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Grounded cognition: Embodiment

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Six views of embodied cognition

(Wilson, 2002)

- What is meant by embodied cognition?
- ”starting point: a body that requires mind to make it function”
- Traditional view: mind as abstract information processor
  - Modularity hypothesis (Fodor, 1983)
- Embodied cognition view:
  - Piaget, Gibson, Lakoff & Johnson, Brooks
- Features: situatedness, time pressure, off-loading, environment, action, body-based.

Cognition is situated

- takes place in the context of task-relevant inputs and outputs
- But some parts can be excluded (off-line mode)
- Role of evolutionary history in situated cognition
- But evolutionary new off-line activities - tool-making, art, ...
- Counterarguments (Barsalou, Brooks)
- Is situatedness central to cognition?

Cognition is time pressured

- Constraints of real time processing, dynamic view of cognition (van Gelder & Port, Pfeiffer & Scheier,...)
- Coping with ”representational bottleneck”?
- How much of cognition is exluded?
- Being in as hurry: environment driven vs self-imposed

Off-loading cognition onto environment

- due to human cognitive limitations
- short-term and long-term off-loading
- use of epistemic actions (in the environment)
- off-loading as a cognitive strategy
  - For what types of tasks?
- symbolic off-loading
  - need not be deliberate & formalized (but automatic)
  - Example: gesturing

Environment as part of cognitive system

- distributedness over mind, body and environment
- forming a single, unified system
- open and closed systems
- System organization: facultative and obligate systems
- weaker claim defendable: mind+situation
- Goal of science: find underlying principles and regularities
- extending cognition by study of group behaviour (Hutchins)

Cognition is for action

- Vision → improved motor control (Churchland et al)
  - ”what” (ventral) & ”where”/”how” (dorsal) system
  - ”how” system serves visually guided actions
  - discovery of mirror neuron system
- Memory → for perception and action (Glenberg)
  - not a passive storage but encoding of patterns of possible physical interaction with 3D world
  - applicable to both episodic and semantic memory
- When is action excluded?
- Difference between ”what” and ”how” systems

Off-line cognition is body based

- Sensorimotor simulations of external situations – widely implicated in human cognition:
- Mental imagery
- working memory (internal off-loading),
- episodic memory (”reliving” the experience)
- Implicit memory (procederes)
- Reasoning and problem solving
  - cognitive linguistics (Talmy)
  - explaining mental concepts via PSS (Barsalou) or metaphors, 2nd order modeling (Lakoff & Johnson)

Conclusion

- Acknowledgment of both on-line and off-line aspects of embodied cognition
- what drives what in either case?
- Can we identify the core components of overall cognition?
- Other questions?