HYPNOTHERAPY:
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INTRODUCTION: Throughout the years there have been periodic surges of great interest in hypnosis. Many extraordinary phenomena have been attributed to its effects and great claims made as to its effectiveness in therapy. Yet, in spite of such claims, there still appear to be relatively few therapists using hypnosis as a major tool. Why? Is it because the criticisms usually leveled at hypnosis are true? That it is overrated, actually limited to a small range of problems, unable to produce lasting changes? Will removal of symptoms by hypnosis lead to new symptoms? Is it dangerous? No, there is far too much clinical evidence contradicting these statements. Such evidence can no longer be ignored. It is felt that the major reason behind the rejection of hypnosis has been that for most people it is still virtually an unknown. It seems to be human nature to stay clear of or reject anything that doesn't seem to fit in or be explained rationally, especially when it seems to be something potentially powerful. It is mainly its unknown nature that has led to the many misconceptions surrounding hypnosis and has kept us from making the best use of it.

The purpose of the present paper is to present some of the recent clinical evidence contradicting the common criticisms and misconceptions surrounding hypnotherapy, to provide a good indication of how to make the best use of this tool, and to provide a rational explanation for its hard-to-believe therapeutic effects.

Overview of Recent Literature: There have been 1,018 articles2 dealing with hypnosis in the past three years (1966 through 1968), approximately forty per cent of which dealt with its use in therapy. In the same period we find 899 articles on psychoanalytic therapy and 355on behavior therapy. Formerly at University of California, Los Angeles.

According to the National Library of Medicine's Medical Literature: Analysis and Retrieval System (MEDLARS) storage of information, based on some 2,400 journals. The number given above does not include the articles on hypnosis in dentistry (64) and anesthesia (59) or those on suggestion (391) or the hypnosis studies done in the European socialist countries (532 in two recently released bibliographies covering the years 1945-1965 û Hoskovec and Svorad, 1966).

Contrary to popular opinion that hypnosis is only effective in certain specific symptom-removal cases, a wide range of diagnostic categories have been successfully treated by hypnotherapy. This includes anxiety reaction, obsessive-compulsive neurosis, hysterical reactions and sociopathic disorders (Hussain, 1964), as well as epilepsy (Stein, 1963), alcoholism (Chong Tong Mun, 1966), frigidity (Richardson, 1963), stammering and homosexuality (Alexander, 1965), various psychosomatic disorders including asthma, spontaneous abortions, dysmenorrhea, allergic rhinitis, ulcers, dermatitis, infertility and essential hypertension (Chong Tong Mun, 1964, 1966). Also in the past few years an increasing number of reports indicate that the psychoses are quite amenable to hypnotherapy (Abrams, 1963, 1964; Biddle, 1967).

Three Large Scale Studies: Three large scale studies in the past five years contain basic findings. Richardson's (1963) study dealt with seventy-six cases of frigidity. He reports 94.7% of the patients improved. The average number of sessions needed was 1.53. The criterion for judging improvement was increase in percentage of orgasms. The percentage of orgasms rose from a pre-treatment average of 24% to a post-treatment average of 84%.

Follow-ups (exact length not given) showed that only two patients were unable to continue realizing climaxes at the same percentages as when treatment terminated. Richardson's

method of treatment was a combination of direct symptom removal, uncovering, and removal of underlying causes, since he had found that direct symptom removal alone was not always sufficient. He reports no hypnotic induction failures.

Chong Tong Mun's (1964, 1966) study covered 108 patients suffering from asthma, insomnia, alcoholism, dysmenorrhea, dermatitis, anxiety state, and impotence. The percentage of patients reported improved was 90%. The average number of sessions was five. The criteria for judging improvement were removal or improvement of symptoms. The average follow-up period was nine months. Chong Tong Mun's method of treatment was a three-fold approach. With some patients he would work on reeducating the patient with regard to the behavior patterns immediately underlying the symptoms. With others he would first regress the patient back to the original onset of the symptom. Once regressed, he would reeducate the patient to the fact that the original cause was no longer operative. In addition, he usually used supplementary suggestions of direct symptom removal. Hussain's (1964) study reports on 105 patients suffering from alcoholism, sexual promiscuity, impotence and frigidity, sociopathic personality disturbance, hysterical reactions, behavior disorders of school children, speech disorders, and a number of different psychosomatic illnesses. The percentage of patients reported improved was 95.2%. The number of sessions needed ranged from four to sixteen. The criteria for judging improvement were complete or almost complete removal of symptoms.

In follow-ups ranging from six months to two years no instance of relapse or symptom substitution was noted. Hussain's approach is illustrated by the case of a 35 year old woman exhibiting the following symptoms: anxiety, alcoholism, depression with suicidal tendencies, sexual promiscuity, insomnia, and inability to make decisions and future plans. Prior to treatment, Hussain pinpointed the various fears and negative attitudes which he felt were underlying the symptoms û e.g., the patient feeling unloved and unwanted in regards to her marriage, feelings of inadequacy at being a mother, fear of her own mother, fear of responsibility and making decisions, and guilt over her sexual promiscuity.

Hussain then used a therapeutic technique somewhat similar to Wolpe's (1958) desensitization technique to eliminate these fears and negative attitudes. For example, he would have the patient think of a particular fear-producing situation and recondition her by suggesting she would find herself calm and relaxed in the situation. This particular approach is very often used now in one form or another. Abrams (1963) refers to it as an "artificial situation" technique. Through hypnosis the patient is able to experience his new attitudes in an "artificial situation," an imagined situation. It differs from Wolpe's approach in two respects. First of all, Wolpe does not often use hypnosis. Secondly, Wolpe has the patient go through a hierarchy of "imagined situations," going from easiest to deal with to most difficult. (There is no reason, however, why this hierarchy approach cannot be incorporated into hypnotherapy.) With the above patient Hussain also used direct symptom-removal suggestions. For example, "aversion to the thought and sight of alcohol was also built up by direct suggestion." This patient was discharged from the hospital after twelve sessions. "No relevant symptoms were left behind and there was no relapse during the six-month follow-up period."

CURRENT METHOD OF USING HYPNOSIS: As one can see in the above studies, and this probably comes as a surprise to most therapists, the main use of hypnosis is not as a means of direct symptom removal. Nor is its main use as an uncovering device. The current trend is to use hypnosis to remove the negative attitudes, fears, maladaptive behavior patterns, and negative self-images underlying the symptoms. Uncovering and direct symptom removal are still used to a certain extent, but usually in conjunction with this new main function.

In the past, so much emphasis was directed towards symptoms and disease processes that some of us were guilty of forgetting the person in the body. It is incumbent upon us [hypnotherapists] to concentrate on treating the particular patient who presents the symptom rather than the symptom presented by the patient (Mann, 1963).

Psychiatric hypnotherapy, as practiced today by the leading practitioners in the field, has in common with all other forms of modern psychiatric treatment that it concerns itself not only with the presenting symptoms but chiefly with the dynamic impasse in which the patient finds himself and with his character structure (Alexander, 1965).

The objection that the results of symptom removal will seldom be permanent is certainly not valid. This may have been so in the past, when direct symptom removal alone was practiced and nothing was done to strengthen the patients ability to cope with his difficulty or to encourage him to stand on his own two feet (Hartland, 1965). This change is being stressed in the present paper because it is part of its purpose to fit hypnotherapy into "the scheme of things." Many therapists have rejected hypnosis because its direct symptom approach of the past clashed violently with their dynamic approach. Now we see that such a clash need no longer exist.

The Ahistorical vs. the Historical Approach in Therapy: Some hypnotherapists use, in part, a historical approach, going back into the patient's childhood and changing his attitudes regarding the causes of these patterns (Fromm, 1965; Abrams, 1963; Chong Tong Mun, 1964,1966). However, most hypnotherapy is ahistorical and, it would seem, faster. If we wanted to change the direction of a river it might be much easier to work on the main current directly (once it had been located) rather than going back upstream, locating all the tributaries, and pointing each one in a new direction. A comment on the Dangers Ascribed to Hypnosis In the past there have been certain dangers ascribed to the use of hypnosis, for example, the danger of a psychotic break, or the substitution of more damaging symptoms. According to a number of investigators (Kroger, 1963; Abrams, 1964) these dangers have been grossly exaggerated. However, whatever dangers there were have been virtually eliminated by this new approach. The few mishaps that have occurred in the past resulted either from (1) the misuse of hypnosis as an uncovering agent, or (2) its misuse as a direct symptom remover. The first type of mishap was produced by a therapist who would allow, or force, the patient to become aware of repressed information which he was not strong enough to face. The second type of mishap occurred when the therapist wrested away a symptom which the patient was using as a crutch before he was strong enough to stand on his own.

HYPNOTIZABILITY OF PATIENTS: Freud abandoned hypnosis because of "the small number of people who could be put into a deep state of hypnosis" at that time and because in the cathartic approach, symptoms would disappear at first, but reappear later if the patient-therapist relationship were disturbed (Freud, 1955, p. 237). In the above studies the only hypnotic induction failures were reported by Chong Tong Mun (eight failures out of 108 patients.) This can mean one of two things: the hypnotic induction procedures have improved since Freud's day, or that the reconditioning approach used in these studies (as opposed to Freud's cathartic approach) does not require very deep levels of hypnosis. There is evidence that both factors bay be involved.

Although many have thought that hypnotic susceptibility was a set character trait, there are a number of studies which now seem to indicate that this is not the case, and that responsiveness can be increased by certain changes in the hypnotic induction procedure (Pascal and Salzberg, 1959; Sachs and Anderson, 1967; Baykushev, 1969), as well as by means of a

pre-induction talk aimed at insuring a positive attitude, an appropriate expectancy and a high motivation toward hypnosis (Dorcus, 1963; Barber, 1969; Barrios, 1969).

With regard to the depth of hypnosis required for the reconditioning approach to work, there are a number of therapists who feel that only a light state of hypnosis is necessary (Van Pelt, 1958; Kline, 1958; Kroger, 1963) A study by Barrios (1969) gives this contention some support; it was found that an increase in the conditioning of the salivary response could be produced almost as effectively by lighter levels of hypnosis as by deeper levels.

The latter point brings us to the question of whether hypnotic induction is necessary at all for the re-conditioning approach to work. Judging from the work of Wolpe (1958) it would appear that hypnosis is not an absolutely necessary requirement. This would also be supported by the work of Barber (1961, 1965) who found that hypnotic phenomena could be produced without a prior hypnotic induction. However, the real question to be answered is not whether hypnotic induction is absolutely necessary, but whether it can further facilitate the conditioning process. Wolpe, himself, concedes the hypnosis apparently does facilitate the conditioning: "Patients who cannot relax will not make progress with this method. Those who cannot or will not be hypnotized but who can relax will make progress, although apparently more slowly than when hypnosis is used." (Wolpe, 1958, p. 141; italics added). Also, although Barrios' (1969) study indicated that conditioning could be increased during lighter levels of hypnosis, it was also found that there was no increase in conditioning with those subjects indicating no response to the hypnotic induction.

As pointed out in the theory (Barrios, 1969), hypnotic and waking suggestion are on the same continuum and hypnotic induction should be looked upon as a procedure whereby we can increase the probability of getting a more positive response to suggestion. The next question to be decided now is not so much whether hypnotic induction procedures increase responsiveness (this is fairly well accepted, e.g., Barber, 1969) but what variables in the hypnotic induction are playing the key roles and what can be done to strengthen the effectiveness of these factors.

Comparison with Psychoanalysis and Behavior Therapy: In Wolpe's comparison of his and the psychoanalytic approaches (Wolpe, Salter, and Reyna, 1964), we find the following: Based on all psychoneurotic patients seen, the number of patients cured or much improved by psychoanalysis was 45% in one study involving 534 patients and 31% in the other study involving 595 patients (the only two large scale studies in the literature on psychoanalysis). The average duration of treatment for the improved patients (given only for the first study) was three to four years at an average of three to four sessions per week, or an average of approximately 600 sessions per patient. For Wolpe's approach we find that, based on all patients seen, the recovery rate was 65% in his own study involving 295 patients (usually reported as 90% of 210 patients) and 78% in a study by Lazarus involving 408 patients. The duration of treatment for the improved patients was an average of thirty sessions in the former and fourteen in the latter.

Averaging the above figures, we find that for psychoanalysis we can expect a recovery rate of 38% after approximately 600 sessions. For Wolpian therapy, we can expect a recovery rate of 72% after an average of 22 sessions, and for hypnotherapy we can expect a recovery rate of 93% after an average of 6 sessions. It is interesting to note the negative correlation between number of sessions and percentage recovery rate. At first sight this seems paradoxical. However, if a form of therapy is truly effective, it should not only increase recovery rate, but also shorten the number of sessions necessary (as well as widen the range of cases treatable).

The Need for a Rational Explanation: In spite of all the encouraging reports, there continues to be considerable hesitation on the part of psychotherapists to use hypnosis. Hypnosis

is still looked upon as an ôunknownö by most therapists. They are as yet not aware of any reasonable rational explanation for hypnotic phenomena that would satisfy them, one that would tie these phenomena down to observable facts and laws. As long as hypnosis continues to exude an air of mysticism and charlatanism, it will continue to be rejected by many, no matter how great the claims on its behalf.

An Explanation Based on Principles of Conditioning: The experienced therapist really should not be so surprised at the effectiveness of hypnosis in facilitating therapy. Hypnotic induction can be looked upon as a technique for establishing a very strong rapport, for establishing a greater confidence, a greater belief in the therapist, whereby the latter's words will be much more effective. As Sundberg and Tyler (1962) point out, one of the common features among all methods of psychotherapy is the attempt to "create a strong personal relationship that can be used as a vehicle for constructive change. It is a significant fact that many theoretical writers, as their experience increases, come to place much more emphasis on this variable." (pp.293-294).

The question still remains, however, what exactly is the process whereby "mere words" can produce such great changes in personality. As pointed out in Barrios' (1969) theory of hypnosis, the ability of words to produce behavior changes is really not so difficult to understand if we are familiar with the principles of higher-order conditioning. First of all, we know that words can act as conditioned stimuli.

Pavlov recognized this fact: Obviously for man speech provides conditioned stimuli which are just as real as any other stimuli. Speech, on account of the whole preceding life of the adult, is connected up with all the internal and external stimuli which can reach the cortex, signaling all of them and replacing all of them, and therefore it can call forth all those reactions of the organism which are normally determined by the actual stimuli themselves (Pavlov, 1960, p. 407). Now, according to principles of high-order conditioning we know that by paring word B with word A we should transfer the response produced by word B to word A and consequently anything that would evoke word A. Thus, for example, if we wanted to condition a person to be more relaxed in the presence of people, we would pair the words "people" (A) and 'relaxed" (B), using a sentence or suggestion such as, 'From now on you will find yourself more relaxed in the presence of people." Mower's theoretical formulations on the sentence as a conditioning device (Mowrer, 1960) tend to support this contention.

Of course, we know that under ordinary circumstances suggestions are not always accepted (and thus conditioning doesn't always result when an appropriate suggestion is given). Why is this? Osgood (1963) holds that a suggestion will tend to be rejected if it is incongruent with the subject's previously held beliefs and attitudes or his present perceptions. It would seem that if there were some means of eliminating the latter we should be able to have a suggestion more readily accepted and thus facilitate the higher-order conditioning. Hypnosis is such a means. Thus we come to the reason hypnosis is so effective in facilitating therapy: the incongruent perceptions, beliefs, and attitudes are kept from interfering with the suggestion (and thus with the conditioning).

As put by Pavlov: The command of the hypnotist, in correspondence with the general law, concentrates the excitation in the subject (which is in a condition of partial inhibition) in some definite narrow region, at the same time intensifying (by negative induction) the inhibition of the rest of the cortex and so abolishing all competing effects of contemporary stimuli [present perceptions] and traces left by previously received ones [previously held beliefs and attitudes].

This accounts for the large and practically insurmountable influence of suggestions as a stimulus during hypnosis as well as shortly after it (Pavlov, 1960, p. 407; italics added).

As an illustration, let us say we wanted to change a patient's self-image from that of an inadequate person to a more self-confident one. If under ordinary circumstances we suggested that he would no longer feel inadequate, it would most likely accomplish little. This is because the patient's negative self-image, usually ever-present and quite dominant, would quickly suppress any positive image suggested, or at least keep it from being too vivid or real. But in the hypersuggestible hypnotic state conditions are different. The patient's negative self-image is now more easily inhibited and should therefore be less likely to interfere when we attempt to evoke the positive self-image through suggestion. As a result, the conditioning can take place and new associations can be made. The person can truly picture himself feeling self-confident in various situations and these new conditioned associations in turn can lead to new behavior. This new attitude can now become permanent by means of self-reinforcement, just as his old negative attitude had been kept permanent by self-reinforcement. As long as the patient has negative attitudes, these are self-reinforcing. They lead to his tensing up, acting awkward and making numerous mistakes. Also, he is unlikely to believe any praise or any positive occurrences should they chance his way. But if this negative self-image has been replaced by a positive one, the opposite cycle can result. Being more confident and relaxed he will naturally be more likely to be accepted. Also, he will now be more open to believing and accepting praise and positive outcomes.

HYPNOSIS: ABSTRACT: A comprehensive theory of hypnosis is presented which attempts to explain the three main aspects of hypnosis in terms of principles of conditioning and inhibition.
(1) Hypnotic induction is explained as a conditioning procedure for producing an inhibitory set. (2) Hypnotic phenomena (increased responsiveness to suggestion) occur because this set can inhibit stimuli (both sensory and cognitive) which would ordinarily contradict the suggested response. (3) Post-hypnotic behavior changes are explained as occurring through a process of higher-order conditioning; this conditioning being facilitated by the inhibitory set which inhibits stimuli that would be incompatible with the new association. The theory is felt to be broad enough to cover not only hypnosis and suggestion, but also such related areas as persuasion, the placebo effect and faith, as well as throw added light on the area of conditioning.

A THEORY OF HYPNOSIS: AN EXPLANATION OF HYPNOTIC INDUCTION, HYPNOTIC PHENOMENA, AND POST-HYPNOTIC SUGGESTION: Throughout the years many extraordinary phenomena have been attributed to the effects of hypnosis and great claims made as to its efficacy in therapy. Yet, in spite of such claims, it seems that there continues to be relatively little interest shown in it by the psychological and psychiatric community. Why?

It is felt that the reason for the continued apathy toward hypnosis is not that the claims made for it are untrue or exaggerated, but that it is still virtually an unknown. This unknown quality has led to the arousal of fears (an innate response to an unknown), many misconceptions and various unjust criticisms, and, consequently, rejection or avoidance of the area. What we are in need of, then, is a rational theory or explanation of hypnosis, one that will tie it down to known laws and facts. and, thus, help us to make the most of this vast, unexplored area.

The following theory is presented as an attempt at achieving this goal. The theory will be divided into three major sections, one each for what is felt are the three major aspects of

hypnosis. Each section will start off with definitions of terms, then the major hypotheses and their corollaries will be presented together with available evidence in support of them, followed by suggestion for further tests. There are a total or seven hypothesis making up the theoretical system. Hypotheses I - III deal with the first aspect, the hypnotic induction Hypotheses IV and V deal with the second aspect, hypnotic phenomena. Hypotheses VI and VII deal with the third aspect, post hypnotic suggestion. The reason for dividing the theory into three sections is to emphasize the fact that when one attempts to explain hypnosis, he has to do more than just explain hypnotic phenomena. He has also to explain how the hypnotic state was produced and how hypnosis can produce post-hypnotic behavior changes. Most previous theories deal only with hypnotic phenomena, per se.

The overall explanation presented will he based mainly on principles of conditioning and inhibition delineated in the postulates. Briefly, hypnotic induction will be explained as the conditioning of an inhibitory set, a set which increases responsiveness to suggestion by inhibiting stimuli and thoughts incompatible with a suggested response. The various hypnotic phenomena, including the phenomenon of post-hypnotic suggestion, will then be explained in terms of this set. The theory presented herein was part of a doctoral dissertation completed in 1969 at the University of California, Los Angeles. The work was supported in part by a Public Health Ser¡vice fellowship (MPM-l3, 264-cl) from the National Institute of Mental Health, Public Health Service.

BASIC POSTULATES: One of the major purposes of any theory or explanation should be to tie the phenomena to be explained down to known laws. This can be done by first stating the known laws and then showing how the theory (the system of hypotheses explaining the phenomena) can be deduced from these laws or can be shown to be compatible with them. In what follows, we will present the known "laws" (the postulates) that the theory of hypnosis will be tied down to.

As the reader goes through the postulates, he should keep in mind that at the present stage the science of psychology has not yet advanced to the point where we can really speak in terms of "laws," in the sense of firmly established and accepted laws. Thus, he is not expected to accept absolutely the validity of the postulates. However, it is felt that sufficient evidence will be presented to show that these postulates are reasonable approximations to established laws. How close an approximation they are will, to a large extent, be mirrored by how valid are the hypotheses and corollaries deduced from these laws. Thus, if the hypo¡theses of the present theory are tested and validated, then the validity of the postulates themselves will be further strengthened.

*** Postulate I. Reciprocal Inhibition:** When an organism is attending or responding to one Stimulus, there will be a reciprocal inhibition of incompatible stimuli and responses. Sherrington (1906, 1940) was one of the first to discover the phenomenon of reciprocal inhibition. He found that "incompatible movements such as turning the eyes to the right and left are so controlled in their nerve centers that with increased activity of one muscle goes decreased activity of its antagonist. The same type of inhibition is observed in human attention and distraction, since in attending to one object, you cease attending to another." (Woodworth and Schlosberg, 1954, p. 669).

The latter contention is supported by the work of Hernandez-Peon (1959) who has shown that when an organism is attentive to one stimulus other stimuli impinging upon it tend to be inhibited. This centrifugal inhibition of afferent sources has been demonstrated for all sense modalities (Lindsley, 1961). Which stimulus will be most likely to be attended or responded to

(and, therefore, which stimuli will be inhibited) in a given situation will depend on a number of different factors, such as: stimulus intensity, novelty of the stimulus, acquired significance of the stimulus, sense modality, etc. (Berlyne, 1960). Some types of stimuli, then will have preference or dominance over others, and they, in turn, will have dominance over others, and so on, thus forming a "stimulus dominance hierarchy" (SDH).

* **Corollary 1:** If a dominant stimulus is itself inhibited or eliminated, those stimuli below it in the hierarchy which it was reciprocally inhibiting will now be responded to more strongly.

* **Postulate II.**

* **Cognitive Stimuli:** Behavior is determined by cognitive stimuli as well as sensory stimuli. We know that an organism's behavior in a given situation can be determined by certain innate behavior patterns. A pin prick will evoke a pain response (withdrawal of the injured part, crying out, heart racing, palms sweating, etc.); salt on the tongue will elicit salivation; stimulation of the erogenous zones will evoke certain patterns of physiological res¡ponses; etc. Such stimulation seems to trigger built-in or innate patterns of behavior. But we also know that organisms do not always make the same response to the same stimulus. Learning or conditioning can and does play a very big part, especially with humans, in modifying be¡havior. For example, the response resulting from stimulation of the erogenous zones will vary from individual to individual as a result or the individual's previous experience; i.e., his previous conditioning. If a person has been taught that sex is something dirty and bad, he could easily respond with feelings of disgust or guilt rather than with the normal (ôbuilt inö) sexual response. Thus, we can say that stimulation can also trigger ôacquiredö or learned patterns of behavior.

One way of conceptualizing this modification of behavior by learn¡ing is to think of the organism as reacting not only to sensory stimuli but reacting as well to what may be called memory, recorded. or "cognitive" stimuli. A sensory stimulus can be defined as coming to the organism via the sensory pathways. A "cognitive stimulus" will herein be defined as a stimulus emanating from engrams (permanent traces or recordings of past experiences in the brain). It is postulated that this stimulus is as potentially capable of initiating and directing behavior as any sensory stimulus. This means, for instance, that a stimulus dominance hierarchy can be made up of both sensory and cognitive stimuli.

These engrams are felt to he formed through a process of conditioning (see Postulate III, below) and are triggered by the conditioned stimulus. This conditioned stimulus can be either a sensory stimulus or another cognitive stimulus. For example, the thought of a steak (a cognitive stimulus) can be triggered by the smell of a steak cooking (a sensory stimulus) or the thought of a particular restaurant specializing in steaks (a cognitive stimulus). Under the heading of cognitive stimuli we would find such things as thoughts, images, beliefs, sets, values, attitudes, ideas, etc. A cognitive stimulus can also be looked upon as the equivalent of Hull's (1933) "pure stimulus act", Tolman's (1932) "expectancy", Osgood's (1948) "representational mechanism", etc.

The reason for using the term "cognitive stimulus" rather than such terms as "expectancy," "thought," or "cognition" is that inclusion of the term "stimulus" more strongly implies action. In the past, cognitive theorists have been usually criticized for leaving their subjects "lost in thought".

Support for the contention that permanent records of previous experience (engrams) are stored in the brain comes from at least two sources. First, there is the work done by Penfield (1954) where he has reported that electrical stimulation of the temporal cortex of humans causes the subject to experience images so vivid that they are difficult to tell from reality. These

hallucinations are reenactments of actual experiences from the recent or distant past. (“Both old and recent memories are evoked with equal ease.") "In general, the recollections produced by stimulation seem to be as clear as they would be seconds after the experience. In fact, they are apparently as clear as they were during the ex¡perience.. . It is an episode in which action goes forward and the patient is an actor. He may seem to see and hear and react as well." (p. 99)

The work of Penfield ties in with clinical reports that brain tumors in the temporal cortex can also lead to complex and elaborate hallucinations (Weinberger and Grant, 1940). It is proposed that the irritation due to the tumor and the electrical stimulation both serve to trigger the engram which, in turn, leads to the hallucinations.

A second source of evidence in support of the existence of engrams which might be used is the recent work which implicates RNA in the process of memory storage. These studies, summarized in a number of recent articles and books (Brazier, 1964; Landauer, 1964; Gaito and Zavala, 1964; Jacobson, 1966), suggest that previous experiences are recorded in the brain by restructuring of the RNA molecule. According to Landauer (1964), for example, when two stimuli, the CS and US, are paired, RNA representing the CS enters the neurons activated by the US. The result of incorporating the new RNA, which represents the CS, alters the recipient. or US cells, so as to make them more likely to fire in the presence of the spreading electrical activity generated by the CS. Thus, the engrams we are talking about could be thought of as the restructured RNA molecules that have entered the neurons normally activated by the US. A cognitive stimulus would be the stimulation propagated by the altered US cells upon stimulation by the CS.

One very important implication from the above engram concept is that all recorded experiences are subject to “replay” if the appropriate engram is triggered. Extinction or forgetting would be explained in terms or an interference hypothesis; that is, ôreplayö would fail to occur if there were more dominant stimuli present which led to responses incompatible with the response evoked by the CS. If these competing responses could be eliminated, then the appropriate engram could be triggered (i.e.. the appropriate cognitive stimulus could be evoked).

* **Postulate III.**

* **Conditioning:** If an organism attends to two stimuli occurring in close contiguity, these two stimuli will become associated so that upon later occurrence of the first stimulus the reaction to the second will occur.

This postulate is essentially the “S-S Contiguity”: interpretation of conditioning with the added stipulation that the organism must be aware of or attentive to the two stimuli. This awareness or attention addendum has recently been shown to be necessary by a number of investigators: Guthrie (1959); Speilberger (1962) Dulany (1962); Maltzman (1966); and Trabasso and Bower (1968). Thus, according to this postulate, (1) association occurs between stimuli and not a stimulus and response as called for by the S-R approach; and (2) contiguity of the attended stimuli is the necessary and sufficient condition for conditioning to take place and not drive or need reduction as called for by the “Law of Effect” approach. It is the authors opinion that the evidence indicates that this is the more general and parsimonious of the three major systematic points of view that have dominated the psychology of learning (namely, the S-S Contiguity, the S-R Contiguity and the S-R Effect approaches).

As pointed out, the S-S Contiguity approach says first of all that association occurs between stimuli and not between a stimulus and a response. This, of course, does not mean that a stimulus cannot become associated with a response. The S-S position would explain an association between a stimulus, S1 and a response, R2, by positing that the association takes

place between S1 and S2 where S2 is a stimulus which normally evokes R2. It is felt the S-S position is more general than the strict S-R approach because as well as explaining association between stimuli and responses, it can also explain the formation of associations between stimuli where no visible response is involved. (One of the major shortcomings or the S-R position, we feel, has been that it is more difficult for S-R theorists to conceive of conditioning taking place when no visible response is known to occur.) Evidence in support of the contention that associations can take place between stimuli without necessitating a response comes from a number of areas of study.

Among them are:

(1) sensory preconditioning,
(2) perceptual learning, and
(3) learning without overt response. An extensive review of these areas can be found in Kimble (1961).

In addition to saying that associations take place between stimuli, Postulate III states that contiguity of the stimuli in the focus of attention is the necessary and sufficient condition for the association to take place. This is opposed to the "Effect" position which proposes that, in addition to contiguity, some form of drive or need reduction is necessary for the association to take place. Although there is no denying that reward or drive reduction can facilitate conditioning, there is considerable evidence to show that conditioning can, however, still take place without the necessity of drive reduction.

The evidence against a strict "Effect" position comes from several areas of study (also reviewed in Kimble, 1961).

These are:

(1) the latent learning studies,
(2) the saccharine studies,
(3) the exploration studies, and
(4) the brain stimulation studies, in addition to the sensory preconditioning and perceptual learning studies already mentioned.

*** Corollary 2:** Whatever would raise the stimuli to be paired in the stimulus dominance hierarchy should facilitate the conditioning. This follows from the postulate since the latter states that the CS and US must be in the focus of attention to be paired. If there are other, more dominant, stimuli present, this condition will not be met.2 Thus, anything that would inhibit competing stimuli should facilitate conditioning. *** Corollary 3:** Words can act as conditioned stimuli which can evoke cognitive stimuli mediating responses similar to those evoked by the original unconditioned stimuli. Pavlov was one of the first to recognize that words could act as conditioned stimuli.

"Obviously for man speech provides conditioned stimuli which are just as real as any other stimuli. . . . Speech on account of the whole preceding life of the adult, is connected up with all the internal and external stimuli which can reach the cortex, signaling all of them and replacing all of them, and therefore it can call forth all those reactions of the organism which are normally determined by the actual stimuli themselves." ¡(Pavlov, 1960, p. 407)

That words can act as conditioned stimuli is supported by a number of experiments. As pointed out by Platinov (l959), Vasileyva found that he could condition a stable defensive motor response to the word "bell". Hudgins (1933) was able to condition the pupils of his subjects eyes to contract upon thinking the word "contract". Menzies (1941), by associating the word "crosses", with immersion of the hand in cold water, was able to condition his subjects so that

when they said the word “crosses” a drop in the temperature of the hand resulted. This contention is also concurred with by Hull: “In the suggestion experiments the words of the experimenter presumably are merely performing the function served by the arbitrary sounds, temperatures, etc. (conditioned stimuli) in the conditioned reflex experiments.” (Hull. 1933, p. 280)

An interesting point to ponder is that the reinforcing effects of the drive reducers (such as food and sex) might themselves be subsumed under a stimulation explanation of reinforcement. This is the case if we consider the possibility that it is the drive reducer’s resulting stimulation of arousal which plays the major role in reinforcement rather than reduction of a drive, per se. This seems to fit in with the position taken by Sheffield's (1966) "Drive Induction” and Miller's (1963) "Go-Mechanism”.explanation of drive reduction in conditioning. The reason that most drive reducers can be such effective reinforcers could be that they are stimuli which, due to their high arousal value, would be placed high in a stimulus dominance hierarchy, as well as place any stimulus they become associated with high in the hierarchy.

That words can evoke responses similar to those evoked by the unconditioned stimuli they are a substitute for is also supported by the available evidence. For instance, Schultz (1950), Vandell, Davis and Uugston (1943), Max (1937), and Jacobson (1938), among others, “have shown quite satisfactorily that thought can give rise to specific patterns of muscular tension and activity, particularly in those muscles that are symbolically represented in the thought in question." (Weitzenhoffer, 1953, p. 246). There are also a number of experiments where it has been shown that various physiological and perceptual responses can be evoked by means of waking suggestion. These are best summarized in Barber’s two review articles on the physiological effects of suggestion (1961, 1965). Among the responses he reports evoked by waking suggestion, we find such things as heart acceleration and deceleration, color blindness, deafness, autonomic changes. salivation, analgesia, and allergic dermatitis. (Heart acceleration, for example, could be produced by words associated with fear-producing stimuli; i.e., by suggesting something fearful.)

*** Corollary 4:** A reciprocal inhibitory response can be conditioned like any other response if it occurs contiguously with the conditioned stimulus. First of all, we know that an inhibitory response can be conditioned just like any other response. For example, Pavlov (1960), referring to experiments in his laboratory by Volborth, concluded that “if an inhibitory stimulus is applied simultaneously and repeatedly for short periods of time together with some neutral stimulus, the latter also develops an inhibitory function of its own.” (p. 106; see also p. 404)

Under Postulate I we saw that when an organism is responding to one stimulus, there occurs a reciprocal inhibition of any stimuli that would lead to incompatible responses. The case in favor of the contention that this type of inhibitory response can be conditioned is very nicely presented by Wolpe (1958) in his book, Psychotherapy by Reciprocal Inhibition. For example, among other things, he refers to Pavlov’s experiment where a strong electric current was made the conditioned stimulus for a feeding response in a dog:

“The current was in time gradually increased (with feeding) until it was extremely strong, but even then no defensive reaction was manifested. In other words, the pathways normally connecting the electrical stimulus with the defense reaction had become inhibited. It would appear that at every stage of the experiment the performance of the feeding response involved a reciprocal inhibition of the mild defense reaction aroused by the electrical stimulus. After many repetitions of the procedure, in the course of which the current was gradually stepped up, so great a degree of conditioned inhibition of the defense reaction to the current was established that even

very strong electrical stimuli were unable to evoke that reaction, but evoked only the feeding response." (Wolpe, 1958, p. 30)

The important thing to note here is that in conditioning the feeding response, the inhibitory response --inhibition of the defense reaction-- was simultaneously being conditioned. Wolpe also cites as evidence various experiments done on cats whereby neurotic anxiety reactions were overcome by opposing them with feeding reactions. To this evidence can be added Watson's "Peter and the Rabbit" experiments wherein a phobia of rabbits was gradually extinguished by having the child eat his meals in the presence of the feared rabbit. (Watson, 1957, pp. 172 - 175) Wolpe's position is apparently supported by at least one learning theorist. Osgood discussing what he refers to as "an hypothesis of reciprocal inhibition of antagonistic reactions" states that

Simultaneous with every increment in excitatory habit tendency in the association of a given stimulus with a given reaction, there is also generated an equal increment of inhibitory habit tendency in the association of the same stimulus with the directly antagonistic reaction. In other words, simultaneous with learning any response, the S is also learning not to make the directly antagonistic response. (Osgood, 1948, p. 150)

*** Corollary 5:** If a set to inhibit certain stimuli is conditioned to a given CS, the presence of this CS will facilitate the occurrence of any response that would ordinarily be interfered with by these stimuli. This corollary is derived from Postulates I and III. It is given substantial support by the work of Harlow on learning sets and error factor theory (Koch, 1959). In a number of experiments he has shown that when monkeys are given a series of different discrimination problems to learn, a "learning set" is gradually established which facilitates the making of new, different, discrimination responses. (The CS referred to in the postulate in this case would be any stimulus or stimuli which are always present from problem to problem, such as the presence of the experimenter himself.)

Harlow explains this facilitation in terms of learned (conditioned) inhibition. He proposes a hypothesis similar to Wolpe's --that in learning to make a particular response the organism learns to inhibit all interfering or incompatible stimuli, or what he calls error factors (EF's). In fact, he goes so far as to say that "learning is nothing but suppressions or inhibitions of EF's" (Koch, 1959, p. 526). Harlow feels that when the monkey is asked to make a new discrimination response, this learned inhibition of EF's facilitates the making of the new response. This is because many of the EF's inhibited in learning the previous problems are potential interferers of the new response as well. Also in support of Corollary 5 is the fact (as pointed out by Harlow) that in most learning experiments the investigator often finds it quite advantageous to "adapt" his animals to the experimental situation prior to the start of the learning. ...Psychologists have been doing this for decades, e.g., "adapting" rats on a straight-away before training them on a multiple unit maze, thereby doubtless reducing error-producing factors in advance of the "learning" situation. (Koch, 1959, p. 526). This adaptation procedure can be looked upon as the establishment of a conditioned inhibition of irrelevant responses. This conditioned inhibition is evoked in the learning situation by the stimuli that are common to both the adaptation trials and the learning trials.

EXPLANATION OF HYPNOTIC INDUCTION (HI): In the following an attempt will be made to explain hypnotic induction in terms of the principles of conditioning and inhibition outlined in the above postulates. It will be shown how the hypnotic induction can be explained as the conditioning of an inhibitory set --a set which increases responsiveness to suggestion by inhibiting stimuli (sensory and cognitive) incompatible with the suggestion. This

explanation will then be condensed into three major hypotheses and evidence presented in their support. Finally, some of the major individual factors that can influence the hypnotic induction, such as prestige, expectation, fears, and age, are discussed and their roles explained in terms of the theory.

The first step in the explanation will be to define the terms to be used, then we shall attempt to fit the HI into a conditioning paradigm.

Definitions:

*** Suggestion:** The definition of suggestion given in WarrenÆs (1934) dictionary is as follows: "A suggestion is a stimulus, usually verbal in nature, by which an individual seeks to arouse activity in another by circumventing the critical, integrative functions." (p. 267) The following is the definition of suggestion given by McDougall (1908, p. 100): "Suggestion is a process of communication resulting in the acceptance with conviction of the communicated proposition in the absence of logically adequate grounds for its acceptance." Hull defines suggestion as follows: "...A true suggestion response is one in which the subject's own symbolic process, instead of becoming active either in facilitating or resisting the tendency to action naturally arising from the experimenter's words, remains passive so far as the particular act suggested is concerned." (Hull, 1933, p. 307)

Lindzey (1954, p. 27), summarizing a number of definitions of suggestion, states: "In these and in similar definitions, attention is called to some arbitrary restriction in the determinants of behavior. The individual is not employing all relevant ideas, nor his full intelligence. Granted that suggestion proceeds according to the laws of association (conditioning), still we must also allow for the blocking of normal association, so that the end result in behavior is due to a selected field on determinants."

The definition of suggestion which will be used in the present paper is as follows: A suggestion is a stimulus or set of stimuli, usually verbal in nature, by which one individual
(1) evokes a cognitive stimulus in another, and
(2) at the same time evokes an inhibitory set which tends to inhibit stimuli (sensory or cognitive) incompatible with the cognitive stimulus evoked.

The only major difference between this definition and the previous ones mentioned is the addition in the parentheses--that sensory stimuli, as well as cognitive stimuli tend to be inhibited by the inhibitory set. All of the above definitions seem to stress the inhibition of cognitive stimuli and do not mention inhibition of sensory stimuli.

It should be stressed that both hypnotic and waking suggestion have an inhibitory set component. The only difference between hypnotic and waking suggestion is that for a given individual, the former should have a larger inhibitory set component as a result of the hypnotic induction. The size of the inhibitory set for waking suggestion will vary from individual to individual depending on certain factors, such as prestige for example, (these are discussed in a later section). This means that for a particular suggestion, the response could be greater for one individual in the waking state than for another individual in the hypnotic state.

Hypersuggestibility: Hypersuggestibility is defined as a state where the cognitive stimulus evoked by a suggestion is responded to more readily or strongly than usual because the usually competing stimuli have been reduced or inhibited.(The usual responsiveness to suggestion could be predetermined for each individual.) There are, of course, numerous ways other than hypnotic induction for bringing about a state of hypersuggestibility. For example, sensory deprivation is known to lead to such a state (Jackson and Pollard, 1962; Jackson and Kelly, 1962; Pollard, Uhr and Jackson, 1963). The hallucinogenic drugs (e.g., LSD and

mescaline), which act as inhibitors, are also known to produce states of hypersuggestibility (Barrios, 1965; Sjobert, 1965; Solursh and Rae, 1966).

Hypnosis: Hypnosis is defined as a state of hypersuggestibility arrived at by means of a hypnotic induction. It should be mentioned that the evocation of the cognitive stimulus alone will cause a certain amount of inhibition of competing stimuli just as the evocation of any stimulus would. However, in a suggestion we find the additional inhibitory "aid" of the inhibitory set.It is a hypersuggestible state (i.e., more suggestible than normal) because when a suggestion is given, the inhibitory set part of suggestion for a given individual is greater in scope that it is in the normal state.

Hypnotic Induction (HI): Hypnotic induction is defined as the giving of two or more suggestions in succession so that a positive response to one increases the probability of responding to the next one. That the author is not alone in his feelings that a positive response to a series of suggestions or assertions leads to a state of hypnosis is illustrated by the following statements made by Skinner (1957):

"With respect to a particular speaker, the behavior of the listener is also a function of what is called belief (a term very similar to suggestibility). ...Our belief in what some one tells us is similarly a function of, or identical with, our tendency to act upon the verbal stimuli which he provides. If we have always been successful when responding with respect to his verbal behavior, our belief will be strong. ... (pp. 159-160) "The listener reacts to the behavior of a given speaker to an extent determined by the consequences of past reactions. The speaker can build confidence or belief by saying many things which are obviously true or quickly confirmed or by resorting to rhetorical devices. ... (p. 365)

"Various devices used professionally to increase the belief of a listener (for example by salesmen or therapists) can be analyzed in these terms. The therapist may begin with a number of statements which are so obviously true that the listener's behavior is strongly reinforced. Later a strong reaction is obtained to statements which would otherwise have led to little or no response. Hypnosis is not at the moment very well understood, but it seems to exemplify a heightened "belief" in the present sense." (p. 160)

From the definition of HI used in the present paper, then, the reader can begin to see the fairly broad scope of the theory of hypnosis presented in this paper. It can not only be used to explain the phenomenal effects of hypnosis, in the accepted sense of the term, but also the hypnotic effects (persuasibility) of salesmen, lawyers, politicians, etc.; the hypnotic effects (placebo effect) of psychotherapists and doctors of medicine; and even the hypnotic effects (faith) of ministers and faith healers.

This definition of HI does not differentiate between waking suggestions and trance or sleep suggestions. That is, we can conceive of the "formal hypnotic induction" suggestions of eyelid closure, drowsiness, sleep, etc., as just so many more waking suggestions. "Sleep suggestions, "however, may, in addition, further aid the hypnotic induction since the sleep-like state thus produced may provide for even greater inhibition of stimuli competing with the suggestions. 4 As Hull puts it,

"It is a very general custom of hypnotists to give suggestions of relaxation while inducing the trance. ... The present hypothesis assumes that this relaxation has the effect more or less completely of suppressing the spontaneous activity of the symbolic 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. ..." (Hull, 1933, p.310)

Hypnotic Induction in a Classical Conditioning Paradigm: In this section, we will attempt to show how the hypnotic induction is actually a conditioning process.

Understanding the Conditioning Paradigm: Before we show how the hypnotic induction fits into the conditioning paradigm we must first be sure we understand the conditioning paradigm. First of all, as pointed out in the conditioning postulate, for a process to be called conditioning it must involve two stimuli presented together contiguously and in the focus of attention. In classical conditioning the two stimuli are usually referred to as the CS and the UCS. The CS is usually some neutral stimulus (i.e., no observable response is evoked or at least not the response to be conditioned) and the UCS is a stimulus which evokes some innate response (e.g., food --salvation; shock --withdrawal). However, and this is an important point to keep in mind, there is nothing that says that the UCS has to evoke an innate response.

The UCS, or second stimulus in the pair, can be one that evokes a learned or previously conditioned response. In classical conditioning, this is referred to as higher-order conditioning and as Hebb (1949) has pointed out, most conditioning in the mature organism is of this higher-order variety.

It should be stressed that in the present theory sleep suggestions are not a necessary condition for hypnotic induction. Thus, the use of the term "hypnotic," which means "tending to produce sleep," is perhaps misleading and it might be appropriate to eventually change it.

Another thing to keep in mind is the nature of the response conditioned (the CR). We know that in a conditioning situation the experimenter (E) is not always interested in the entire response to the UCS. He usually focuses on one component of the UCR which he is interested in associating with the CS. Usually, this component is some positive response (e.g., salvation, eye-blink, withdrawal, etc.). However from our reciprocal inhibition postulate, we know that occurring with each positive response there is also a reciprocal inhibitory response. Now, in applying the conditioning paradigm to hypnotic induction, we will be focusing on the inhibitory component rather than the positive component.

Finally, a third thing to keep in mind is that the CS need not be something as obvious as a bell ringing, but can also be the very presence of the experimenter and any action on his part which is repeated prior to each time the UCS is presented.

Evidence in Support of the Explanation of Hypnotic Phenomena: In this section we will look at the evidence in support of Hypotheses IV and V, as well as suggest further tests of them. In doing so, we will not only be presenting evidence in support of the theory, but we will also be suggesting methods whereby suggestions can be made more effective; i.e., whereby we can increase the probability of getting a positive response to a suggestion.

Hypothesis IV: A suggestion produces the desired response by first evoking a cognitive stimulus which is associated with that response. This, among other things, means that the suggestion must have meaning for the subject, or no response will result. For example, if the experimenter suggests to the subject that he will secrete the enzyme pepsin (the protein enzyme), no response is likely to occur since most people would not know what pepsin is. From the hypothesis, we can deduce a number of corollaries:Corollary 7: The Higher the cognitive stimulus is in the stimulus dominance hierarchy (SDH) to begin with (i.e., the height before the cognitive stimulus is aided by the inhibitory set), the greater the response to the suggestion.

Corollary 7: The Higher the cognitive stimulus is in the stimulus dominance hierarchy (SDH) to begin with (i.e., the height before the cognitive stimulus is aided by the inhibitory set), the greater the response to the suggestion.This corollary would predict that hypnosis would more greatly facilitate the recall of meaningful material than nonsense material; this, because recall of

meaningful material would involve evoking stronger cognitive stimuli than nonsense material. In support of this contention are a number of studies. For example, White, Fox and Harris (1940) tested recall for nonsense material, meaningful verbal material, and meaningful nonverbal material (scenes from movies). They reported no gain in hypnosis for nonsense material and a gain of around 80 percent for nonverbal meaningful material.

This corollary would also imply, for example, that if we wanted to increase the chances of inducing age regression, we would be wise to first suggest some incidents that are likely to have made a deep impression at the particular age (i.e., left a strong engram) such as a birthday party or graduation.

This corollary would also predict that indirect suggestion would be more effective than direct when attempting to control involuntary responses. To illustrate what is meant here we will look at a number of examples: Since the amount of responsiveness to individual suggestion will be a definite factor affecting hypnotic induction, these methods might also be felt to be of value in making a hypnotic induction more effective as well.

In the above pepsin example, it was implied that the word pepsin was never associated with the eating of protein. But for some people there might be some association between the two. Would the suggestion of pepsin secretion lead to pepsin secretion in such people? Probably, to a certain extent; but from this second corollary we would predict that this direct suggestion of pepsin secretion would be much less effective than the indirect suggestion of eating a steak. This is because the cognitive stimulus of a protein food evoked by the word ““steak”” would be higher in the stimulus dominance hierarchy than the cognitive stimulus evoked by the word ““pepsin.”” The word ““pepsin”” has most likely not been present very often during the eating of a protein meal (a person is much more likely to think of the word ““steak”” while eating a steak than the word ““pepsin””), nor is it likely to have been associated that much with protein-type words which could act as mediators.

Similarly, if we wanted a person to salivate it would be wiser to use the indirect suggestion of tasting salt, sucking a lemon, or eating a delicious meal rather than the direct suggestion to salivate. How often do we actually think of salivating when we are salivating? Also, if we wanted to increase heart rate, we would suggest something fearful. If we wanted to decrease heart rate, we would suggest something relaxing.

The evidence fairly well supports the contention that indirect suggestion is more effective than direct in controlling involuntary responses. The conclusion reached by Weitzenhoffer (1953, p. 138) summarizing his extensive review of this area was that the involuntary functions ““...appear to be most susceptible to indirect influences arising from the direct evocation of emotional states and hallucinations. Direct evocation of the changes themselves is least effective. In fact, it is rare that involuntary responses are directly altered by suggestion. It is of considerable significance for a theory of hypnosis that the available information appears to show that in nearly every reported instance for which alterations of reflex and reflex-like responses were produced by suggestions, the reflex arc was most certainly one that involved higher centers in the cortical and subcortical regions.””

Corollary 8: The more (compatible) cognitive stimuli associated with the response evoked by the suggestion, the stronger the response to the suggestion. Thus, if we wanted to induce a vivid regression, it would be wisest to suggest as many things known to be associated with the particular age as possible, as opposed to merely suggesting that S will regress to a particular age. For instance, the experimenter could get considerable information about a particular day in the

patient's past from his parents and use this in his age regression suggestions. Also, if we wanted to increase the probability of producing an involuntary response, it would probably help to add considerable garnishing to the suggestion. For example, instead of merely suggesting that S was eating a steak, we might suggest that he was eating a thick, juicy steak, smothered in onions.

Hypothesis V: The inhibitory set facilitates the suggested response by inhibiting stimuli competing with the cognitive stimulus. This hypothesis is, of course, founded to a great extent on Corollary 5 of the postulates which states that if a set to inhibit incompatible stimuli is conditioned to a given CS, the presence of the CS will facilitate the occurrence of any response that would be interfered with by such incompatible stimuli. We shall now look at three corollaries to this hypothesis.

Corollary 9: Suggestibility should be increased if sensory stimulation is curtailed. This corollary would predict, for example, that if the eyes are shut, the lights are dim, proprioceptive stimulation is kept down (by lying still), noises are eliminated, etc., suggestibility should be increased. (Anyone familiar with the area of hypnosis will recognize these sensory curtailing procedures as part of the usual procedure followed by most hypnotists.) Curtailment of sensory stimulation decreases the number of stimuli in the stimulus dominance hierarchy (and this includes cognitive stimuli since sensory stimuli can evoke cognitive stimuli) and thus increases the responsiveness to any cognitive stimuli focused on.

In partial support of this prediction are the sensory deprivation studies already mentioned above, which report an apparent increase in suggestibility under sensory deprivation conditions. Similar to the sensory deprivation evidence are the clinical reports on patients with damaged sensory organs. This includes the visual sense (Colman, 1894; Wagener, 1948; Bartlet, 1950; and Weinberger and Grant, 1940); the auditory sense (Colman, 1894). A high incidence of hallucinations have been reported in such studies, which would lead one to suspect that suggestibility is also increased. At least one report (Sternberg, 1964) does indicate this to be so. In this report the hallucinations were shown to be induced through self-suggestion.

Corollary 10: Drugs that act as stimulus inhibitors should lead to a state of heightened suggestibility. In support of this prediction are the numerous studies indicating that such drugs as LSD and Sernyl, which have been shown to act as stimulus inhibitors, do indeed produce states of hypersuggestibility (Barrios, 1965: Sjoberg, 1965; Solursh and Rae, 1966). Similarly, anesthetic type drugs, such as sodium pentothal, which induce a sleep-like state, have been reported to increase suggestibility when light doses are used; i.e., when doses are not heavy enough to induce complete unconsciousness (Weitzenhoffer, 1953, pp. 52-54).

Corollary 11: Suggestibility should be greater when the number of potentially conflicting cognitive stimuli are kept to a minimum. It has already been pointed out how the elimination of negative attitudes towards accepting suggestions would be expected to increase suggestibility. Also, from this corollary, we would expect that responsiveness to a suggestion would be greater the more unfamiliar the subject is with the area of the suggestion, or as put by Lindzey (1954, p. 27), people will accept suggestions more readily "if they are relatively unfamiliar with a topic, unaccustomed or unable to check up on the suggestion offered to them...."

Summary: To sum up briefly, response to suggestion (whether it be normal or hypnotic suggestion) occurs because of two properties of a suggestion. The words of a suggestion can act as conditioned stimuli which (1) trigger the suggested responses (via the appropriate cognitive stimuli), and (2) evoke an inhibitory set which increases the strength of the suggested response by suppressing any stimuli (both sensory and cognitive) which would be incompatible with the

suggested response. The reason that hypnotic suggestion is more effective than normal suggestion is that the inhibitory set is greater in the state of hypnosis.

POST-HYPNOTIC SUGGESTION: All responses produced in the hypnotic state can be carried over into the normal "waking" state. That is, they can be made to re-occur on cue after the hypnosis is terminated. This includes the control over all the involuntary functions mentioned, including habits, attitudes, fears, etc. This "carry-over" is done by means of what is referred to as post-hypnotic suggestion. The purpose of the present section is to explain how post-hypnotic suggestion produces such results.

The first step in this explanation is to show that the phenomena under the heading of post-hypnotic suggestion can be explained as a form of higher-order conditioning, a form that Mowrer (1954) has called sentence or sign-sign conditioning, and which the present writer refers to as cognitive-cognitive conditioning. The second step is to present evidence that hypnosis can facilitate this type of conditioning.

In what follows we shall first define cognitive-cognitive conditioning and post-hypnotic suggestion. Next, we shall condense the explanation of post-hypnotic phenomena into two major hypotheses and present evidence in support of them.

Definitions:

*** Cognitive-Cognitive (C-C) Conditioning:** Cognitive-Cognitive Conditioning is defined as a form of higher order conditioning resulting from the pairing of two cognitive stimuli. It differs from Pavlovian or first-order conditioning in that the CS and UCS are cognitive rather than sensory. As an illustration, let's say we wanted to condition salivation to the ringing of a bell by means of cognitive-cognitive conditioning. Rather than pair a real bell with real food, as in Pavlov's classic example of conditioning, we should be able to establish an association between bell and food by pairing the words "bell" and "food". (Because of previous conditioning, the word "bell" has come to evoke the cognitive stimulus "bell" and the word "food" the cognitive stimulus "food".)

We find that Hebb (1949) has proposed a similar model to explain learning in the mature organism. According to Hebb, "The characteristic adult learning (outside of psychological laboratories) is learning that takes place in a few trials, or in one only. It seems always to involve a recombination of familiar perceptions and familiar patterns of movement. ... Adult learning is thus a changed relationship between the central effects [cognitive stimuli] of separate stimulations, and does not concern the precipitating stimulus or, primarily, the motor response whose control is imbedded in the central activity. ...That is, the central effects of sensation are what enter into an association, rather than the comparatively simple sensory event itself. This seems especially true of the most efficient learning--the kind that is established most easily and persists longest." (pp.126-132)

The type of cognitive-cognitive conditioning resulting from suggestion differs from Pavlovian (or sensory-sensory) conditioning in still another way. A suggestion which pairs the words "bell" and "food" involves more than just merely saying "bell" and "food", "bell"--"food," "bell"--"food" over and over. The form of suggestion usually used is more like, "Whenever you hear a bell you will find the taste of food in your mouth." This suggestion does two things, it evokes the cognitive stimuli "bell" and "food", but, in addition, it evokes an inhibitory set (as do all suggestions) which tends to suppress any stimuli which would interfere with the association of these stimuli.

*** Post-Hypnotic Suggestion (PHS):** Post-hypnotic suggestion can be defined as suggestion given during hypnosis producing C-C conditioning that affects later, post-hypnotic behavior.

Not all suggestions producing C-C conditioning during the hypnotic state will affect later post-hypnotic behavior. Whether the post-hypnotic behavior is affected will depend on the wording of the suggestion and on how the hynotic state is terminated. For example, the suggestion, "When I ring a bell you will taste food," given during the hypnotic state will probably not affect later, post-hypnotic behavior. This is because when bringing the subject out of the hypnotic state the hypnotist either directly or indirectly suggests that the subject will come back to normal; i.e., that all suggestions given during the hypnotic state will no longer hold. That this suggestion of return to normality can so quickly extinguish the conditioning that has taken place is given some support by the work done on the effect of cognitive factors on conditioning. For instance, Spence (1963) found that when subjects in a conditioning experiment were led to believe that the experiment was over, presentation of the CS was suddenly found to no longer evoke the CR.

Such effects of trance termination on C-C conditioning can be gotten around by means of appropriate wording of the suggestion. For example, we would word the suggestion to read, "Whenever I ring a bell you will taste food, "or better yet, "After you have awakened, whenever I ring a bell you will taste food."

*** Explanation of PHS in Terms of Two Hypotheses: Hypothesis VI:** Post-Hypnotic Suggestion leads to behavior change by a form of higher order conditioning called cognitive-cognitive conditioning. In strong support of this hypothesis are Mowrer's theoretical formulations on language and behavior, presented in his 1954 presidential address to the American Psychological Association (Mowrer, 1954) and later expanded in his book, Learning Theory and the Symbolic Processes (Mowrer, 1960). In his discussion of the role of language in conditioning, Mowrer postulates that the sentence (a form of suggestion) can act as a means of conditioning. As he puts it:

"The notion under examination in this chapter is...that the sentence is, pre-eminently, a conditioning device, and that its chief effect is to produce new associations, new learning, just as any other paired presentation of stimuli may do.... "The essence of the argument advanced up to this point is that the subject-predicate complex which we call a sentence is, in effect, simply an arrangement for conditioning the meaning reaction produced by the predicate to the interoceptive stimu□lation aroused by the meaning reaction elicited by the sentence subject. (Mowrer, 1960, pp. 141-142, 147)

Although in this quote Mowrer refers to “meaning reaction” rather than cognitive stimuli, it will be readily apparent to anyone reading Mowrer that he would consider the two terms practically synonymous (see pp.163-207). Mowrer goes on to “put this hypothesis about language function into a broader, more systematic perspective” by subsuming sentence conditioning under what he calls “sign-sign” conditioning (what we refer to as cognitive-cognitive conditioning). He points out that signs need not be words only (as in sentence conditioning) but other stimuli and cues with acquired meaning as well.

What Mowrer is essentially saying, then, is that contiguous cogni□tive stimuli, whether elicited (suggested) by words or by other stimuli, can bond together forming a new cognition, a new conditioned association, leading to new behavior. Mowrer’s arguments in favor of such a contention are quite persuasive, and, as he points out, the experimental evidence in support of it is already beginning to come in (e.g., Staats et al., 1959).

*** Hypothesis VII: Hypnosis facilitates the C-C conditioning produced by suggestion.** It must, of course, be obvious to anyone that under ordinary circumstances suggestions are not always readily accepted, thus C-C conditioning does not always take place after the appropriate

suggestion. Why is this so? We will find that the answer to this question will begin to throw some light on the part hypnosis plays in facilitating C-C conditioning.

Osgood (1963) perhaps best answered this question in his 1963 presidential address to the American Psychological Association when discussing Mowrer's concept of the sentence as a conditioning device. According to Osgood, if the assertion made by the sentence (the suggestion) is incongruent with the subject's previously held beliefs and attitudes (the cognitive environment) or his present perceptions (the sensory environment), it will tend to be suppressed.

The interference of incongruent stimuli with C-C conditioning is understandable in terms of the conditioning paradigm if we recall Postulate II (the conditioning postulate). It will be remembered that a corollary to this postulate stated that anything interfering with the contiguous occurrence in the focus of attention of the stimuli being associated would interfere with the conditioning. Since incongruent or incompatible beliefs, attitudes, perceptions, etc., would tend to suppress the cognitive stimuli to be paired, they would thus interfere with the conditioning. Therefore, we would hypothesize that anything that would eliminate such interfering stimuli should facilitate the C-C conditioning. (This hypothesis can be tested by first producing a situation where competing stimuli were eliminated or suppressed and then seeing if this facilitates the C-C conditioning.)

This leads us to the part that hypnosis plays in the facilitation of the conditioning. Hypnosis, it is felt, provides an especially effective means (the inhibitory set) whereby interfering stimuli can be readily inhibited. That the writer is not alone in this approach to explaining the part hypnosis plays in conditioning is seen from the following quote of Leuba's: "I attributed the quickness and the ease of conditioning during hypnosis to the relatively complete concentration achieved on the conditioned and unconditioned stimuli, and the consequent absence of conflicting and inhibitory responses at the time of conditioning. I envisioned hypnosis as providing ideal circumstances for conditioning to occur. It provided the experimenter with the means for excluding distracting psychological variables - interfering thoughts and experiences." (1955, p. 10)

In discussing the possible mechanisms whereby hypnosis facilitates C-C conditioning we should not only explain why hypnosis facilitates the making of the associations, but also why the CR produced can be such an enduring, "functionally autonomous" response. Hull (1933) seems to be aware of this characteristic in his section on post-hypnotic phenomena where he discusses the results of Patten's (1930) study of the effect of repetition on the strength of the post-hypnotic response:

"The composite graph of these results shows that the vigor of the [post-hypnotic] response while slightly variable, displays no tendency whatever to fall, but, if anything, a slight tendency to rise. Patten believes that with a daily practice post-hypnotic suggestion might persist indefinitely without renewal of the suggestion. However this may be, it is evident that the repeated performance of the post-hypnotically suggested act characteristic of clinical practice would seem to be favorable for maintaining its strength." (pp. 164 - 165)

It is felt that the functionally autonomous nature of the post-hypnotic conditioned response can best be explained if we assume an interference theory explanation of extinction. This theory states that in order for a response to become extinguished, another incompatible response must become conditioned to the CS. An implication from this interference theory would be that if the CR is stronger than a potentially interfering response, the latter will be the one inhibited. Thus, as long as we have a strong enough CR to begin with, it can keep itself from being extinguished. And what's more, if we have such a strong conditioned response, it not only

will inhibit the competing responses, but will itself become conditioned to the potentially interfering stimuli. (For example, we know that if we attempted to extinguish a strong conditioned fear response by feeding an animal in the direct presence of the feared object, we could very well find that the animal soon becomes afraid of eating.) Not only would the CR become associated with the competing stimuli, but, of course, neutral stimuli as well. All this would serve to strengthen the CR in that it would now be associated with many more stimuli than just the original CS.

It should be mentioned that in therapy there is probably still another reason for a post-hypnotic response becoming functionally autonomous--it can become self-reinforcing from the relief or new pleasure experienced whenever the new response occurs.

We have shown how a strong CR can become functionally autonomous, but now the question is, why is the CR established through PHS so strong in the first place? In order to explain this, we propose, first of all, that in the process of conditioning, in general, there are two components of the UCS which become associated with the CS, an excitatory and an inhibitory one. This inhibitory component, or set, as we refer to it, is the same one suppressing the competing stimuli at the time of the association.

This is close to the position held by Harlow (1959), who considers learning to involve the transfer of the learned inhibition of the error-producing factors(the competing stimuli) operating during the learning, to the particular situation (the CS).In the case of the conditioning taking place when a PHS is given, the inhibitory set conditioned to the CS is the same one developed by the hypnotic induction. It is because this set is so strong that the CR is so strong.

Understandably, a learning theorist might hesitate in accepting the possibility that it is a process of conditioning that underlies the dramatic changes produced in hypnotherapy. One-trial conditioning and functional autonomy are not commonly encountered in the laboratory. However, such phenomena are more prevalent outside the laboratory. Because theses phenomena are difficult to fit into the learning theorists' present scheme of things--because they don't seem to fit the usual gradual acquisition curves and the declining extinction curves--does not mean that they should be rejected as conditioning phenomena. Rather, the learning theorists should reject their outmoded theories, or at least revise them so as to better encompass these phenomena as well. The inhibitory set approach which has been stressed in this paper is felt to be one direction learning theorists could take in arriving at a more comprehensive theory of learning. Now let us see if we can find evidence to show that hypnosis does indeed facilitate cognitive-cognitive conditioning.

Evidence that Hypnosis Facilitates C-C Conditioning: There are at least four sources of evidence that we might use to support the hypothesis that hypnosis facilitates C-C conditioning. One comes from the use of PHS to facilitate psychotherapy. Another source comes from the experiments which have shown hypnosis to facilitate first-order conditioning. A third source comes from its use in medicine. Finally, there is the experimental work that has been done on post-hypnotic suggestion **Facilitation of Therapy Via PHS:** As pointed out by Barrios (1969, 1970), post-hypnotic suggestion has been shown to be a highly effective means for producing therapeutic behavior changes. Three large-scale studies were cited in support of this contention (Richardson, 1963; Chong Tong Mun, 1964, 1966; and Hussain, 1964).

Richardson reported an improvement rate of 94.7 percent of 76 cases of frigidity. The average number of sessions was 1.53. The percentage of orgasms (the criterion for judging improvement) rose from a pre-treatment average of 24 percent to a post-treatment average of 84 percent.

Chong Tong Mun's study covered 108 cases. These included patients suffering from asthma, insomnia, alcoholism, dysmenorrhea, dermatitis, anxiety state and impotence. The percentage of patients reported improved (removal or improvement of symptoms) was 90 percent. The average number of sessions was 5. The average follow-up period was 9 months.

Hussain's study reports on 105 patients of varying diagnostic categories. This included patients suffering from alcoholism, sexual promiscuity, impotence and frigidity, sociopathic personality disturbance, hysterical reactions, behavior disorders of school children, speech disorders, and a number of different psychosomatic illnesses. The percentage of patients reported improved was 95.2 percent. The number of sessions ranged from 4 to 16. The criterion for judging improvement was complete or almost complete removal of symptoms. The follow-up ranged from 6 months to 2 years.

Facilitation of First-Order Conditioning: Two studies seem to indicate that hypnosis facilitates first-order conditioning. Scott (1930) found that he could establish a conditioned finger withdrawal response much more rapidly and effectively in his hypnotic subjects. Whereas only five of nine control subjects were conditioned, in an average of 26.6 trials, all of the hypnotized subjects were conditioned and in an average of only 14.2 trials. The remaining four controls had not been conditioned after an average of 30.3 trials.

Leuba (1940) found that he could establish conditioned sensations in his hypnotic S's in an average of six trials, often in only one trial. During deep hypnosis, two stimuli, such as the ringing of a bell and a pin prick on the hand, were applied simultaneously for about six pairings. Before awakening, S's were given post-hypnotic amnesia for what had occurred. A few minutes after awakening, one of the two stimuli was presented whereupon S automatically reacted as if the other stimulus had also been presented. The conditioned sensations were frequently so intense and vivid as to be mistaken for actual sensations. Unfortunately, Leuba does not report using a control group of non-hypnotic S's.

Use of PHS in Medicine: Post-hypnotic suggestion has been used very successfully with hospitalized patients who were ill due to traumatic injury and/or chronic disease (Cangelo, 1961; Crasilneck et al., 1955; Fogelman and Crasilneck, 1956; Kroger and DeLee, 1943; Marmer, 1956; Mason, 1955; Raginsky, 1951; and Schneck, 1953). In these studies we find post-hypnotic suggestion serving a number of different uses. For example, it is of great use in the reduction of pain and the need for narcotics. This includes post-operative pain, the pain resulting from severe burns, and the pain of terminal cancer. It has also been used, for example, to induce a greater appetite in patients whose previous refusal to eat was endangering their lives (Crasilneck, et al., 1955).

A criticism that might be leveled at the use of the use of the above clinical reports as evidence in support of the contention that hypnosis facilitates C-C conditioning is that in most cases no appropriate comparison control group was run. That is, matched patients were not treated with waking suggestion rather than hypnotic suggestion. Some people might feel that such results could have been achieved on the basis of waking suggestion alone.

Experimental Work Done on Post-Hypnotic Suggestion: "Despite a wealth of anecdotal material and case reports, there have been few experimental investigations of the performance of post-hypnotic behavior."(Fisher, 1954) Although fisher made the above statement in 1954, for the most part, it continues to hold true. The following is a summary of most of the studies indicating the effectiveness of post-hypnotic suggestion: Lundholm (1928) was able to produce deafness and blindness by means of PHS. Hammer (1954) found that post-hypnotic suggestions of increased ease, concentration, motivation and ability led to significant

increases in various learning tasks. Gladfelter and Crasilneck (1960) found that they could increase S's vocabulary skill by means of post-hypnotic suggestions aimed at inducing certain emotions, fear having the greatest effect. Rosenberg (1960) used PHS to effectively change subjects' attitudes.

A number of studies have been done on duration of the PHS (Kellogg, 1929; Patten, 1930; Weitzenhoffer, 1950; Edwards, 1954 and Orne, 1963). In general, these studies indicated that, although there was an overall gradual decay of the response, in many cases it continued to be effective for long periods of time, even years; and in some cases there was no decay.

There are also a number of studies done on investigating other characteristics of the post-hypnotic suggestion. Erickson and Erickson (1941) investigated the "spontaneous self-limited post-hypnotic" trance produced in performance of the PHS. Marcuse (1945) studied the effect on PHS of conscious awareness of the post-hypnotic signals and responses. Weitzenhoffer (1950) discussed the effect of difficulty of task on PHS. Levitsky (1960) summarized various techniques for giving the post-hypnotic suggestion.

A study by Barrios (1969, 1973) was more specifically aimed at testing the hypothesis that hypnosis facilitates cognitive-cognitive conditioning. The experimental design was such as to eliminate certain methodological shortcomings associated with most of the previous hypnosis experiments. Among other things, this included using an appropriate control group as well as using the subjects as their own controls; a tape recorder was used to eliminate any possibility of experimenter biasing due to changes in tone of voice; a more appropriate measure of hypnotic depth was used; and an involuntary response (salvation) was used to measure the conditioning rather than the usual voluntary type of response used in most previous PHS experiments. The results from the experiment supported the three predictions made from the hypothesis. That is, it was found that (1) the hypnosis group showed significantly greater conditioning than the control group; (2) the strength of the conditioned response for the hypnosis group was positively correlated with hypnotic depth; and (3) the conditioned response once formed was a strong one, as evidenced by no significant extinction.

Summary: To briefly sum up this final section, the phenomenon of post-hypnotic suggestion, whereby responses produced in the hypnotic state can be carried over into the normal state, was explained as occurring through a process of higher-order conditioning. It was also pointed out that it is the inhibitory set produced by the hypnotic induction that facilitates this conditioning. This overall explanation was condensed into two hypotheses and evidence was presented in support of them.