

³⁶Joseph Peterson, "The Effect of Attitude on Immediate and Delayed Reproduction: A Class Experiment," Journal of Educational Psychology, VII (1916), 527.

³⁷Ibid., p. 532.

Nonsense Syllables

Leaving the science of perception for awhile, something needs to be said concerning the validity of the use of nonsense syllables in this experiment. They were chosen in order to keep as constant as possible the variables of the "random influences," such as association, familiarity, meaningfulness or personal value, foreknowledge, and frequency of usage. While nonsense syllables are of definite advantage in these respects they are of disadvantage for similar reasons. One cannot expect as good as results as might have been obtained had these random influences been held at a maximum rather than to a minimum. It was felt by the writer, however, that there had been sufficient experimentation done under the maximum conditions, and what was hoped to be achieved here was not an experiment with controlled subjects, but one which more nearly simulated the general population and the conditions under which they would be subjected to subliminal projection should it ever become a part of the advertising business.

The following quotation from Clark L. Hull, is an important key to the understanding of the meaningfulness of nonsense syllables:

Most experimental studies of learning and memory in which nonsense syllables are employed are quantitative in nature. This fact makes the relative ease of learning the individual nonsense syllable a matter of prime importance. It is through its indirect bearing on this important

question that the relative meaningfulness of the various nonsense syllables possesses significance, that a prior expectation being that the more meaningful syllables would be more easily memorized.

It requires but a glance through an ordinary set of nonsense syllables to make it clear that many such syllables do not conform strictly to the implied criterion of being without meaning. This result of casual observation has been substantiated experimentally by Glaze, who determined the association value of nonsense syllables."³⁸

In Glaze's experiment, he tested the association value of what is commonly known as nonsense syllables. It is well known that many of the so-called nonsense syllables lend themselves to some form of past association. Glaze prepared all of the nonsense syllables possible from the English language. The initial and final letters of a syllable were never the same, and his final list contained 2,019 syllables. His use of nonsense syllables fits the writer's definition.³⁹ It cannot be said or assumed that Glaze ended up with a list of real nonsense syllables, but rather he found 101 syllables to which none of his fifteen subjects replied with an associated word in the time limit allowed. What has meaning for one subject will not always have meaning for another. It is said that trained subjects soon learn to avoid looking for associations, and it is implied that naive subjects may look for meaning in anything or resort to some mnemonic device to

³⁸Clark L. Hull, "Meaningfulness of Nonsense Syllables," American Journal of Psychology, XLV (1933), 730.

³⁹Supra, p. 13.

help them over a difficulty. "With some confidence," Glaze states, "we may say that there are syllables relatively low in associations, and this should be gratifying to everyone employing so-called nonsense material."⁴⁰

Experimentation and Subliminal Advertising

The final part of this chapter deals directly with previous experimentation in the field of subliminal perception, conclusions drawn from these experiments, subliminal perception in the advertising field, and the public's reaction to advertiser's claims. It is hoped that through an understanding of the previous work done that readers will be better able to place the writer's work in its proper perspective within the vast area of subliminal perception.

Freud pointed out that people are aware in dreams of things they are only subconsciously aware of during the day. In 1917, Otto Poetzl seemed to confirm Freud's observations. Poetzl exposed landscape slides on a tachistoscope for 1/100 of a second and asked his subjects to tell what they saw. They reported that they didn't see anything but their dreams proved interesting. Some of the material in the dreams included details they had not consciously seen the day before in the landscape slides. In other words, information which registered without awareness was enlisted by whatever process

⁴⁰Arthur J. Glaze, "The Association Value of Non-Sense Syllables," Journal of Genetic Psychology, XXXV (1928), 260.

operates in the construction of dreams, and it was utilized in forming some of the dream content.⁴¹

Probably the best known and one of the earliest explorations done in this field was made by Knight Dunlap in 1900, the purpose of which was to discover whether subliminal visual stimuli had any effect on the judgment of distance. Dunlap used a modification of the well-known Muller-Lyer Illusion in which he replaced the visible wings at the ends of the line that was to be measured with wings of equal dimensions, but which, under the conditions of the experiment, were invisible to the observer. He assumed that if the invisible wings exercised any motive power at all, their effect upon the observer's judgment of distance could be measured by comparing his judgments of the length of the line with the wings with those of the length of a line without them. Thus, if the subliminal stimulus did motivate the response, the observer would judge the line bearing the wings to be longer than a line different from the first only in possessing wings. That is what he did find, but the differences were very small and resulted in Dunlap's exercising excessive caution in formulating his conclusions.⁴²

⁴¹Gay Talese, "Most Hidden Hidden Persuasion," New York Times, CVII (January 12, 1958), 22.

⁴²Knight Dunlap, (work not cited), Psychological Review, VII (1900), 435-453, as quoted by Joseph Bressler in "Illusion in the Case of Subliminal Visual Stimulation," The Journal of General Psychology, V (1931), 246.

In 1907 Titchener and Pyle repeated the experiment and found no difference. Bressler then followed with an experiment in which three slides bearing the subliminal arrows and slide 0 (plain bar) were presented in a mixed order until twenty-four judgments on each were taken. The subject was then asked to draw what he saw and invariably the drawing was an ordinary black line. The subjects also reported that they were guessing lines of different lengths. If Bressler's experiment proved his hypothesis, that the invisible arrows would exercise motive power, then the subjects would judge lines A, B, and C longer than 0. All the subjects but one judged thusly. Bressler says, "We may conclude therefore, that the arrows that were at all times invisible to the observers, nevertheless exercised sufficient power to act as an illusion motive and cause the subjects to misjudge the lengths of the line at the ends of which they were present."⁴³

Another early experimenter in this field is A. C. Williams. Williams' work concerned visual perception of three geometric figures; a circle, triangle and a square, similar to ESP cards. These were projected below the limen on a screen and according to the subjects, all responses given were guesses. The results showed that the entire stimulus object may be subliminal and yet be responded to adequately. Williams

⁴³Joseph Bressler, "Illusion in the Case of Subliminal Visual Stimulation," The Journal of General Psychology, V (1931), 245-250.

concludes the work with the emphatic statement that in order for subliminal perception to take place, the subject must know what stimuli are to be presented to him, and his possible responses must be limited to those corresponding to the stimuli, otherwise "no response would be made."⁴⁴ The following conclusions were drawn by Williams: (1) subliminal stimulation is frequently effective in eliciting an appropriate response; (2) there is a considerable stimulus intensity range below the limen where the same frequency of correct responses may be obtained; (3) an appropriate stimulus set must be given the subject in order for any response to be made; and (4) when no subliminal stimuli are presented the frequency of correct responses corresponds to what would be expected according to chance.⁴⁵

Since World War II, research along these lines has proceeded apace. In 1951, two researchers at the John Hopkins University, Richard Lazarus and Robert A. McCleary, reported an experiment which had convinced them of the existence of subliminal discrimination between words. They made up a group of nonsense words (to eliminate the factor of individual reactions to real words) and then flashed them on the screen slowly enough so that they could easily be seen. The subjects, who were students, were conditioned by giving

⁴⁴A. C. Williams, Jr., "Perception of Subliminal Visual Stimuli," Journal of Psychology, VI (1938), 197.

⁴⁵Loc. cit.

them electrical shocks immediately after certain of the words appeared. The final step was to flash the words so quickly that they could not be consciously seen and without the electrical shocks. In a significant number of cases, the researchers found the subjects reacting strongly to the words to which they had been conditioned in a way that could be measured with a galvanometer attached to the skin. The findings, although they have been modified by subsequent studies, never have been discredited. It was from the results of this study that Lazarus and McCleary coined the word "subception"--a process of autonomic discrimination in the absence of the ability to report conscious recognition.⁴⁶

Charles Eriksen argues that the experiment of Lazarus and McCleary did not contain the necessary operations and controls to permit an interpretation of their data in terms of discrimination without verbal awareness. He contends that such an interpretation requires the demonstration that the number of verbal responses available to the subject was sufficient to reflect all the discrimination he was capable of making. In other words, he feels that the ten nonsense syllables permitted the subjects as responses were not sufficient to determine the subject's verbal discrimination capacity. Another weakness

⁴⁶Richard S. Lazarus and Robert A. McCleary, "Automatic Discrimination Without Awareness: An Interim Report," Journal of Personality, XVII (September, 1949 - June, 1950), 171, as quoted by John Brooks, "The Little Ad That Isn't There," Consumer's Report, XXIII (January, 1958), 8.

he found was the partial correlation between the GSR and the verbal response. He feels there should be perfect correlation before conclusions can be drawn.⁴⁷

Lazarus' rejoinder to Eriksen states that it is not at all necessary to assume that the physiological response system of the organism is a more precise mirror of the physical stimuli than the verbal response system. His logical alternative is that the autonomic response system neglects the presence or absence of danger, i.e., the shock or non-shock consequences of the stimulus, even though the level of discrimination is not sharp enough to identify the specific components of the stimulus. He says, "I do not know whether it can be maintained that the autonomic system is a better reflector of the stimulus than the verbal response system. However, organisms unable to use language often seem able to discriminate some stimuli better than man, and the absence of a cerebrum may even result in facilitated discrimination."⁴⁸ Lazarus concludes that the nature of subception remains a theoretical question and that the conditions which define its operation could be clarified by further experimentation.

Voor's experiments, which were similar to Lazarus' and

⁴⁷Charles W. Eriksen, "Subception: Fact or Artifact?" Psychological Review, LXIII (January, 1956), 79-80.

⁴⁸Richard S. Lazarus, "Subception: Fact or Artifact? A Reply to Eriksen," Psychological Review, LXIII (September, 1956), 343-347.

McCleary's studies, submit the following conclusions: (1) there exists a definite relationship between the information received from a stimulus presentation and the ability to discriminate on the basis of the GSR; (2) when no information is gotten from the presentation, indicated by verbal recognition, below chance expectancy, the subception effect also fails to reach statistical significance; (3) there is no evidence of automatic discrimination WITHOUT awareness. Rather the GSR seems to be mediated by the partial recognition that the subject gets from the presentation; and (4) in regard to the theoretical problem of the nature of the perceptual process, the data of this experiment support the position which involves various stages of clarity.⁴⁹

Hoisington and Spencer investigated the hypothesis that when the subject has a general adjustment to perceive a certain class of familiar material for which stimulation is below perceptual threshold, perception will occur if an appropriate specific set is introduced. It was assumed that appropriate experimental instructions may arouse in the subject an adjustment of the same type as that aroused by increased stimulation. It was further assumed that the factors investigated in the experimental situation were the same as those which operate in normal perception of the

⁴⁹Joseph H. Voor, "Subliminal Perception and Subception," The Journal of Psychology, XLI (January-April, 1956), 458.

familiar. The first thresholds established were rarely found to be reliable. Each threshold had to be checked several times, during which, the reported threshold-distance gradually increased until the limit was reached. The subjects had to become fully adjusted to the task before perceptual acuity, as measured by ability to read words or letters with a general set, reached its maximum. The sixty subjects were asked to pick out a specific word from lists of words placed several inches beyond the point at which they reported they could read neither the letters nor the words. The results revealed the dependence of a completed perception on adjustive states of the organism. 50

In Smith's research he found that different psychopathological groups responded differently to subliminally projected materials. He presented two columns of material tachistoscopically. Eventually, column A was speeded up so that it reached the state of subliminal projection. With vague and almost meaningless material, the paranoid group perceived the reality context (column B) drastically influenced by A, and this varied from one individual to another. In a compulsive group the A process seemed to be isolated from B until A emerged as a correct, independent entity. With well structured precepts, such as column A consisting of

⁵⁰L. B. Hoisington and Carol Spencer, "Specific Set and the Perception of 'Subliminal' Material," The American Journal of Psychology, LXXI (March, 1958), 263-269.

words of feeling (happy and angry) and column B an emotionless face, it was interesting to note that the effect of subliminal stimulation (A) was not necessarily directly related to the conventional meaning of these words. That is to say ANGRY did not produce only angry expressions in the face but more often also, tense, anxious, serious, pensive, and similar expressions. The author, Gudmund Smith, felt that these results indicated that the early stages of a perceptual process included more varied possibilities than those related to the conscious, stabilized cognition, but that one had to consider the interaction, which could have or did take place between the subliminal process and the conscious thoughts about the face. Probably, these contributed to the modifications of meaning.⁵¹

If stimulus A is very novel, unusual or controversial, there is reason to believe that, in many individuals, other possibilities than the correct one will influence the B percept, or in other words, that the difference between sub and supraliminal conditions will be considerable. The same will be true of differences between individuals in the subliminal condition.⁵²

This experiment stimulates the thought that perhaps any type of subliminal projection which is superimposed on a complex field would reproduce the A and B series cited above. If this is possible, then quite often we should expect the B series, whether it be movie, TV show, or poster, to be

⁵¹Gudmund Smith, "Visual Perception: An Event Over Time," Psychological Review, LXIV (1957), 311.

⁵²Ibid., p. 312.

and the brightness of the home television screen would affect perception.⁵⁴

The basic equipment used for sprinkling television programs with invisible messages consists of a rectangular metal box about half the size of a standard table top television set. Its power unit, in a separate smaller container, runs on house current. The equipment is the electronic mixer, where printed information can be subtly stirred in with pictures. Inside the main Precon (a commercial name derived from the word preconscious) television cabinet, along with seventeen vacuum tubes and a photo multiplier, is a little flying-spot scanner and in front of it a small frame for holding the test to be scanned. This is printed on a transparent plastic slide on a three by four inch space.⁵⁵

Picture signals from image-orthicon tubes in the studio camera focused on live performances or from iconoscopes recording filmed scenes, pass into the Precon television apparatus on their way to the station's antenna. It takes 1/30 of a second for a cathode-ray tube to project one complete picture image on a television screen and in that time it has to scan the picture twice, each perusal taking 1/60 of a second. Inside the cabinet aided by a pulsed light, the printed message is superimposed on the incoming picture

⁵⁴"Ads You'll Never See," op. cit., p. 31.

⁵⁵Wesley S. Griswold, "TV's New Trick: Hidden Commercials," Popular Science, CLXXII (April, 1958), 96.

signals every 1/60 of a second. This rate can be varied as can the pulsed light intensity, which normally is less than one third as bright as that of the picture signals.⁵⁶

Professor Becker, an electronics engineer and physicist, who teaches experimental neurology at Tulane University, points out that if you suspect you are watching a Precon program, you can find out what the hidden message is by spreading the fingers of one hand and moving them rapidly up and down in front of your eyes. By varying the rate of this motion, you will be able to match the rate of the messages and thus be able to read them.⁵⁷

Dr. Corrigan, a former fighter pilot who is now a psychologist for the Douglas Aircraft Company, says:

We have found ample proof that it works, in exhaustive experiments at Tulane University that we have been conducting since 1950. In the course of finding that proof, we also became convinced that Precon technique of communication can't be dangerous. There is no possibility of brainwashing by means of Precon for each man is his own censor. His preconscious mind responds to Precon messages in complete accord with his likes and dislikes. There is no better chance of putting something over on his preconscious mind than there is of hoodwinking his conscious mind.⁵⁸

Together, Corrigan and Becker discovered people's built-in censorship. A test containing three different types of words was given. Words were typed as neutral, like stove; emotional, such as scream; and obscene words. In repeated trials, the speed at which each word was flashed was slowed

⁵⁶Loc. cit.

⁵⁷Loc. cit.

⁵⁸Ibid., p. 97.

down until the subject stated that he definitely had seen it. The results indicated, that due to individual censorship, the emotional and obscene words had to be shown two or three times slower than the neutral words before the subjects could recognize them. Further tests showed, they contended, that people could be taught preconsciously. These tests resembled the Lazarus-McCleary tests in which shock was attached to some words.⁵⁹ Corrigan and Becker's shocks were given with the neutral words. When the shocks were stopped, the subjects continued to react to the neutral words as they did when they received the shocks. They had learned without realizing it, to attribute a new and painful meaning to harmless words.⁶⁰ The response was the same in both experiments. Corrigan and Becker call it "preconscious learning," while Lazarus and McCleary gave it the term "discrimination without awareness."

One of the most interesting tests done by the Precon developers was one in which subjects were given jumbled letters to rearrange into actual words. Before the test began, they showed the answers on a screen, subliminally. Comparative tests indicated that the subjects solved the puzzles fifteen to forty-six per cent faster when the answers had been slipped to their subconscious minds in advance.⁶¹

Experimentation with subliminal projections has not been confined to the United States. The British Broadcasting

⁵⁹Supra, p. 33.

⁶⁰Griswold, op. cit., p. 97.

⁶¹Loc. cit.

Company, in 1956, experimented with five million television viewers by flashing "Pirie Breaks Record" during a ballet program at 1/25 of a second. Viewers were told afterward that a news item had been flashed on the screen during the program and asked for letters. Four hundred and thirty replied. Out of this number, twenty viewers had the message letter perfect and 130 had it nearly correct.⁶²

Many such experiments have been made including one held exclusively for the New York press, by James Vicary. This was a Coca-Cola flash similar to the stimulus used in Vicary's experiment in the movie house.⁶³ Some of the press personnel present claimed they had seen a very dim imprint of the Coca-Cola trademark. Vicary explained that the stimulus had been seen only when it was incorrectly projected against a dark frame. "We did this on purpose so that you could actually see the words. In practice the application is always on the screen lighter than the projected print itself, and therefore impossible to see."⁶⁴ This introduction of subliminal advertising and its possibilities to the New York press is what set off the chain of public reaction.

Public Reaction

Public reaction seemed to fall into three categories:
(1) it has possibilities but we'll approach with extreme

⁶²Talese, op. cit., p. 22.

⁶³Supra, p. 25.

⁶⁴Mannes, op. cit., p. 36.

caution; (2) a violent disapproval; and (3) we don't know so we'll poke fun at it. In the first group are such remarks as: " . . . it can work even without the subject's cooperation--a supersoft sell;"⁶⁵ "subliminal stimulation is a proven fact Vicary has turned a respectable psychological phenomenon into a 'gimmick' that would give the whole field of motivation research a bad name" "Some had ethical qualms, wondering about subliminal projection's possible effect on political campaigns and some feared it would alienate customers instead of bewitching them;"⁶⁶ and a small portion of the Science Newsletter review which read:

What is definitely known by psychologists today is that we can and do perceive a great deal that we are not aware we are seeing or hearing. Thus, your mood is probably affected at a movie by background music even though you seem to pay no attention and could not possibly describe it to a friend or name the composition It is well to understand that learning of children is affected not only by the things they are consciously attending to, but also a thousand other trivial things that flit by on the fringes of their awareness.⁶⁷

The second type of reaction, the violently opposed, includes reactions by Senator Charles Potter, Republican of Michigan and Representative William A. Dawson, Republican of Utah, who both urged the Federal Communications Commission to make sure that ad-men were not slipping the "secret pitch"

⁶⁵"Supersoft Sell," Time, LXX (September 9, 1957), 68.

⁶⁶"Devilish?" Newsweek, L (October 14, 1957), 98.

⁶⁷"'Ghost' Ads Overrated," Science Newsletter, LXXII (October 26, 1957), 260.

into the television sets of unsuspecting viewers.⁶⁸ Others derided the claims of "subliminal salesmanship." A prominent investigator told a Science Newsletter reporter, "Whether such perceptions would have any effect at all on your actions has not been established scientifically."⁶⁹ This, of course, is in direct contradiction to psychological experiments previously cited in this paper.

The Nation periodical is another example of the second type of public reaction as is demonstrated in their review.

Subliminal advertising is like so much in that trade, the hybrid spawn of psychology, Yankee know-how and economic enterprise (greed). Briefly it has been shown that the human animal's thought processes can be influenced by repeated sensory stimuli, each of such short duration that sense organs do not register the signal in the conscious area of the brain.

The advertising people are reassuring. They say that this sort of suggestion won't work on people not disposed to accept the advice. But advertising and politics had better keep on a conscious level or we shall turn off the set and stay away from the polls.⁷⁰

The humorous reviews provide very enjoyable reading but offer little or no information. Two of the most humorous can be found in the Saturday Review⁷¹ and the New Republic.⁷²

⁶⁸Talese, op. cit., p. 22.

⁶⁹"Ghost Ads Overrated," op. cit., p. 260.

⁷⁰"Diddling the Subconscious," The Nation, CLXXXV (October 5, 1957), 7.

⁷¹Elmo Roper, "How Wonderful Are the Persuaders," The Saturday Review, XL (October 5, 1957), 19.

⁷²"Quicker Than the Eye," The New Republic, CXXXVIII (January 27, 1958), 5.

To all of this publicity, Vicary replies that the aim of subliminal advertising is not to induce but to remind; that only those who were already thirsty reacted to the Coca-Cola stimulus and that it did not affect those who were not. He does comment, however, that the process could build up a "prior readiness."⁷³ Vicary believes the use of his process should be subject to some sort of control, and should be linked to some method of telling the audience in advance that they are going to be subjected to invisible ads.⁷⁴ This, of course, reassures the public that they will not slip into anything unaware. However, in light of the research done for this paper and the experiments cited herein, the writer feels that by informing the public they become more susceptible. A. C. Williams concludes his work with the emphatic statement that in order for subliminal perception to take place the subject must know what stimuli are to be presented him.⁷⁵ In the investigation of "random influences" upon perception it was pointed out that foreknowledge and familiarity tend to condition the subject to a higher level of susceptibility.⁷⁶ If Vicary is as well informed concerning subliminal perception as he contends, then it could be that he actually has

⁷³Mannes, op. cit., p. 37.

⁷⁴"Ads You'll Never See," op. cit., p. 31.

⁷⁵Williams, op. cit., p. 197.

⁷⁶Supra, p. 15.

something to gain and nothing to lose by suggesting that the Federal Communications Commission require that the public be informed as to how and when subliminal advertising will take place.

Vicary is not the only one who hopes to see FCC regulation. Many reporters and a large percentage of the public feel as the reporter for The Saturday Review does. "At least the FCC should act in the public interest to prevent the device from being used on television, even though the owners would promise to inform viewers when and how they are being subliminated."⁷⁷ He continues to say it all boils down to a battle with "integrity of the inner self" pitted against the "movement of merchandise."

According to Business Week, the FCC is investigating the possibility of banning subliminal ads for television and the National Association of Radio and Television Broadcasters has adopted a rule against stations using them. When it gets back to the individual advertiser, most agencies take the attitude that they must investigate all the possibilities themselves. Their findings are often labeled "negative" or "they don't excite us much."⁷⁸

In summing the whole problem up, one is confronted with many conflicting theories. Even though Williams concluded

⁷⁷"Smudging the Subconscious," The Saturday Review, October 5, 1957, p. 20.

⁷⁸"What Sways the Shopper," op. cit., pp. 49-50.

that the subject must have foreknowledge and familiarity with the stimulus before a better than chance response will take place, Vicary has proven that a response will take place without these. It may boil down to physical response versus verbal response. The former seems to be more easily measured than the latter.

Authorities in the field differ with each other and the writer has not attempted to judge. The facts from several experiments have been gathered and general conclusions drawn from them collectively, all of which must be proven. But, upon the data cited and the limitations thereof, this writer has experimented with another small facet of subliminal research.

CHAPTER III

EXPERIMENTAL EQUIPMENT

The equipment used for this experiment consisted basically of standard moving picture equipment, plus a film strip projector adapted with a strobe unit for showing the subliminal visual stimulus.

The movie projector was an RCA "400" series with a 1000 watt bulb. The normal RCA speaker system was replaced with two twelve inch speakers mounted on the wall which are used on either side of glass beaded wall mounted screen. (See Figure 2). Using a four inch lens, the movie projector showed a picture seventy-four inches wide and fifty-five inches deep.

The projector used for the subliminal stimulus was a film strip Picture Projector model E.A.G. also with a four inch lens. Modification of this projector was accomplished by sliding the strobe bulb of a Powell Repeater Flash Model, F-210, through an opening in the lamp housing, aligning the bulb so that the tube was ninety degrees to the concave reflector mirror, and then taping the unit in place. This enabled the operator merely to drop the top back and replace the tungsten bulb when it was necessary to check the focus and position of the stimulus on the movie screen. In order to make the color temperature of the strobe bulb approximately

the color temperature of the tungsten bulb used in the movie projector, a Kodak Wratten number eighty-five Daylight Filter was taped over the front of the strobe projector lens. This gave both projectors a color temperature of approximately 3400° Kelvin.

The stimulus nonsense syllables were made with a press (type style, 20th Century, bold) using black letters on a white background so that when the Plus-X film was developed it could be used as a positive slide. The film was developed in Ethol 90 and the frame used had a gamma of approximately 0.9. To avoid having extraneous light flashed on the screen with the stimulus, the area of the film strip surrounding the nonsense syllables was covered with black India ink. Tests using only the stimulus light proved that there was no extraneous light being projected upon the screen.

Because the filmstrip projector did emit spurious light, and to avoid as much comment as possible from the subjects in the first two groups, the projector was encased in a box of black construction paper with a light proof hole for the wires of the bulb connection, and an opening in front next to the color filter. Observation showed no light leakage from this housing unit which might have distracted the subjects or aroused curiosity of the first subjects.

Operation of the strobe unit was automatic once the operator turned on the stand-by operation switch. Turning

this switch on enabled the strobe to operate and also put an electric pulse counter into operation. This 1-999 two dial counter was run by a small six volt battery charger and was activated by the same relay that shorted the strobe unit, causing it to flash. (See Figure 3).

Basically the automatic timing unit consisted of a GE NE32 neon bulb built into a "saw-tooth" circuit. When electricity being stored up in the neon bulb reached a certain stage, it discharged, causing the bulb to glow briefly and the resultant surge of electricity to operate the twelve volt relay. When the relay operated, causing two contacts to close, it fired the strobe unit, and at the same time caused the counter to tally one, thereby assuring an accurate count of the number of stimuli received by any one group.

Calibration of the strobe unit both for relative brightness and for duration of flash, was done by using a No. 927 Continental Electric photo-electric cell with the output of this cell going into a Heathkit Laboratory oscilloscope.

By using an audio oscillator and multiples of the sixty cycle line frequency, it was possible to compute the duration of the strobe flash ± 5 per cent. This was done by removing the film and placing the photo-electric cell at the end of the lens. A comparison was then made to the wave form of the audio signal and wave form of the photo electric cell which was calibrated proportionately.

Relative brightness of the strobe unit was measured by

CHAPTER IV

RESULTS OF EXPERIMENTATION

Statistical Procedures

As E. F. Lindquist points out:

It is generally believed that the ultimate purpose in drawing a sample is to obtain an estimate of group characteristic of the population. This is, of course, true, but it might be more conducive to clear thinking to say that we draw a sample in order to determine which hypotheses about the population are tenable, in the light of what is learned from the sample.¹

Viewing a particular experimental problem with this outlook has several advantages. It enables one to see that the statistical evidence is only an estimate. It recognizes the importance of knowing the extent that one can depend on, or know how precise one's evidence is in relation to either a finite or infinite population. Finally, this viewpoint enables one better to draw upon the logic by which one describes the degree of precision which he wants to attain.²

Proof that the results of the experiment support the original hypothesis was done by determining the observed differences between the two groups and testing the null hypothesis for the significance of difference in proportions from the groups. The writer realizes that rejection of the

¹E. F. Lindquist, Statistical Analysis in Educational Research (Cambridge: Houghton Mifflin Company, 1940), p. 10.

²Ibid., p. 11.

null hypothesis does not constitute proof in itself, for in rejecting the null hypothesis one has only rejected one possible cause--chance fluctuation due to random sampling.³ What does account for the difference obtained is to be found in the design of the experiment and the fact that rejection is statistically significant. Some variation was to be expected in the pre-and post-test matching of the nonsense syllables. The problem, then, was to determine whether the difference in response was due to chance fluctuation or was it statistically significant.

To determine the statistical significance of the data obtained the writer used the Chi Square formula.⁴ As Lindquist

$$\chi^2 = \sum \frac{(f_o - f_t)^2}{f_t}$$

points out, Chi Square is an index of the divergence of fact from the hypothesis. This is done by comparing the expected frequency with the observed frequency. If each of the observed frequencies agreed exactly with the corresponding theoretical frequency observed in the data, the Chi Square would be zero.

Chi Square may also be used as a measure of divergence from any other hypothesis that the experimenter might want to use. Here the data obtained is used to test the observance for the pre- and post-test so that the hypothesis may be

³Ibid., pp. 15-16.

⁴Ibid., p. 31.

rejected or accepted.

Comparison of Pre- and Post-Test Differences

For Each Group

The null hypothesis to be tested for pre- and post-test differences for each group is: that comparison of pre- and post-test differences for each group show no change. The data in Table II indicates the number of subjects in each group who reported correctly the first and second pairs of key stimulus syllables in pre-test and post-test trials. Also given are the Chi Square values and significance levels for the two

TABLE II

DIFFERENCES BETWEEN PRE- AND POST-TEST STIMULUS
RESPONSES FOR EACH GROUP ON EACH
PAIR OF STIMULI

Group	Stimulus Pair	Pre-Test Raw Score	Post-Test Raw Score	X ²	Significance Level in Percentage
A	1st	4	6	.50	40
	2nd	4	2	0.	99
B	1st	2	2	0.	99
	2nd	0	0	0.	99
C	1st	3	3	0.	99
	2nd	0	1	0.	99
D	1st	1	10	7.11	1
	2nd	0	1	0.	99

situations wherein there were any differences. The data indicates that the first stimulus pair proportions for Group D differed significantly on pre- and post-testing. The difference favored the proportion on post-test. The possibility of Group D making that score by chance could happen less than one per cent of the time. Group D is the group that received the instruction which informed them that they were going to receive this stimulus, following which they received the subliminal stimuli. One must reject the null hypothesis then, and say that comparison of pre- and post-test differences for each group does show a change which cannot be attributed to chance.

Response Comparison of Groups Who
Were Told of Stimuli

In looking at the hypothesis that differences in accuracy of response comparison of control groups who were and were not told of the stimuli showed no change, one must first look at the differences between the two groups who constituted the control and experimental factions.

The hypothesis for these groups was that there would be no change on pre- and post-testing. Comparing Group D with Group C, where both groups received the same instructions and information as to the presence of the subliminal stimuli, the first set (ZIW-TOV) was matched at a frequency which is

far above chance expectancy. The null hypothesis is rejected at the .01 level of significance.

TABLE III

DIFFERENCES IN ACCURACY OF RESPONSE BETWEEN CONTROL
(C) AND EXPERIMENTAL (D) GROUPS
WHO WERE TOLD OF STIMULI

First Set of Syllables			Second Set of Syllables		
	C	D		C	D
Pre-Test R-Score	3	1	Pre-Test R-Score	0	0
Post-Test R-Score	3	10	Post-Test R-Score	1	1
	$\chi^2 = 81$			$\chi^2 = 0$	
	$P = .01$			$P = .99$	

Response Comparison of Groups Who Were Not
Told of Stimuli

In the first control and experimental groups the hypothesis was again used that there would be no difference on pre- and post-testing. When Group A was compared to Group B (see Table IV) it was found that Group B did not differ significantly from Group A in the number of correct responses, neither group varying significantly from chance expectancy. Therefore, the null hypothesis was accepted for these groups,

TABLE IV

DIFFERENCES IN ACCURACY OF RESPONSE BETWEEN CONTROL (A)
AND EXPERIMENTAL (B) GROUPS WHO WERE
NOT TOLD OF STIMULI

First Set of Syllables			Second Set of Syllables		
	A	B		A	B
Pre-Test R-Score	4	2	Pre-Test R-Score	4	0
Post-Test R-Score	6	2	Post-Test R-Score	2	0
	$\chi^2 = 1$			$\chi^2 = 1$	
	$P = .35$			$P = .35$	

who were not told that they would receive the stimulus.

Response Comparison of Control Groups Who Were
and Were Not Told of the Stimuli

It is now possible to examine the main hypothesis; that differences in accuracy of response comparison of control groups who were and were not told of the stimuli showed no change. From Table V we find that control Groups A and C do not differ significantly from each other in the number of nonsense syllables matched. Therefore, with these two groups it is possible to accept the null hypothesis.

TABLE V

DIFFERENCES IN ACCURACY OF RESPONSE BETWEEN CONTROL
GROUPS (A AND C), THE FIRST NOT
BEING TOLD OF THE STIMULI

First Set of Syllables			Second Set of Syllables		
	A	C		A	C
Pre-Test R-Score	4	3	Pre-Test R-Score	4	0
Post-Test R-Score	6	3	Post-Test R-Score	2	1
	$\chi^2 = 1$			$\chi^2 = 2$	
	$P = .35$			$P = .15$	

Response Comparison of Experimental Groups Who Were
and Were Not Told of the Stimuli

The last of the hypotheses to be examined is that response comparison of experimental groups who were and were not told of the stimuli showed no change.

In the two experimental groups it was found that the number of correctly matched syllables in the first set differed significantly ($P = .01$), the difference favoring Group D, who were told that they were to receive the stimuli. Therefore, the null hypothesis must be rejected. It was found that the first pair of syllables were not matched by chance. As Group B received the same pre- and post- instructions and the

same subliminal stimuli as Group D received, the significance of difference between these two groups must be attributed to the fact that Group D received information to which Group B did not have access.

TABLE VI

DIFFERENCE IN ACCURACY OF RESPONSE BETWEEN EXPERIMENTAL GROUPS (B AND D), THE FIRST NOT BEING TOLD OF THE STIMULI

First Set of Syllables			Second Set of Syllables		
	B	D		B	D
Pre-Test R-Score	2	1	Pre-Test R-Score	0	0
Post-Test R-Score	2	10	Post-Test R-Score	0	1
	$\chi^2 = 81$			$\chi^2 = 0$	
	P = .01			P = .99	

comparison of experimental groups who were and were not told of the stimuli showed no change. It was found that Group D matched the stimulus pair at a rate (1 per cent level of significance) which is above the level attributed to chance, while Group B (who also received the subliminal stimulus) showed no increase in the stimulus pairs.

It was therefore presumed that the subject's knowledge of the subliminal stimulus enabled a greater number of them to recall this stimulus than of those who did not know that subliminal stimulus was being used.

Recommendations

While this phase of subliminal perception needed to be studied for a better view of the overall problem, this writer recommends that further work be done in determining the difference in effects, or conscious recall, between nonsense stimuli and meaningful material. It may well be that traditional controls will need to be modified to take into account the barrier of recall from the subconscious. The problems of using large groups and meaningful material are formidable, but this work must be done before practical use of subliminal stimulation in education or advertising becomes possible.

Further work certainly needs to be done with different styles, colors, shapes, sizes, etc., as well as placement of the stimulus on the screen to see which is most effective.

The writer offers a tentative explanation that the difference which occurred in response between the first and second set of syllables might have been due to the influence of the golden section.² The first set of stimulus was located in the upper third of the picture; furthermore, the structure of the film whereby the top half of the picture consistently was darker would have emphasized the subject's receptiveness to the first set of nonsense syllables. Certainly more research needs to be done into the amount of stimulus which can be most efficiently absorbed subliminally, and to the most efficient placement of this stimulus.

Further work needs to be done with subliminal stimulus to determine the ability of subjects to accept or reject such stimulation. While Corrigan and Becker's work with "built-in censorship"³ is pertinent on the conscious level, it does not answer the problem of when the subject is "resisting and censoring upsetting words."⁴ If the personality is used as conceived by Freud,⁵ does the id accept whatever it perceives unconsciously, and the super-ego censor it from coming out, or can it be said that normally alien thoughts are blocked

²James Drever, A Dictionary of Psychology (Baltimore: Penguin Books, Inc., 1956), p. 108.

³Wesley S. Griswold, "TV's New Trick: Hidden Commercials," Popular Science, CLXXII (April, 1958), 97.

⁴Loc. cit.

⁵Calvin S. Hall, A Primer of Freudian Psychology (New York: New American Library, 1954), pp. 22-34.

before the id can make use of them? At what point is this stimulus accepted and at what point is it rejected?

Further work needs to be done in measuring the effects of subliminal stimulation where obvious symbols are used. Does, for example, the signboard along the highway that motorists glance at and then promptly forget, have any more sales impact than the identical picture flashed below the person's level of conscious perception while he is watching a movie?

The problem of subliminal perception as it has developed in the last year is but a small part of man's attempt to understand himself. Many experiments and much applied imagination needs to go into studying man's perceptual abilities.

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APPENDIX

Name _____ Sex _____ Age _____

NS list #1

Match the nonsense syllables from column B to the nonsense syllables in column A. Use whichever pairs appeal to you most. There are no right or wrong answers.

A

BEP _____
 ZIW _____
 KAJ _____
 FEH _____
 JID _____
 GAH _____
 FUH _____
 LAJ _____
 VAJ _____
 WUH _____
 MEF _____
 GEC _____

B

CEF
 MIB
 MEC
 BOF
 KOJ
 TOV
 POH
 JAT
 GEK
 SEB
 JUZ
 QIW

Figure 1. Test Used for the Matching of Nonsense Syllables.

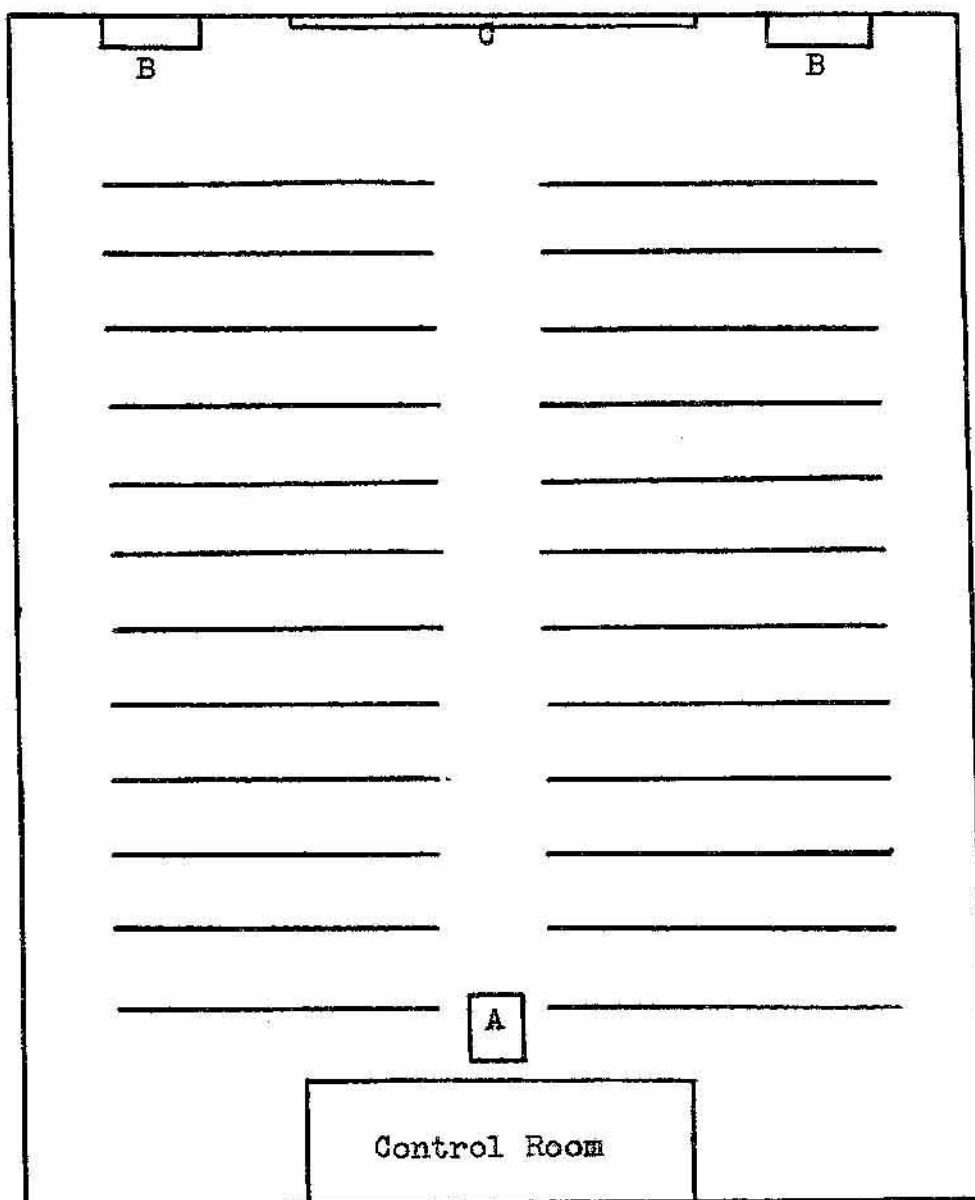


Figure 2

Setting of the Audio-Visual Room Showing Placement
of Equipment

A = Projector and Strobe Unit
B = Speakers
C = Glass Beaded Screen

