

COGSCI 300
Week 8: Consciousness

Please turn off and put away all electronics.



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What is Consciousness? 3-analysis

Exemplars: external perceptions such as colors, internal perceptions such as pain, emotions, thoughts, self-awareness

Typical features: experiences, awareness, attention, shifts, starts & stops, unity

Explains: reports, behaviors

Explained by: ?

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Theories of Consciousness

1. Consciousness is a property of non-material souls.
2. Consciousness is an illusion to be eliminated.
3. Consciousness is a computational process, perhaps quantum computing.
4. Consciousness is a neural process.
5. Consciousness is information integration.

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What Needs to be Explained

1. People have numerous conscious experiences of different kinds, e.g. emotions.
2. Conscious experiences stop and start, e.g. sleep.
3. Consciousness shifts.
4. Consciousness is unified.
5. Consciousness has levels: basic, self.
6. Consciousness influences actions.

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Competition Theory of Consciousness

1. Semantic pointers are patterns of neural firing that result from binding of patterns derived from perception, motor control, emotions, and verbal representations
2. Semantic pointers compete to be active representations of the current situation.
3. Winning semantic pointers produce conscious experiences.

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Discussion Questions

1. What is the semantic pointer explanation of consciousness missing?
2. What animals are conscious, and how does their consciousness differ?

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Other Neural Mechanisms

1. Damasio: convergence zones and somatic markers
2. Dehaene: broadcasting across different parts of a global neuronal workspace.

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How Information Integration Works

Representations: Information is intrinsic, assessed from the perspective of a system, in terms of the differences that make a difference to it. Intrinsic information is causal, and it must be evaluated by perturbing a set of elements in all possible ways, not just by observing them. Composition, meaning.

Procedures: Integration occurs when mechanisms are not reducible to components that are independent.

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IIT Strengths

1. Tries to give a scientific account of consciousness
2. Tries to be mathematically precise
3. The intuitive idea that consciousness is integrating information is appealing.

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IIT Limitations

1. Concepts of information and integration are vague.
2. Attributes consciousness to photodiodes, cell phones, etc.
3. Mathematics is obscure and computationally intractable.
4. Basal ganglia integrate information but do not contribute to consciousness.
5. Axioms are not self-evident, e.g. existence of consciousness.

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Discussion Question

Can information integration explain consciousness in humans and other animals?

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IIT versus Neural Mechanisms

1. Advantages of information integration: allows possibility of machine consciousness.
2. Advantages of neural mechanisms: mathematically specified, computationally implemented, explanations of important psychological phenomena.

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