

SCIENTIFIC
BREAKTHROUGHS
IN HYPNOSIS

SCIENTIFIC HYPNOSIS

- Mesmer (1734-1815) was the first to have a scientific theory to explain hypnotic phenomena.
- In the 1770's Mesmer developed a theory of "Animal Magnetism" to explain the cataleptic trance he produced in subjects.

ANTOINE MESMER



THE ROYAL COMMISSION

- A Royal Commission was formed to investigate Mesmer's work in 1784.
- The commission showed that the Animal Magnetism theory was incorrect.
- However, since his time hypnosis and trance have been investigated scientifically.

NERVE EXHAUSTION

- James Braid (1795-1860) coined the term “hypnosis.”
- He theorized that hypnosis was caused by exhaustion of the nerves, especially the optic nerve.
- He proposed that in hypnosis a subject is hypersuggestible.

JAMES BRAID



THEORY OF SUGGESTION

- Hippolyte Bernheim (1837-1919) emphasized the effect of suggestions in producing hypnosis.
- This theory has become the dominant explanation of how hypnosis works.

HIPPOLYTE BERNHEIM



SOCIAL THEORIES

- Up to 1980's there was no scientific proof that hypnosis was a special brain state.
- Theodore X. Barber (1927-2005) developed the theory in the 1960's that hypnosis was essentially a social construct.
- People knew what was expected of them and acted accordingly. They thought that they were "hypnotized," but were really acting according to their beliefs.

BRAIN WAVES

- Brain waves are measured by an electroencephalogram (EEG).
 - **High Beta** 30-40 Cps Hyper-alert state
 - **Beta** 15-30 Cps Ordinary alertness
 - **Alpha** 7-14 Cps Relaxed comfort
 - **Theta** 4-7 Cps Dreaming
 - **Delta** 0.5-4 Cps Deep sleep

BRAIN SCIENCE

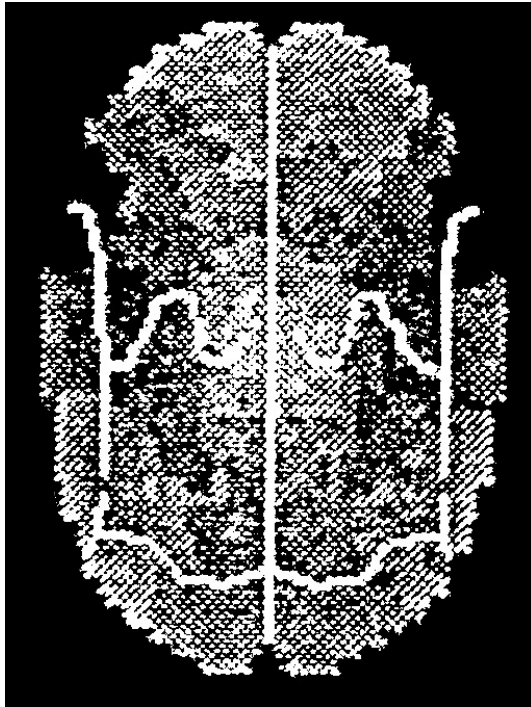
- By the 1980's detailed EEG computer maps of brain wave function were possible.
- Positron Emission Tomography (PET) scan uses radiation to track the flow of blood in the brain.
- Functional Magnetic Resonance Imaging (fMRI) uses the magnetic properties of blood to track its flow.

THE RESEARCHERS

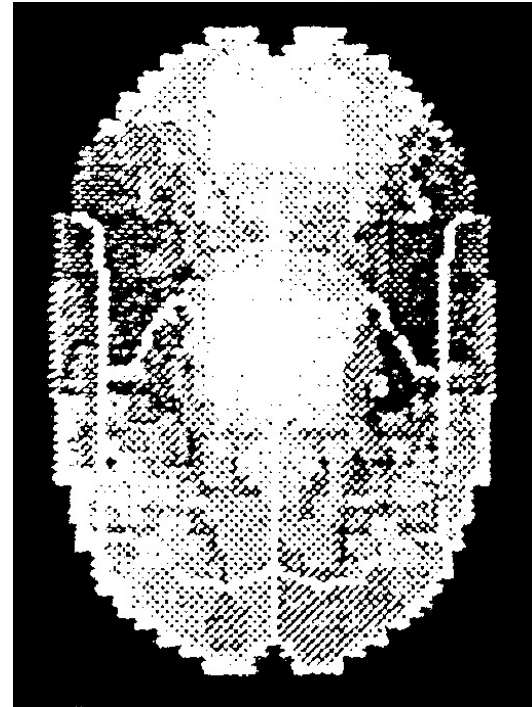
- Helen J. Crawford of the Virginia Polytechnic Institute
- John Gruzelier of the Imperial College in London
- Together they developed a four step theory of how people enter hypnosis.

THE FOUR STAGES

- The four stages for entering hypnosis are:
- 1. The **body relaxes**.
- 2. The **left hemisphere** of the brain focuses on an idea or an object .
- 3. The **prefrontal cortex** of the brain is inhibited.
- 4. Dominance shifts from the **left hemisphere** to the **right hemisphere**.

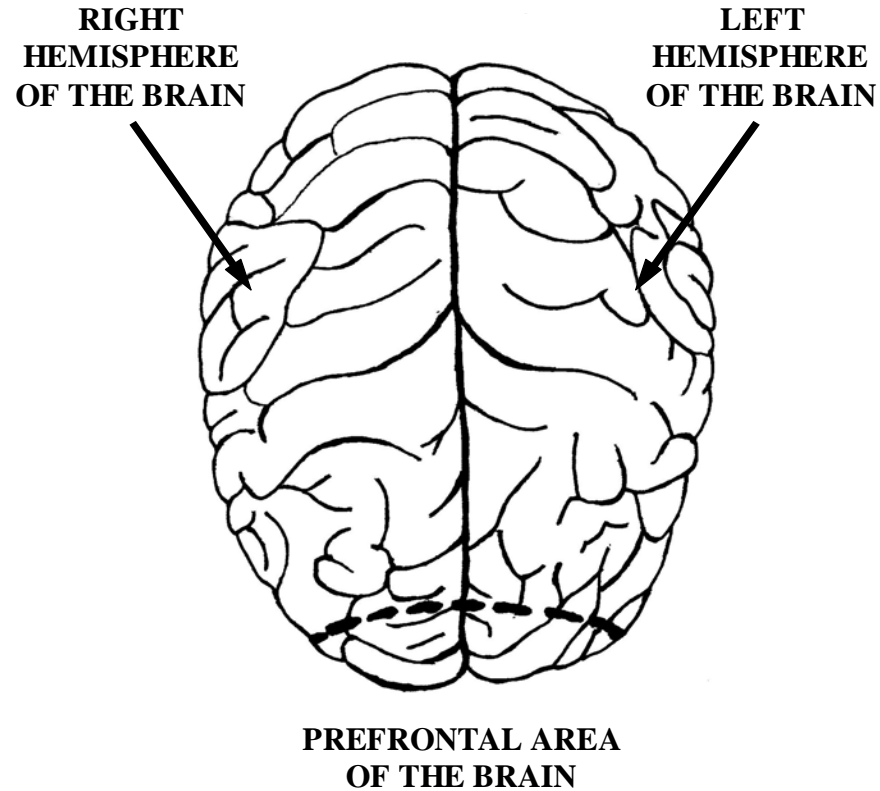


This is your brain



This is your brain
on hypnosis

CEREBRAL HEMISPHERES



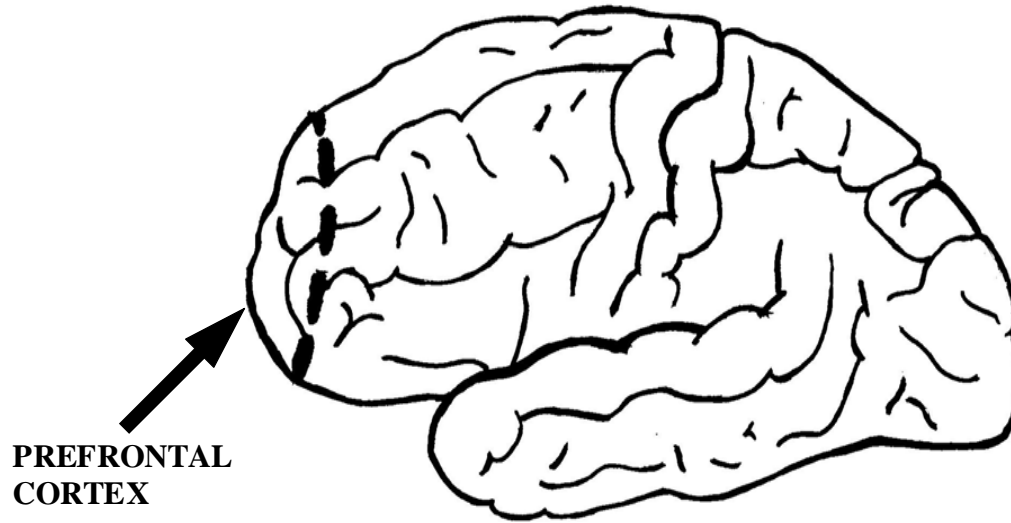
THE LEFT HEMISPHERE

- The left hemisphere is in charge of:
 - Logic
 - Mathematics
 - Higher level language
 - Direction of attention (working with prefrontal cortex)
- The left hemisphere is essentially analytic.

THE RIGHT HEMISPHERE

- The right hemisphere is in charge of:
 - Bodily functions
 - Emotions
 - Basic language skills
 - Music
 - Seeing the “big picture”
- The right hemisphere is essentially holistic.

THE PREFRONTAL CORTEX



THE PREFRONTAL CORTEX

- The prefrontal cortex is in charge of:
 - Planning
 - Social relationships
 - Evaluation of choices
 - Judgments
- The prefrontal cortex is the “critical faculty.”

HYPNOTIZABILITY

- Finally an answer to the question, What makes some subjects better at entering hypnosis than others?
- People who can easily shift thinking strategies from one hemisphere to the other enter hypnosis more easily than those who tend to rely on one hemisphere only.

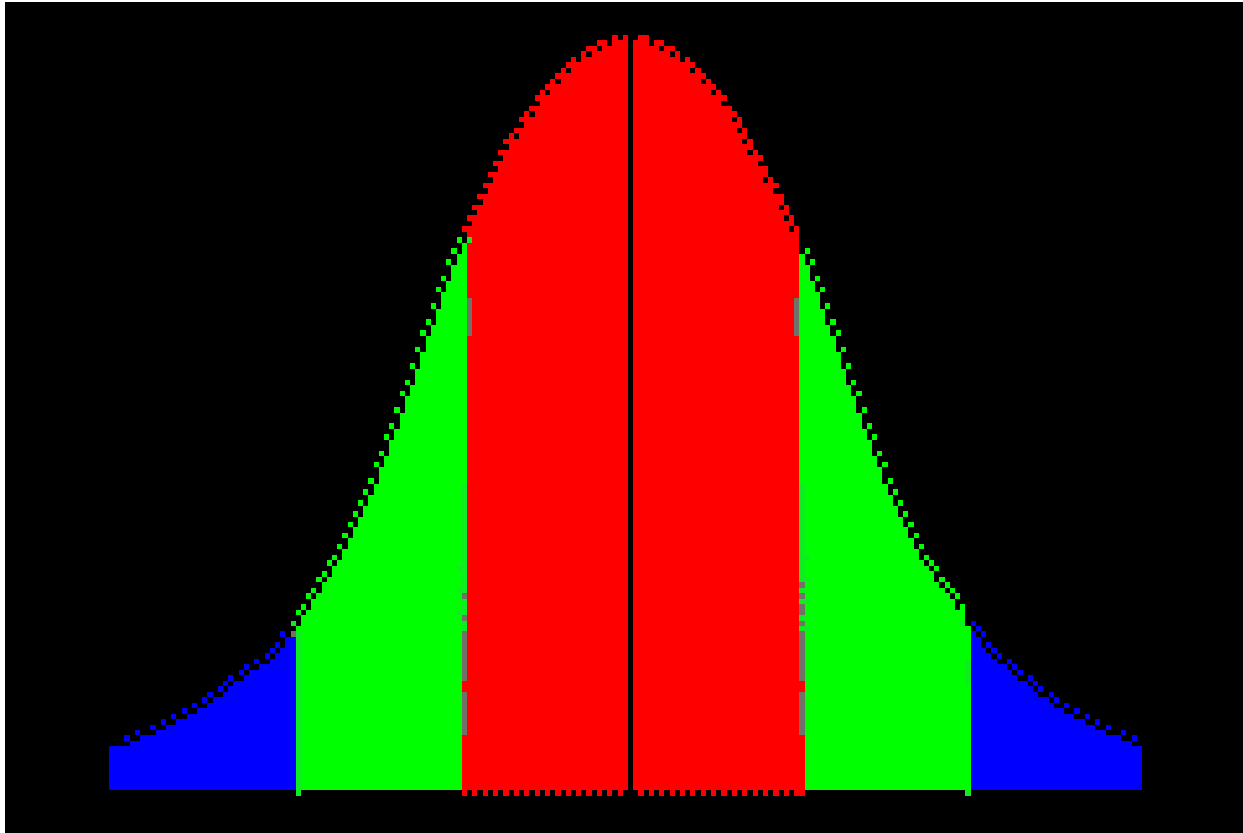
HIGH VS. LOW

- High hypnotizables quickly shut out external stimuli during the induction phase and easily establish rapport with the hypnotist.
- Low hypnotizables begin to pay more attention to external stimuli, especially sounds, as they begin to relax during a hypnotic induction.

STANDARDIZATION

- The Stanford Hypnotic Susceptibility Scale begins with fixation of attention on a spot.
- It uses suggestions for eyelid fatigue and heaviness to produce eye closure.
- It is not surprising that with this approach the first stage in hypnosis is relaxation.

THE NORMAL CURVE



THE ORIENTING REFLEX

- The orienting reflex is the characteristic behavioral and physiological response to a novel stimulus by a person or animal, including:
 - Attention is focused on the source of the stimulus.
 - The head and body turn toward it.
 - The pupils dilate.
 - The heart rate slows down.

RAPID INDUCTION

- 1. Dr. Boyne takes charge by having the client assume a particular posture.
- 2. He delivers the surprise command, “sleep” while pulling on the arm.
- 3. The client closes his eyes in response to the command “sleep.”
- 4. He immediately has the client begin to relax.
- 5. He then has the client sit down and begins a hand levitation.

RAPID INDUCTION STAGES

- The steps in a rapid induction are:
- 1. Hypnotist is established as authority figure.
- 2. Surprise elicits orienting reflex and interrupts activity of prefrontal cortex.
- 3. Closing eyes prevents external orienting, so client goes within.
- 4. Relaxation continues and deepens the induction.
- 5. Hand levitation completes the shift from left to right hemisphere domination.

ACCEPTANCE OF HYPNOSIS

- 1955 British Medical Association (BMA) approved hypnosis for psychoneuroses and hypnoanesthesia.
- 1958 American Medical Association (AMA) accepted therapeutic use of hypnosis, specifically mentioning hypnoanalgesia and hypnoanesthesia.
- It is easier to get research dollars for researching pain prevention and treatment.

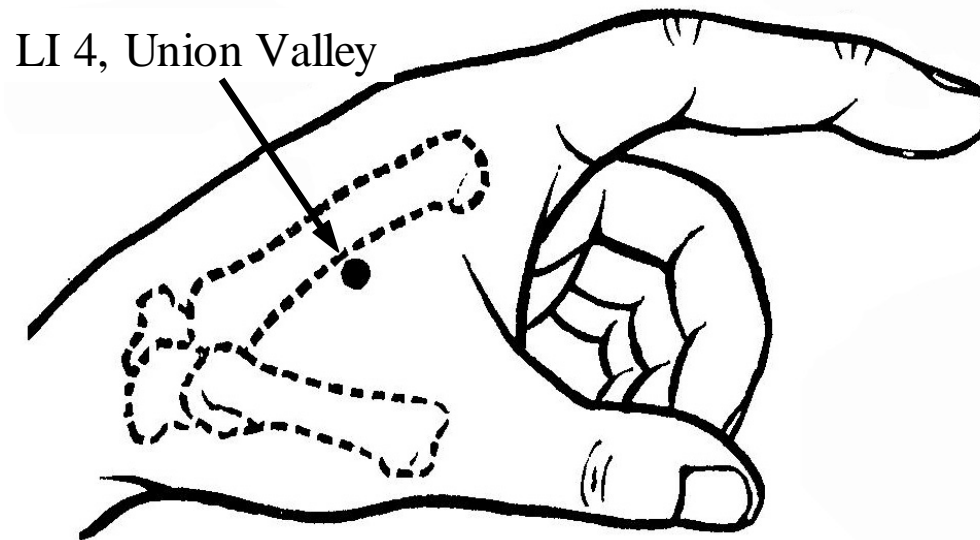
EARLY HYPNOANESTHESIA

- Dr. James Esdaile (1808-1860), used hypnoanesthesia at a hospital in Calcutta in the 1840's.
- His assistants used magnetic passes to produce hypnosis.
- It could take many sessions over a period of days to produce the needed deep trance.

ACUPUNCTURE ANESTHESIA

- Traditional Chinese Medicine uses electrostimulation of LI 4 to produce anesthesia.
- Mayer and others (1977) used the cold pressor test combined with naloxone and found that electroacupuncture produced endorphins.

FINDING LI 4



LI 4, Union Valley. Note how the point lies in the muscle tissue under the second metacarpal, the metacarpal of the index finger.

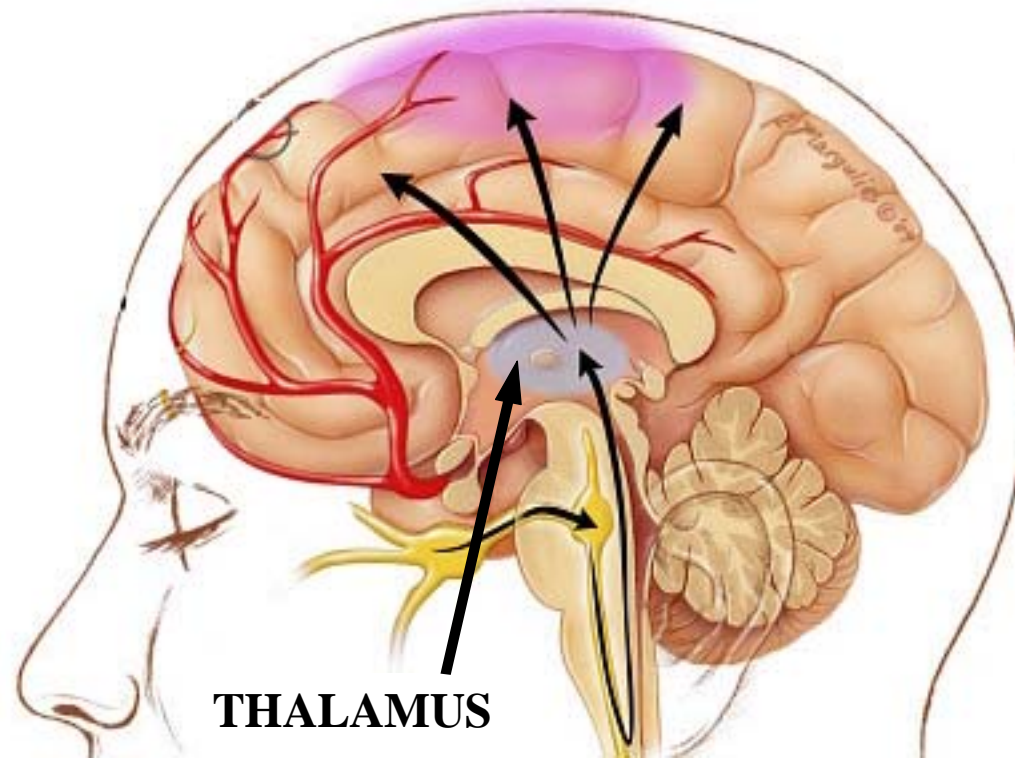
HYPNOANESTHESIA

- Goldstein and Hilgard (1975) used the cold pressor test combined with naloxone for hypnoanesthesia and discovered that naloxone did not block the effects.
- They concluded that higher order brain processes were blocking awareness of pain.

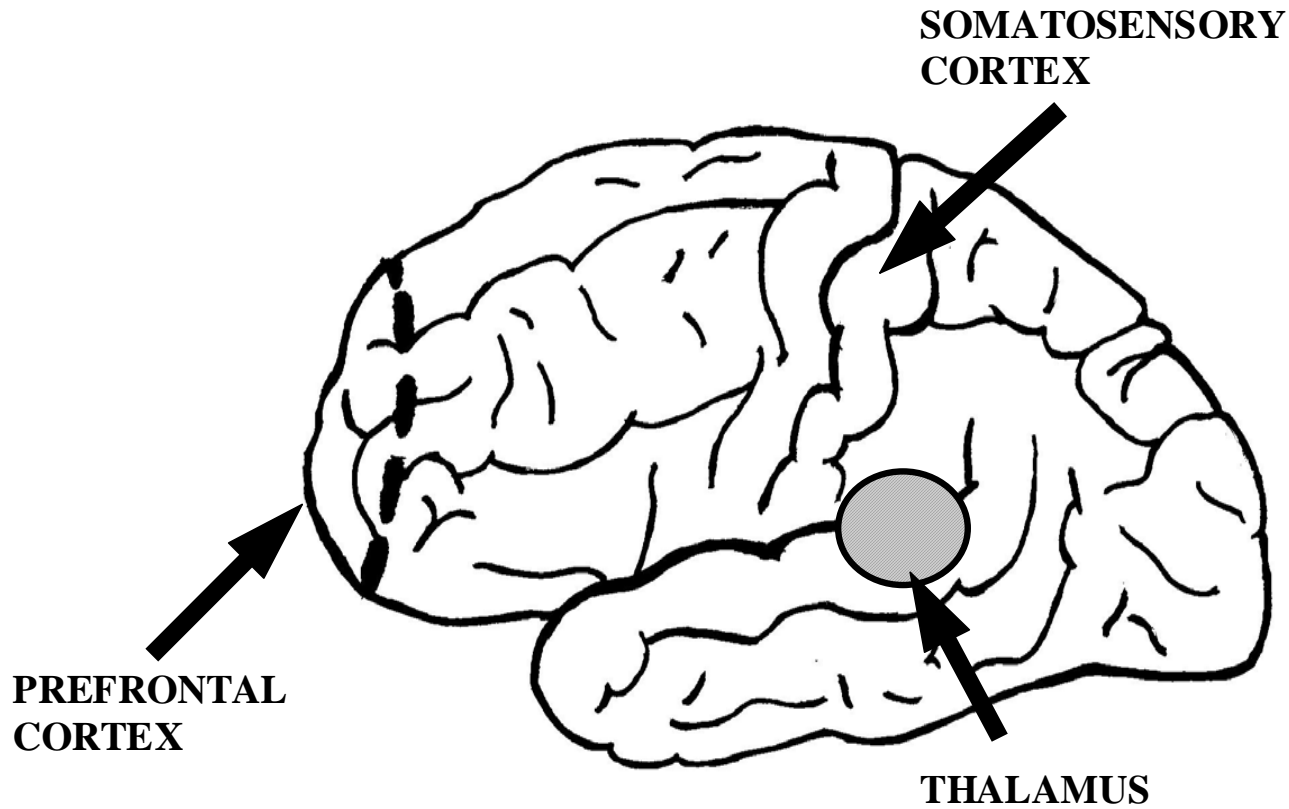
HYPNOTIC PAIN CONTROL

- In 1993 Crawford and others found specific changes in blood flow in the brain during hypnoanalgesia.
- There were also increases in theta wave production in particular areas of the brain.
- Theta waves on the cortex indicate inhibition.

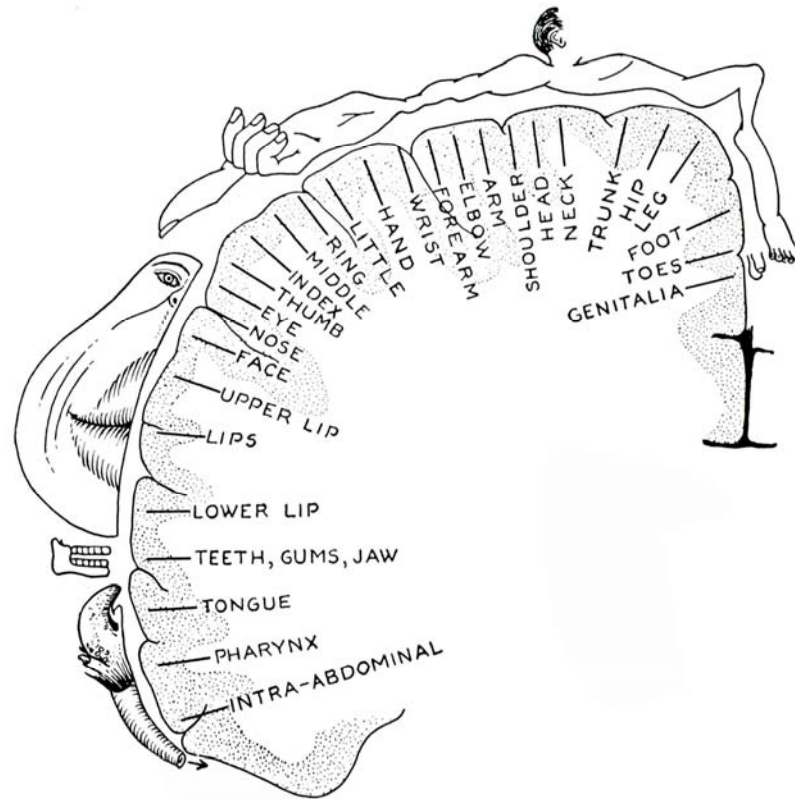
THE THALAMUS



PAIN IN THE BRAIN



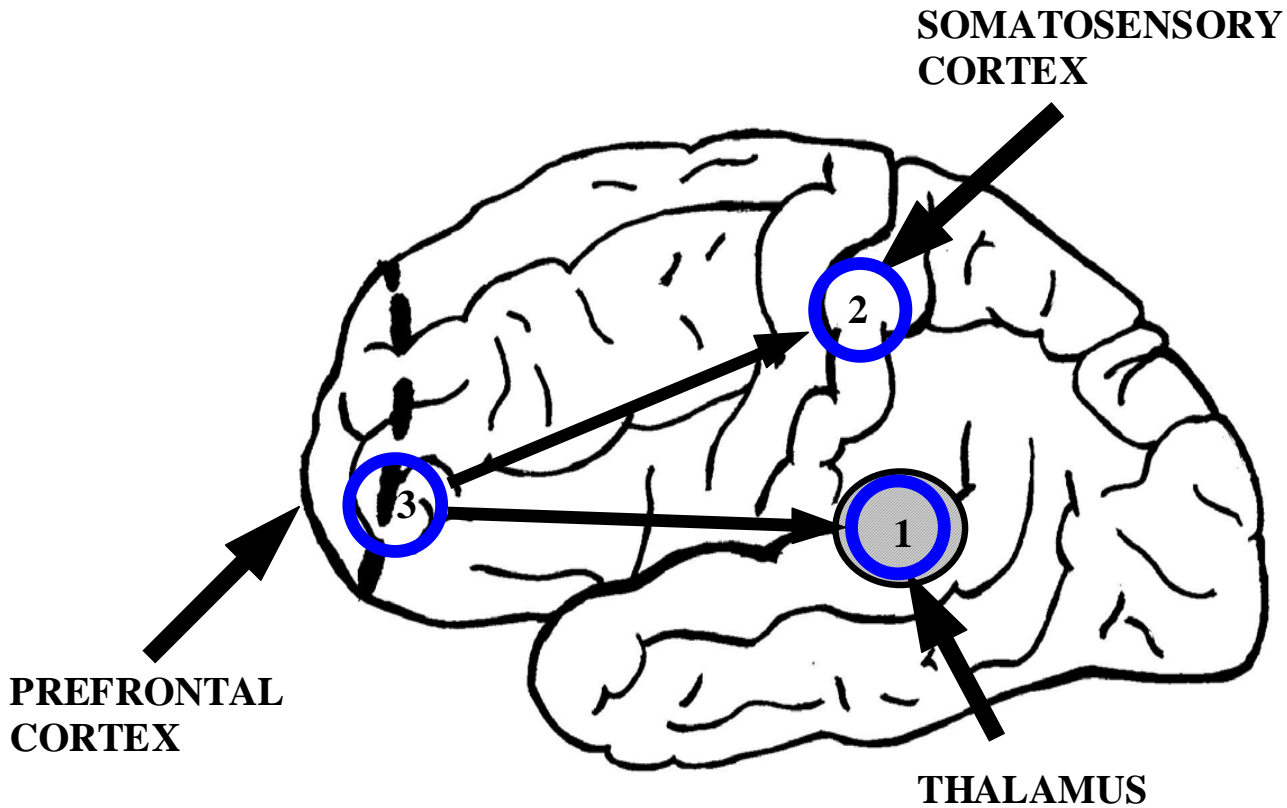
THE HOMUNCULUS



HYPNOANALGESIA

- Three areas are inhibited:
 - The thalamus where pain impulses are transmitted to the brain.
 - The somatosensory cortex where the pain is felt consciously and located on the body map.
 - The prefrontal cortex area which interprets incoming sensations.

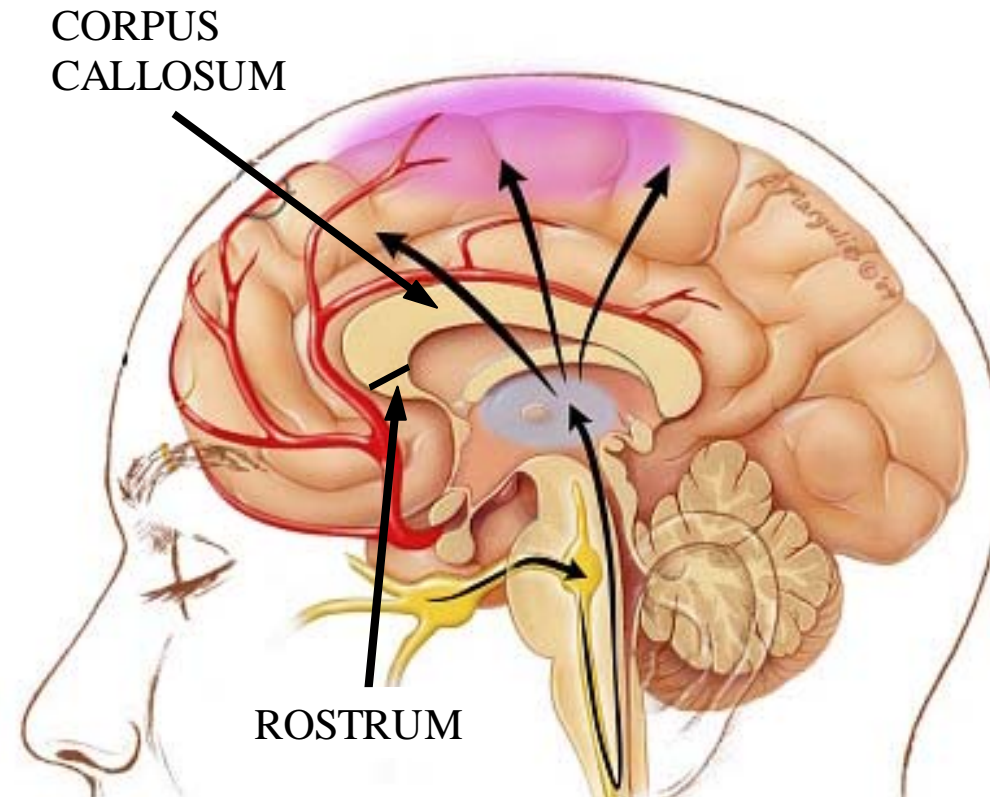
HYPNOANALGESIA



A SURPRISING DISCOVERY

- In 1994 Crawford and others published an article in the journal *Brain* announcing that those who were able to eliminate pain perception with hypnosis had a significantly larger front part of the corpus callosum (the rostrum) than low hypnotizables
- This is the first physical difference ever associated with a specific hypnotic ability

THE CORPUS CALLOSUM



APPLIED ANALGESIA

- The classic suggestions use different parts of the brain:
 - “You feel numbness in your body.” (Somatosensory)
 - “The sensations seem far away.” (Thalamus)
 - “If you feel anything, it might be a feeling of pressure or tingling.” (Prefrontal cortex)
- Low hypnotizables (LH’s) need more training.
- The distraction technique works better for LH’s.
- Motivation can make a real difference.

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