PHIL 256

The Future of Cognitive Science NO ELECTRONICS

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Futures for Cognitive Science

1. Dualism
2. Embodied, embedded, extended, enacted, dynamic systems
3. Bayes craze
4. Multilevel explanations
   - molecular, neural, psychological, social
   - incorporation of body & world
   - many applications, including consciousness and creativity

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Mechanisms

A mechanism is a system of parts whose interactions explain regular changes and critical transitions.

Examples: bicycle, heart & lungs, brain.

Psychological mechanisms:

Parts are mental representations that are both cognitive and emotional. Interactions are computational procedures.

Social mechanisms:

Parts are people. Interactions are verbal and non-verbal communication.

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Levels of Mechanisms

	Parts	*Relations*	*Inter-actions*	*Changes*
Mole-cular	Molecules	Chemical	Reactions	Chemi-cal
Neural	Neurons	Synapses	Excita-tion	Firing patterns
Psych'l	Represen-tations	Consti-tuents	Computa-tions	Infer-ences
Social	Persons, groups	Associa-tions	Commu-nication	Group actions

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Relations between levels

Reductionist

- parts/whole: groups are made of persons with brains made of neurons made of molecules
- interactions at higher level result from interactions at lower level

Non-reductionist

- changes at higher levels can cause changes at lower levels
- e.g. social stress affects cortisol levels

Multilevelism: Pay attention to all relevant levels and their interactions.

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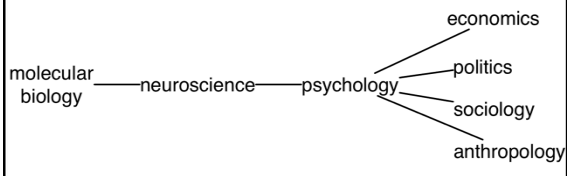
Integrating Levels



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Discussion Questions

- What do you think are the biggest successes of cognitive science?
- What do you think are the biggest problems?

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Your future in cognitive science

- Major applications: decision making, education, human-machine interaction, intelligent systems, mental health.
- Strategy:
  - Identify levels of explanation most relevant to your interests.
  - Adopt relevant methods, e.g. experiments, simulations.
  - Keep track of relevant research at related levels.
  - Integrate levels: molecular, neural, psychological, social.

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Cognitive Science at UW

- Cognitive Science Minor
- PHIL 255: Philosophy of mind
- PHIL/PSYCH 447: Seminar in cognitive science
- SYDE 556: Simulating neurobiological systems
- Research assistants

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Key points

- Cognitive science has been successful in using computation/representation to explain how people perform many important psychological phenomena.
- Explanations in cognitive science employ explanations at multiple levels.
- Challenges can be met by expanding the computational-representational approach to include brain, body, world, and social interactions.

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