

HOW THE BRAIN CREATES LANGUAGE AND THOUGHT

Coordinator: James Smith

Language is not just an abstract symbol system: it's a human biological ability that can be understood as a function of the brain, like vision and motor control. Cognitive science is revealing much about how the brain produces language and thought, though we don't know yet exactly how words are understood. We examine current theories that combine the latest findings from biology, computer science, linguistics and psychology.

We examine how facts about neural computation, the biology of neurons and neural circuits, and brain structure produce a formal model for such topics as how children learn their first words, words for abstract and metaphorical concepts, understanding stories and grammar as well as examining alternative models. This study group is for anyone interested in how human beings think, act and communicate.

Readings and other Required Materials:

Jerome A. Feldman, *From Molecule to Metaphor*, MIT Press, 2008, ISBN-10: 0262562359, \$22.

Plus selected on-line readings, including journal articles that examine up-to-the-minute findings and alternative models in this area.

James Smith has had a career in education and learning theory, and has coordinated a few study groups on cognitive science and psychology at the IRP.

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- Week 1 Embodied Information Processing: What perspective on language learning is most productive?
- Week 2 How the Brain Computes: Neurons and other Cells.
- Week 3 Nature and Nurture: How the MIND computes.
- Week 4 Connections in the Mind: Embodied concepts and their words
- Week 5 The computational bridge: how do we learn concrete words?
- Week 6 First words, what conceptual schema do we use? How does culture effect these?
- Week 7 Learning Spatial Relation Words and Action Words

Week 8 Metaphor and Meaning. Understanding as Simulation. Why do we understand and like stories?

Week 9 Belief and Inference. Understanding News Stories. Combining Form and Meaning.

Week 10 Combining Forms - Grammar. What are the Language Wars about?

Week 11 Combining Meanings - Embodied Language

Week 12 Remaining Mysteries