

## Key Points

1. Most theories of pain take into account that higher order brain functions can influence how pain is experienced
2. This suggests the possibility that people can control how they feel pain
3. Research has shown that people can be trained to control pain using real-time MRI feedback
4. This study examined the effects of cognitive suggestion, hypnosis, and demands for honesty on perceived pain levels in 80 healthy subjects
5. Only cognitive suggestion had a significant impact on pain levels; hypnosis did not
6. Provides further evidence that cognitive functions, which can be consciously controlled, can be used to reduce pain levels

## Definitions

**hypnosis** - a trance like state in which a person becomes very open to suggestions

**pain** - an unpleasant sensory and emotional experience associated with actual or potential tissue damage

**cerebellar tonsils** - portion of the cerebellum located at the bottom, so named because of their shape

**cerebellum** - part of the brain located at the bottom of the skull, near the opening to the spinal area; important for muscle control, movement, and balance

**cerebrospinal fluid (CSF)** - clear liquid in the brain and spinal cord, acts as a shock absorber

**Chiari malformation I** - condition where the cerebellar tonsils are displaced out of the skull area into the spinal area, causing compression of brain tissue and disruption of CSF flow

**decompression surgery** - general term used for any of several surgical techniques

## Cognitive Suggestions Can Reduce Pain

**May 31, 2007** -- In the macho flick, Roadhouse, Patrick Swayze utters one of the corniest lines ever written after being stabbed in a bar fight, "Pain don't hurt." However, as silly as it sounded at the time, his character was actually making the point that the conscious mind can control the perception of pain, and there is some evidence that this may in fact be true.

Most theories of pain factor in that higher level cognitive processes can influence how pain is perceived. Distraction is a good example of this. If you know that something painful is about to occur, some people try to think about something else during the process so as to not focus on the pain.

There were a number of research studies published in the 60's which examined how cognitive factors influence the pain experience. In one such study, subjects were given a fake drug and then exposed to a painful electric shock. Half of the subjects were told that the tremors and palpitations they felt were not due to the shock, but rather were side effects of the drug. The other half of the subjects believed, correctly, that what they felt was from the electric shock. In a clear demonstration that pain is a complex phenomenon, the subjects who were led to believe the drug had side effects actually reported less pain from the shock than the other group.

Accepting that cognitive functions can influence pain opens the door to trying to consciously control pain. One way people have tried to do this is through hypnosis. As most people are aware, hypnosis is defined as a very relaxed, almost trance like, state which makes people very open to suggestion. While hypnosis is very popular for breaking bad habits such as smoking and overeating, the evidence of its effectiveness for controlling pain is mixed. Like many alternative therapies the research that has been published on hypnosis is often flawed methodologically which makes interpreting the results difficult. In addition, hypnosis operates in a grey area where practitioners are not always regulated and their training is not standardized.

Recently however, a well publicized study offered strong evidence that people can exert cognitive control over pain. The study used a real-time MRI to provide visual feedback of brain activity to patients while they were experiencing chronic pain. From this the subjects were trained to consciously reduce activity in certain brain areas which in turn reduced their reported pain by as much as half.

Also recently, a study out of Boston University, published in 2005 in the journal Integrative Physiological & Behavioral Science showed that even simple - and cheap - cognitive techniques can influence pain. Specifically, the study used 80 college students to determine the influence of three factors on pain perception: cognitive suggestion, hypnosis and demands for honesty.

Using what is known as a factorial design, the student subjects were randomly divided into 8 groups such that all combinations of the three interventions being examined were used, for example:

- Group 1 = suggestion, hypnosis, demand
- Group 2 = suggestion, hypnosis, no demand
- Group 3 = suggestion, no hypnosis, demand
- Group 4 = suggestion, no hypnosis, no demand
- Group 5 = no suggestion, hypnosis, demand
- Group 6 = no suggestion, hypnosis, no demand
- Group 7 = no suggestion, no hypnosis, demand
- Group 8 = no suggestion, no hypnosis, no demand

At the start of the experiment, a base line pain measure was established for all the subjects using a pain stimulator (which uses a weight) on their hands for 60 seconds. Each person was asked to rate the pain on a scale from 0 (normal) to 10 (extremely painful).

After the baseline pain measure was taken, the subjects underwent the interventions according to their group assignment. Those in the hypnosis group were placed into a hypnotic state using a standardized 10 minute procedure. Next, those in the suggestion group were told the following:

"I want you to succeed in not being disturbed by the weight by doing the following. Try to the best of your ability to imagine and think of your right hand as numb and insensitive. Think of your right hand as unable to sense any pain or discomfort. Please try to think of your hand as numb and insensitive as if it were a piece of rubber, until I

employed to create more space around a Chiari malformation and to relieve compression

## Source

Spanos NP, Barber TX, Lang G. [Cognition and self-control: cognitive control of painful sensory input](#). Integr Physiol Behav Sci. 2005 JulSep;40(3):119-28.

take the weight off your finger. Other students were able to think of their hand in this way and it isn't as hard as it seems. What I want you to do is to control your thoughts and think continuously that your right hand has no feeling. Keep thinking that it is unable to feel any pain or discomfort. Continue to think of your hand as without pain, discomfort, or feeling of any kind. Please try to the very best of your ability to think continuously and to imagine vividly that your hand is numb, insensitive, and like a piece of rubber until the weight is off. Now keep thinking and vividly imagining that your right hand is becoming more and more numb and insensitive."

After the hypnosis and suggestion (for the groups that received them), the pain stimulator was again applied for 60 seconds. Finally, the subjects were again asked to rate their pain. However, selected groups were told explicitly to be honest in rating their pain and the importance of their honesty was stressed.

The pain ratings showed that of the three interventions, only the cognitive suggestion significantly influenced the level of pain felt (see Table 1). Specifically, those who received the suggestion rated the painful stimulus an average of 4.5 versus 5.8 for the rest of the subjects.

Although small in scale and scope, this study effectively demonstrates the power of cognitive processes to influence the perception of pain. And if a carefully worded suggestion is able to reduce the pain felt from a weight applied to the hand, one has to wonder what a carefully designed training system for chronic pain patients could accomplish.

**Table 1**  
**Average Pain Scores By Intervention Type**

Intervention	Avg Score w/Intervention	Avg Score w/out Intervention
Cognitive Suggestion	4.5	5.8
Hypnosis	5.0	5.3
Demand For Honest	5.4	4.9

**Notes:** Scores are self-reported on a scale from 0-10; Only Cognitive Suggestion was a statistically significant difference

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