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Tranceformation: Digital dissemination of hypnosis

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Hypnosis is an underutilized tool despite evidence of efficacy from randomized clinical trials. In this NeuroView, I discuss potential mechanisms in the context of brain networks and propose the use of app-based instruction in self-hypnosis.

Hypnosis was the first concept of psychotherapy introduced into Western medicine and psychology. It has been shown to be highly effective in helping people with problems ranging from stress, pain, anxiety, focus, and insomnia to smoking cessation, controlling eating, and coping with trauma.[1,2,3] Despite this record of success, hypnosis is only used rarely by a small number of healthcare professionals.[4] It has been derided as a stage-show trick, considered useless or even dangerous, none of which is true. Hypnosis is an underappreciated means of controlling consciousness with enormous therapeutic potential. I will briefly discuss the nature of hypnosis, its efficacy, brain mechanisms underlying it, and novel means of dissemination that could make safe and effective stress and pain management skills widely available.

Hypnosis is a naturally occurring state of highly focused attention that prioritizes experience over evaluation. This intensity of focus is accomplished with the help of dissociation—putting potential distractions outside of conscious awareness. Another component is cognitive flexibility[5]—the capacity to see old, familiar situations from a new point of view. This mental state creates a superb opportunity for therapeutic change.

In the last decade, we have learned a great deal about what happens in the brain when people enter a hypnotic state.[6] fMRI, PET, and EEG neuroimaging have revealed three major changes in brain activity that are associated with experiencing hypnosis. The first component is reduced activity in the dorsal anterior cingulate cortex (dACC), which is a major node of the salience network. The salience network is involved in interoceptive awareness and the orientation toward salient stimuli. People who are highly hypnotizable have greater concentrations of the major inhibitory neurotransmitter GABA (gamma-aminobutyric acid) in their dACC.[7] Indeed, benzodiazepine anti-anxiety medications work by facilitating the binding of GABA to its receptor.

The second component of this intense concentration achieved with hypnosis is dissociation: putting outside of conscious awareness things that would ordinarily be in consciousness. There is recent evidence that dissociation involves rhythmic activity between the precuneus near the posterior part of the cingulate cortex and the dorsolateral prefrontal cortex.[8] In fact, hypnosis involves inverse functional connectivity-between activity in the left dorsolateral prefrontal cortex and that in the posterior cingulate cortex (PCC).[6] This is important because the PCC is a key node, along with the ventromedial prefrontal cortex, of the default mode network, which processes self-reflection and social engagement. To the extent that we are actively involving ourselves in a hypnotic state, we tend to disconnect from activity in the part of the brain that processes self-evaluation, hence enhancing cognitive flexibility. Rather than representing the presumed weakness of suggestibility, it mobilizes an openness to trying out being different.[5]

The third component of hypnotic experience involves greater functional connectivity between the left dorsolateral prefrontal cortex and the insula, another component of the salience network that involves mind-body interaction.[9] The insula processes both cognitive control by the executive control network of body systems, including the autonomic nervous system, and interoception, the brain's perception of the body and its physiological status. Hence, in hypnosis, one is able to turn down anxiety-generating input, focus intently, feel freer to experiment with states of mind that involve altered perception and behavior, put outside of conscious awareness thoughts and feelings that would ordinarily be disturbing or distracting such as pain, and intensify control over the body. Hypnosis extends our ability to be and feel different.

Therefore, under hypnosis, people can rapidly face and manage stressors more constructively and alter their perception of the meaning of symptoms and indeed their intensity. For example, in a study of different hypnotic analgesia suggestions,[10] PET imaging showed that just changing the words used in hypnotic analgesia instructions shifted the source of analgesia from reduced activity in somatosensory cortex (reduced intensity of pain) to the dACC (reduced suffering caused by the painful shocks). Indeed, this study demonstrates that pain sensation and related suffering are the products of both peripheral input through the lateral spinothalamic tract and central processing of the pain signal in the dACC, insula, and somatosensory cortex, neural pathways by which hypnosis can and does modulate pain perception.

These therapeutic outcomes provided by hypnosis have been established in randomized clinical trials,[2,3,11] and their neural mechanisms have been demonstrated with fMRI, PET, and EEG imaging; yet, hypnosis remains underutilized. There is clearly a need to employ other novel technologies to make the low-risk benefits of hypnosis much more widely available. We and others have developed apps to disseminate the opportunity to utilize

hypnosis. Reveri is a digital interactive app that offers step-by-step guidance in assessing hypnotizability, managing stress, controlling pain, finding focus, dealing with phobias, sleeping better, stopping smoking, controlling eating, and dealing with other unhealthy urges and habits. It is built on the premise that all hypnosis is really self-hypnosis, and what it does is teach people how to utilize their own hypnotic ability to deal with a variety of problems. The experience is interactive—responses to questions lead to different subsequent instructions. It is designed as a health and wellness skill to help people mobilize and utilize their hypnotic ability. There are several other excellent hypnosis apps available now, including Nerva, which specializes in helping with irritable bowel syndrome, and Oneleaf, which offers help for problems similar to those addressed by Reveri. The efficacy of these tools remains to be seen, but so far, users report improvements in their pre-post evaluation of their problem, such as stress and pain.

Hypnosis is a naturally occurring aspect of normal brain function that combines direction of focus, dissociative control of perception, and cognitive flexibility. It involves reducing activity in the salience network with altered connectivity between the executive control and both the salience and default mode networks. Hypnosis facilitates the potential for change via rapid modulation of perception and self-evaluation. Combining the oldest psychotherapeutic strategy with the newest dissemination technology may hopefully help millions of people to make fuller use of their mental resources to tranceform their lives.

DECLARATION OF INTERESTS

D.S. is co-founder and chief scientific officer of Reveri Health, Inc.

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