

Philosophy in Cognitive Science: 1979-2008



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Questions

- Where are the philosophers?
- What in the world do philosophers do?
- What have they/could they contribute to cognitive science?

Points of Contact with Cognitive Science

- Philosophy of Mind: What are mental states/processes and how do they work?
 - Application of philosophical tools (e.g., thought experiments) to foundational issues about mental states/processes
- Philosophy of Science: How does/should science work?
 - Cognitive sciences provide the subject matter
 - But may provide reciprocal guidance to science
- Possible third? Cognitive/experimental philosophy: application of methods/results in cognitive science to philosophical problems (cf. neurophilosophy)

Philosophy of Mind

What are mental states/processes and how do they work?

- Strategies of Inquiry with Uptake in Cognitive Science
 - 1970s Onwards: Thought experiments
 - Putnam's Twin Earth
 - Searle's Chinese Room
 - 21st Century: Experimental Philosophy
- Mind-Body Problem
- Representation and Computation

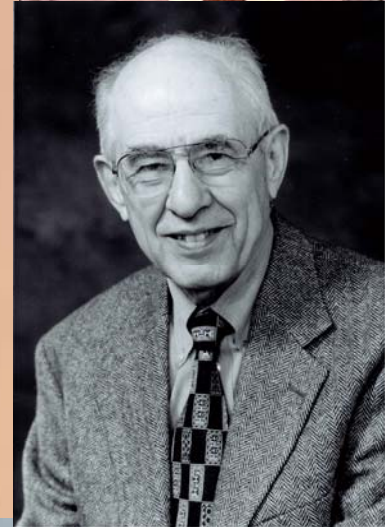
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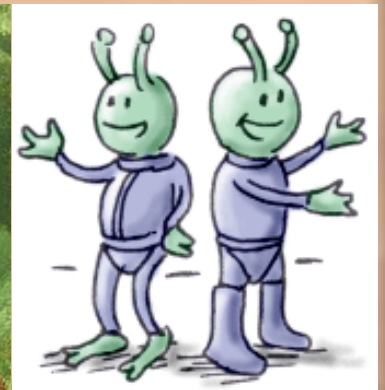
The Mind-Body Problem

- The Identity Theory: Mental states (processes) are identical with brain states (processes)
- Functionalism: Mental states are defined by their relations to other mental states
 - May be realized by brain states but are not identical with them
- Qualia Dualism: The qualitative character of conscious experiences is ontologically independent of anything physical/functional
- Reviving the Identity Theory



Objections to the Identity Theory

- Correlation Objection:
 - Evidence for Identity Theory can never go beyond mere correlation between mental states and brain states
- Multiple Realizability Objection:
 - Hilary Putnam argued that the brain states corresponding to mental states such as pain or hunger vary widely across actual (and possible) species



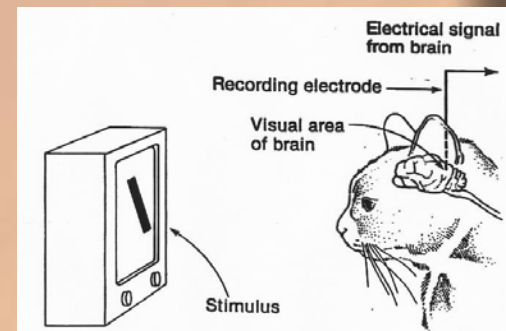
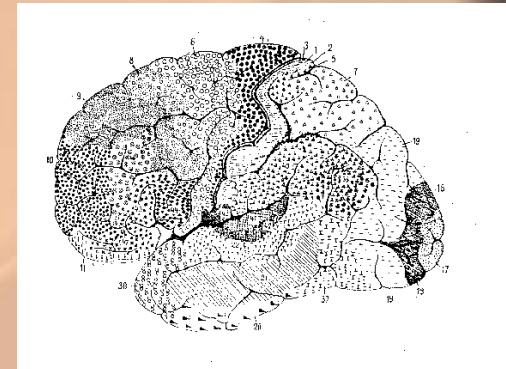
Try Relating Money to Physics

- Diversity of things that count as money
 - Strings of wampum
 - A signed check
 - A French 100 franc note
 - A US silver dollar
 - A wire transfer by computer
 - Bits in a computer
 - Etc.
- These various instances of money are not likely to have anything physical in common
- And even a disjunction of actual realizers is insufficient, since new things might come to count as money in the future



Reviving the Identity Theory

- Rethinking the Multiple-Realization Claim
 - Is pain (hunger, etc.) the same in us as in other species? And the same in each of us?
 - Neuroscience is fundamentally comparative
 - Map mind and brain at the same grain
- Rethinking the Mere Correlation Claim
 - Identity a discovery heuristic, not a conclusion from evidence
 - Evaluated by how productive the research is

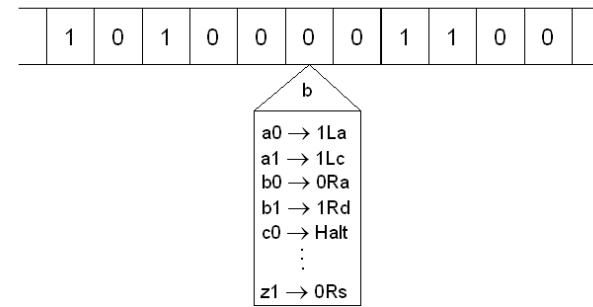


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Representation (and Computation)



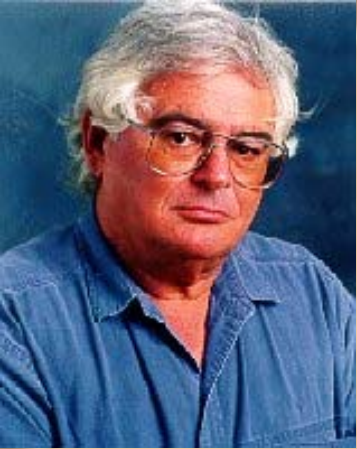
- Representational Vehicles:

What sorts of things can serve as representations?

- Propositions, spatial layouts, etc.
- These are the entities that are manipulated in computations

- Representational Contents:

What is the relation between vehicles and what they represent?

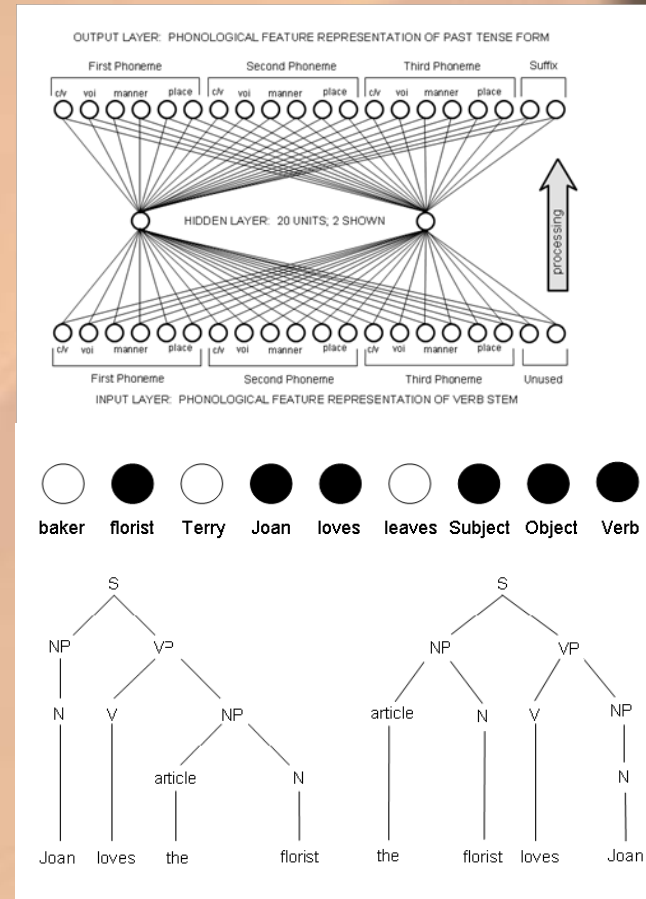


Representational Vehicles: Language of Thought

- Language is the exemplar of a representational system
 - Can be operated on by inference rules
- Learning requires hypothesis testing
 - Must first represent hypothesis in order to test it
- Language of thought must be innate
 - Before one could acquire other representational systems, one must possess a representational system of equal representational power

Representational Vehicles: Connectionism Wars

- Connectionism has emphasized non-syntactically structured distributed representations
- Fodor & Pylyshyn's response
 - Thought, like language, is productive and systematic
 - Units in networks lack the compositional structure to explain productivity and systematicity
 - Classical (linguistic) representations alone possess a compositional syntax that can explain thought



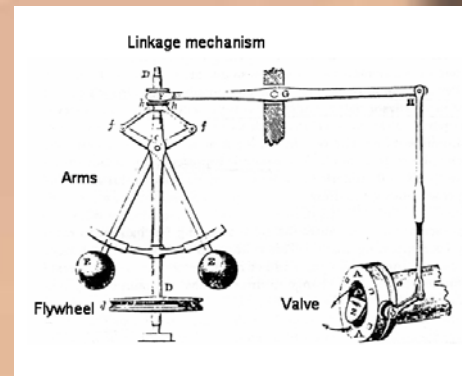
Representational Content

- Information theoretic approaches
 - Loosely inspired by Shannon
 - Effect carries information about its cause
- Asymmetric dependence
 - Privilege causal relation to intended referent
- Teleological approaches—emphasize function
 - Natural selection (Darwinian)
 - Autonomous systems (self-maintaining systems far from equilibrium)



Anti-Representationalism

- Dynamical Systems Theory
 - Representations are the wrong explanatory tool (too static)
 - Alt: Relating variables across time, often utilizing differential equations
- Embodied and Situated Cognition
 - Brains are coupled to their bodies and environments, arguably without internally representing either

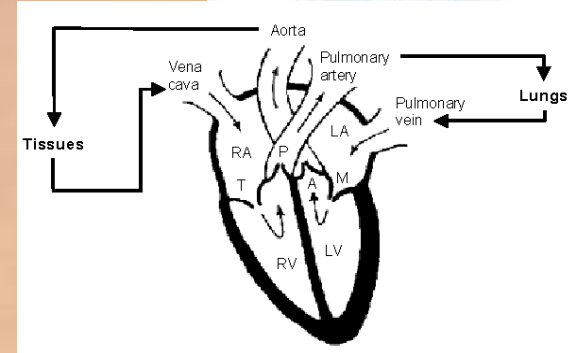


Philosophy of Science

- How does/should science work?
 - Cognitive sciences has served as the raw material for inquiries by such philosophers as Dennett, Thagard, Nersessian, the Churchlands
 - Reciprocally, philosophy of science provides guidance to the cognitive sciences, for example:
- Accounts of explanation
- Understanding interdisciplinary relations

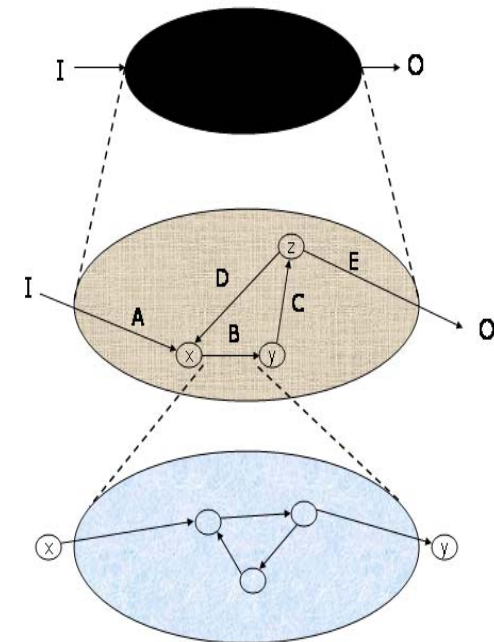
Explanation

- Approaches to Explanation
 - Nomological Approach
 - Laws carry the explanatory burden
 - Explanation involves derivation from laws
 - Mechanistic Approach
 - Parts and operations are organized to realize a phenomenon
 - Importance of diagrams and diagrammatic reasoning
 - Mechanisms are particulars; generalization via schematization and conservation of mechanisms



Interdisciplinary Relations

- Nomological Accounts: Theory Reduction
 - Laws/theories of higher-level sciences are derived from those of lower-level sciences
 - Anti-reductionists cite multiple realizability
- Mechanistic Accounts: Inherently multi-level, hence interdisciplinary
 - Turn to a lower-level science to explain how a mechanism works
 - Turn to higher-level sciences to identify the conditions under which the mechanism operates and engages its environment



Philosophy in Cognitive Science?

