

HULL, CLARK L. (1933): HYPNOSIS AND SUGGESTIBILITY

AN EXPERIMENTAL APPROACH

The study of hypnotism bristles with difficulties, although this has not occurred to the numerous persons who have expected to find in these questions the occasion of a brilliant and easy success. Although nothing is more simple than the invention of dramatic experiments, which strike the vulgar with fear and astonishment, it is on the other hand very difficult, in many cases, to find the true formula of the experiment which will give its result with convincing accuracy.—Alfred Binet and Charles Féré, *Animal Magnetism* (1888).

PREFACE

Throughout the history of hypnotism the clinical approach, with its preoccupations with remedial exigencies, has greatly predominated. In contrast to this tendency the approach of the present work is experimental rather than clinical; the persons employed as subjects in the program of research were normal rather than pathological; the ends sought were principles and relationships rather than treatments and cures.

Chapter I

HYPNOTISM IN SCIENTIFIC PERSPECTIVE

It is sufficient to observe that hypnotism originated in magic in much the same way that chemistry arose from alchemy and astronomy from astrology.

Mesmer and the Beginnings of Hypnotism

Mesmer's Character

It is difficult at this day to form a just opinion of Mesmer's character. Widely different views have been held. He has been charged, probably not entirely without truth, with being an avaricious charlatan. Bernheim, for example, says (1, 106):

"In spite of the discredit which the interested charlatanism of Mesmer threw upon his practices, magnetism continued to have its followers."

No matter what may be the final verdict on Mesmer's character, his scientific influence must be judged on its own merits. His theories are of very considerable interest to the historian of the growth of science, perhaps not so much because of the amount of truth they contained as because it has taken the world such a long time to separate the grain of truth from its enormous husk of error.

Mesmer's Views

Mesmer's medical dissertation (1766) was written on the influence of the planets upon the bodies of men. The notion that the planets influence the lives of men was prevalent as a survival of astrology, and the somewhat similar phenomenon manifested by the magnet (action at a distance) was also attracting a great deal of attention. Mesmer, from these two concepts, evolved the hypothesis that the two halves of the human body acted like the poles of a kind of animate magnet. Disease resulted when there was an improper distribution of this magnetism.

Animal magnetism was held to be a kind of impalpable gas or fluid as distinguished from the magnetism of minerals. Its distribution and action were supposed to be under control of the human will. Mesmer's followers not only believed that this strange fluid could be reflected by mirrors but that it could be seen. Trained somnambulists were supposed to behold it streaming forth from the eyes and hands of the magnetizer, though they disagreed as to whether the color was white, red, yellow, or blue! It was agreed, however, that the fluid could be confined in a bottle, and transported thus to exert its marvelous power in distant places.

Hull - Hypnosis and Suggestibility

Under such conditions the commission had no alternative but to decide against the existence of animal magnetism as a physical force. Moreover, even at that early day they were dimly aware of the psychological nature of the phenomena in question, as is shown by the following section taken from their official report: (277)

“Finally, they have demonstrated by decisive experiments that imagination apart from magnetism, produces convulsions, and that magnetism without imagination produces nothing. They have come to the unanimous conclusion with respect to the existence and utility of magnetism, that there is nothing to prove the existence of the animal magnetic fluid; that this fluid, since it is non-existent, has no beneficial effect; that the violent effects observed in patients under public treatment are due to contact, to the excitement of the imagination, and to the mechanical imitation which involuntarily impels us to repeat that which strikes our senses. . .”

The Royal Society of Medicine made a very similar report at about the same time:

“From a curative point of view animal magnetism is nothing but the art of making sensitive people fall into convulsions. From a curative point of view animal magnetism is useless and dangerous. . .”

These reports marked the end of Mesmer's popular favor in Paris, and he returned to Germany.

The century which has elapsed since 1825 has been much less fertile in the discovery of hypnotic phenomena than the preceding half-century. Indeed, almost the only noteworthy tendency during this period has been the gradual though still incomplete correction of errors which had accumulated around the pseudo-science of hypnotism previous to that date. One development is the gradual, but only partial, escape of hypnotism from its age-long entanglements with mysticism and magic. A second and more dramatic episode is the struggle centering around the rivalry between the physical theories of animal magnetism and the psychological theory of suggestion as alternative explanations of hypnotic phenomena. It is with events of this latter conflict that we shall now concern ourselves.

Braid and the Revolt from Animal Magnetism

The subjective or psychological nature of hypnotic phenomena seems to have been discovered and exploited quite independently by James Braid in England (1843) and by a group of French investigators whose work began with the Abbé Faria (1819) and culminated with Liébeault (1866) and Bernheim (1886).

Braid developed a special technique for inducing the trance, a method still extensively used. Originally he caused his patients to look at a cork bound to the forehead. His later procedure was to have the subject look fixedly at some bright object, such as his lancet case, which was held near, and slightly above, the eyes in such a way that the eye muscles were under a certain amount of strain. This technique was usually combined with verbal suggestion, though he seems not to have appreciated, at least during his early years of experimentation, the importance of the rôle played by suggestion in the process. Braid coined the word hypnotism, now in general use, and utilized the trance mainly for painless surgical operations, which he performed in large numbers.

But this experimental naiveté must have been largely the result of inexperience, for in later years his methods greatly improved. The results obtained from subsequent and better controlled experiments finally led him to abandon his belief in phrenology and its hypnotic correlates. He appears also in his later years to have come gradually to a very adequate realization of the role played by suggestion in producing the phenomena, both of the hypnotic and the waking or “vigilant” condition.

Liébeault and the French Revolt from Animal Magnetism

The parallel movement in France which opposed the theory of a magnetic fluid was much more complicated. It began in 1814-1818, when the Abbé Faria showed by experiments that no special force was necessary for the production of mesmeric phenomena such as the trance, but that the determining cause lay within the subject himself. One of Faria's subjects was a general named Noizet, who became converted to the Abbé's views. He, in turn, passed the teachings on to a physician, Alexander Bertrand, who elaborated them. Both Noizet and Bertrand wrote books upon the subject.

Hull - Hypnosis and Suggestibility

Liébeault was a humble physician who began a country practice in 1850. In 1864 he settled at Nancy and practised hypnotism among the poor peasants who came to his clinic.

The temper of the man is indicated by his refusal to accept fees for these services. Bramwell, who visited Liébeault's clinic, draws such an inimitable picture of it that it must be quoted:

"His clinique, invariably thronged, was held in two rooms in the corner of this garden. . . The patients told to go to sleep apparently fell at once into a quiet slumber, then received their dose of curative suggestions, and when told to awake, either walked quietly away or sat for a little to chat with their friends, the whole process rarely lasting longer than ten minutes...

No drugs were given, and Liébeault took special pains to explain to his patients that he neither exercised nor possessed any mysterious powers, and that all he did was simple and capable of scientific explanation ... A little girl, about five years old, dressed shabbily, but evidently in her best, with a crown of paper laurel leaves on her head and carrying a little book in her hand, toddled into the sanctum, fearlessly interrupted the doctor in the midst of his work by pulling his coat, and said, "You promised me a penny if I get a prize" This accompanied by kindly words, was smilingly given, incitement to work having been evoked in a pleasing, if not scientific way. Two little girls, about six or seven years of age, no doubt brought in the first instance by friends, walked in and sat down on a sofa behind the doctor. He, stopping for a moment in his work, made a pass in the direction of one of them, and said, 'Sleep, my little kitten,' repeated the same for the other, and in an instant they were both asleep. He rapidly gave them their dose of suggestion and then evidently forgot all about them. In about twenty minutes one awoke, and wishing to go, essayed by shaking and pulling to awaken her companion—her amused expression of face, when she failed to do so, being very comic. In about five minutes more the second one awoke, and, hand in hand, they trotted laughingly away."

After coming to Nancy, Liébeault began writing a book on hypnotism which was finished after two years of hard work.

When it was published, however, only one copy was sold!

It seems (4, 30) that Bernheim, a professor in the medical school at Nancy, treated without success for six months a case of sciatica which had lasted for six years. The patient was quickly cured through hypnotic suggestion administered by Liébeault. This striking cure led Bernheim to investigate the novel method of treatment. His initial incredulity soon changed to enthusiastic admiration, and in 1884-1886 Bernheim published an attractively written book in which he directed the attention of the world to Liébeault's work. Then tardily, twenty years after it had been written, the remaining copies of Liébeault's book were finally sold, and the modest physician at last received recognition. Doctors from all countries now flocked to Nancy to study his methods.

Charcot and the Revival of Animal Magnetism

But suggestion as an explanation of hypnotic phenomena was yet to encounter a severe struggle. Quite independently of Liébeault, Charcot, an anatomist and neurologist of Paris, had around 1880 attracted considerable attention by his courageous experiments and lectures on the subject of hypnosis. Warned by the unscientific extravagances which had very properly brought the magnetizers into disrepute, Charcot resolved that his experiments, at least, should be ultra-scientific and technically above reproach. It is largely because of this that the controversy which eventually grew up between the Paris and Nancy schools merits our attention. Nevertheless, despite Charcot's scientific intentions, no one has ever fallen into more grievous experimental errors or gone more widely astray in experimental method than he.

The Paradox of Alfred Binet

Hull - Hypnosis and Suggestibility

Binet and Féré, loyal and admiring pupils of Charcot, elaborated his views in their book *Animal Magnetism*. In regard to the phenomenon of transference, they remarked (2, 117):
"In subjects sensitive to the magnet, the transfer of unilateral contractures may be effected by means of this agent; thus, when the ulnar attitude has been produced in the right hand, and a magnet is brought close to the subject's fore-arm when he is asleep, and even when he is awake, both his hands become agitated with slight, jerking movements; then the contracture of the right hand ceases, and is transferred to the left hand, without losing any of its characteristics or of its precise localization,"
Thus we find magnetism reappearing in the history of hypnotism, this time in respectable, scientific garb, though quite as fallacious as when the existence of a magnetic fluid was advanced by the old magnetizers.

This insistence of Binet and Féré upon such a gross error in the face of Bernheim's experiments and criticisms is especially surprising when one recalls the well-deserved scientific fame to which Binet later attained. Only two years after the publication of *Animal Magnetism*, Binet published *La Suggestibilité*, an extremely original and thoroughly scientific work on an intimately related subject. And all the world knows that still later, in collaboration with Simon, he devised the intelligence tests which bear his name and thus made to the science of psychology one of the greatest contributions of its entire history. Even so, the fact remains that there has rarely been written a book containing a greater aggregation of results from wretched experiments, all put forward with loud protestations of impeccable scientific procedure and buttressed by the most transparent sophistries, than this work by Binet and Féré.

Bernheim and the Eclipse of Animal Magnetism

Coué and Autosuggestion

The conflict with Paris having been won, there was yet another chapter in the history of hypnosis and suggestion to emanate from Nancy. In 1885 the good Liébeault met at Troyes a young druggist named Emile Coué. The two men at once found much in common. For a time Coué studied and practised hypnotic suggestion according to Liébeault's technique. Meanwhile, in his profession, he observed the influence of waking suggestion in effecting cures when associated with the use of drugs, the latter often quite ineffective in themselves.

Coué abandoned the trance entirely and depended wholly upon waking suggestion. This he called autosuggestion, insisting that all suggestion is in reality nothing but autosuggestion. What Coué meant by the term autosuggestion may best be understood from his quaint directions to a person suffering from pain:
"Therefore every time you have a pain, physical or otherwise, you will go quietly to your room. . . sit down and shut your eyes, pass your hand lightly across your forehead if it is mental distress, or upon the part that hurts, if it is pain in any part of the body, and repeat the words: 'It is going, it is going,' etc., very rapidly, even at the risk of gabbling . . . The essential idea is to say: 'It is going, it is going,' so quickly, that of contrary nature to force itself between the words. We thus actually think it is going, and as all ideas that we fix upon the mind become a reality to us, the pain, physical or mental, vanishes. And should the pain return repeat the process 10, 20, 50, 100, 200 times if necessary, for it is better to pass the entire day saying: 'It is going!' than to suffer pain and complain about it."

The Tardy Development of Hypnotism as a Science

Such, in brief, is the history of hypnotism. All sciences alike have descended from magic and superstition, but none has been so slow as hypnosis in shaking off the evil associations of its origin. None has been so slow in taking on a truly experimental and genuinely scientific character.

Practically all of the actual phenomena were discovered and described during the first fifty years, from 1775 to 1825. But the century since 1825 has shown a remarkable sterility. Almost nothing of significance has been accomplished during this period except the very gradual correction of errors which originally flowed directly from bad experimental procedures.

Hull - Hypnosis and Suggestibility

The tardy development of the science of hypnotism, moreover, is especially striking when it is recalled that practically from the beginning hypnotism has been definitely an experimental phenomenon. Not only this, but experimentation has been continuous and widespread during a period in which other fields of science have made the greatest advances ever known.

The paradox in this case, as in all others, disappears with full knowledge of the attendant circumstances. In the first place, the non-physical notions of the nature of mind fostered by metaphysical idealism probably favored hypnotism's mystical affinities, and mysticism is notoriously incompatible with controlled experiment. In the second place, as we have already seen, the dominant motive throughout the entire history of hypnotism has been clinical, that of curing human ills. A worse method for the establishment of scientific principles among highly elusive phenomena could hardly have been devised.

Hypnosis and the Control Experiment

The control experiment has long been known and employed by scientific investigators. It is an integral part of that most potent of all scientific methods, the "method of difference."

According to John Stuart Mill (9), it is "by the method of difference alone that we can ever, in the way of direct experience, arrive with certainty at causes." The principle upon which the method is based is stated by Mill as follows:

"If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance in common save one, that one occurring only in the former; the circumstance in which alone the two instances differ is the effect, or the cause, or an indispensable part of the cause, of the phenomenon."

The Scientific Outlook for Hypnosis

Despite the very devious and unscientific history of hypnotism, there is excellent reason to expect a decided change for the better.

Chapter II

ELEMENTARY PHENOMENA OF HYPNOSIS AND SUGGESTIBILITY

Muscle Reading

The phenomenon shown in Demonstration I has been variously known as mind-reading, thought-reading, and muscle reading. The unconscious movements made by the subject, by which [] was able to locate the hidden object, have frequently been called ideomotor action. Aside from being the naturalistic explanation of many phenomena popularly regarded as more or less occult, among which may be mentioned the planchette phenomena and those of its modern descendant, the "Ouija" board, ideomotor action is of basic importance in understanding hypnotic phenomena.

Waking Suggestion, Catalepsy

Chapter III

EXPERIMENTAL PHENOMENA OF DIRECT WAKING SUGGESTION

We shall accordingly proceed to the description of a number of simple experiments. These will be concerned with direct waking suggestion, which marks the transition from the more familiar forms of human behavior to the less commonly observed ones known as hypnotic.

Unconscious Mimicry

Every one has at one time or another caught himself unintentionally performing the actions which he is observing in some other person. When we watch a contortionist going through his straining activities on the stage we tend automatically to take similar postures. When we watch a person trying very hard to reach something, we tend unconsciously to reach.

Even the lowly chimpanzee seems to show this tendency, as is indicated by a remarkable photograph published by Köhler (7, 142).

Hull - Hypnosis and Suggestibility

The phenomenon has been called unconscious imitation, ideomotor action, and empathy.

Summary and Conclusions

We have seen that it is possible by means of rather simple apparatus and experimental procedures to record with precision responses to various levels of direct and indirect prestige suggestions. Experiments of this kind yield clear evidence of unconscious mimicry when the subject is observing another person in a straining posture.

Similar but more marked responses are made when a subject imagines himself taking such a posture, when whispering to himself that he is taking the posture, when receiving such suggestions from a phonograph or when receiving them from some other person standing near by.

The tracings of the above reactions are so strikingly similar that they strongly confirm the general a priori: probability that all are of essentially the same nature. This evidence supports the hypothesis long held that ideomotor action is the basis of prestige suggestion.

Chapter IV

SOME RELATIONSHIPS OF EXPERIMENTAL HYPNOSIS AND SUGGESTIBILITY

How is suggestibility distributed in the ordinary population? Do people who manifest a given degree of one type of suggestibility display the same degree of other forms of suggestibility: Is suggestibility a single unitary process, or is it merely an aggregation of processes? How does suggestibility vary with sex: Are women more suggestible than men? How is it related to age: Are children more suggestible than adults? How is it related to intelligence: Is suggestibility a mark of a strong or a weak mind? How is it related to personality: Is it a mark of a weak will or character? How does it vary with respect to mental pathology: Does it indicate a tendency to hysteria, as has been so widely believed? How is it related to delinquency: Is negativism, for example, associated with antisocial behavior? How is it related to the action of drugs: Do certain drugs render persons more suggestible and hence more easily influenced by others? While the evidence on none of these questions is as full and conclusive as we should like it to be, there is now available a certain amount of fairly scientific data on most of them.

Summary and Conclusions

We have seen that while perhaps a third of normal subjects show little or no direct verbal or prestige suggestibility, it is very rare indeed for them to manifest overt negative response. The distributions of various groups on the several scales of suggestibility and of hypnotizability which are available have yielded somewhat various as well as erratic contours. A judicious examination of all the evidence leads to the conclusion, however, that the seeming deviations from the normal or bell shaped distribution are more likely the result of defective scales for measurement than of any inherent constitutional tendency.

It has been found wherever the question has been investigated that all forms of direct verbal or prestige suggestion correlate positively and to a rather high degree with each other and with susceptibility to hypnosis, whereas there is some indication that they correlate to a low or zero degree with indirect suggestion. Thus, direct suggestion is indicated to be closely allied (though not identical) with hypnosis, but in indirect suggestion to be probably distinct in its basic determination.

The indication is that women and girls are probably more susceptible to direct suggestion and hypnosis than are men and boys, but only very slightly so—the average difference being only about one-fifteenth as great as that between the average standing height of the two sexes.

The experimental evidence seems to indicate that in childhood suggestibility is at a minimum before the acquisition of language habits and that it rises rapidly from five until about eight years of age, after which it declines steadily until adult years are reached.

Hull - Hypnosis and Suggestibility

The popular belief that suggestibility is a mark of stupidity or lack of intelligence appears to be wholly an error so far as direct or prestige suggestion is concerned. Considerable experimental evidence indicates that, if anything, there is a slight positive relationship between direct suggestibility and intelligence.

The attempts experimentally to discover relationships between direct suggestibility and various character traits have, for the most part, been indecisive, though there is a little indication of a weak positive relation to a group of traits characterized by general amiability.

Such evidence as has been found bearing on the correlation of hypnotizability and a tendency to mental morbidity is that the two are quite unrelated, which supports Bernheim's side of the old controversy with Charcot.

That catatonic dementia precox patients are negatively suggestible has been fully substantiated by experiment, which confirms both clinical observations and the a priori belief that the postural technique really yields a measure of suggestibility.

Juvenile delinquent girls in a reformatory have been shown to be far more negatively suggestible than ordinary young women, though the significance of the findings for delinquency is not clear.

As regards drugs, alcohol does not appear materially to increase suggestibility. Scopolamine, on the other hand, seems to increase suggestibility in persons who normally show positive responses, but not in those who normally do not give positive response.

Chapter V

THE RECOVERY OF LOST MEMORIES IN THE HYPNOTIC TRANCE

We must now plunge into the midst of the experimental phenomena of the hypnotic trance itself. A large and important group of these concern memory. One of the most remarkable of the latter is the alleged capacity of subjects in the hypnotic trance to recall events which are completely lost to the ordinary waking memory. Such special facility of recall is called *Hypermnnesia*. The phenomena have very great interest in themselves and, in addition, possess special significance as bearing on the nature of the hypnotic state.

Losses of Memory

Two types of lost memories have been utilized in the study of hypnotic hypermnnesia. In one type, hypnosis is used as a device to bring about recall in cases in which there has been an *amnesia*, i.e., an abnormal or pathological lapse of memory. In the other, it is used to recover memories of very early childhood which might reasonably be presumed to have been lost through the ordinary processes of forgetting.

While superficially quite distinct, these two types of lost memories have frequently been brought into very close relationship, particularly by the psychoanalysts. This appears quite clearly in the opening paragraph of an early article by Sigmund Freud, written in conjunction with Joseph Breuer, before the former gave up the use of hypnosis in his treatment of mental disorders:

"Instigated by a number of accidental observations, we have investigated for a number of years the different forms and symptoms of hysteria in order to discover the cause and the process which provoked the phenomena in question for the first time, in a great many cases years back. In the great majority of cases we did not succeed in elucidating this starting point from the mere history, no matter how detailed it might have been, partly because we had to deal with experiences about which discussion was disagreeable to the patients, but mainly because they really could not recall them; often they had no inkling of the causal connection between the occasioning process and the pathological phenomenon. It was generally necessary to hypnotize the patients and reawaken the memory of that time in which the symptom first appeared, and we thus succeeded in exposing that connection in a most precise and convincing manner." (2, 1)

Hull - Hypnosis and Suggestibility

Many cases of amnesia have been studied and reported in voluminous detail, though we are still far from a satisfactory understanding and agreement as to their nature. A trifling amnesia in the form of a temporary failure of recall of some perfectly well-known memory is an occurrence familiar to nearly every one. A person may be a little fatigued or worried.

He attempts to recall a name. He may try his best, but to no avail. On a later occasion, without any intervening rehearsal, the name may be recalled with ease.

Extensive amnesias are very apt to be associated with shocks of some kind. These may be gross physical injuries, such as severe blows on the head {p. 107), or the shock may be an emotional disturbance or even a moral conflict. The resulting loss of memory may cover only the few minutes immediately preceding an injury which produced unconsciousness; on the other hand, cases not infrequently appear in which the patient can recall nothing of what took place during a period of several months or even years. He may be able to recall neither his name nor anything of his former life. Such cases are believed usually to be hysterical in nature.

That the memory traces are really intact during the amnesia is shown by the fact that recall can usually be effected, without any relearning, merely by putting the subject into the hypnotic trance and suggesting to him that he will be able to recall everything in a normal manner. Further indication that the memory traces are intact in such cases lies in the fact that bodies of learned material are relearned with remarkable ease even without resort to hypnosis.

Some Typical Opinions Regarding Hypnotic Hypermnnesia

The view that memories completely inaccessible to normal recall may be recovered in hypnosis has had a very wide currency, chiefly among physicians dealing with psychopathology. For the most part, the use of hypnosis for this purpose has been interpreted largely in terms of that hypothetical psychic entity known as the subconscious mind and a hypothetical state of the nervous system called dissociation. Thus Breuer and Freud write (2, 8):

“. . . we had to emphasize the fact that the recollection of the effective psychic trauma is not to be found in the normal memory of the patient but in the hypnotized memory. The more we occupied ourselves with these phenomena the more certain became our convictions that the splitting of consciousness so striking in the familiar classical cases of double consciousness exists rudimentarily in every hysteria, and that the tendency to this dissociation. . . is the chief phenomena of this neurosis.”

Passing to the more normal types of loss of memory, we may cite Moll, who remarks (6, 124):
“Events of the normal life can also be remembered in hypnosis even when they have apparently been long forgotten.”

McDougall states (4, 94).

“It is true that in hypnosis, especially in its deeper stages, the power of recall of seemingly forgotten incidents, especially those of early childhood, is greatly increased; . . .”

Wingfield writes (9, 102):

“In the deep stage the memory may extend farther back, often very much farther than it does in the normal condition, and a subject may be able to recall events of his earliest childhood. This extension of memory is not limited to the deep state, though it is then more marked . . . In one case... I made a lady of thirty-two remember herself in long clothes . . .”

Bramwell says (7, 102):

“The improvement of memory as to remote events is still more interesting; and this I have frequently demonstrated in the following manner: Certain subjects were first questioned in the normal state as to the earliest events they could remember, when it was generally found they could recall nothing which had happened before the age of five or six. They were then hypnotized and, starting from the first event in their lives they could recall, it was suggested that they should revive the memory of earlier and earlier incidents. Some of the subjects related what they stated had happened at the age of two, and one described a children’s party given on the first anniversary of her birthday.”

The Problem of Establishing the Validity of Hypnotic Hypermnnesias

Hull - Hypnosis and Suggestibility

Reports of such remarkable power of recall as the two last cited naturally arouse a considerable degree of skepticism as to the genuineness of the memory. There is always the possibility that the subject under the influence of suggestion has fabricated the report. Even the fact that psychotherapy based on the supposed memory has been of value to the patient is hardly satisfactory evidence of historic accuracy because it is always possible that a pseudo-memory might be quite as efficacious in such a case as a genuine one. As a rule, writers who report such results are more or less aware of this difficulty and usually seek by means of the testimony of relatives or documents such as diaries to substantiate the accuracy of the supposed memory as to fact. Such evidence is rarely or never under experimental control and hence is usually unsatisfactory as scientific material. The same, of course, holds for the supposed hypnotic recall in cases of obviously traumatic amnesias such as the one reported by Mr. Sames (p. 107).

Luckily it is not necessary to depend entirely upon such uncertain data. In the case of standard and well-known verbal material memorized at an early age, the nature of the original memory is easily established and with quite satisfactory accuracy. We are fortunate in having a quantitative study based on such evidence.

An Experimental Test of the Power of Hypnosis to Restore Lost Childhood Memories

Two Hypotheses Concerning Hypnotic Hypermnnesia

It is very generally believed by psychopathologists that the memory traces in the case of hysterical amnesias are not particularly weaker than those which mediate ordinary waking recall. It is supposed, rather, that the trauma or emotional complex, whatever its nature, somehow inhibits or blocks the recall; that it interferes with the action of excitatory tendencies which would otherwise bring about perfectly normal recall.

On this hypothesis, then, hypnosis merely removes the block or inhibition in the case of hysterical or traumatic amnesias and thus permits the existent excitatory tendencies to function in a normal manner.

It is possible, however, to frame an alternative, or at least a supplementary, hypothesis. According to this second supposition, the greater facility of recall alleged in cases such as are cited by Wingfield and Bramwell (p. 110), as well as the results reported by Stalnaker and Riddle, may be accounted for by assuming a genuine lowering of the threshold of recall in the trance. If such a general lowering of the recall threshold takes place automatically in the trance, on some primitive physiological basis, it should operate to facilitate the recall of recently learned material as well as of relatively remote material. Fortunately, we have in the very carefully controlled work of Huse (3) an experimental test of this lower-threshold hypothesis.

Results of the Huse Experiment

So far as the results of the Huse experiment are concerned, then, the indication is definitely against the hypothesis of a special lowering in the hypnotic trance of the threshold of recall for faint memories.

A Second Study Concerning the Hypnotic Recall of Faint Memories

Fortunately there are two additional experimental studies which fully corroborate Miss Huse's findings. The first of these to be considered is reported by Mitchell (5).

Implications of the Experiments on Recall of Recently Learned Material

Hull - Hypnosis and Suggestibility

We have, then, including the major investigation of Huse, three wholly independent experiments, all of which indicate that the threshold for memories of recently acquired material is no better but, if anything, a little worse in the trance state than in the normal waking condition. On the other hand, if we take the clinical reports at face value, there is a great mass of evidence not only to the effect that the hypnotic trance is able to facilitate recall of memories which have been inhibited by traumas of various kinds, but also that it greatly facilitates the recall of ordinary memories of early childhood. The clinical evidence concerning this latter tendency is strongly substantiated by the controlled quantitative experiment of Stalnaker and Riddle. This later evidence seems, superficially, to indicate something like a lowered threshold for remote memories. That hypnosis should produce a lowered threshold for remote memories and no such lowering for relatively recent memories is distinctly paradoxical.

Summary and Conclusions

The experimental evidence shows rather definitely that recently acquired memory material is recovered no better in hypnosis than in the waking state, which probably indicates that hypnosis does not lower the threshold of recall. There is some striking experimental evidence which, while not absolutely convincing, tends strongly to confirm the clinical observations that hypnosis facilitates the recall of childhood and perhaps other remote memories.

Chapter VI

EXPERIMENTAL ASPECTS OF POST-HYPNOTIC PHENOMENA

A. Post-hypnotic Amnesia Discovery

Post-hypnotic amnesia is a remarkable inability shown by many hypnotic subjects to recall in the normal state events which took place during hypnosis (p. 31). The phenomenon was discovered by the Marquis de Puységur, in 1784, in connection with experiments on his famous subject Victor (p. 8). When this subject awoke from his dreamlike condition, he manifested a complete amnesia for everything which had taken place while it lasted.

Since it was already well known at that time that spontaneous somnambulists or sleep-walkers have such amnesias, the peasant's condition was quite naturally called artificial or induced somnambulism.

Because of the wholly erroneous belief that Victor, while in this state, possessed marvelous powers of prescribing medical treatment, Puységur's artificial somnambulism had a tremendous local vogue. So many patients came to him that he personally could not treat them all, and he resorted to Mesmer's old device.

He magnetized an elm tree on the village green, to which the patients could have free access. Fortunately we have what appears to be a trustworthy contemporary account of the behavior of these subjects (2, 28).

"Cloquet, an eye-witness, has given us some valuable information on the subject. He says that the patient's eyes were closed, and there was no sense of hearing, unless it was awakened by the master's voice. Care was taken not to touch the patient during his crisis, nor even the chair on which he was seated, as this would produce suffering and convulsions, which could only be subdued by the master. To rouse them from the trance, the master touched the patient's eyes, or said, 'Go and embrace the tree.' Then they arose, still asleep, went straight to the tree, and soon afterwards opened their eyes. As soon as they returned to a normal condition, the patients retained no recollection of what had occurred during the three or four hours.

The essential point to be noted in the present connection is that upon recovery there was a complete amnesia for the events occurring during the crises, exactly as had been observed in Victor, with whose case these subjects were doubtless familiar.

In general most writers since Liébeault have considered post-hypnotic amnesia as the most significant single symptom of hypnosis, and as marking the most profound degree of hypnosis which it is possible to attain.

Recall by Hypnotized Subjects of Events of Previous Trances

Hull - Hypnosis and Suggestibility

There is no indication in the sources available to the present author that either Puységur or his associates knew of the capacity of subjects while in the trance to recall events of previous trances, even though, for the subject in question, the latter events are inaccessible to recall in the normal state. As late as 1843 even Braid, who was familiar with certain of the French works on the subject, seems quite definitely to have missed this point. He writes (3, 123):

“There is also another remarkable difference. It is stated that although natural somnambulists cannot remember, when awake, what they were engaged in when asleep, they have a vivid recollection of it when in that state again; but I have found no parallel to this in the somnambulism induced by hypnotism. By this I mean that they cannot explain what happened during the former somnambulatory state, but they may approximate to the words and actions which had formerly manifested themselves, provided they are placed under exactly similar circumstances. For the extent to which peculiar manifestations may be brought out by manipulating the head and face, at a certain stage of hypnotism, . . . examples are given of memory as regarded events which happened during the waking condition, whilst they seemed to have no recollection of what happened during a former state of hypnotism.”

It is a little curious that Braid should have failed to discover this exceedingly obvious phenomenon, since, as shown by the above quotation, he was familiar both with the parallel phenomenon in sleep-walking and with the supposed kinship of hypnotism to it.

Experimental Approach to the Problems of Post-hypnotic Amnesia

Such considerations as the above serve to raise the fundamental questions of (1) what memory processes actually are subject to post-hypnotic amnesia and (2) the profundity of the amnesia where existent.

Certain casual observations seem to indicate that post-hypnotic amnesia may prove to be a fairly superficial phenomenon. It is a well-known fact, for example, that if, just before a subject is waked from the trance, a suggestion is given him that he shall remember everything that took place while he was under hypnosis, he will have no amnesia for that particular trance; at least there will be none evident to ordinary observation. This, coupled with the fact that a subject in one trance state can recall events of previous trances without any intervening rehearsal whatever, shows very clearly that the amnesia is not a phenomenon of retention. The memory traces must have been existent throughout the waking amnesic period; otherwise the registration (learning) would need to be reënacted before recall could occur in the succeeding trance state.

Summary

Subjects ordinarily classed as somnambules, but who have received no suggestions of any kind regarding post-hypnotic amnesia in the experiments, have been tested for post-hypnotic amnesia on a number of different memory functions. These subjects uniformly deny any recollection of trance events, i.e., as tested by general symbolic recall, amnesia is 100 per cent. By detailed specific recall this amount of amnesia is reduced for nonsense material probably to about 97 per cent. By the relearning method the amnesia falls to approximately 50 percent. Manual habits learned in the stylus maze show by the relearning method an amnesia also of about 50 per cent. With specific training in arithmetical addition and general training in memorizing nonsense material the amount of post-hypnotic amnesia is reduced to zero. The experimental results, while inconclusive, probably also indicate that post-hypnotic amnesia is Not operative in the case of conditioned reflexes.

The second major post-hypnotic phenomenon which has been connected with the theory of dissociation is post-hypnotic suggestion. This appears to have been discovered very early in the history of hypnosis, along with post-hypnotic amnesia and the other major hypnotic phenomena.

Hull - Hypnosis and Suggestibility

A typical and authentic picture of post-hypnotic suggestion is sketched by Bernheim (7, 31): "I wish to speak of the possibility of inducing in somnambules by means of suggestion, acts, illusions of the senses, and hallucinations which shall not be manifested during the sleeping condition, but upon waking. The patient hears what I tell him in his sleep, but no memory of what I said remains. He no longer knows that I spoke to him. The idea suggested arises in his mind when he wakes, but he has forgotten its origin, and believes it is spontaneous. Facts of this kind have been observed by A. Bertrand, Gen. Noiset, Dr. Liébeault and Chas. Richet. I have repeated these observations successfully many times in a large number of hypnotic cases and am convinced of their accuracy."

As indicated by the quotation from Bernheim, post-hypnotic suggestion presents two main aspects—the subjective and the objective. A concrete example of the former would be the suggestion to a subject that at a certain time after waking from the trance he will hear the clock in the near-by tower strike the hour of eight. The subject is likely to report hearing the bell and may even be induced to count aloud the individual strokes as they are hallucinated. Because of the relative inaccessibility of subjective phenomena to experimental investigation, the more exact and quantitative work has been directed toward the objective processes. As yet, however, but two such studies have appeared in this rich field. Both of these are concerned with changes in the strength of post-hypnotic suggestion tendencies to action with the lapse of time, more or less analogous to the curve of forgetting in memory investigations.

Summary

We have seen two techniques by which it is possible to measure the strength of a post-hypnotic suggestion and to trace its course as it declines with the lapse of time. It has been found by these methods that the curve of diminution in the strength of post-hypnotic suggestion is most rapid at first and becomes progressively slower as time goes on, in this respect resembling the curve of ordinary forgetting. Control groups given parallel instruction in the waking state probably show a decline, but one decidedly less in amount. Thus a post-hypnotic suggestion, at least for commonplace action, appears to be decidedly less effective as a motivating device than ordinary waking instruction. Lastly, the evidence is fairly clear that daily repetition of post-hypnotically suggested acts tends strongly to prevent their normal disintegration for some weeks at least.

Chapter VII

HYPNOSIS AND THE DISSOCIATION HYPOTHESIS

Janet's Conception of Dissociation

Pierre Janet (4) gives perhaps as clear an exposition of the dissociation hypothesis as any one. Quite typically he illustrates his account with cases from his clinical experience. One of his patients was a young girl of twenty years, called Irène.

This poor girl had for a long time cared for her mother who was dying of consumption, and at the same time had worked as a seamstress to provide the bare necessities of their lives.

Death came at last, with its characteristic gasping, blood-vomiting, and other ghastly accompaniments. The girl, terrified, tried frantically to bring the breath back to the lifeless body.

In the attempt the corpse fell to the floor. After frantic efforts the girl was finally able to lift the body back to the bed. It is scarcely surprising, after all these frightful experiences, that Irène should have developed a severe neurosis.

The neurosis took the form which Janet calls monoideic somnambulism. When in the somnambulistic condition, Irène was likely to rehearse the whole gruesome episode of her mother's death. Like Lady Macbeth in the famous sleep-walking scene of Shakespeare's play, she appeared to be oblivious to everything about her. If spoken to, she would not answer. Even though her eyes were open, they appeared to see nothing but what was relevant to her dreamlike preoccupation. However, when the somnambulistic episode had ended and she had regained her normal comprehension of her surroundings, she remembered nothing of what she had just been doing and saying—there was a complete amnesia for the entire episode. It developed, upon further investigation, that in the normal state she also had a complete amnesia for the incidents connected with her mother's death. She had, indeed, no recollection at all of that tragic event except as it had been told her.

Hull - Hypnosis and Suggestibility

It is important at this point to note that amnesia is fundamental in the dissociation hypothesis. It was assumed that the act of normal recall is the result of association. Quite naturally, then, the failure of the power to recall events which normally should be recalled, and which at one time perhaps were really susceptible to recall, was regarded as an interruption or destruction of the normal associative tendencies. It consequently was called dissociation. According to this hypothesis, the painful episode in the life of Irène is regarded as having given rise to a group of memories which, while closely associated with one another, are separated, i.e., dissociated from, the main body of her memories.

Dissociation and the Concept of the Subconscious

Careful study of other hysterical phenomena brought to light evidence which seemingly pointed not only to the existence of isolated, self-integrated groups of memories or ideas, but suggested that these dissociated aggregates could, and frequently did, live a life of their own and might in very rare instances somehow become a kind of secondary personality.

Sometimes the secondary personality might even attain a temporary dominance over the patient's behavior, producing characteristic changes in his character. When not dominant, the secondary personality (dissociated memory or habit system) managed somehow to maintain a fairly active existence, though the patient usually had no articulate or conscious knowledge of the fact.

Since, according to the current psychology of Janet's day, the ability to give verbal report was regarded as a test of consciousness, and since these memories were ordinarily not able to activate the symbolic speech processes in such a way as to be reported, the dissociated memory complex came to be regarded as somehow submerged and beneath the conscious. Such memories were accordingly said to be subconscious. Sometimes they were said to reside in the subconscious, a kind of dim psychological realm where all sorts of strange and bizarre happenings might take place. Curiously enough, these dissociated habit systems, even though subconscious, apparently were able to influence the overt behavior of the patient, sometimes to a marked degree. Unfortunately this influence too often led to more or less serious individual and social maladjustments. In short, these eccentricities of behavior constituted the symptoms of a psychoneurosis.

Preliminary Experiments Based on the Dissociation Hypothesis

Now, under such circumstances, it clearly is most important for psychopathology that the characteristics of this subconscious activity be discovered. The proper procedure would be, of course, to do this by experiment. But few persons would have the temerity to provoke a neurosis deliberately in order to study its history, however desirable the resulting knowledge might be. It was found, however, that what appeared to be dissociations of a closely similar but harmless nature could be induced experimentally by hypnosis. This was naturally regarded as opening up the entire realm of the subconscious to experimental investigation, and it was soon discovered that subconscious integrates produced in this manner, even though strictly unconnected with the speech systems of the patient, might become tolerably articulate through the activities of an accessory language system, namely, that of handwriting.

By a rather simple experimental procedure the hand could be induced to write fairly elaborate scripts automatically, i.e., apparently without any conscious knowledge on the part of the subject as to what was being written. This is known as automatic writing. It was discovered by this procedure that the dissociated or subconscious system of ideas was often capable of fairly complex intellectual achievements. Among these may be mentioned acts of judgment, the composition of brief original letters, and fairly complicated arithmetical computations. These results were somewhat paradoxical, since such acts normally are performed only when the subject is clearly conscious of the processes in question.

Hull - Hypnosis and Suggestibility

Indeed, it has often been thought that such processes could not take place without "conscious control." It was therefore inferred that the dissociated system must be in some sense or other genuinely conscious. It followed from this as a logical necessity that in such cases there must exist a kind of double consciousness, two simultaneous consciousnesses somehow coexistent in association with the same body. As a means of emphasizing this simultaneity or coexistence, the secondary or dissociated consciousness was frequently called the co-conscious.

Prince's Attempt to Test the Dissociation Hypothesis

His chief subject was a woman with a dual personality. One personality is designated as A, the other as B.

State A had an amnesia for the events experienced by B, but B had normal recall for the events of both A and B. State B, however, could be hypnotized. The hypnotic state is represented by 5. After waking from the trance B had an amnesia for b, its own trance state. Personality B made vigorous claims to Dr. Prince that when state (or personality) A was conscious, 1ϕ., dominating the oral speech mechanism, personality B or b was actively and vividly conscious. Thus b was at such times, in a literal sense, co-conscious. Of all this, state or personality A professed to have no knowledge whatever.

Prince seems to have regarded these remarkable allegations with a certain degree of skepticism. He accordingly carried out a number of experiments with the avowed purpose of testing the subject's claims. One of the experiments took the same general form as Janet's computational experiment already described, except that the induced alternation of the personalities seems largely to have replaced hypnosis.

"Accordingly it was agreed with b that when co-conscious would do a particular sum in arithmetic while A's consciousness was engaged in another task. The figures to be added . . . were not to be given until A was present...

It was accordingly agreed that A's attention should be engaged by having her write some verses with which she was familiar on a sheet of paper, on the upper and lower margins of which the required figures for the sum would be unobtrusively written. Co-conscious b was to perceive these figures and make the computation. . . . A was kept entirely in the dark regarding the nature of the experiment, and was not even informed that an experiment as such was being made... . It was further arranged with & that as soon as A had completed the verse she was to be changed to b, who was to give the answer immediately . . . before she could have time to make the computation from memory after the change to b, in case it had not been done co-consciously."

These various evidences led Prince to the conclusion "that such perceptions, interpretations, calculations, and translations could have been made by pure physiological processes without thought is inconceivable and not substantiated by anything that we know of physiological processes." He concludes, in short, that his "experiments to determine co-conscious (subconscious) ideation" had yielded a conclusive affirmative.

Two Simultaneous Independent Conscious Processes Reported by Burnett

In summarizing the investigations of Janet, Prince, and Burnett, it is well to remember that there are implicit in them two fairly distinct questions: (1) Is it possible by means of hypnosis to bring about an intellectual process within a subject's body and yet have the subject remain in professed ignorance of its existence while it is going on? (2) Is the dissociation, which is supposed to effect the results indicated in (1), of such a nature that two distinct intellectual processes may go on quite or nearly independently of each other, i.e., is the wall or barrier between the conscious and the subconscious (or co-conscious) of such a nature that one process does not interfere with the other under conditions in which interference normally takes place? There seems little room for disagreement with the conclusion of the authors on the first question, i.e., that post-hypnotic suggestion rather easily brings about a condition in which a person will perform fairly complex intellectual tasks and yet will deny all knowledge of the process at the very moment that it is taking place. Burnett's work is particularly convincing on this point. But in answer to the second question the experiments cited above are not nearly so conclusive.

Summary and Conclusions

Hull - Hypnosis and Suggestibility

We may now summarize the experimental results bearing on the dissociation hypothesis as applied to hypnosis. Post-hypnotic amnesia is a fact as well established as anything in hypnosis.

Furthermore, there can scarcely be any doubt that complex intellectual processes such as continuous addition may go on and the subject orally deny all knowledge of the activity at the very time it is taking place. It is difficult to understand how these phenomena could exist without some very special suspension or interference of the normal association processes.

In this limited sense it would seem that the concept of dissociation has some reason for existence. In view of the clinical interests of Janet and Prince, together with the notions of the nature of mind prevalent at the time, it is not surprising that this solid basis of fact should have led to the extension of the principle of dissociation to include something quite different, i.e., a functional independence of the processes dissociated. The significance of the clever experimental approach of Barry, Mackinnon, and Murray is not entirely clear. So far as it goes, it possibly points in the direction of dissociation as a functional independence, though a quite different explanation seems more likely, and the authors quite properly decline to draw from it conclusions in favor of the dissociation hypothesis. The results of Messerschmidt and Mitchell, on the other hand, suggest rather strongly that the whole concept of dissociation as functional independence is an error. It is to be hoped that the situation is now sufficiently clarified that the near future will see a series of well-controlled, large-scale investigations which will completely remove the uncertainties which at present becloud this extremely important problem.

Chapter VIII

HYPNOSIS CONCEIVED AS SLEEP

Some Typical Views Concerning Hypnosis and Sleep

ESMER seems never to have associated in any way in his theories of animal magnetism with the phenomena of sleep. This association appears first to have been made by the Marquis de Puységur, in 1784, as the result of observations made on his famous subject, Victor. Because the behavior of this youth after being magnetized resembled that of a sleep-walker, Puységur regarded his state as an artificially induced somnambulism. From that day to the present, the concepts of sleep and what later came to be known as hypnosis have been intimately related. Probably the majority of the writers on the subject, up to the present time, have tended to regard the hypnotic trance as differing in no way from natural sleep except in degree or in the artificial means by which it is brought about.

Summary and Conclusions

Hull - Hypnosis and Suggestibility

In concluding this discussion we seem forced to the view that hypnosis is not sleep, that it has no special relationship to sleep, and that the whole concept of sleep when applied to hypnosis obscures rather than clarifies the situation. The physiological criterion of the knee-jerk shows the trance to be allied, rather, with the waking state, and to be clearly differentiated not only from sleep but from incipient drowsiness as well. The psychological test of voluntary reaction to a signal shows practically identical results. Moreover, the same techniques which distinguished hypnosis from sleep were able definitely to trace objectively the gradual passage from the hypnotic trance into true sleep. This wholly natural transition accounts very simply and logically for the so-called lethargic state of hypnosis, which has often been observed and contrasted with the so-called alert stage. Thus the extreme lethargic state is not hypnosis, but true sleep; only the alert stage is hypnotic. Lastly, evidence has been presented which indicates not only that conditioned reflexes may be set up during hypnosis, but that this may perhaps be accomplished with even greater ease than in the waking state. This probably disproves Pavlov's hypothesis that hypnosis is a state of partial sleep in the sense of a partial irradiation of inhibition. On the other hand, the remarkable facility of subjects for falling asleep while receiving regular heavy blows on the patellar tendon seems to support Pavlov's theory of the nature of sleep itself. The alternative interpretation, that Pavlov's hypothesis assumes hypnosis to be an inhibition of the higher rather than the lower centers, is effectively refuted by Bass's results showing that voluntary action to a signal is not appreciably disturbed by hypnosis. The results of Hoff and Wermer cannot be evaluated until the experiment is performed under conditions which provide objective evidence that true sleep was not involved where only hypnosis was supposed to be.

Chapter IX

HYPNOTIC SUGGESTIBILITY AND THE TRANSCENDENCE OF VOLUNTARY CAPACITY

A. Processes Primarily Motor

have already had repeated occasion to observe the strong tendency to attribute remarkable or super normal powers to persons during hypnosis. Happily, the belief in the ability of subjects while in the trance to see without the normal use of the eyes, to obtain the normal pharmacological effects of drugs from the mere contact of the sealed container, to give strange but characteristic responses to the presence of certain metals, and to manifest marvelous sensitivity to magnets has now been very generally abandoned.

Nevertheless, the view persists that hypnotized individuals may display certain powers which transcend those possible to normal voluntary effort.

Some Persistent Claims Concerning Supernormal Performance During Hypnosis

It has been reported and widely credited that in the state of hypnotic catalepsy a subject becomes so immune to ordinary muscular fatigue that the arm can be held out horizontally for long periods with comparatively little sagging. Other writers have contradicted this, stating that the extended arm will sag during hypnosis, just as in the normal state, but that its descent is smooth and gradual, whereas the descent in the non-trance state is accompanied by marked involuntary tremors. It has been reported that subjects in the trance can perform feats on the ergograph which are quite impossible in the normal state.

By some it has been alleged that temperature changes amounting to several degrees may be brought about by direct suggestions (5, 100). It has been claimed that hypnotic suggestion can cause the blood to leave or return to a certain part of the body, such as the hand, so that it will become alternately pale or red at the whim of the hypnotist (5, 100). It has even been said that bleeding from open wounds could be stopped and later resumed by similar suggestions. It has been asserted that under the influence of hypnotic suggestion subjects become hypersensitive so that they can see and hear stimuli normally quite beyond their powers. On the other hand, it is asserted that under suggested anesthesia individuals may undergo even major operations without either pain or shock.

The great ease with which such claims have attained currency doubtless may be attributed in part to the natural human craving for the marvelous, but other and more creditable sources of interest have not been lacking.

Hull - Hypnosis and Suggestibility

One such source lies in the fact that, from the first, experimentalists in this field have been haunted by the fear of being deceived by the simulation of hypnosis on the part of their subjects. Clearly, if certain phenomena can be evoked in the trance which it is not possible to attain through voluntary effort in the non-trance state, this fact immediately becomes of importance as an objective means of detecting simulation and thus, indirectly, a means of protection against this danger.

An additional consideration which makes such possibilities of importance, but one which has received little attention, is the likelihood that, if hypnosis is really able to evoke supernormal processes of any kind, a sagacious investigation of such phenomena might lead to the discovery of hitherto unknown physiological mechanisms. It is conceivable, for example, that it might lead to an effective control of certain autonomic processes ordinarily very feebly influenced by voluntary effort. Apart from the contribution to science of such a sequel, there is the additional possibility that the ready control of such a physiological process might prove of practical therapeutic value in the treatment of nervous, mental, and even somatic disorders.

While it cannot be denied that claims of the transcendence of physiological normality smack strongly of the miraculous, it is to be observed that as a rule they are not put forward as magic but soberly, the cause being attributed to some hypothetical but as yet unrecognized physiological principle. In many cases the reports of the investigations in question have appeared in reputable scientific publications, and have been written by persons presumably with scientific training. Moreover, the experimental evidence for a heightened suggestibility in the hypnotic state (p. 288ff.) gives a certain a priori plausibility to some of the more moderate claims. It accordingly is both unscientific and unsafe to reject all statements of this kind as untrue, however preposterous they may appear to ordinary common sense. The decision in each case must rest, in the last analysis, upon the evidence of carefully controlled experiment.

Summary and Conclusions

Several of the investigations reviewed in the present chapter are, by reason of one defect or another, of only historical interest. Of the more recent authors, Williams finds no significant difference between the trance and the waking state either in ability to hold the extended arm in a horizontal position or in the amount of tremor when so doing. Nicholson found a great, though undetermined, amount of advantage in the trance state in power to resist muscular fatigue. Williams's more carefully controlled experiment confirms this finding, but the advantage of the trance state shrinks, on the average, to something in the neighborhood of 12 or 16 per cent, according to the method of computation. Young reports no difference between the two states in respect to the power of momentary grip of a dynamometer.

In the consideration of these apparently conflicting facts, as well as evidence to be presented in the two succeeding chapters, it is important to note that there are involved two distinct questions which have not always been clearly distinguished.

They are:

1. Does the hypnotic state, as such, produce a supernormal capacity as to muscular power, resistance to fatigue, and so on?
2. Is the hypnotic state a condition of heightened suggestibility such that performances beyond the usual voluntary range can be induced if suggestions to that effect are given?

Hull - Hypnosis and Suggestibility

The evidence at present available seems to indicate with some definiteness that the former question should receive a negative reply, but that the latter should be answered affirmatively. The superficial inconsistency between the negative results of Willams's arm-extension experiment and the positive results of his ergographic experiment probably disappears on these assumptions. The arm-extension experiment should not have shown any trance advantage because no strong or special suggestions were given that the arm should stay up indefinitely or that there would be no fatigue pains. In the case of his ergographic experiment, however, there was a definite suggestion that the subject would suffer no fatigue and that he would make a good record; and we find the trance in this case yielding a clearly superior performance. It seems likely, therefore, that if the arm-extension experiment should be repeated with suggestions of superior strength in holding the arm horizontal and of absence of fatigue, the trance state might show a moderate but fairly consistent advantage. It is difficult to account for Young's negative finding in the matter of grip, though it would be worth while also to repeat his experiment, with more vigorous suggestions that the subject would manifest superior strength than Young seems to have used. Exactly the same suggestions should, of course, be given in the waking tests. If, however, this experiment should fail to yield a moderate advantage for the trance, it would probably mean that the suggestions against fatigue may be the essential active factor in the protracted activities involving fatigue and pain.

Chapter X

HYPNOTIC SUGGESTIBILITY AND THE TRANSCENDENCE OF VOLUNTARY CAPACITY— Continued

B. Processes Primarily Related to the Senses

At this point we pass from the consideration of the supposed hypnotic transcendence of voluntary capacity primarily in the field of the motor processes to that primarily in the field of the sensory or receptor processes. In this connection we shall consider first the matter of suggested hyperesthesia (increased acuity of the senses); of selective anesthesia (insensitivity to certain arbitrary classes of stimuli); of suggested analgesia (specific insensitivity to pain); and of suggested hallucinations (reactions as if to non-existent stimuli), with particular reference to certain investigations concerning the influence of hypnotic suggestions on processes normally supposed to be under the control of the autonomic nervous system.

Hypnotic Suggestion and Hyperesthesia

During the long history of hypnosis, beliefs in the greatest variety have been held as to the supposed supernormal sensitivity to faint stimuli of subjects while in the hypnotic trance. The following passage from the sober Braid may serve as an example (3):

"When we consider that in this process we have acquired the power of raising sensibility to the most extraordinary degree, and also of depressing it far below the torpor of natural sleep; and that from the latter condition, any or all of the senses may be raised to the exalted state of sensibility referred to, almost with the rapidity of thought, by so simple an agency as a puff of air directed against the respective parts. . ."

Hypnotic Anesthesia and Surgery

It may be recalled that in the quotation from Braid mention is made of the power of suggestion in the trance state to depress sensitivity as well as to heighten it, just as Hadfield (8) speaks of the capacity of hypnotic suggestion to weaken the power of muscular contraction as well as to strengthen it. In the motor field such a loss of power resembles paralysis. Spontaneous functional paralyses closely resembling those producible by suggestion have long been known and studied as symptoms of hysteria. The parallel functional loss of sensory capacity is usually called anesthesia. Sometimes the loss of the sense of pain receives the special name of analgesia. Spontaneous functional anesthetics have also long been recognized as symptoms of hysteria and employed in the diagnosis of this complex group of disorders. Ironically enough, the presence of spontaneously anesthetic spots on the skin was once supposed to be a valuable distinguishing characteristic of witches and was utilized in their detection.

Hull - Hypnosis and Suggestibility

In the case of the inhibition of the power of muscular contraction, there is clearly not involved the same type of transcendence of physiological normality that a supernormal performance implies; nothing is easier than a submaximal effort.

In a sense the same may be said of an apparent blunting or depression of sensitivity by suggestion, as contrasted with a suggested hyperesthesia. Suggested anesthesia may possibly be nothing more than the influencing of the speech apparatus by means of suggestion in such a way that it will deny the fact of stimulation rather than affirm it. If carried to its logical limit, however, the lack of response to stimulation might conceivably imply a genuine physiological dissociation between the stimulus and the response. This may best be seen, perhaps, by considering the case of very strongly injurious stimuli. Normally such stimuli evoke such overt reactions as shrinking or withdrawing from the stimulus, grimaces, cries, tears, and so on. Reactions of this type are, however, more or less under voluntary control, provided the intensity of the stimulus is not too great. That a dissociation? of some kind between stimulus and the normal response may be brought about by means of appropriate suggestions of anesthesia or analgesia in the hypnotic state, even in the case of the most violent stimuli, has long been believed, and apparently with some reason,

Summary and Conclusions

We may now take a brief backward glance at the evidence which has been assembled concerning the more sensory aspects of the power of hypnotic suggestion to produce a transcendence of voluntary capacity. Young's study showed that cutaneous sensitivity probably is not improved by suggestions of hyperesthesia. It is noteworthy, however, that his subjects when in the hypnotic state believed themselves to have a greatly increased sensory acuity. Stalnaker and Richardson showed that subjects in the trance, when it was suggested that they would display heightened sensibility to time intervals, manifested no increased power of judging time but—exactly as in Young's study—uniformly indicated their belief that their sensitivity was greatly enhanced.

We thus come to the contrasted matter of sensitivity lowered

by suggestion. We find reason to believe that hypnotic anesthesia is a genuine phenomenon in the sense that painful stimuli will often be endured without the usual outward signs of suffering. For this reason analgesia was doubtless useful in surgery before the discovery of the chemical anesthetics. Sears's careful measurements of various voluntary and non-voluntary reactions show that moderately painful stimuli applied under hypnotically suggested anesthesia produce complete or nearly complete abolition of verbal reports of pain, of facial grimaces ordinarily associated with pain, and of two different experimental indicators of pain normally manifested by respiration, a semivoluntary process. However, it was found that the presumably non-voluntary pulse activity shows a clear reaction to painful stimuli but that the amount of the reaction is reduced through suggested anesthesia by a half or three fourths.

Neither is the galvanic skin reaction obliterated, though it is reduced under the influence of suggested anesthesia by something like a fifth of its normal amount. It thus appears that hypnotically suggested anesthesia produces a nearly perfect abolition of the ordinary signs of pain in the case of voluntary and semivoluntary processes but shows a reduction ranging from 20 to 75 per cent, only, on non-voluntary processes.

This differential effect of hypnotically induced analgesia probably indicates that the process in question is in some way significantly related to the mechanism of volition. Here also must be considered the phenomena traditionally called rapport, which appear upon analysis to be nothing whatever but a selective anesthesia resulting either from direct or from indirect suggestion.

The matter of suggested hallucinations may be summarized rather simply by saying that some remarkable differential physiological responses have been obtained with susceptible subjects by suggesting to them pseudo-stimuli, particularly such as relate to food and drink. Normal waking control experiments in this field are very scarce, but such as are available, taken together with the Russian experimental work on conditioned salivary reactions, seem to indicate that the observed phenomena probably do not differ materially from those producible in both animals and men by means of the conditioned reflex technique. This raises a certain amount of presumption in favor of the view that the non-voluntary differential secretions and metabolic effects obtained from suggested hallucinations may be essentially conditioned-reaction phenomena.

Hull - Hypnosis and Suggestibility

Owing to the fact that in most cases comparable control experiments in the non-trance state were not carried out, it is impossible at the present time to make a final decision concerning whether the effects observed under hypnotic suggestion are any more pronounced than the effects following parallel suggestions administered in the waking state. Certain facts, some of which will be presented in the next chapter, raise some a priori expectation that a moderate tendency in this direction may be anticipated from suitable experimental procedures.

Chapter XI

HYPNOSIS AS A STATE OF HEIGHTENED SUGGESTIBILITY

At least since the time of Braid's later activity (1847), it has been generally recognized by writers on the subject of hypnosis that persons display while in the hypnotic trance a heightened responsiveness to direct suggestion. Bramwell (3, 283), who had seen certain of Braid's later works not generally accessible, gives it as Braid's view that "Such suggestions [verbal] acted more powerfully during hypnosis." Binet and Féré (2, 364) assert, "In slight hypnotism, in the states described as fascination, magnetic sleep, etc., subjects appear to be peculiarly liable to suggestion." Bernheim (1, 141) writes, "Hypnotism . . . facilitates suggestion when it can be induced; but other suggestions may sometimes succeed when the suggestion of sleep is inefficacious." ? Forel (7, 60) remarks, "Sleep or slumbering is produced by suggestion. But as soon as this is present, the suggestibility is increased by sleep, as long as the latter does not become lethargic." Sidis (75, 70) states, "With the Nancy school we agree that suggestion is all-powerful in the hypnotic trance; the hypnotic trance is, in fact, a state of heightened suggestibility, . . ." Moll (72, 264) says, "We have seen that susceptibility to suggestion is the chief phenomenon of hypnosis. . . . A certain degree of susceptibility to suggestion is normal." Bramwell (3, 333) reports it as his own observation that, "In hypnosis, to gain increased suggestibility it is often only necessary to repeat quietly some recognized formula once or twice..." Lastly, Wingfield (r7, 8) states, "To put the matter in another way, successful suggestion will induce hypnotic phenomena, and the phenomena in their turn induce an increased suggestibility."

However different may be the theoretical bias of the various writers, and however varying may be their interpretation of the phenomenon, there appears to be no disagreement regarding the fundamental fact that whatever else it may be, the hypnotic trance is a state of heightened susceptibility to suggestion.

It is wholly characteristic of hypnotism as a science that despite the long period during which the phenomenon of hyper suggestibility has been widely recognized, no serious attempt at a quantitatively controlled verification of the principle has been made. We shall later have occasion to note a similar experimental sluggishness in the case of habituation as related to hypnosis. But the modern scientific temper will not be satisfied with mere belief and opinion; it demands objective evidence from controlled experiments that subjects actually are more susceptible to suggestion when under hypnosis than when in the normal state.

And if there really is an increased suggestibility while in the trance, this must be to a certain degree or quantity. How great is this? Is the difference, for example, a relatively slight and unimportant one, or is a person many times more susceptible to suggestion in the trance than in the waking state?

Three Hypotheses Concerning the Nature and Origin of Hypnotic Hypersuggestibility

In the preceding pages we have discarded, as non-characteristic, one after another of the phenomena once supposed to be distinctive of hypnosis. Among these may be mentioned catalepsy, rapport, and post-hypnotic suggestion.

We have now before us perhaps the last important claimant for this distinction. This is that the hypnotic state is clearly to be differentiated from the non-hypnotic condition, not as being merely a state of susceptibility to suggestion, for that is notoriously true of the normal condition as well, but rather as being a state of heightened susceptibility to suggestion. The experimental results already given in the present chapter, together with the more or less indirect evidence contained in the two preceding chapters, indicate rather conclusively that hypnosis actually manifests this tendency at least with the majority of subjects.

Hull - Hypnosis and Suggestibility

Nevertheless, the question of whether hypersuggestibility is a physiological tendency genuinely inseparable from the hypnotic trance must still be faced. This point is a peculiarly critical one owing to the fact that if hypersuggestibility must also be discarded as distinctive of the hypnotic trance, which must be done if the inquiry receives a negative answer, we should be forced by logical necessity to abandon the concept of hypnosis as a significant entity.

In the consideration of this question three prominent possibilities may be noted. It will be convenient to present them as formal hypotheses:

1. Specific Physiological Hypothesis. This hypothesis assumes that there may be a specific physiological tendency (the nature of which is not specified) for positive response to any direct prestige suggestion to induce within the responding organism a more or less generalized increase in the normally existent tendency to respond positively to any and all other forms of prestige suggestion. "Having responded to one suggestion, the organism is at once in a state of heightened susceptibility to further suggestion. According to this line of reasoning, the hypnotic trance becomes only a special case of the general law. According to the usual procedure for inducing the trance, the closure and ultimate catalepsy of the eyelids, along with certain other phenomena, are first evoked on the basis of waking suggestion... these responses to waking suggestion would naturally produce a state of heightened susceptibility to further suggestion which is . . . characteristic of the trance state." (8) If this hypothesis should find verification, it would seem reasonable to conclude that hypnotic hypersuggestibility is an essential rather than a fortuitous characteristic of hypnosis, and hypnosis as hypersuggestibility may continue to be regarded as a genuine entity.

2. Indirect Physiological (Relaxation) Hypothesis. It is a very general custom of hypnotists to give suggestions of relaxation while inducing the trance. Moreover, it is likely where such specific suggestions are not given that the subjects receive indirect suggestions to the same end from the direct suggestions of being tired and of going to sleep which almost always are given. At all events, subjects in deep hypnosis normally present a picture of rather complete relaxation. The present hypothesis assumes that this relaxation has the effect more or less completely of suppressing the spontaneous activity of the symbolic or thought processes. With this suppression should disappear the control normally exercised by symbolism over the lower levels of activity. This should leave the latter more completely exposed to the influence of suggestive stimuli from outside sources, as has been shown in the preceding pages to take place.

In so far as this hypothesis may find experimental verification, hypnotic hypersuggestibility must be regarded as merely a fortuitous associate of hypnosis, just as rapport and catalepsy already have come to be regarded, and hypnosis may accordingly cease to be considered as a distinctive entity.

3. Social Suggestion Hypothesis. It is an almost universal belief—among the American people, at least—that once a subject has yielded to hypnosis (lid-catalepsy, the assumption of a sleeping posture, etc.) he is completely within the power of the hypnotist, and that so long as the trance persists he cannot resist any suggestions that the latter may choose to give. The widespread impression that crimes may be induced by means of hypnotic suggestion is but one manifestation of this belief.

It is even believed by large numbers of well-educated persons that the tendency to hypersuggestibility may become both fixed and generalized by one or two hypnotic procedures, with the result that a permanent weakening of the "victim's" resistance to suggestion may lay him open to the exploitation of unscrupulous persons. The present hypothesis assumes that this widespread belief itself constitutes a powerful suggestion supplementary to that administered by the hypnotist, and is quite sufficient to produce, after the trance has been induced by ordinary suggestion, a marked facilitation of response to further suggestions.

In so far as this hypothesis finds verification it will be fatal to the claims of hypersuggestibility as being an essential characteristic of hypnosis, and hypnosis should tend, to this extent, to cease to be regarded as a scientific entity.

It should be observed that none of the above hypotheses is necessarily in conflict with any of the others. So far as a priori considerations alone are concerned, it is quite possible that all three may be true, each contributing to a common observed result.

Hull - Hypnosis and Suggestibility

The Role of Hypothesis, Deduction, and Experiment in Evolving Scientific Theory

There is a statement attributed to a well-known American psychologist to this effect: "An experiment without an hypothesis is blind. An hypothesis without an experiment is dead—or ought to be."

If the above principle had been more generally observed throughout the history not only of hypnotic theory but of psychological theory in general, the current offerings in each would be less voluminous and at the same time more illuminating.

The first characteristic of a satisfactory explanatory hypothesis in science is that it shall really explain all the phenomena which it purports to explain. The test of whether it does this is whether or not the phenomena to be explained can be deduced from the hypothesis by a strictly logical procedure. But the fact that an hypothesis can do this is not necessarily convincing evidence that it is true, especially where the phenomena to be explained are neither numerous nor complex. Within limits it is always possible for an ingenious person, if permitted to choose his variables with some freedom, to construct more or less by trial and error an hypothesis which will fit simple situations.

The real test comes at the next step in the evolution of an hypothesis into a theory. This step consists in passing from the deduction of those phenomena already well known to the deductive prediction of the existence of phenomena never yet observed. These deductive predictions naturally set problems for the experimentalists, and at this point the laboratory makes its contribution. If experiments consistently verify the deductions, the hypothesis progresses to the status of a theory or a law; if not, it passes (or should pass) out of the realm of the living science into the history of science.

Summary and Conclusions

We have seen that subjects as a rule show a fairly marked tendency to both homoactive and heteroactive hypnotic hypersuggestibility. These two tendencies are related to each other very much like the immediate effects of training and transfer effects of training respectively. Whether or not this hypothetical relationship is the true one, at least the two forms of hypersuggestibility conform to it in so far as relative strength is concerned: homoactive hypersuggestibility is considerably stronger than the heteroactive variety, just as the effects of training are stronger on the activity trained than on some different activity. The evidence at present available indicates that homoactive hypnotic hypersuggestibility is somewhat more than twice as strong as suggestibility in the normal state, whereas the heteroactive manifestation is somewhat less than twice as strong.

It is particularly to be noted, however, that the hypnotic hypersuggestibility revealed by these experiments has not an absolute, but only a relative, significance.

While most persons actually are more suggestible when in the hypnotic trance than when they are in the non-trance condition, it does not follow by any means that all persons in hypnosis are more suggestible than any person in the normal condition.

Despite the limitation in the meaning of hypnotic hypersuggestibility just noted, it has been regarded as presenting some possibilities of being a basic and essential characteristic of hypnosis. For this reason the nature and origin of hypersuggestibility becomes of considerable theoretical significance.

Chapter XII HYPNOSIS REGARDED AS HABIT

Hull - Hypnosis and Suggestibility

It has long been known that successive repetitions of the hypnotic trance facilitate the induction of the trance on later occasions. Husson's committee, appointed by the French Academy of Medicine, stated in 1831 (3, 35), "When once a person has been thrown into the magnetic sleep, it is not always necessary to have recourse to contact and passes in order to magnetize him afresh." James Braid wrote in 1843 (4, 116), "It is important to remark, that the oftener patients are hypnotized, from association of ideas and habit, the more susceptible they become." Forty-five years later we find Binet and Féré writing from a different point of view, yet agreeing in this. They state (3, 364), "The hypnotic sleep, which is produced with so much difficulty and delay in fresh subjects, occurs with alarming rapidity in those who have been long under treatment." Bernheim (2, 17), referring to hypnotic "sleep," says, "The habit of sleep is very soon acquired by the organism." Moll (20, 158) remarks, "Training not only makes the hypnosis deeper, but makes it appear more quickly." Forel (6, 86) states, "That one increases the suggestibility of a person by repeated hypnotizing is an assured fact." Bramwell (5, 335) writes, "Hypnotic suggestion tends to gain strength with repetition." Pavlov characteristically concludes (73, 407), "We can, therefore, regard 'suggestion' as the most simple form of the typical conditioned reflex in man." On no phenomenon from the whole field of hypnosis, perhaps, is there more complete agreement by the writers on the subject. Clearly, hypnotic susceptibility is greatly facilitated by practice.

Objective Characteristics of Habituation

Summary and Conclusions

We have seen that the available experimental results as a whole show that the process of hypnosis manifests the following characteristics:

Practice in the act facilitates its performance; the rate of gain is more rapid early in the practice than later; a period of disuse is followed by a partial loss of the facilitation resulting from practice; the amount of loss from disuse is greater where the practice intervals are closely spaced; a resumption of practice produces a recovery of the lost facility; the curve of the recovery is one of negative acceleration; and the general rate of recovery of facility is faster than was its original acquisition at the point in question. Such a remarkable and detailed conformity of the phenomena of hypnosis to the known experimental characteristics of ordinary habituation can hardly be accidental and without significance. The indication would seem to be that, whatever else hypnosis may be, it is—to a considerable extent, at least—a habit phenomenon and that quite possibly this hypothesis may furnish the basis for an ultimate understanding and explanation of its hitherto largely inexplicable characteristics.

While not quite so complete experimentally, the parallel characteristics as those of hypnosis, just enumerated. This not only serves to identify waking suggestion as in some sense a habit phenomenon, but to strengthen still further the kinship between hypnosis and direct suggestibility already indicated by the evidence of correlational studies (p. 77), as well as general a priori considerations. These positive habituation phenomena also serve a useful purpose in differentiating hypnosis and direct waking suggestion from animal catalepsy on the one hand and from indirect or non-prestige suggestion (p. 379ff.) on the other.

Finally, it should be noted that all of the experiments summarized in the present chapter have been based on the homoactive principle, i.e., the criterion of habituation in all cases has been the influence of repetition upon the act repeated (p. 287). Hypnosis should also show a complete set of heteroactive practice phenomena in the form of facilitated responsiveness to miscellaneous non-practised suggestions in successive trances. The experimental determination of this matter is logically the next step in the development of this branch of the subject. The findings may be very significant as to the nature of hypnosis.

Chapter All]

HYPNOSIS AND NON-PRESTIGE SUGGESTION

Chapter XIV

INTERPRETATIONS

Hull - Hypnosis and Suggestibility

behind the conclusions is too intricate for brief presentation. It is obvious that the theory of human behavior is much too scantily developed, and that the phenomena of suggestibility are too imperfectly known at the present time, for a complete and ultimate theory of hypnosis to be possible.

The evidence is sufficiently complete in certain portions of the subject, however, to permit of limited generalizations. It is also sufficiently complete on a number of controverted points to enable us to state with some confidence that the supposed phenomena really are not characteristic of the hypnotic trance, and therefore need not be embraced in a general theory of the nature of hypnosis as such. By this removal of pseudo difficulties we may at least be opening the way to a possible theoretical development which may be expected in the future.

Pseudo-Difficulties in Hypnotic Theory

One pseudo-difficulty which has been a stumbling block in the way of certain writers is the belief that rapport is an inherent and essential characteristic of hypnosis. Our experience with this phenomenon is wholly in agreement with that of Braid, Bramwell (6, 344), and Young (25), among others, in indicating that the phenomenon called rapport is never encountered unless suggested to the subject either directly or indirectly. This does not, of course, abolish the ultimate necessity of accounting for the phenomenon, but it definitely simplifies the theoretical problem of the nature of hypnosis itself.

A second pseudo-difficulty which has been the cause of considerable futile theoretical effort is the belief that catalepsy is an essential and inherent characteristic of hypnosis. This error has been particularly pernicious in its indirect effect of falsely linking hypnosis with the tonic immobility (7) which may be induced in many animals such as hens, rabbits, toads, lizards, etc., by means of violent stimulation or of physical restraints.

There is some reason to believe that the two phenomena are effectively differentiated by their differences in response to practice: hypnosis and prestige suggestion in general show markedly positive practice effects (p. 340), whereas animal catalepsy seems to show negative practice effects (p. 346).

Moreover, hypnosis and prestige suggestion appear to originate in habits which must previously have been acquired, whereas the tendency of animals to pass into a state of tonic immobility seems to be innate and unlearned. But probably the most convincing evidence indicating differentiation between human hypnosis and the tonic immobility of animals is the well-known fact (p. 25) that suggested catalepsy can be induced about as readily in the waking condition as in the trance state. Thus catalepsy appears to be anything but peculiar to hypnosis.

A third pseudo-difficulty which has presented a major obstacle to many hypnotic theorists is the belief that hypnosis is a form of true sleep.

Indeed, the fact that subjects during hypnosis (as indicated by post-hypnotic amnesia, say) can perform the most complex processes of learning, computation, and problemsolving should have prevented any such view from ever having been widely held. People do not do such things when really asleep.

A fourth pseudo-difficulty which has agitated writers in hypnotic theory (5, 86; 6, 89) is the belief that subjects under hypnosis show a greatly heightened sensitivity to faint stimuli. We have seen, on the contrary (p. 245ff.), that the evidence for hypnotic hypersensitivity is negligible but that the evidence for normal or even subnormal sensitivity is good.

A fifth pseudo-difficulty which has complicated the problem of hypnotic theory has been the belief that hypnosis is a pathological condition, presumably allied to hysteria. It must be granted at the outset that hysteria, with its amnesias, anesthetics, etc., probably is dependent to a certain extent upon the same mechanisms as enable the corresponding phenomena to be evoked artificially in the hypnotic trance. It is even likely that a comparative study of the two phenomena by modern experimental procedures would yield important light regarding the psychoneuroses. However, the correlational studies which have been performed (p. 92ff.) reinforce the consensus of observational reports that persons susceptible to hypnosis are quite as normal (p. 93) and quite as intelligent (p. 86) as are persons who are resistant to suggestion (7).

Hull - Hypnosis and Suggestibility

A sixth pseudo-difficulty in the development of a theory of hypnosis has been the belief that it is a state of dissociation. We have fairly good experimental evidence (p. 183) indicating that hypnosis is a state of dissociation neither in the sense that persons in that state can carry on two independent mental processes more effectively than when in the non-trance state (16), nor in the sense that persons susceptible to hypnosis can in the normal state carry on two independent mental processes relatively more readily than can persons who are not susceptible to hypnosis (1).

It is true, however, that specific suggestions to that effect are able in hypnosis to make certain memories inaccessible to voluntary recall (p. 138), and to reduce to varying degrees the responsiveness of the organism to painful stimuli (p. 264). These are, in a certain real sense, dissociation phenomena, but by no means such in the sense of a dissociation into two independent "minds," one conscious and the other subconscious.

These latter notions are probably survivals of an outworn metaphysics which conceived the mind as a kind of disembodied spirit which was associated with a living body only by reason of a kind of metaphysical coincidence?

1 The dissociation once conceived to exist between physical conditions and mental processes is clearly expressed in the words of Tyndall (6, 307):

"There is no fusion possible between the two classes of facts. The passage from the physics of the brain to the corresponding facts of consciousness is unthinkable." Many things which are unthinkable to one generation become easily conceivable and even commonplace to later ones.

Hypnosis Is a State of Relatively Heightened Susceptibility to Prestige Suggestion

The only thing which seems to characterize hypnosis as such and which gives any justification for the practice of calling it a "state" is its generalized hypersuggestibility. The difference between the hypnotic state and the normal is, therefore, a quantitative rather than a qualitative one. Despite the widespread and long standing belief to the contrary, the author is convinced that no phenomenon whatever can be produced in hypnosis that cannot be produced to lesser degrees by suggestions given in the normal waking condition.

The Mere Susceptibility to Prestige Suggestion Is Not Hypnosis

It is further to be noted that this hypnotic hypersuggestibility has a relative and not an absolute significance. The essence of hypnosis thus lies in the fact of change in suggestibility.

The evidence at present available indicates that of two people who show a distinct heightening of suggestibility following the hypnotic procedure, one individual may be considerably more responsive to suggestion before going into the trance than the other is afterwards. Not only this, but persons differ greatly in the amount of hypersuggestibility induced by a given technique. It is indeed probable that a certain small percentage of persons who appear to go into the trance and who display such phenomena as post-hypnotic amnesia do not show any overt motor hypersuggestibility whatever. It is even possible that occasional individuals will show, when apparently in the trance, a diminution in suggestibility, at least for certain activities."

Prestige Suggestion Conceived as a Habit Phenomenon

There remains the still more basic problem of the nature of suggestion itself. In the consideration of this question it must be observed, in the first place, that we are not here concerned with any forms of behavior not essentially related to hypnosis.

On this ground we discard from further consideration the non prestige forms of suggestion such as Binet's progressive weights and progressive lines (p. 350).

The experimental evidence indicates that whatever else prestige suggestion may be, it at least is a habit phenomenon.

That both hypnosis and waking suggestion manifest the classical behavior of habituation in remarkable detail (p. 334) has been shown by Krueger (75), and by Patten, Switzer, and Hull (78).

Hull - Hypnosis and Suggestibility

This general thesis is supported indirectly by Messerschmidt's results, which show that children in early childhood are not as suggestible as they are at seven or eight years of age. This latter fact is interpreted as meaning that learning the ordinary habitual responses to language stimuli is an essential component of acquiring the tendency called suggestibility.

Bernheim (4) reduced suggestion substantially to the association of ideas; the view here presented reduces it to the strictly physical basis of the associations between stimuli and responses, ideas becoming purely physical symbolic acts.

Suggestion Differentiated from Volition on the Habit Hypothesis

From the introspective point of view, one of the most characteristic differences between actions performed through the influence of suggestion and ordinary acts is that the latter are usually felt somehow to be willed, whereas the former acts are felt not to be willed. This being the case, it is obvious that no wholly satisfactory account of suggestion can be given until there is available an adequate psychology of volition.

Since no satisfactory systematic view of voluntary action has yet been formulated, the following is offered as a skeleton working hypothesis upon which to project a systematic account of hypnosis and suggestibility.

The basic assumption of the present hypothesis is that there exist two fairly distinct levels of habitual reactions, an upper or symbolic level, and a lower, non-symbolic or instrumental level. Symbolic acts may perhaps best be described as pure stimulus acts (ro, rr), acts which function purely as stimuli to evoke other acts. The most common form of symbolic or pure-stimulus act is speech.

Suggestions Differentiated from Commands

Responses to commands are conceived as being either voluntary or involuntary, though it would seem that frequently the two mechanisms may be simultaneously active. In the case of an instant response to a sharp command such as might be given by an officer to a soldier, the reaction would presumably be non-voluntary—a simple habitual reaction without involvement of the soldier's symbolic processes. A truly voluntary response to a command, on the other hand, would be a case in which the command first evoked an intraorganic symbolic sequence on the part of the subject, which finally led to a subvocal symbolic reaction substantially equivalent to the command emanating from the other person, which, in turn, evoked the reaction commanded. It is not inconceivable that suggestions might also set going a symbolic sequence in the subject similar to that caused by the command just considered, in which event we should probably have a case of simulation.

Ideomotor Action and Monoideism Conceived as Habit Phenomena

According to Bramwell (6, 283), Braid in his later years held that the various phenomena of hypnosis resulted entirely from dominant ideas which "reacted on the body and produced their physical equivalent." A number of other writers in this field, notably Bernheim, have held a substantially similar view. That the concrete facts of normal psychology support this hypothesis has been shown in considerable detail in the preceding pages (p. 41ff.). A continuous stimulation by words associated with a particular act will bring about the act, whether these words are those of the subject himself or of some other person. Perhaps the most critical evidence of all indicating the reality of ideomotor action is the fact (p. 44) that when a subject merely observes an action, he tends automatically to execute it.

The present hypothesis recognizes very fully the rôle played by ideomotor action in the field of hypnosis and suggestibility. It disagrees sharply with the view held by Braid and Bernheim, however, who believed with most psychologists of their respective periods that an idea is some non-physical entity which is evoked in the mind of the subject by the experimenter's words, and which somehow in the case of ideomotor action is able to muster the physical energy required to evoke the action suggested. According to the present hypothesis, the physical substance of an idea is a symbolic or pure-stimulus act.

Suggestive Control over Certain Nonvoluntary Processes

Hull - Hypnosis and Suggestibility

One of the phenomena of hypnosis which has impressed workers profoundly is the fact that suggestion, particularly in the hypnotic trance, is sometimes able to evoke phenomena which the subject is presumed not to be able to call forth voluntarily (p. 272ff.). The seemingly paradoxical nature of such results lies largely in their conflict with the usual but unwarranted assumption that voluntary control of physical processes is the maximum control possible. As a matter of fact, large numbers of physiological processes which take place all the time are normally quite beyond voluntary control.

The method by which the present habituation hypothesis explains the long-standing paradox mentioned above is not difficult to understand. In the process of suggestion a series of verbal stimuli (ideas) from another person are assumed to have become conditioned to the reaction in question during the previous life of the subject. He may or may not possess the necessary conditioned (proprioceptive) excitatory tendency to evoke the same reactions by means of his own symbolic processes. It is likely that in most cases he really does possess them, but having no occasion for the self-evocation of such reactions as gastric secretion, pupillary constriction, etc., he has never made the attempt and therefore does not know of their existence. There is strong reason to believe, however, even in case the chance experiences of life have not provided the subject with such proprioceptive excitatory tendencies, that they could easily be acquired. This is to say that all reactions susceptible to control by suggestion are ultimately capable of being controlled voluntarily by suitable conditioning to or association with proprioceptive stimuli arising from one's own symbolic activities.

Hypnotic Hallucinations Interpreted as Habit Phenomena

Conclusion

Thus ends an attempt at a scientific account of the major phenomena of hypnosis and suggestibility. Many similar attempts have been made in the past, and many more will be made in the future. Too many of the works on the subject in the past have fallen short of the scientific ideal. Doubtless many things have contributed to this weakness, but surely a major factor must be the inherent difficulty of the problems involved, the fundamental elusiveness of the phenomena, and the consequent subtlety necessary in the experimental controls.

These difficulties are so great that to enter seriously on a program of investigation in this field is a little like tempting fate; it is almost to court scientific disaster. Small wonder that orthodox scientists have usually avoided the subject!