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PARAMETERS OF HYPNOSIS

WITH SPECIAL REFERENCE TO
POSTHYPNOTIC AMNESIA AND
HYPNOTIC ANALGESIA

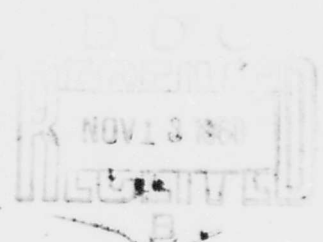
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PARAMETERS OF HYPNOSIS , WITH SPECIAL REFERENCE
TO POSTHYPNOTIC AMNESIA AND HYPNOTIC ANALGESIA

The phenomena of hypnosis have so long been associated with either entertainment or with magic and mysticism that they have not received the amount of scientific attention that they deserve because of their significance and potential usefulness. The experiments undertaken with the aid of this contract are in the direction of "domesticating" hypnotic phenomena within normal experimental psychology through showing that they can be subjected to orderly quantitative treatment. Only if such a quantitative and parametric program is carried out will we know what purposes hypnosis can be made to serve, and what its limitations are. The two main directions of the work have been the study of the recoverable forgetting that takes place after hypnosis, commonly called posthypnotic amnesia, and the reduction of experimentally produced pain, referred to as hypnotic analgesia. Our results on these two topics will be summarized separately.

Studies on posthypnotic amnesia

Four published papers report the experimentation done on posthypnotic amnesia (Hilgard and Cooper, 1965; Hilgard, 1966; Cooper, 1966; Osborn and others, 1967).^{*} Four kinds of amnesia were studied: spontaneous posthypnotic amnesia, occurring without any suggestion that there would be a memory loss after hypnosis; suggested posthypnotic amnesia, in which

^{*}References cited by author and date can be identified in the list of publications at the end of this report.

the subject is told within hypnosis that he will have a memory loss upon awakening, until memory is restored by a signal; source amnesia, in which facts learned within hypnosis are retained, but the fact that they were learned within hypnosis is forgotten; and, finally, amnesia produced by a drug (thiopental)** , with attempted recovery through hypnosis.

In brief, the results were as follows.

1. Spontaneous amnesia was found to be very rare, if indeed it could be attributed to hypnosis at all. That is, there is a certain amount of forgetting that takes place when ordinary tasks are recalled in the waking state; spontaneous amnesia must go beyond this. Others who have reported spontaneous amnesia may have unwittingly given the suggestions for its occurrence either through the expectations of the subject owing to his beliefs about hypnosis, or owing to the form of inquiry.

2. Suggested posthypnotic amnesia is readily and convincingly demonstrable, but its amount varies from subject to subject. Hence the amount of amnesia shown is a good indicator of the "hypnotizability" of the subject.

3. Source amnesia, like other posthypnotic amnesia, may occur spontaneously (particularly in the context of suggested general amnesia within hypnosis), but it is readily demonstrated if it is suggested that the facts learned will be retained but the fact that they were learned in hypnosis will be forgotten. Subjects often "rationalized" their knowing of unusual facts by such statements as "I must have heard it on the TV."

** Trade name: Pentathol sodium.

4. The amnesia produced by thiopental appears to be of a different order from that produced by posthypnotic suggestion. Although the subjects, under the dosages used, were able to learn paired associates and to describe pictures to be used in a test of recognition, if the blood level of the thiopental was sufficiently high during learning, after subsequently sleeping and awakening, with blood levels again normal, subjects were commonly completely amnesic for the events within the drugged state. There was no evidence that the recall was "state specific", for events learned in the waking state were readily recalled under the drug, and readministering of the drug did not restore the lost memories. With highly hypnotizable subjects, some recall of the forgotten material was restored through hypnosis, indicating that more was registered than was recovered, but the recall was not dramatic as in the breaking of hypnotic amnesia.

5. A theoretical paper (Hilgard, 1966) proposed some alternatives for the interpretation of posthypnotic amnesia; (a) perhaps people with poor incidental memories are the ones found susceptible to amnesia; (b) amnesia may be a function of the regressed state, for children are known to be highly amnesic; (c) if a person uses repression as part of his "cognitive style" he may tend to use amnesia as a repressive measure; (d) amnesia may be primarily a motor inhibition of speech, thus similar to other motor inhibitions (catalepsies) within hypnosis; (e) amnesia may represent a form of dissociation, in which memories normally available for recall are temporarily not subject to recall. While these five possibilities are not mutually exclusive, they are not equally plausible. The ones that appear most promising for further investigation are the last two.

Studies on hypnotic analgesia

Among the useful applications of hypnosis, none is more promising than its use in the alleviation of pain. Hypnosis was already being used as an anesthetic in major surgery before chloroform and ether came into use. It is used successfully today by a number of dentists, obstetricians, and anesthesiologists. It is somewhat surprising, therefore, to find how little is known about pain reduction under hypnosis from a scientific standpoint.

We have used two methods for producing pain in the laboratory: immersing a hand and forearm in circulating cold water ("cold pressor response") and producing pain by a tourniquet to the upper arm followed by exercise of the hand and forearm below the tourniquet ("ischemic pain").

Our first problem was to be sure that we could have an adequate verbal report of felt pain that was reliable and met psychophysical requirements of orderliness. Simple pain-state reports on a scale of 0 to 10 proved satisfactory, with 0 for no pain and the report of 10 for a pain so severe that the subject would prefer to terminate the experiment. If the experiment was not quite over the subject continued and gave reports beyond 10. Such reports (1) proved reliable on retesting, (2) correlated with water temperature (the colder the water the greater the pain), (3) rose in a lawful way with time in the water or time of ischemia, and (4) could be fitted with a power function of the type made familiar by S. S. Stevens. They were thus judged to be both reliable and valid as reports of felt pain.

Hypnosis alone (without suggested analgesia) reduced the pain very little if at all, so that whatever relaxation is associated with hypnosis is not sufficient to reduce the kinds of pain being studied. Under suggested analgesia, however, the pain was significantly reduced, with greater

reduction for those who proved more highly hypnotizable. The most highly susceptible subjects felt no pain at all.

The physiological correlates of the pain proved somewhat paradoxical. In the waking state, blood pressure rose with increasing pain in both the cold pressor situation and in the ischemic one, but under hypnotic analgesia blood pressure continued to rise in the cold pressor test, despite absence of pain, while in the ischemic experiment blood pressure did not rise when no pain was felt. While further experiments are required to resolve the paradox, it appears reasonable to suppose that the effect of the cold upon the blood stream is such as to produce local reflexes which increase the blood pressure, even though no pain is felt, while in the tourniquet experiment when pain is not felt there is nothing corresponding to cold to raise the blood pressure.

Some further reports will be forthcoming from aspects of these experiments already conducted but not yet analyzed. The relevant reports to date are Voevodsky and others, 1967; Hilgard, 1967; Hilgard and others, 1967; and several of the papers now in process of publication.

Other Studies

In addition to these main emphases, some related studies have been done, as, for example, on the kinesthetic aftereffect as studied by Petrie. The first report (Hilgard and others, 1968) is concerned with some psychophysical conditions of the experiment; reports in preparation will relate the contrast effects in the kinesthetic experiment to pain and pain-reduction under hypnosis. For example, those most sensitive to contrast effects appear to be the ones who reduce their pain most under hypnotic analgesia.

With the aid of the contract some earlier work has been analyzed and prepared for publication by Josephine R. Hilgard. Her manuscript has been submitted to the University of Chicago Press, and should appear as a book in 1969.

Publications Which Have Appeared

1. Hilgard, E. R. Hypnotic susceptibility. New York: Harcourt, Brace & World, 1965.
2. Hilgard, E. R., and Cooper, L. M. Spontaneous and suggested posthypnotic amnesia. International Journal of Clinical and Experimental Hypnosis, 1965, 13, 261-273.
3. Hilgard, E. R. Posthypnotic amnesia: Experiments and theory. International Journal of Clinical and Experimental Hypnosis, 1966, 14, 104-111.
4. Cooper, L. M. Spontaneous and suggested posthypnotic source amnesia. International Journal of Clinical and Experimental Hypnosis, 1966, 14, 180-193.
5. Voevodsky, J., Cooper, L. M., Morgan, Arlene H., and Hilgard, E. R. The measurement of suprathreshold pain. American Journal of Psychology, 1967, 80, 124-128.
6. Hilgard, E. R. A quantitative study of pain and its reduction through hypnotic suggestion. Proceedings of the National Academy of Sciences, 1967, 57, 1581-1586.
7. Hilgard, E. R., Cooper, L. M., Lenox, J. R., Morgan, Arlene H., and Voevodsky, J. The use of pain-state reports in the study of hypnotic analgesia to the pain of ice water. Journal of Nervous and Mental Disease, 1967, 144, 506-513.

8. Osborn, Anne G., Bunker, J. P., Cooper, L. M., Frank, G. S., and Hilgard, E. R. Effects of thiopental sedation on learning and memory. Science, 1967, 157, 574-576.
9. Hilgard, E. R., Morgan, Arlene H., and Prytulak, Susan. The psychophysics of the kinesthetic aftereffect in the Petrie block experiment. Perception and Psychophysics, 1968, 4, 129-132.
10. Graham, K. R., and Patton, Ann. Retroactive inhibition, hypnosis, and hypnotic amnesia. International Journal of Clinical and Experimental Hypnosis, 1968, 16, 68-74.

Forthcoming Articles and Monographs

11. Hilgard, E. R. The psychophysiology of pain reduction through hypnosis. Proceedings of the International Symposium on Psychophysiological Mechanisms of Hypnosis. (Paper delivered at the International Symposium on Psychophysiological Mechanisms of Hypnosis sponsored by the International Brain Research Organization in Tourtour, France, October, 1967.) To appear in Proceedings.
12. Hilgard, E. R. Experimental psychology and hypnosis. Revue de Médecine Psychosomatique. (Paper delivered at the International Symposium on Psychophysiological Mechanisms of Hypnosis sponsored by the International Brain Research Organization in Tourtour, France, October, 1967.) To appear.

13. Hilgard, E. R. Cognitive processes within hypnosis. Prepared as a Chapter for the forthcoming book edited by Jacques Mehler and tentatively titled: Handbook of Cognitive Psychology (to be published by Prentice-Hall).
14. Hilgard, E. R. Pain as a puzzle for psychology and physiology. (Paper prepared for the American Psychological Association Convention held in San Francisco, California, September, 1968.) To be published in the American Psychologist.
15. Hilgard, E. R. The psychophysiology of pain and its hypnotic reduction. Prepared as a Chapter for the forthcoming book edited by Alfred Katzenstein on "Psychological Findings regarding the Application of Hypnosis in Clinical Practice" (to be published in Germany).
16. Hilgard, E. R. Altered states of awareness. Journal of Nervous and Mental Disease (to appear).
17. Graham, K. R. Brightness contrast by hypnotic hallucination. International Journal of Clinical and Experimental Hypnosis (to appear).
18. Hilgard, J. R. Personality and hypnosis: A study of imaginative involvement. Chicago: University of Chicago Press (to appear).

There are others being prepared for publication.

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13. ABSTRACT			
<p>To bring order into our knowledge of hypnotic phenomena quantitative experiments have been performed on hypnotic amnesia and on hypnotic analgesia.</p> <p>Spontaneous amnesia following hypnotic induction, commonly reported in the lore of hypnosis, proved to be very rare, and may thus be the result of the subject's expectations or of the hypnotist's nonverbal suggestions. Suggested amnesia is readily demonstrated, and is correlated with hypnotic susceptibility. The special kind of amnesia known as source amnesia, in which something learned under hypnosis is remembered, while the fact that it was learned under hypnosis is forgotten, was found to occur both spontaneously and as a result of special suggestion.</p> <p>Pain reduction under hypnosis has been familiar for many years, and is widely used by clinicians in childbirth, dental surgery, relief of painful burns, and terminal cancer. Still, the scientific knowledge of what happens is at a primitive level. Pain was produced experimentally by the cold pressor reaction (immersion of a hand and forearm in circulating ice water) or by ischemia (the consequence of a tourniquet and exercise). Verbal pain reports were shown to meet psychophysical requirements of reliability and validity. Pain was readily reduced under hypnotic analgesia suggestions, the amount of reduction corresponding to measured hypnotic susceptibility. Blood pressure rose with pain in the waking state, but continued to rise in the cold pressor response even though pain was absent, although it did not rise in the ischemic experiment when pain was absent. This somewhat paradoxical finding remains to be explained.</p>			

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Amnesia, posthypnotic						
Analgesia, hypnotic						
Pain						
Cold pressor response						
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