

# What Is Consciousness?

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- 1920s-1930's: Consciousness disappears from the research of psychology
  - Didn't really have to tools to studies of it, so the main tool that they could use was introspectionism
    - The problem with this is that it is very subjective and highly unreliable
  - By the 1920's, people decided they wanted to only use objective evidence, and so **behaviorism** came about
- 1950's: The Cognitive Revolution
  - People realized that there is something more than just behavior
  - People started using computers as examples, there is a lot of internal things that were going on that we couldn't see but perhaps we could study

Studying consciousness was still out of favor until the 1980's – 90's

- MRIs and fMRIs opened up the brain world to it was easier to study

## Consciousness

- Self awareness
  - Body
  - Mind
  - Actions
- Situated Awareness
- Social Awareness
- \*General Awareness\*
- Emotion – modifies/changes/biases consciousness
- Agency (Control)
- Gradients of Consciousness
  - Coma.... Sleep.... awake
- Memories of Consciousness
  - Both can change each other
  - Perhaps representations of consciousness
- Attention (selective)
- Limits:
  - Physical limits: e.g. no receptors to UV light
  - Only through the first person perspective
- Feedforward/feedback
- Unified: in the first person view there is only one "first person"
  - If this is broken then there is multiple personalities
  - Split brain patients

**Meta-awareness:** the awareness of being aware

Consciousness from a Neuroscience Perspective

- What are the mechanisms that modify attention and other consciousness related cognitive activities?
- Anterior Cingulate – Social Response
- Prefrontal Cortex – Personality
  - Phineus Gage
- Amygdala
- Hippocampus
- Neurotransmitters
- Thalamus
  
- Working Memory
  - Attention
  - Inference Analogies
  - Emotions
  - Arousal (enabling)

# Functional Neuroanatomy and Alternate States of Consciousness

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## Assumptions of this Paper:

1. Consciousness is a combination of hierarchically ordered cognitive processes
    - Arousal, attention, memory, actions, self awareness
  2. As you move up the hierarchy, there is increasingly more complex processes and function, more integration as well as increased flexibility
  3. The highest level in the hierarchy is the frontal cortex
  4. Not all areas contribute to consciousness equally
  5. Higher levels don't replace lower computations, simply rerepresent or elaborate on the information
  6. PFC is not necessarily the seat of consciousness
  7. PRC does provide the most highly sophisticated levels of consciousness
    - Self awareness
    - Complex social cognition
    - Abstract thinking
    - Cognitive flexibility
    - Planning for the future
    - Theory of Mind
  8. The content in the working memory buffers is the current awareness
  9. PFC does not act through inhibition, rather it acts by elaborating on input "to produce more sophisticated output" .... Not a satisfactory explanation!
- Alternate States of consciousness are produced by transient changes in the hypofrontal part of the brain

## Frontal Cortex

- Two Regions of the Prefrontal Cortex
  - Ventromedial (VM)
    - Social Functions (Phineas Gage)
    - Connects with limbic system (emotion)
  - Dorsolateral (DL)
    - Working Memory
    - Direction of attention
    - Planning (temporal integration)
    - Task switching – Perseveration

What about direct connections between amygdala and prefrontal cortex?

- Perhaps there are multiple hierarchies because things doesn't move in a serial order
- Consciousness is the product of the process of elaboration
  - Lower parts of the hierarchy are the most critical parts of consciousness
- Between thalamus/hippocampus there is a line between eliminating consciousness and simply altering it
- Paul McLean (1953): Three levels of processing in terms of brain evolution:
  - Cortex
  - Limbic
  - Brain stem
- Hughlins Jackson: Neurophysiologist in 1800s-1900s proposed a hierarchy of functional circuits
- **Dissolution of consciousness:** When one level is damaged, consciousness falls down to the next, more basic level
- Working Memory is limited, thus consciousness is limited as well