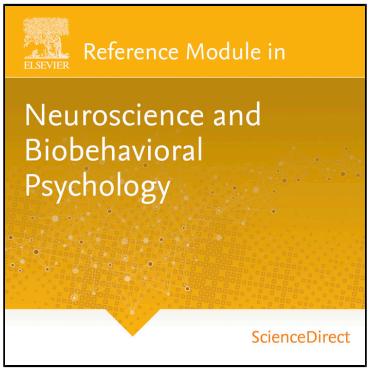

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Hypnosis: Applications☆

John F Kihlstrom, University of California, Berkeley, CA, United States

Introduction

In the classic instance, these suggested experiences are associated with a degree of subjective conviction bordering on delusion, and an experience of involuntariness bordering on compulsion. Hypnosis has its origins in the "animal magnetism" promoted by Franz Anton Mesmer (1724–1815), an Austrian physician, for the treatment of medical illnesses. Mesmer's theories were discredited in 1784 by a French royal commission chaired by Benjamin Franklin, but interest in his technique persisted. Over the years, animal magnetism was transformed into "mesmerism", then "artificial somnambulism", then "neurohypnotism", and finally hypnosis as we know it today (Gauld, 1992). Since the time of William James and Ivan Pavlov, hypnosis has been of interest to psychologists and other scientists and philosophers for the insights it can yield about perception, memory, consciousness, and other basic psychological functions. However, it has also found its way into practical applications of various sorts (Nash, 2001; for comprehensive coverage, see Nash and Barnier, 2008).

Hypnotizability and Its Correlates

It is important to understand that not everyone responds positively hypnotic suggestions. Individual differences in hypnotizability are measured by performance-based tests such as the Stanford Hypnotic Susceptibility Scale or Harvard Group Scale of Hypnotic Susceptibility (Hilgard, 1965). Some researchers and clinicians use alternative scales, but the Harvard scale is the most popular choice for this purpose, and Form C of the Stanford scale remains the "gold standard" for measuring hypnotizability. The hypnotizability scales consists of a standardized induction procedure accompanied by a set of representative hypnotic suggestions, response to which is scored according to objective, behavioral criteria. As measured by the scales, most people are at least moderately responsive to hypnotic suggestions; relatively few people are entirely refractory to hypnosis, and relatively few "hypnotic virtuosos" fall within the highest level of responsiveness. Some theorists have argued that hypnotizability can be enhanced by developing positive attitudes, motivations, and expectancies concerning hypnosis. 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 high hypnotizability.

Hypnotizability is not substantially correlated with other individual differences in ability or personality, such as intelligence or extraversion. One exception is *absorption*, defined as the tendency to have subjective experiences characterized by the full engagement of attention (narrowed or expanded), and blurred boundaries between self and object. Absorption, in turn, is a facet of the "openness to experience" dimension in the "Big Five" structure of personality. However, even these correlations are too weak to permit hypnotizability to be predicted in advance, on the basis of the usual sorts of personality questionnaires. Hypnotizability must be measured by performance-based work-samples such as the Harvard and Stanford scales.

Pain and Analgesia

By far, the most successful clinical application of hypnosis involves suggestions for analgesia to relieve pain (Hilgard and Hilgard, 1975; Patterson and Jensen, 2003). As early as the 1840s, John Elliotson and James Esdaile separately reported that they had performed a large number of surgeries painlessly, with the artificial somnambulism as the only anesthetic agent. However, beginning in 1846 the introduction of chemical anesthetics, such as ether and chloroform, quickly supplanted hypnosis. Nevertheless, when chemical analgesics or anesthetics were unavailable, or contraindicated, physicians still sometimes resorted to hypnosis. Between 1955 and 1974 more than two dozen cases were published in which hypnosis had been used as the sole analgesic or anesthetic

agent in surgery. Of even greater importance was the publication, in the early 1960s, of extensive case series documenting the successful use of hypnosis in obstetrics and in the treatment of cancer pain. Other clinical studies found that hypnosis can effectively relieve pain in dental patients. One comprehensive review of the clinical literature estimated that approximately half of medical, dental, and surgical patients could obtain significant pain relief through hypnosis alone. More recent reviews confirm that even when patients are unselected for hypnotizability, hypnotic suggestions can have quite substantial effects on both acute and chronic pain. Hypnosis may be especially useful in cases of chronic pain, where chemical analgesics such as morphine pose risks of tolerance and addiction, and in childbirth, where the active participation of the mother may be desirable.

In addition to replacing chemical analgesics when circumstances warrant, hypnosis can serve as a useful adjunct to more conventional medical treatment of pain, such as "conscious sedation" for outpatient surgery. Careful clinical studies have shown that the addition of hypnosis reduces both pain and anxiety. Hypnotized patients request, and receive, less pain medication than controls. Hypnosis is associated with a decrease in interruptions and adverse events during surgery; the procedure takes less time, and patients recover faster, when they receive hypnosis as well as medication. Although hypnosis can rarely substitute for the chemical analgesia and anesthesia that is the standard of care in modern medicine, it is a cost-effective adjunctive treatment (a complement, if not an alternative) that improves the quality of patient care.

In addition to this increasing body of clinical research, a large amount of laboratory research has shed light on the mechanisms by which hypnotic suggestions have their effects. Psychophysical studies of hypnotic analgesia, and its close relative, hypnotic tactile anesthesia, show that reductions in sensory experience are correlated with Hypnotizability. Hypnotic analgesia is not mediated by mere relaxation, or by the release of endogenous opiates (endorphins). It is not merely a placebo effect (though there is a placebo component in hypnotic analgesia, just as there is in chemical analgesics and other medical interventions). Hypnosis can reduce both sensory pain and suffering, and in fact suggestions specifically targeting one or the other of these components of pain have selective effects on activity in the somatosensory and anterior cingulate regions of the brain. Psychologically speaking, hypnotic analgesia seems to go beyond self-distraction, stress-inoculation, cognitive reinterpretation, and tension-management. According to one prominent theory, hypnotic analgesia involves a dissociation, or division of consciousness, that effectively reduces the patient's awareness of pain (Hilgard, 1977).

Other Clinical Applications

Hypnotic suggestion can have "psychosomatic" effects on aspects of bodily functioning other than pain, and these can also be practically useful. For example, it has frequently been observed that hypnotic suggestions can reduce bleeding from wounds and speed the healing of burns. However, these effects have not yet been subject to rigorous clinical and experimental study. Several well-controlled laboratory and clinical studies have shown that hypnotic suggestion can affect allergic responses, asthma, and the remission of warts. Such successes have led some practitioners to offer hypnosis in the treatment of cancer, but there is no evidence that hypnosis affects tumors themselves, as opposed to pain, nausea, and other aspects of the patient's quality of life. While hypnosis may be a useful adjunct to conventional medical treatment, there is no reason to think that in such cases.

Hypnosis has also been used in psychotherapy (Kirsch et al., 1995; Lynn et al., 2011). Some psychodynamic theorists, working in the tradition of Sigmund Freud, consider hypnosis to be a form of "adaptive regression" or "regression in the service of the ego", and use it to promote relaxation, enhance imagery, and generally loosen the flow of free associations. However, there is little evidence from controlled outcome studies that "hypnoanalysis" or "hypnotherapy" is more effective than nonhypnotic forms of the same treatment. By contrast, a recent review found substantial treatment gains when hypnosis is used adjunctively in cognitive-behavioral therapy for such problems as obesity, insomnia, anxiety, phobia, and hypertension. In view of the demands of managed medical and mental health care, it is important for practitioners who use hypnosis to document, quantitatively, the clinical (and economic) benefits of doing so.

An important but unresolved issue is the role played by individual differences in the clinical effectiveness of hypnosis. In the laboratory as in the clinic, a genuine effect of hypnosis should be correlated with hypnotizability. 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 assessing allergic responses before prescribing an antibiotic. In both cases, the legitimate goal is to determine what treatment is appropriate for the patient.

It should be noted that clinicians sometimes use hypnosis in non-hypnotic 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 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 hypnosis per se.

Sensory-Motor Performance Enhancement

Much of the popular interest in hypnosis stems from claims that it permits people to transcend their normal voluntary capacities, yielding increased muscular power, endurance, and resistance to fatigue, increased sensory acuity, and other special abilities. However, controlled research has largely failed to find evidence that hypnosis can enhance these and other aspects 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. For example, subjects may "hold back" on nonhypnotic trials in order to satisfy experimenters' implicit expectations that they show "improved" performance during hypnosis. Of course, in some situations benefits may be achieved

indirectly through suggestions for reduced awareness of pain. Hypnotized subjects may *experience* themselves as stronger, etc., but this is not the same thing as a direct enhancement of human performance capacities per se.

In general, it appears that hypnotic suggestions for increased muscular strength, endurance, sensory acuity, or learning do not exceed what can be accomplished by appropriately motivated subjects outside hypnosis. Nevertheless, the folklore surrounding hypnosis may lead subjects to achieve performance enhancements through a kind of self-fulfilling prophecy. For example, instead of giving suggestions for increased muscle strength, one intriguing study asked hypnotizable subjects to imagine themselves becoming stronger. These subjects actually outperformed control subjects who were merely exhorted to maximize their performance. If hypnosis does enhance human performance, it may be by virtue of hypnotic alterations in the individual's self-concept, rather than his or her skeletal musculature.

Another highly intriguing line of research suggests that hypnotic suggestions may enhance visual acuity in individuals with myopia (though not in individuals with normal vision). The research is especially intriguing because the investigators took special care to rule out "peripheral" factors that might account for the effect, such as accommodation or other structural changes in the eyes. If hypnotic suggestions do in fact improve visual acuity in those with impaired vision (and this claim still must be confirmed by additional research), the effects appears to be mediated centrally, perhaps involving cortical centers associated with visual attention.

It is sometimes claimed that hypnosis enhances "parapsychological" abilities such as clairvoyance, telepathy, and telekinesis. However, there is no good evidence that this is the case – not least because there is no good evidence for parapsychological effects to begin with.

Learning and Memory

Similar conclusions apply to learning capacity. Many studies of hypnotically enhanced learning suffer from the same methodological defects as the aforementioned studies of muscular performance and sensory acuity. One well-known line of research attempted to enhance learning by giving subjects hypnotic suggestions for time distortion. By extending the "subjective" interval of time devoted to studying the material, these investigators hoped to enable subjects to learn more over short intervals of time. However, the promising results of early experiments have largely failed to be confirmed by more tightly controlled follow-up studies. Hypnotic subjects may well experience time as flowing more slowly, or more rapidly, than it actually is. But this distortion in perception does not have positive consequences for learning in "real time".

A special case of performance enhancement has to do with hypnotic suggestions for improvements in memory, or *hypnotic hypermnesia*. Hypermnesia suggestions are sometimes employed in forensic situations, with forgetful witnesses and victims, or in therapeutic situations, to help patients remember childhood sexual abuse and other traumatic personal experiences. Sometimes, suggestions for enhanced memory are accompanied by suggestions for age regression, in which subjects are asked to return to a previous period in their lives. Although the clinical literature contains a number of reports claiming success, most of these are anecdotal in nature and fail to obtain independent corroboration of the memories that emerge. There is no clinical evidence that hypnotically enhanced memories are reliable – that is, that they can be assumed to be true in the absence of independent confirmation.

In fact, evidence from carefully controlled laboratory studies shows quite the opposite. Hypnosis does not appear to increase accurate recollection, over and above what can be achieved under nonhypnotic circumstances. To make things worse, hypnosis appears to increase the likelihood of "false alarms" on recognition tests, and to inflate subjects' confidence in their memories, independent of their accuracy. Moreover, by virtue of their enhanced responsiveness to suggestion, hypnotic subjects may be especially vulnerable to leading questions and other suggestive influences that might bias or distort their memories. Hypnotized subjects may well believe that they are recovering forgotten memories, but that does not make the memories valid representations of the historical past. Any memories recovered by means of hypnosis must be subject to independent corroboration before they are taken seriously.

Similar considerations apply to hypnotic age regression. Although age-regressed subjects may experience themselves as children, and may behave in a distinctly 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.

Given what we know about the unreliability of hypnotic hypermnesia, the use of hypnosis to recover memories in clinical or forensic situations is highly risky, and not recommended. In fact, many legal jurisdictions severely limit the introduction of memories recovered through hypnosis, out of a concern that such evidence might be tainted. In the United States, the Federal Bureau of Investigation has published a set of guidelines for those who wish to use hypnosis forensically, and similar precautions should be employed in the clinic. While field studies have sometimes claimed that hypnosis can powerfully enhance memory, these anecdotal reports have not been duplicated under laboratory conditions.

Risks of Hypnosis

Hypnosis poses few risks to subjects. Because it requires the subject's active participation, people cannot be hypnotized unknowingly, or against their will. Nor can even deeply hypnotized subjects be led, by virtue of hypnotic suggestion, to do something that they would not do under other circumstances. In experimental situations, the risks to subjects are usually limited to drowsiness or mild headache – no different in kind or severity from those that crop up when subjects take exams or listen to lectures. In most instances these transient problems can be rapidly traced to some specific expectation on the part of the subject, perhaps derived from inadvertent comments made by a stage performer or television commentator seen recently. Occasionally subjects actually doze off during the procedure, or rest their heads in an uncomfortable position, leading to drowsiness or neckache

upon arousal. In any event, a few minutes of supportive interaction are usually sufficient to deal effectively with the problem. However, problems may be compounded when inexperienced experimenters find it difficult to cope with a minor problem and communicate their lack of competence and self-confidence to the subject, who may then proceed to make matters even worse. Problems may also occur in stage hypnosis, where the entertainment context has special effects on experience and behavior, over and above the hypnotic context.

Untoward consequences are more likely to arise when hypnosis is employed during therapeutic, as opposed to experimental, procedures. A therapist who simply tries to "suggest away" symptoms may encounter problems that stem from his or her own therapeutic errors. When hypnosis is used to recover ostensibly forgotten memories, whether in therapeutic or forensic situations, the subject's memories may be contaminated with information that is objectively false – with potentially serious negative consequences for other people as well as that patient. When hypnosis is used to control pain in athletic situations, competitors may ignore important information about the location and severity of bodily damage. In other cases of performance enhancement, it is possible that subjects will harm themselves through overexertion. Practitioners should not attempt to treat with hypnosis any condition that they are not qualified to treat *without* hypnosis.

Mind and Brain in Hypnosis

Suggestion is the key to hypnosis: nothing happens without it. But Hypnotizability is not just a special case of suggestibility in general. In the first place, there are many different forms of suggestibility, not all of which are correlated with hypnotizability. Nor is hypnosis a special case of the placebo effect – not least because placebo effects do not account for the effects of hypnosis on pain. Hypnosis is sometimes characterized as a case of ideomotor action, in which the idea of a response automatically leads to its execution. But hypnotic effects are not automatic in the technical sense of that word. For example, response to posthypnotic suggestions, perhaps the paradigm case of involuntary response in hypnosis, are not independent of the context in which the cues are delivered; and their execution consumes attentional capacity.

Psychologically, the core of hypnosis appears to involve a division of consciousness affecting perception, memory, and the voluntary control of action (Hilgard, 1977; Kihlstrom, 2007). For example, posthypnotic amnesia (the phenomenon that gave hypnosis its name, by analogy to sleep), entails a dissociation between explicit (conscious) and implicit (unconscious) memory: subjects cannot consciously remember what they did or experienced while they were hypnotized; but these same events continue to influence their experience, thought, and action outside of phenomenal awareness – as for example in repetition and semantic priming effects. Similar dissociations between explicit and implicit perception are observed in hypnotic blindness and deafness. Responses to posthypnotic suggestion may be experienced as involuntary because the subject is not consciously aware of initiating the movement in question.

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 led to the speculation that hypnosis requires the verbal functions normally associated with the left cerebral hemisphere. Because the experience of involuntariness is a central feature of hypnosis, some theorists have proposed that the state entails alterations in functioning of the frontal lobes of the brain, which are known to be involved in executive functions. However, as noted earlier, hypnotic behaviors do not occur automatically in the technical sense. More recently, it has been suggested that hypnosis, like daydreaming and meditation, alters activity in the "default-mode network" in the brain (Raz and Lifshitz, 2016). 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., PET, fMRI) of normal subjects (Halligan and Oakley, 2013).

Conclusion

Claims of hypnotically induced performance enhancement are almost as old as hypnosis itself. In George DuMaurier's novel *Trilby* (1895), Svengali transforms the eponymous heroine into an accomplished singer. And reviewing the hypnosis literature almost half a century ago, F.L. Marcuse referred to as "The Generation of Hypers" – the notion that hypnosis could produce hyperpraxia, hyperesthesia, and hypermnesia, as well as other special effects. Aside from the ability of hypnotic suggestion to control pain, which is a genuine phenomenon of substantial practical importance, most other claims for hypnotic performance enhancement are dubious at best. Hypnosis is fascinating to observe and theoretically interesting, and has many actual and potential applications as an adjunctive treatment in medicine and psychotherapy, but it will not make us better people.

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