

How preschoolers' thinking shapes adult cognition: Objects, agents, other minds, and morality.

830:402: Advanced Topics in Development of Cognition

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Course Description.

We will explore the idea that humans have a characteristic way of thinking about and experiencing the world. To the extent that these characteristics are inbuilt and part of the genetic endowment of all human beings, we can call this “human nature”. Our hypothesis is: Our mind/brain by its nature includes certain characteristic powers of learning about the world. These powers are organized around a set of topics or *domains*. The domains we will study in this class include *physical objects and physical mechanics, number, social agents and goal directed action, agents and ‘theory of mind,’ agents and moral action.*

Each domain contains at least some *ideas* (concepts) that are specific to that domain plus some characteristic principles or patterns of reasoning. As a result, each domain finds its own topic-targets in the world and bestows a distinct power of learning about those targets. We’ll be exploring hypotheses about these domains of learning through experimental findings, theories, and controversies in the literature on early cognitive development. The brain’s powers of natural learning about the world express our shared human nature. At the same time these powers reflect the nature of the world.

Our approach is rooted in cognitive science. This means we assume that the brain is a *computational* organ, a complex network of natural computers built out of neurons connected to one another. Actually, most scientists now believe that *each* neuron is a little computer. The question is, what are they computing? What are they thinking about?

What you’ll be expected to do:

This course will require you to attend lectures, and to read assigned papers, which will be discussed by class and in the class online sakai forum. You will also be required to take two online quizzes with multiple choice questions and a short answer question. Readings will be posted at intervals on sakai related to what we cover in class. The PowerPoints of my lectures will also be posted there after we have worked our way through them in class.

Course grades will be assigned based on your total participation in class, in the online forum, and in the quizzes. You may also *volunteer* to present one of the assigned readings to the class (PowerPoint and talk for 10 to 15 mins). If you want to volunteer for this, let me know as soon as possible so I can plan your assignment. Those students who take on a presentation like this can earn generous extra credit. The concept of “volunteering” will be the one used in the armed forces.

Course Goals:

This is a small seminar class, so there is a big emphasis on class participation. You can participate in class by asking questions, during or after class, or making relevant comments, and also in the on-line Forum on sakai, responding to topics and questions that I and other class members will post there. The sakai forum is intended to get class members interacting with each other on the topics we discuss and learn about. Your level and quality of participation in these activities will form part of your grade score, together with the quizzes (also on-line). So that's the first goal.

My main goal is to get you thinking about the mind and how it develops, to challenge some of your basic assumptions about human nature and about how our human nature develops. I want you to begin to see how experimental methods can make discoveries about the minds of very young humans — about our minds when we are very young. You will learn what researchers have discovered over the last two or three decades about the infant and preschool mind. Through the various class activities and topics you will discuss more knowledgeably how the human mental-computation system develops and learns.

Syllabus (roughly) by week:

1. Introduction. Representation and information: Could the mind-brain be a system of computers? What is a computer? Can computers develop?

Part I: Origins of knowledge about the Physical World

- 2: Objects and the Physical World: The Solidity Principle
- 3: Objects and the Physical World: The Unity, Rigidity, and Continuity Principles
- 4: The Object Representation: Information and the 'binding problem' (what, how many, where?)
- 5: Mechanics and the Object: Modules and Causality
- 6: What are infants doing when they 'look longer'? Innateness and learning
- 7: Some Objects are also Agents: the bridge between the physical and the social worlds
- 8: Review and Exam 1

Part II: Origins of our Social World

- 9: Theory of Mind: Agents acting with goals
- 10: Theory of Mind: Agents with Mental States - Pretense and Autism
- 11: Theory of Mind: Beliefs and desires
- 12: Origins of Moral Cognition: Helping, Harming, and Fair Shares
- 13: Moral Judgment of Action
- 14: Course Review and Discussion