



Hypnosis and the Psychological Unconscious

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Automatic Processes Perceptual–cognitive processes that are initiated involuntarily, executed outside phenomenal awareness, and consume no attentional resources.

Data-Driven Processes Perceptual–cognitive processes that are based on the perceptual structure of a stimulus.

Episodic Memory Memory for personal experiences, each associated with a unique spatiotemporal context (see contrasting *Semantic Memory*).

Explicit Memory Conscious recollection, as manifested in a person's ability to recall or recognize some past event (see contrasting *Implicit Memory*).

Factor Analysis A statistical technique that provides a concise summary of the correlations among a large number of variables.

Hypnotizability Individual differences in response to hypnosis, as measured by standardized psychological tests such as the Stanford Hypnotic Susceptibility Scales.

Implicit Memory Any effect on task performance that is attributable to a past event, independent of conscious recollection of that event (see contrasting *Explicit Memory*).

Preattentive Processing The perceptual–cognitive processing that occurs before attention has been paid to a stimulus.

Priming The facilitation of perceptual–cognitive processing of a stimulus (known as a target) by presentation of a prior stimulus (known as a prime). In repetition priming, prime and target are identical (e.g., water–water); in semantic priming, prime and target are related in terms of meaning (e.g., ocean–water).

Semantic Memory Context-free memory for factual information (see contrasting *Episodic Memory*).

HYPNOSIS is a social interaction in which one person (the subject) responds to suggestions given by another person (the hypnotist) for imaginative experiences involving alterations in perception, memory, and the voluntary control of action. In the classic case, these responses are associated with a degree of subjective conviction bordering on delusion and an experience of involuntariness bordering on compulsion. The psychological unconscious refers to the proposition that mental states—cognitions, emotions, and motives—can influence ongoing experience, thought, and action outside of phenomenal awareness and voluntary control.

I. HISTORY OF HYPNOSIS

The origins of hypnosis extend back to the ancient temples of Aesculapius, the Greek god of medicine, where advice and reassurance uttered by priests to sleeping patients was interpreted by the patients as the gods speaking to them in their dreams. Its more recent history, however, begins with Franz Anton Mesmer (1734–1815), who theorized that disease was caused by imbalances of a physical force, called animal magnetism, affecting various parts of the body. Accordingly, Mesmer thought that cures could be achieved by redistributing this magnetic fluid—a procedure that typically resulted in pseudoepileptic seizures known as “crises.” In 1784, a French royal commission chaired by Benjamin Franklin and including Lavoisier and Guillotin among its members concluded that the effects of mesmerism, while genuine in many cases, were achieved by means of imagination and not any physical force. In the course of their proceedings, the commissioners conducted what may well be the first controlled psychological experiments.

Mesmer’s theory was discredited, but his practices lived on. A major transition occurred when one of Mesmer’s followers, the Marquis de Puységur, magnetized Victor Race, a young shepherd on his estate. Instead of undergoing a magnetic crisis, Victor fell into a somnambulistic state in which he was responsive to instructions, and from which he awoke with an amnesia for what he had done. Later in the nineteenth century, John Elliotson and James Esdaile, among others, reported the successful use of mesmeric somnambulism as an anesthetic for surgery (although ether and chloroform soon proved to be more reliably effective). James Braid, another British physician, speculated that somnambulism was caused by the paralysis of nerve centers induced by ocular fixation; in order to eliminate the taint of mesmerism, he renamed the state “neurhypnotism” (nervous sleep), a term later shortened to hypnosis. Later, Braid concluded that hypnosis resulted from the subject’s concentration on a single thought (monoideism) rather than from physiological fatigue.

Interest in hypnosis was revived in France in the late 1880s by Jean Martin Charcot, who thought hypnosis was a form of hysteria. Charcot believed that both hypnosis and hysteria reflected a disorder of the

central nervous system. In opposition to Charcot’s neurological theories, A. A. Liebeault and Hippolyte Bernheim, two other French physicians, emphasized the role of suggestibility in producing hypnotic effects. Pierre Janet and Sigmund Freud also studied with Charcot, and Freud began to develop his psychogenic theories of mental illness after observing the suggestibility of hysterical patients when they were hypnotized.

In America, William James and other early psychologists became interested in hypnosis because it seemed to involve alterations in conscious awareness. The first systematic experimental work on hypnosis was reported by P. C. Young in a doctoral dissertation completed at Harvard in 1923, and by Clark Hull in an extensive series of experiments initiated at the University of Wisconsin in the 1920s and continued at Yale into the 1930s. Also at Wisconsin during Hull’s time was Milton Erickson, whose provocative clinical and experimental studies stimulated interest in hypnosis among psychotherapists (Hull knew Erickson at Wisconsin, but the immediate source of Hull’s interest in hypnosis was Joseph Jastrow, who was Hull’s mentor). In England, Hans Eysenck studied hypnosis and suggestibility as part of his classic explorations of personality structure.

After World War II, interest in hypnosis rose rapidly. Ernest Hilgard, together with Josephine Hilgard and Andre Weitzenhoffer, established a laboratory for hypnosis research at Stanford University. Hilgard’s status as one of the world’s most distinguished psychologists helped establish hypnosis as a legitimate subject of scientific inquiry. Also important in this revival were Theodore Sarbin, Martin Orne, Theodore Barber, and Erika Fromm. Hypnosis is now a thriving topic for both scientific inquiry and clinical application, and is represented by such professional organizations as the Society for Clinical and Experimental Hypnosis, the American Society of Clinical Hypnosis, and other affiliates of the International Society of Hypnosis. The *International Journal of Clinical and Experimental Hypnosis*, the *American Journal of Clinical Hypnosis*, the *Australian Journal of Clinical and Experimental Hypnosis*, and *Contemporary Hypnosis* (formerly the *British Journal of Experimental and Clinical Hypnosis*) are among the leading journals publishing hypnosis research.

II. INDIVIDUAL DIFFERENCES

The Abbe Faria, another follower of Mesmer, recognized individual differences in response to animal magnetism as early as 1819, and there are large individual differences in response to hypnosis as well. Hypnosis has little to do with the hypnotist's technique and very much to do with the subject's capacity, or talent, for experiencing hypnosis. Hypnotizability is measured by standardized psychological tests such as the Stanford Hypnotic Susceptibility Scale or the Harvard Group Scale of Hypnotic Susceptibility. These instruments are work samples, analogous to other performance tests. They begin with a hypnotic induction in which the subjects are asked to focus their eyes on a fixation point, relax, and concentrate on the voice of the hypnotist (although suggestions for relaxation are generally part of the hypnotic induction procedure, people can respond positively to hypnotic suggestions while engaged in vigorous physical activity). The hypnotist then gives suggestions for further relaxation, focused attention, and eye closure. After the subjects close their eyes, they receive further suggestions for various imaginative experiences. For example, they may be told to extend their arms and imagine a heavy object pushing their hands and arms down, or that a voice is asking them questions over a loudspeaker, or that when they open their eyes they will not be able to see an object placed in front of them. Posthypnotic suggestions may also be given for responses to be executed after hypnosis has been terminated, including posthypnotic amnesia, the inability to remember events and experiences which transpired during hypnosis. Response to each of these suggestions is scored in terms of objective behavioral criteria—do the subjects' arms drop a specified distance over a period of time, do they answer questions realistically, do they deny seeing the object, and so on.

Hypnotizability, so measured, yields a roughly normal (i.e., bell-shaped) distribution of scores. Most people are at least moderately responsive to hypnotic suggestions, while relatively few people are refractory to hypnosis and relatively few (so-called hypnotic virtuosos) fall within the highest level of responsiveness. Cross-sectional studies of different age groups show a developmental curve, with very young children relatively unresponsive to hypnosis and hypnotizability

reaching a peak at about the onset of adolescence; scores drop off among middle-aged and elderly individuals. Hypnotizability assessed in college students remains about as stable as IQ over a period of 25 years.

Although hypnotizability is generally assessed in terms of a single-sum score, factor-analytic studies reveal a degree of multidimensionality. Hypnotic suggestions can be classified roughly as ideomotor (involving the facilitation of motor responses), challenge (involving the inhibition of motor responses), and cognitive (involving alterations in perception and memory). These factors are themselves intercorrelated, so that a general dimension of hypnotizability emerges at a higher level, much like Thurstone's solution to the structure of intelligence in terms of primary mental abilities and a superordinate general intelligence.

Even though hypnosis is a product of suggestion, it is a mistake to identify hypnotizability with suggestibility. In fact, suggestibility itself is also factorially complex. Eysenck distinguished among primary (e.g., direct suggestions for the facilitation and inhibition of motor activity), secondary (implied suggestions for sensory-perceptual changes), and tertiary (e.g., attitude changes resulting from persuasive communications) forms of suggestibility; a further form of suggestibility is the placebo response. Hypnotizability is correlated only with primary suggestibility, and this is carried mostly by the relation between primary suggestibility and the ideomotor and challenge components of hypnotizability.

There is some controversy over whether hypnotizability can be modified. Some clinical practitioners, influenced by the theories of Milton Erickson, believe that virtually everyone can be hypnotized, if only the hypnotist takes the right approach, but there is little evidence favoring this point of view. Similarly, some researchers believe that hypnotizability can be enhanced by developing positive attitudes, motivations, and expectancies concerning hypnosis, but there is also evidence that such enhancements are heavily laced with compliance. As with any other skilled performance, hypnotic response is probably a matter of both aptitude and attitude: negative attitudes, motivations, and expectancies can interfere with performance, but positive ones are not by themselves sufficient to create hypnotic virtuosity.

The role of individual differences makes it clear that

in an important sense, all hypnosis is self-hypnosis. The hypnotist does not hypnotize the subject. Rather, the hypnotist serves as a sort of coach, or tutor, whose job is to help the subject become hypnotized. Although it takes considerable training and expertise to use hypnosis appropriately in clinical practice, it takes very little skill to be a hypnotist. Beyond the hypnotist's ability to develop rapport with the subject, the most important factor determining hypnotic response is the hypnotizability of the individual subject.

III. CORRELATES

Hypnotizability is not substantially correlated with most other individual differences in ability or personality, such as intelligence or adjustment. Interestingly, it does not appear to be correlated with individual differences in conformity, persuasibility, or response to other forms of social influence. However, in the early 1960s, Ronald Shor, Arvid Ås, and others found that hypnotizability was correlated with subjects' tendency to have hypnosis-like experiences outside of formal hypnotic settings, and an extensive interview study by Josephine Hilgard showed that hypnotizable subjects displayed a high level of imaginative involvement in domains such as reading and drama. In 1974, Auke Tellegen and Gilbert Atkinson developed a scale of absorption to measure the disposition to have subjective experiences characterized by the full engagement of attention (narrowed or expanded) and blurred boundaries between self and object. Absorption is the most reliable correlate of hypnotizability (by contrast, vividness of mental imagery is essentially uncorrelated with hypnosis), although the statistical relation is too weak to permit confident prediction of an individual's actual response to hypnotic suggestion. So far as the measurement of hypnotizability is concerned, there is no substitute for performance-based measures such as the Stanford and Harvard scales.

Absorption seems to be a heretofore unappreciated aspect of individual differences. The scales of the Minnesota Multiphasic Personality Inventory, California Psychological Inventory, and other such instruments do not contain items related to absorption, which may explain their failure to correlate with hypnotizability. However, absorption is not wholly unrelated to other individual differences in personality. Recent multivariate research has settled on five major di-

mensions—the Big Five—which provide a convenient summary of personality structure: neuroticism (emotional stability), extraversion, agreeableness, conscientiousness, and a fifth factor often called openness to experience. Absorption is correlated with openness. [See PERSONALITY.]

Actually, the definition of the fifth factor as openness is somewhat controversial, with some theorists arguing for alternative interpretations in terms of intellectance (i.e., the appearance of being intelligent) or culturedness. Openness itself proves to be heterogeneous: some facets (richness of fantasy life, aesthetic sensitivity, and awareness of inner feelings) resemble absorption, while others (need for variety in actions, interest in ideas, and liberal value systems) relate to sociopolitical liberalism. In fact, hypnotizability is correlated with the absorption component of openness, but not with liberalism or intellectance. This pattern of differential correlates indicates that intellectance, absorption, and liberalism are different dimensions of personality and should not be lumped together. In stimulating the discovery of absorption, and in clarifying the nature of the fifth factor in the Big Five structure, research on individual differences in hypnotizability has contributed to understanding in the broader domain of personality.

Researchers have been interested in biological correlates of hypnotizability as well as in those which can be measured by paper-and-pencil tests. Although hypnosis is commonly induced with suggestions for relaxation and even sleep, the brain activity in hypnosis more closely resembles that of a person who is awake. The discovery of hemispheric specialization, with the left hemisphere geared to analytic and the right hemisphere to nonanalytic tasks, led to the speculation that hypnotic response is somehow mediated by right-hemisphere activity. Studies that used both behavioral and electrophysiological paradigms have been interpreted as indicating increased activation of the right hemisphere among highly hypnotizable individuals, but positive results have proved difficult to replicate and interpretation of these findings remains controversial.

It should be noted that hypnosis is mediated by verbal suggestions, which must be interpreted by the subject in the course of responding. Thus, the role of the left hemisphere should not be minimized. One interesting proposal is that hypnotizable individuals show greater flexibility in deploying the left and right hemi-

spheres in a task-appropriate manner, especially when they are actually hypnotized. Because involuntariness is so central to the experience of hypnosis, it has also been suggested that the frontal lobes (which organize intentional action) may play a special role. A better understanding of the neural substrates of hypnosis awaits studies of neurological patients with focalized brain lesions, as well as brain-imaging studies (e.g., positron-emission tomography, magnetic resonance imaging) of normal subjects. [See BRAIN SCANNING/NEUROIMAGING.]

IV. EXPERIMENTAL STUDIES

Right from the beginning of the modern era, a great deal of research effort has been devoted to claims that hypnotic suggestions enable individuals to transcend their normal voluntary capacities—to be stronger, see better, learn faster, and remember more. However, research has largely failed to find evidence that hypnosis can enhance human performance. Many early studies, which seemed to yield positive results for hypnosis, possessed serious methodological flaws, such as the failure to collect adequate baseline information. In general, it appears that hypnotic suggestions for increased muscular strength, endurance, sensory acuity, or learning do not exceed what can be accomplished by motivated subjects outside hypnosis.

A special case of performance enhancement has to do with hypnotic suggestions for improvements in memory—what is known as hypnotic hypermnesia. Hypermnesia suggestions are sometimes used in forensic situations, with forgetful witnesses and victims, or in therapeutic situations to help patients remember traumatic personal experiences. Although field studies have sometimes claimed that hypnosis can powerfully enhance memory, these anecdotal reports have not been duplicated under laboratory conditions.

A 1994 report by the Committee on Techniques for the Enhancement of Human Performance, a unit of the U.S. National Research Council, concluded that gains in recall produced by hypnotic suggestion were rarely dramatic and were matched by gains observed even when subjects are not hypnotized (in fact, there is some evidence that hypnotic suggestion can interfere with normal hypermnesic processes). To make things worse, any increases obtained in valid recollection are met or exceeded by increases in false recollec-

tions. Moreover, hypnotized subjects (especially those who are highly hypnotizable) may be vulnerable to distortions in memory produced by leading questions and other subtle and suggestive influences.

Similar conclusions apply to hypnotic age regression, in which subjects receive suggestions that they are returning to a previous period in their lives (this is also a technique used clinically to foster the retrieval of forgotten memories of child abuse). Although age-regressed subjects may experience themselves as children, and may behave in a childlike manner, there is no evidence that they actually undergo either abolition of characteristically adult modes of mental functioning or reinstatement of childlike modes of mental functioning. Nor do age-regressed subjects experience the revivification of forgotten memories of childhood.

One phenomenon that has received a great deal of attention is hypnotic analgesia—in large part because of the obvious clinical uses to which it can be put. A comparative study of experimental pain found that among hypnotizable subjects, hypnotic analgesia was superior to morphine, diazepam, aspirin, acupuncture, and biofeedback. Hypnotic analgesia relieves both sensory pain and suffering. It is not mediated by relaxation, and the fact that it is not reversed by narcotic antagonists would seem to rule out a role for endogenous opiates. There is a placebo component to all active analgesic agents, and hypnosis is no exception; however, hypnotizable subjects receive benefits from hypnotic suggestion that outweigh what they or their insusceptible counterparts achieve from plausible placebos.

Psychological explanations of hypnotic analgesia come in two primary forms. On the one hand, it is argued that hypnotized subjects use such techniques as self-distraction, stress-inoculation, cognitive reinterpretation, and tension management. While there is no doubt that cognitive strategies can reduce pain, their success, unlike the success of hypnotic suggestions, is not correlated with hypnotizability and thus is unlikely to be responsible for the effects observed in hypnotizable subjects. Rather, hypnotic analgesia seems to be associated with a division of consciousness which prevents the perception of pain from being represented in conscious awareness, without altering the physiological effects of the pain stimulus.

A great deal of research has also been devoted to the posthypnotic amnesia frequently displayed by hypnotizable subjects. This form of forgetting does not occur

spontaneously and may be reversed by administration of a prearranged signal without the reinduction of hypnosis, so it does not represent a form of state-dependent learning. However, the reversibility of amnesia does indicate that its mechanisms may be located at the retrieval stage of memory processing, rather than at the encoding or storage stages. Posthypnotic amnesia does not prevent words studied during hypnosis from being used as free associates or category instances, indicating that posthypnotic amnesia is a disruption of episodic, but not semantic, memory. Moreover, the production of studied items as instances and associates is actually facilitated, resulting in priming effects. Similarly, posthypnotic amnesia does not affect retroactive inhibition or savings in relearning. Skills acquired during hypnosis are preserved afterward, even though the subject cannot remember the acquisition trials. This assortment of findings indicates that although posthypnotic amnesia disrupts explicit expressions of episodic memory (such as recall), it spares implicit expressions. [See AMNESIA.]

Other phenomena of hypnosis can also be understood in terms of the explicit-implicit distinction. For example, hypnotizable subjects given suggestions for deafness deny hearing anything; yet they show speech dysfluencies under conditions of delayed auditory feedback. And when given suggestions for blindness, they deny seeing anything, yet show priming effects from stimuli presented in their visual fields. With the analogy between explicit and implicit memory, we may say that hypnotic suggestions for blindness, deafness, and the like impair explicit perception while sparing implicit perception.

V. CLINICAL APPLICATIONS

Hypnosis has been used in clinics for both medical and psychotherapeutic purposes. By far the most successful and best documented of these has been hypnotic analgesia for the relief of pain. Clinical studies indicate that hypnosis can effectively relieve pain in patients suffering pain from burns, cancer and leukemia (e.g., bone marrow aspirations), childbirth, and dental procedures. In such circumstances, as many as one half of an unselected patient population can obtain significant, if not total, pain relief from hypnosis. Hypnosis may be especially useful in cases of chronic

pain, where chemical analgesics such as morphine pose risks of tolerance and addiction. Hypnosis has also been used, somewhat heroically perhaps, as the sole analgesic agent in abdominal, breast, cardiac, and genitourinary surgery, and in orthopedic situations, although it seems unlikely that more than about 10% of patients can tolerate major medical procedures with hypnosis alone. [See PAIN.]

Hypnotic suggestion can have psychosomatic effects, a matter that should be of some interest to psychophysiologists and psychoneuroimmunologists. For example, several well controlled laboratory and clinical studies have shown that hypnotic suggestion can affect allergic responses, asthma, and the remission of warts. A famous case study convincingly documented the positive effects of hypnotic suggestion on an intractable case of congenital ichthyosiform erythroderma, a particularly aggressive skin disorder. Such successes have led some practitioners to offer hypnosis in the treatment of cancer. While there is some evidence that hypnosis can have effects on immunological processes, more research in this area is needed, and hypnosis should never be substituted for conventional medical treatments in such cases. [See PSYCHONEUROIMMUNOLOGY.]

Hypnosis has also been used in psychotherapy, whether psychodynamic or cognitive-behavioral in orientation. In the former case, hypnosis is used to promote relaxation, enhance imagery, and generally loosen the flow of free associations (some psychodynamic theorists consider hypnosis to be a form of adaptive regression or regression in the service of the ego). However, there is little evidence from controlled outcome studies that hypnoanalysis or hypnotherapy are more effective than nonhypnotic forms of the same treatment. By contrast, a 1995 meta-analysis by Kirsch and colleagues showed a significant advantage when hypnosis is used adjunctively in cognitive-behavioral therapy for a number of problems. In an era of managed mental health care, it will be increasingly incumbent on practitioners who use hypnosis to document, quantitatively, the clinical benefits of doing so. [See BEHAVIOR THERAPY; COGNITIVE THERAPY; PSYCHOANALYSIS.]

Hypnosis is sometimes used therapeutically to recover forgotten incidents, as for example in cases of child sexual abuse. Although the literature contains a number of dramatic reports of the successful use of this technique, most of these reports are anecdotal

and fail to obtain independent corroboration of the memories that emerge. Given what we know about the unreliability of hypnotic hypermnnesia, and the risk of increased responsiveness to leading questions and other sources of bias and distortion, such clinical practices are not recommended. Similar considerations obtain in forensic situations. In fact, many legal jurisdictions severely limit the introduction of memories recovered through hypnosis out of a concern that such evidence might be tainted. The Federal Bureau of Investigation has published a set of guidelines for those who wish to use hypnosis forensically, and similar precautions should be used in the clinic. [See CHILD SEXUAL ABUSE.]

Returning to strictly therapeutic situations, an important but unresolved issue is the role played by individual differences in the clinical effectiveness of hypnosis. As in the laboratory, so in the clinic: a genuine effect of hypnosis should be correlated with hypnotizability. It is possible that many clinical benefits of hypnosis are mediated by placebo-like motivational and expectational processes—that is, with the “ceremony” surrounding hypnosis, rather than with hypnosis *per se*. An analogy is to hypnotic analgesia, which appears to have a placebo component available to insusceptible and hypnotizable individuals alike, and a dissociative component available only to those who are highly hypnotizable. Unfortunately, clinical practitioners are often reluctant to assess hypnotizability in their patients and clients out of a concern that low scores might reduce motivation for treatment. This danger is probably exaggerated. On the contrary, assessment of hypnotizability by clinicians contemplating the therapeutic use of hypnosis would seem to be no different, in principle, than an assessment of allergic responses before prescribing an antibiotic. In both cases, the legitimate goal is to determine what treatment is appropriate for what patient.

It should be noted that clinicians sometimes use hypnosis in nonhypnotic ways—practices which tend to support the hypothesis that whatever effects they achieve through hypnosis are related to its placebo component. There is nothing particularly hypnotic, for example, about having a patient in a smoking-cessation treatment rehearse therapeutic injunctions not to smoke and other coping strategies while hypnotized. It is likely that more successful use of hypnosis as an adjunct to the cognitive-behavioral treatment of smoking, excessive weight, and similar habit

disorders would be to use hypnotic suggestions to control the patient's awareness of cravings for nicotine, sweets, and the like. Given the ability of hypnotic suggestions to control conscious perception and memory, such strategies might well have therapeutic advantage—but only, of course, for those patients who are hypnotizable enough to respond positively to such suggestions.

VI. THEORIES

The dual nature of hypnosis, in which alterations in consciousness occur in an interpersonal context, has meant that theoretical attempts to understand the phenomenon have been entangled in dichotomies. This has been the case since Mesmer, who thought his effects were due to a magnetic fluid, while the French royal commission attributed them to imagination. Charcot thought hypnotizability was a matter of neurology, while Liebeault and Bernheim emphasized suggestion. Sometimes these dichotomies are manifested within a single individual: Braid began with ideas about the paralysis of nerve centers and ended up emphasizing attention, imagination, expectation, and personality.

In the modern era these dichotomies are still visible, if somewhat obscured by theoretical nuance. Thus, the traditional (if perhaps somewhat tacit) view that hypnosis involves a “special” or “altered” state of consciousness is opposed by a variety of social-psychological or cognitive-behavioral views which assert that hypnotic behavior is a result of processes that are in every sense ordinary. However, there is considerable heterogeneity of viewpoint within each camp, which is sometimes ignored by the other side (a common feature of intergroup relations, according to social psychologists). Among those who are sometimes labeled as state theorists (including the present writer) are cognitive psychologists who think that hypnosis involves dissociative processes, psychoanalysts who invoke adaptive regression in the service of the ego, and neuroscientists who emphasize the inhibition of cortical structures. Among the critics of the state view are some who claim that hypnotic effects can be produced in the absence of a hypnotic induction, so long as subjects are appropriately motivated and instructed. There are others who emphasize the importance of prescriptive social roles played out by both hypnotist

and subject, the self-fulfilling effects of expectancies, and the role of attributional processes and self-deception. While some social-psychological and cognitive-behavioral theorists have spent a great deal of time debunking exaggerated or erroneous claims about hypnosis, this has been no less true for some state theorists.

Although it is sometimes popular to portray this theoretical dispute as a kind of enduring debate, there is as much controversy within each camp as there is between camps, and in the final analysis most hypnosis research is designed more to illuminate the nature of specific hypnotic phenomena such as analgesia or amnesia than to provide evidence for any overarching theory of hypnosis. Nevertheless, scientists are trained to test hypotheses derived from theories, and, if possible, to test single hypotheses that will decide between competing theories, so that any empirical evidence obtained tends to be construed as evidence for one view or another.

In the early 1960s, J. P. Sutcliffe published a pair of seminal papers that contrasted a credulous view of hypnosis, which holds that the mental states instigated by suggestion are identical to those that would be produced by the actual stimulus state of affairs implied in the suggestions, with a skeptical view, which holds that the hypnotic subject is acting *as if* the world were as suggested. This is, of course, a version of the familiar dichotomy, but Sutcliffe also offered a third view: that hypnosis involves a quasi-delusional alteration in self-awareness—a delusion that is constructed out of the interaction between the hypnotist's suggestions and the subject's interpretation of those suggestions. Hypnosis is simultaneously a state of (sometimes) profound cognitive change, involving basic mechanisms of perception, memory, and thought, and a social interaction, in which hypnotist and subject come together for a specific purpose within a wider sociocultural context. A truly adequate, comprehensive theory of hypnosis will seek understanding in both cognitive and interpersonal terms. We do not yet have such a theory.

VII. PSYCHOLOGICAL UNCONSCIOUS

The psychological unconscious refers to the idea that mental states—cognitions, emotions, and motives—can influence ongoing experience, thought, and action

outside of phenomenal awareness and voluntary control. Although the discovery of the unconscious is commonly attributed to Sigmund Freud, in fact, interest in unconscious mental states and processes goes back to the eighteenth century philosopher Leibnitz, who argued for the importance to perception of subliminal stimuli, and the nineteenth century psychophysicist Helmholtz, who argued that conscious perception results from unconscious inferences about environmental stimuli. Within contemporary cognitive psychology and cognitive science, interest in the psychological unconscious is almost entirely divorced from Freud and psychoanalysis.

In early cognitive psychology, the psychological unconscious was conceived as part wastebasket and part file cabinet. On the one hand, it was the repository for unattended inputs or for those contents of the sensory registers and short-term memory (STM) that had been rendered unavailable by virtue of decay or displacement. On the other hand, the unconscious was identified with the latent contents of long-term memory (LTM), which are brought into awareness when they are copied from LTM to STM. Later, acceptance of the distinction between automatic and effortful processes led to the idea that unconscious mental processes were executed automatically, without drawing on attentional resources. The upshot has been the identification of the unconscious with the unattended, and the rise of the notion that unconscious processing is limited to perceptual and other low-level, presemantic analyses.

More recently, unconscious processing has frequently been identified with the distinction between automatic and controlled mental processes. In some respects, the models for automatic processes are innate reflexes, taxes, instincts, and learned stimulus-response connections formed through classical and instrumental conditioning. Automatic processes are initiated independent of conscious intentions, are executed outside of awareness, and cannot be terminated until they have run to completion. Moreover, it appears that their execution consumes no attentional resources, so that they do not interfere with other ongoing perceptual-cognitive activities. Automatic processes are unconscious in the strict sense of the term: they are never directly available to conscious awareness and are known only by inference.

The automatic-controlled distinction refers to per-

ceptual–cognitive processes engaged in the course of perceiving, remembering, and thinking. The implication is that percepts, memories, and thoughts themselves are available to conscious awareness. Logically, however, availability is no guarantee of accessibility, raising the possibility that mental contents as well as mental processes might be unconscious. In fact, a wealth of experimental evidence, involving both brain-damaged patients and normal subjects, supports a distinction between explicit and implicit memory. Amnesic patients or normal subjects who show preserved priming in the absence (or independent) of recall or recognition, constitute evidence for unconscious memory.

The explicit–implicit distinction can be extended to other psychological domains as well. In perception, for example, there is considerable evidence that stimuli which are subliminal, masked, or unattended can have effects on cognition and behavior even though the stimuli themselves are not consciously perceived. In cases of “blindsight,” patients who have suffered damage to the striate cortex of the occipital lobe are able to respond appropriately to visual stimuli even though they are unable to see them. These experimental outcomes illustrate a distinction between explicit and implicit perception, analogous to the explicit–implicit distinction in memory. Explicit perception refers to the conscious perception of current events, as exemplified by the ability to locate and identify objects. By contrast, implicit perception refers to any effect of a current event on ongoing experience, thought, or action in the absence (or independent) of conscious perception, as exemplified by subliminal perception or blindsight.

The explicit–implicit distinction may also be relevant to discussions of thinking and problem solving. For example, intuitions about the solution to a problem, in the absence of conscious awareness of the solution itself, may be an example of implicit thought; incubation may reflect increases in activation associated with an implicit thought; and insight may occur once an implicit thought crosses the threshold required for conscious awareness.

It should be noted that the explicit–implicit distinction may be relevant to emotion and motivation as well as cognition. Many theorists distinguish among three components of an emotional response: subjective (or cognitive), referring to the person’s conscious feeling state; behavioral, referring to overt motor activities associated with the emotion; and physiological, refer-

ring to associated covert somatic changes. Researchers have observed that these three components are not always positively intercorrelated, a situation known as desynchrony. A particular form of desynchrony, in which the subjective component of emotion is absent while the behavioral and physiological components persist, is tantamount to a dissociation between explicit and implicit emotion.

Implicit perception, memory, and thought serve as examples of preconscious cognition, in which the percepts and memories lie on the fringes of consciousness. Were the encodings deeper, or the retention interval shorter, or the retrieval cues richer, implicit memories might be consciously accessible. So, too, for implicit percepts: we would be conscious of them if only the stimuli contributing to implicit perception effects were of greater intensity or duration, or unmasked, or presented within the focus of attention. In general, the processing of preconscious percepts and memories is analytically limited. For example, the repetition priming effects obtained in the typical study of implicit memory are mediated by traces that represent the perceptual structure, but not the meaning, of the event in question. Semantic priming effects have been obtained in subliminal perception, but they are very weak and short-lived. Apparently, the conditions under which preconscious processing occurs do not permit very much to be done, cognitively, with these percepts and memories.

Hypnosis is relevant to the psychological unconscious because the phenomena of hypnosis appear to expand the boundaries of unconscious processing beyond the automatic and the preconscious. For example, the priming effects which are preserved in posthypnotic amnesia reflect semantic processing: the items in question were deeply processed at the time of encoding. Finally, the impairment in explicit memory is reversible: posthypnotic amnesia is the only memory disorder studied under laboratory conditions where implicit memories can be restored to explicit recollection. Taken together, then, these properties of priming in posthypnotic amnesia reflect the unconscious influence of semantic representations formed as a result of extensive attentional activity at the time of encoding. The priming itself may be an automatic influence, but it is not the sort that is produced by automatic processes mediated by a perceptual representation system or by presemantic or data-driven processing.

A second example is provided by posthypnotic suggestion, which appears to have a quasi-compulsive quality to it, especially when—as so often happens—the subject is unaware (by virtue of posthypnotic amnesia) that he or she is responding to the experimenter's cue. Thus it appears to be an automatic response to stimulation, but careful examination indicates that responding to the posthypnotic cue consumes attentional resources and interferes with other ongoing activities. Even though the posthypnotic suggestion is executed outside of the subject's awareness, and is experienced as involuntary, it is not automatic in the technical sense of being attention-free.

The identification of the psychological unconscious with automatic processing and with preconscious perceptions and memories is popular, but if the phenomena of hypnosis are to be taken seriously, it is also misleading. Studies of hypnotic phenomena indicate that deep, semantic processing can occur without concurrent or retrospective awareness of what has been processed, and behavior executed outside of awareness can nonetheless consume attentional resources. The major contribution of hypnosis to our understanding of the psychological unconscious is the realization that there is more to consciousness than attention. At the very least, the phenomena of hypnosis seem to require another category, besides automatic processes and preconscious contents, in the taxonomy of unconscious mental life: subconscious contents. Subconscious perceptions are in no sense subliminal or unattended; subconscious memories are in no sense weakly encoded. Yet neither are accessible to conscious awareness.

VIII. DISSOCIATION AND SUBCONSCIOUS PROCESSING

Hilgard and others have suggested that the phenomena of hypnosis and similar phenomena observed in other altered states indicate that consciousness can be divided, so that attentive, semantic processing can proceed outside phenomenal awareness. Hilgard's neodissociation theory of divided consciousness characterizes the mind as a set of modules that monitor and control mental functions in different domains. In the normal case, these modules are organized to be able to communicate with each other and with a central cognitive structure—what Hilgard calls the executive

ego—which serves as the end point for all conscious inputs and the point of origin for all conscious outputs. This executive ego provides the cognitive basis for the phenomenal experiences of awareness and intentionality.

However, neodissociation theory also asserts that certain conditions, one of which is hypnosis, can alter the integration of the various cognitive structures. If the lines of communication between two subordinate structures are cut, they may perform input-output functions in the absence of any coordination between them. If the communication between a subordinate structure and the executive ego is disrupted, the domain-specific module will perform its function in the absence of the phenomenal experience of awareness and intentionality. In descriptive terms, both cases constitute states of dissociation.

Neodissociation theory holds that responses to suggestions are executed by the subordinate cognitive substructures, alone or in combination, independent of involvement of the executive ego. In the case of posthypnotic amnesia, for example, the events and experiences of hypnosis are processed by modules dedicated to learning and memory; when the suggestion for posthypnotic amnesia is given, the normal communicative link between these modules and the executive control structure is disrupted. Thus, when the executive control structure tries to gain access to these memories in order to respond to an explicit memory test, it cannot do so. However, implicit memory functions such as priming, which do not require conscious access mediated by the executive control structure, are unimpaired. Similarly, posthypnotic suggestions are executed by the relevant substructures without involvement of the executive. Because the executive has no awareness of this activity, the behavior in question is experienced as automatic, even though it may be quite complex and cognitively demanding. Although some critics have interpreted dissociation theory as implying that dissociated activities should not interfere with other ongoing functions, it should be apparent that such a system of dissociated control may well make considerable demands on cognitive resources, resulting in decrements in the performance of simultaneous tasks.

How this dissociation occurs is not well understood. However, the neodissociation theory of divided consciousness, proposed in the context of hypnosis,

has stimulated a revival of interest in various forms of dissociation observed clinically, such as psychogenic amnesia, fugue, and multiple personality (dissociative identity disorder). In addition to these clinical syndromes, which fall under the diagnostic rubric of "dissociative disorders," it has been noted that the various "conversion disorders," such as functional blindness, deafness, and paralysis, are essentially dissociative in nature. In each case, some aspect of perception or memory is split off from awareness. Research on the mechanisms of dissociation is at an early stage, but it is already clear that the phenomena of hypnosis, and the clinical syndromes which they resemble, expand the domain of the psychological unconscious and constitute major challenges to our understanding of the nature of conscious and unconscious mental life. [See DISSOCIATIVE DISORDERS.]

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