

# Class Reference on Split Brains, Hypnosis, and Contract

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#### \*[Disclaimer]

Notes to Readers: This document was intended to be used as a reference during a classroom session, and thus does not contain the citations in the proper format. All the materials and pictures used in this paper are derived from original works by other scholars.

My contribution in this paper is limited to restructuring the contents in an appropriate way to present in the classroom for the purpose of diffusing the information to the class. Formal presentations given in the class hereafter would have all references and sources cited in a proper form. Use caution in referring and distributing the information on this paper.

## I. A Brief History of Split Brain Experiments

The "split brain" was first discovered in the laboratory by Roger Sperry and Ronald Meyers in the late 1950's. Initially they began experimenting with cats, and later proceeded to study monkeys. In 1961 the first human patient was subject to the split brain surgery. The procedure worked well as a "cure" for patients who suffered from severe epilepsy<sup>1</sup> and did not respond to anti-epileptic drugs. It was soon discovered that patients who had a commissurotomy had some interesting difficulties. Patients were not able to communicate information from one hemisphere to the other, almost as though they now had two separate brains.

Example of a standard experiment done to examine split brain perception.

Sperry and other scientists proceeded with further experimentation in order to determine the relationship between the right and left hemispheres of the brain. How (and what) the hemispheres communicate would provide valuable insight into the "mind" of a split brain patient. How did a commissurotomy affect one's perceptions of the outside world?

In one experiment, a word (for example "fork") was flashed so only the right hemisphere of a patient could receive the information. The patient would not be able to say what the word was. However, if the subject is asked to write what he saw, his left hand would begin to write the word "fork". If asked what he had written, the patient would have no idea. He would know that he had written something, he could feel his hand going through the motion, yet he could not tell observers what the word was. Because there is no longer a connection between the two hemispheres, information presented to the right half of the brain cannot convey this information to the left. Interestingly enough, the centers for speech interpretation and production are located in the left hemisphere. Similarly, if the patient is blindfolded and a familiar object, such as a toothbrush, is placed in his left hand, he appears to know what it is; for example by making the gesture of brushing his teeth. But he cannot name the object to the experimenter. If asked what he is doing with the object, gesturing a brushing motion, he has no idea. But if the left hand gives the toothbrush to the right hand, the patient will immediately say "tooth brush".

Micheal Gazzaniga, who did his graduate work in Sperry's laboratory, did further experiments which showed the attempts of the left hemisphere to compensate for it's lack of information, as well as attempts by the right hemisphere to get it's knowledge conveyed.

These experiments, pioneered by Sperry and colleagues, provided insight into the functionings of the two hemispheres and how they are different.

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<sup>1</sup> Additional Information on Epilepsy:

**Alternative Names:** seizure disorder

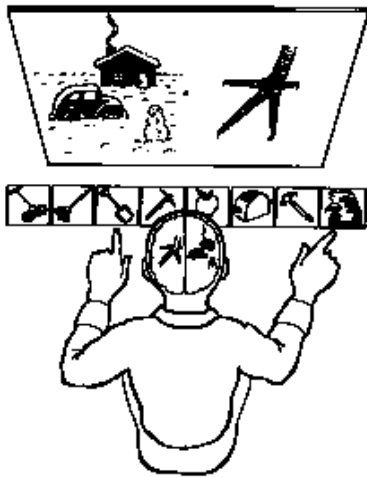
**Definition:** A brain disorder involving recurrent seizures.

**Causes, Incidence and Risk Factors:** A seizure disorder includes any condition in which there are repeated episodes of seizures of any type. Epilepsy (idiopathic seizure disorder) is a term used when the seizure disorder has no identifiable cause such as brain disease. A seizure disorder affects about 0.5% of the population. It can affect people of any age. Transmission of information from nerve cell to nerve cell occurs by an electrochemical process. This process can be detected as electrical activity by an electroencephalograph (EEG). Abnormal patterns of electrical activity are associated with seizures.

The cause of the seizure correlates to some extent with the age of onset. In some people, seizures may be triggered by hormone changes such as pregnancy or menstruation. They may also be triggered by illness or by sensory stimuli such as lights, sounds, and touch. In many cases, no trigger is found for the seizures. Given sufficient circumstances, any person will have a seizure. The amount of stimulation required to cause a seizure is called the seizure threshold. Many people with epilepsy are considered to have a low seizure threshold.

**Symptoms:** Epilepsy is characterized by seizures of any type that occur on a chronic, recurrent basis and have no known cause. Nonspecific symptoms and/or signs may occur along with the seizures; including a headache, changes in mood or energy level, dizziness, fainting, confusion, and memory loss. An aura, sensations indicating a seizure is imminent, occur in some persons just prior to a generalized seizure.

## Experiments With Subjects Who Have Had Their Corpus Callosum Severed



When a split brain subject is subjected to tests where the left half of their brain does not know the correct answer, it will often make something up based on the information it does have.

In this particular test, each hemisphere was simultaneously presented with a different cognitive test. Each hemisphere was presented with a picture and told to pick the object which relates to that picture. The left hemisphere was shown a chicken claw, while the right viewed a snow scene. You can see that the patient is pointing to a chicken with his right hand, and a shovel with his left. After each hemisphere responded, the left hemisphere was asked to explain its choices. The way the subject verbally interpreted the double field stimuli is of particular interest. When asked what images he saw on the screen, the patient responded, "I saw a claw and I picked the chicken, and you have to clean out the chicken shed with a shovel."

Trial after trial, this kind of response occurred. The left hemisphere could easily and accurately identify why the right hand chose the corresponding picture that it had, and then subsequently, and without batting an eye, it would incorporate the right hemisphere's response into the framework. While observers knew exactly why the right hemisphere made its choice, the left hemisphere could merely guess. What is interesting is that the left hemisphere did not offer its suggestion in a guessing vein but rather as a statement of fact.

This cartoon illustrates another experiment done with a split brain subject in which the left hemisphere compensates without the person being aware what is going on. Top Row: The command "Laugh" was flashed to the left field of vision (right hemisphere), and the subject laughed. When asked, "Why are you laughing?", the subject said, "Oh...you guys are really something."

Middle Row: The command "Rub" was flashed to the right hemisphere and the subject's left hand scratched the back of the right hand. When asked what the command was, the subject said, "Oh...itch."

Bottom Row: The instructions are "Assume the position of the flashed word." The word flashed was "Boxer." The subject clinched both fists and held them in a ready position. "What was the word?" "Oh...boxer."

The left hemisphere proved extremely adept at immediately attributing cause to the action. The subject could not truly say why they were laughing, for the left hemisphere had not received any information from the right that the command laugh had been flashed. The subject's left hemisphere evaluated the response and characterized it. It compensated for its lack of knowledge by calling upon previous experiences in which laughing was an appropriate response and said, "Oh...you guys are really something".

When the patient tried to explain why she was rubbing the back of her right hand, her left hemisphere again tried to compensate for the lack of knowledge, suggesting to her that she had an itch. The fact that she said "itch" instead of "rub" shows that she was guessing. Yet the patient could be quite accurate when the command gave less leeway for multiple descriptions, as in the case of the word boxer. The test instruction was to "assume the position of ...". The subject correctly assumed the pugilistic position, and when asked what the word was, he said, "Boxer." But on subsequent trials, when she was restrained and the word boxer was flashed, the left hemisphere said it saw nothing. When released, however, she assumed the position and said, "O.K., it was boxer."

In another experiment, a split brain patient is asked to identify an object - such as a pencil - by reaching



inside a bag and feeling it. Success depends on which hand does the reaching. Most of the wiring in the body is arranged contralaterally, with the left hemisphere getting its information from - and controlling - the right side of the body, and vice-versa. Since the left hemisphere normally controls language, when the patient reaches in the bag with his right hand he can readily identify the object. But if the left hand does the reaching, only the right hemisphere gets the information that the object is a pencil, and is powerless to direct the voice to express this. Occasionally, it seems, a patient's right hemisphere will hit upon a clever stratagem. By finding the point of a pencil and digging it into his palm, he

causes a sharp pain to be sent up the left arm. Some pain fibers are ipsilaterally wired, thus the language-controlling hemisphere gets a clue: it is something sharp enough to cause a pain. "It's sharp - it's perhaps a pen? A pencil?" The right hemisphere, overhearing this vocalization, may help it along with some hints - discouraging the pen response, encouraging the pencil - so that by a brief bout of Twenty Questions the left hemisphere is led to the correct answer (p. 198).

Thus, the right hemisphere may occasionally use other forms of communication in order to compensate for the nonexistent corpus callosum.

## II. Understanding Clinical Hypnotherapy<sup>2</sup>

### Overview

Hypnosis is a method of communication that induces a trance or a trance-like state. Hypnosis can be conducted by one individual addressing another, or it may be conducted with the self (self-hypnosis). Trance is a naturally occurring state in which one's attention is narrowly focused and relatively free of distractions. The attention may be focused either internally (on thoughts---internal self-talk or images or both) or externally (on a task, a book, or a movie, for example). The focus of attention is so narrow that other stimuli in the environment are ignored or blocked out of conscious awareness for a time. Examples of trance states are daydreaming and some forms of meditation.

As an adjunct to psychotherapy, hypnosis can help clients enter a relaxed, comfortable, trance state for obtaining specific therapeutic outcomes. With clinical hypnosis, the therapist can make suggestions designed to help the client formulate specific internal processes (feelings, memories, images and internal self-talk) that will lead to mutually-agreed-upon outcomes.

Hypnotic suggestions can influence behavior when the listener is

- (a) relaxed, receptive and open to the suggestions
- (b) experiences visual, auditory, and/or kinesthetic representations of the suggestions
- (c) anticipates and envisions that these suggestions will result in future outcomes.

These three criteria are facilitated through the use of "hypnotic language patterns." Hypnotic language patterns include: guided visualization, stories, guided memories, analogies, ambiguous words or phrases, repetition, and statements about association, meaning, and cause-effect.

Hypnosis is often requested for the purpose of uncovering childhood memories. Hypnosis may or may not work in this regard. When memories do surface, the client may have a "false memory" and there is no guarantee that such memories are accurate or based on reality. Such memories may be uncomfortable and distressing, but not always.

### Ericksonian Hypnosis

The kind of hypnotherapy most frequently practiced in psychotherapy today is "Ericksonian Hypnosis," named after the late Milton H. Erickson, M.D. From the 1930's to the 1980's Dr. Erickson was very influential in bringing the use of clinical hypnosis into the fields of medicine and psychotherapy. He taught and practiced a kind of hypnosis that was gentle, permissive, and respectful of the client. He established the National Association for Clinical Hypnosis and published the first professional journals and monographs on the therapeutic uses of hypnosis. The Ericksonian Foundation continues his work. Hundreds of books and articles have been written about Dr. Erickson and his methods. Dr. Erickson has been regarded as the leading hypnotherapist in the world.

### Applications of Hypnotherapy

Hypnosis has many applications in therapeutic settings. Among them are building confidence, relaxation during childbirth, treating phobias, fears and anxiety, sleep disorders and disturbances, interpersonal problems, depression.

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<sup>2</sup> By Judith E. Pearson, Ph.D.

### III. Contract

#### **Finance Term**

A legally binding document between two or more people, parties, or companies, that stipulates one party promises to perform [or not to perform] certain actions

#### **Entrepreneurs Definition**

A legal, written agreement between two or more parties to perform certain services in exchange for money or other remuneration; also used to describe a type of funding in which specific services are performed for a set fee.

Also Known As: Covenant

#### **Legal Contract**

An agreement between two or more competent parties in which an offer is made and accepted, and each party benefits. The agreement can be formal, informal, written, oral or just plain understood. Some contracts are required to be in writing in order to be enforced. (2) An agreement between two or more parties which creates obligations to do or not do the specific things that are the subject of that agreement. Examples of a contract are a lease, a promissory note, or a rental agreement.

This term, in its more extensive sense, includes every description of agreement, or obligation, whereby one party becomes bound to another to pay a sum of money, or to do or omit to do a certain act; or, a contract is an act which contains a perfect obligation. In its more confined sense, it is an agreement between two or more persons, concerning something to be, done, whereby both parties are bound to each other, or one is bound to the other. Blackstone defines it to be an agreement, upon a sufficient consideration, to do or not to do a particular thing. A contract has also been defined to be a compact between two or more persons.

Contracts are divided into express or implied. An express contract is one where the terms of the agreement are openly uttered and avowed at the time of making, as to pay a stated price for certain goods. Express contracts are of three sorts: 1. By parol, or in writing, as contradistinguished from specialties. 2. By specialty or under seal. 3. Of record.

Implied contracts are such as reason and justice dictates, and which, therefore, the law presumes every man undertakes to perform; as if a man employs another to do any business for him or perform any work, the law implies that the former contracted or undertook to pay the latter as much as his labor is worth; or if one takes up goods from a tradesman without any agreement of price, the law concludes that he contracts to pay their value.

Contracts considered in relation to their substance are either commutative or independent, principal or accessory.

Commutative contracts are those in which what is done, given or promised by one party is considered as equivalent to, or in consideration of what is done, given or promised by the other.

Independent contracts are those in which the mutual acts or promises have no relation to each other, either as equivalents or as considerations.

A principal contract is one entered into by both parties, on their accounts, or in the several qualities they assume.

An accessory contract is made for assuring the performance of a prior contract, either by the same parties or by others, such as suretyship, mortgage and pledges.

Contracts, considered in relation to the motive for making them, are either gratuitous or onerous. To be gratuitous the object of a contract must be to benefit the person with whom it is made without any profit or advantage received or promised as a consideration for it. It is not, however, the less gratuitous if it

proceed either from gratitude for a benefit before received, or from the hope of receiving one hereafter, although such benefits be of a pecuniary nature. Any thing given or promised as a consideration for the engagement or gift; any service, interest or condition imposed on what is given or promised, although unequal to it in value, makes a contract onerous in its nature.

Considered in relation to their effects, contracts are either certain or hazardous. A contract is certain when the thing to be done is supposed to depend on the will of the party or when, in the usual course of events, it must happen in the manner stipulated. It is hazardous when the performance of that which is one of its objects depends on an uncertain event. Some divide contracts under the five following heads:

Into reciprocal and unilateral.

Into consensual or those which are formed by the mere consent of the parties such as sale, hiring and mandate; and those in which it is necessary there should be something more than mere consent, such as loan of money, deposit or pledge, which from their nature require a delivery of the thing (rei) whence they are called real contracts.

Into first contracts of mutual interest which are such as are entered into for the reciprocal interest and utility of each of the parties, as sales exchange, partnership and the like.

Contracts of beneficence which are those by which only one of the contracting parties is benefited, as loans, deposit and mandate.

Mixed contracts, which are those by which one of the parties confers a benefit on the other, receiving something of inferior value in return, such as a donation subject to a charge,

Into principal and accessory.

Into those which are subjected by the civil law to certain rules and forms, and those which are regulated by mere natural justice.