# Major Issues in Cognitive Science

from: *Foundation of Cognitive Science* @ JHU By Prof. Paul Smolensky

### Theory- vs. Data-Centering

Should the primary goal of cognitive science be to construct a comprehensive, insightful theory or to collect and describe a comprehensive set of data?

### Explanation vs. description

What should be the descriptive or explanatory goals of cognitive science?

### Computational vs. non-computational frameworks

Should a cognitive theory be a computational theory, viewing the mind as a machine that takes data in, processes it according to an algorithm, and output behavior?

### Models vs. theories

Should cognitive science strive to build models or theories of cognition, and how are these two related?

### Abduction vs. data-driven induction

Is abstract knowledge generalized from experience (data-driven induction) or does experience select among a priori abstract hypotheses in the form of data-generating models (abduction)?

### Knowledge/concepts as rules/definitions vs. examples

In the mind, are concepts, or knowledge more generally, constituted of stored specific examples, or of general definitions or rules, as in mathematics?

### Localized vs. distributed neural realization

Are localized bits of representations, knowledge, or processes realized in localized bits of the nervous system

### Levels of cognitive analysis

At what level does the explanation of cognitive phenomena lie: the level of individual neurons, or a more fine-grained, coarse-grained, or abstract level?

### Formal vs. non-formal theories

What is the appropriate level of formality for cognitive theory? is human knowledge a formal system?

### Competence vs. performance

Should cognitive science seek theories that explain the details of actual human performance, or theories of 'competence' – the knowledge underlying performance, ignoring the vagaries of particular instances of use of this knowledge?

### Nativism vs. empiricism

Does knowledge derive from experiences?

### Conscious vs unconscious processes

What roles do conscious and unconscious processes play in an overall theory of cognition?

### Serial vs. parallel processing

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### Independent mental faculties ('modules') vs. interactionism

Is the mind a collection of fairly autonomous faculties or modules, each concerned with some particular cognitive domain and governed by its own idiosyncratic principles, or is the mental processing of information from multiple domains so heavily interactive that decomposition into separate modules is not possible or useful?

### Internal vs. external/functional explanation

Should cognitive explanation derive from principles internal to the cognitive system, or from external factors such as the function served by cognition or the physical constraints under which it operates?

### Theories of [brain function vs. behavior vs. mental knowledge]

What is cognitive science the science of?

### Representational vs. non-representational frameworks

Does cognition deploy representations of the outside world, on which it computs?

### Mind as statistical processor vs. mind as structure processor

Is the mind primarily a device for processing highly structured, symbolic information, or primarily a device for performing statistical analysis of experiences?

### Explicit vs. implicit knowledge rule-following vs. rule-governe

Is knowledge (e.g. a rule) explicitly encoded in the mind as a declarative statement S for a general-purpose interpreter, or implicitly encoded in a system whose behavior can be described by S?

### Inference and decision making: logic based vs. non-rational approaches

Are human inferences and decisions based on some kind of logic

### Situated vs. non-situated cognition

must a theory of cognition depend crucially on the way the mind is situated in the body and in the external social and physical world?