

Human Knowledge
The Mind Sequence
Social Sciences 143
University of Chicago
Spring 1996

Staff

Section 1

Beth Hagen

Beecher 403, 752-7103

LEH2@midway.uchicago.edu

Office hours: Wed 1:30-2:30, or by appt

Discussion room: Social Sciences 108

Section 3

Terry Regier

Kelly 313, 702-0918

t-regier@uchicago.edu

Office hours: By appointment

Discussion room: Humanities 155

Section 2

Lawrence Barsalou

Beecher 313, 702-4193

L-Barsalou@uchicago.edu

Office hours: By appointment

Discussion room: Judd 110

Section 4

James Hampton

Green 305, 834-0338

hampt@cicero.spc.uchicago.edu

Office hours: By appointment

Discussion room: Judd 111

Teaching Assistant

Wenchi Yeh

Beecher 312

yeh1@midway.uchicago.edu

Office hours: By appointment

Topic and Themes

During the spring quarter of the Mind sequence, we will focus on the topic of human knowledge. Why devote an entire quarter to this topic? First because knowledge is one of the most important aspects of human nature. Knowledge affects everything we do, because it structures all our central abilities to a tremendous extent, including perception, attention, memory, learning, language, thought, social interaction, and culture. Until we understand the nature of human knowledge and the roles it plays in human activity, we will have an impoverished account of what it means to be human.

A second reason to study knowledge is because it provides a microcosm for studying classic themes concerning human nature. Virtually every classic theme manifests itself in knowledge in some way. Consider themes from the previous two courses of the Mind sequence. From the first quarter, the theme that the human mind goes beyond the information in the world is central to human knowledge. One of the primary reasons that the human mind goes beyond information in the world is because of the knowledge it contains. From the second quarter, the theme that the human mind can and should be addressed at multiple levels of explanation is central. To understand human knowledge, it must be understood at the cognitive, socio-cultural, and biological levels. During the coming quarter, a close examination of human knowledge will allow us to explore these themes in greater detail, as well as

providing us with classic examples of how important they are. In addition, our examination of human knowledge will raise a number of other major themes as well, as we shall see throughout the course.

Topic Structure

In the first three lectures, we will review the ubiquitous and profound effects of knowledge on human activity. We will demonstrate that knowledge affects all aspects of human activity, from perception and basic cognition, through language and thought, to social interaction and culture. By the end of these lectures, it should be clear that knowledge is one of the central factors that allows humans to go considerably beyond the information present in the world as they pursue their daily activities.

In the last six lectures, we will explore the mechanisms that underlie human knowledge. Whereas the first three lectures document the impact of knowledge on human activity, the last six lectures explore the mechanisms that produce this impact. In this section, we will address mechanisms at the cognitive, socio-cultural, and biological levels that underlie human knowledge. It should become clear that many different kinds of mechanisms contribute to human knowledge and its effects, and that an adequate understanding of knowledge requires adequate explanations at all levels.

Course Structure

The structure of this course will differ from the structure of the previous two Mind courses. The expression, *directed integrative thinking*, sums up the logic behind this quarter's structure. To see how this works, consider the idealized cycle that we will follow for each of nine topics (the actual time course for each cycle departs a little from the idealized cycle, as shall be clear later) :

- (1) Study three integrative questions for a topic (provided in this syllabus).
- (2) Read two background articles on the topic (on reserve in Harper Library).
- (3) Hear a lecture on the topic (Judd 126).
- (4) Attend a seminar meeting to discuss the topic, the readings, the lecture, the integrative questions, and strategies for answering the questions.
- (5) Take an exam in which you will receive one of the three integrative questions (selected randomly) and write up to two pages on it in class without any notes.

Thus, *directed integrative thinking* means that you will base your learning of a topic on constructing answers for integrative questions central to it. To construct answers, you must draw on the readings and the lecture, bringing both to bear significantly. Furthermore, you must go beyond the readings and the lecture, adding analysis, synthesis, and your own thought. You are free to consult with other students in preparing your answers, as well as other sources. You may also use material acquired during the seminar discussion for the topic. We believe that if you do a good job of preparing your answers that you will not only learn a lot about important issues concerning human nature, but also about how to think, formulate arguments, and deal with evidence in general.

The actual course structure departs somewhat from the simplified structure just described. The course will consist of three groups of topics, each group organized as follows across a three week period:

Week 1

- | | |
|--------|--------------------|
| Tues: | Lecture on topic 1 |
| Thurs: | Lecture on topic 2 |

Week 2

- | | |
|-------|------------------------------|
| Tues: | Discussion of topics 1 and 2 |
|-------|------------------------------|

Thurs: Lecture on topic 3

Week 3

Tues: Discussion of topics 1, 2, and 3, with the emphasis being on topic 3

Thurs: Exam containing three integrative questions, one drawn randomly from the three integrative questions for each topic

This same structure will repeat itself during weeks 4-6 for topics 4-6, and again during weeks 7-9 for topics 7-9. During the 10th week, we will hold a review session in preparation for the final during the 11th week.

Exams

For each of 9 topics, you will receive 3 integrative questions, for a total of 27 questions. These questions are provided later in the syllabus. On each of the three exams, you will receive 3 questions, with 1 drawn randomly from the each of the 3 questions for each topic. The first exam will cover the first topics 1, 2 and 3; the second exam will cover only topics 4, 5, and 6, and the third exam will cover only topics 7, 8, and 9.

During the tenth week, we will tell you the grade that you have earned thus far. During the eleventh week, there will be a final on Wednesday 10:30-12:30 in the room for your discussion section. If you have taken all of the three previous exams, the final can only improve your grade—it can't hurt it. For these students, the final will consist of six questions, which were not included in one of the three previous exams (i.e., questions from a previous exam will not be repeated). If you receive a grade for a final question that is higher than a grade for a question on an earlier exam, the grade for the final question will replace the earlier grade. For example, if the six grades on your final are all higher than six of your nine grades on the earlier exams, the earlier six grades will be replaced. Alternatively, if only one of your final grades is higher than one of your earlier grades, only one of your earlier grades will be replaced. Similarly, if none of your final grades is higher than an earlier grade, none of your earlier grades will be replaced, leaving you with the grade that you had received in the tenth week.

If you miss any of the first three exams, there will be no make ups. Instead, you can use questions on the final to make up a missed test. The questions on your final will be tailored to make up the exam(s) that you missed. For example, if you missed the first exam, 3 of the 6 questions on the final will come from the 9 possible questions for the first three topics, with 1 question for each topic (note that questions from the earlier exam may be repeated for makeups). The scores on these 3 final questions replace your 3 missing test scores for the first test. They cannot be used to replace lower test scores from the second or third tests, although the remaining 3 questions on your final can (these other three questions would come only from topics that you aren't making up). As this illustrates, having to make up an exam with the final decreases your ability to use the final to replace low grades on earlier exams. If you missed two exams, all 6 questions on the final must be used to make up those two exams, with 1 question for each of the 6 topics covered. In this case, the final cannot be used to replace any lower grades on the one test taken earlier. Finally, if a student missed all three of the earlier exams, the final can only be used to make up two of them. In this case, your course grade will be based only on your six final grades and three missing test scores.

Answers to the integrative questions will be graded on a number of factors including:

- utilization of relevant material in the readings and the lecture

- synthesis of the material (not just repeating it)
- ability to reason about the issues, going beyond the material
- ability to make headway on the issue raised
- compellingness of the arguments made and the evidence brought to bear
- lack of flaws in reasoning, interpretation of evidence, and so forth
- clarity of writing

Sections

Because changing sections makes grading difficult, and because it leads to sections of different sizes, please do not attempt to change your section assignment. All students must remain in the section that the registrar assigned to them. There will be no exceptions.

The section meetings will serve several purposes:

- (1) We will begin each meeting by discussing any questions that you may have about the recent lectures and readings, especially concerning material that is relevant to answering the current set of integrative questions. If you have any questions about this material that bear on your ability to formulate answers to the integrative questions, this is the time to bring them up. The course schedule specifies which lectures and readings are most relevant to each section meeting.
- (2) Next we will discuss the integrative questions on which you are currently working. The questions to be discussed at each meeting are listed later in the course schedule. For each question that we will discuss at a given meeting, we will explore material that might be relevant to answering it, strategies for answering it, and so forth. As described in the next section, each student will prepare outlines that will serve as a basis for these discussions, and individual students will be asked to discuss how they would answer these questions based on these outlines.
- (3) Finally, we will discuss any other issues that arise concerning recent material. For example, you might have questions about a topic that go beyond the material presented. Or you might have criticisms of research in an area. Or you might believe that there is an important issue that isn't being addressed that should be. Or you might be methodological problems that undermine the evidence being presented. Whatever issues of this sort that you believe are important to discuss should be raised during the last part of these meetings.

Attendance at section meetings is required and will be included in final grades. You will receive a 1 for each section meeting attended, and a 0 for each meeting not attended.

Question Outlines

For each section meeting, prepare one outline for each integrative question to be discussed that day. The course schedule specifies which outlines are due at which meetings.

Your outline for each integrative question should formulate how you would attempt to answer the question at that time. List major points, arguments, sources of evidence, specific pieces of evidence, and so forth that you would include in your answer. By no means will you be committed to following this outline, should you receive this question on an exam. Instead, you may decide to answer the question in a significantly revised way, or in completely different way, if you like.

There are two purposes of preparing these outlines. First, they will help you to begin organizing your thoughts about the integrative questions. Second, they will serve as a basis for discussion in the section meetings. By beginning to formulate your answers well in advance of the exam, you will have

more time to think about them, to discuss them with your classmates, and eventually to produce sophisticated answers.

Preparing these outlines is a required part of the course. A copy is to be turned in to your instructor at the relevant section meeting. You will receive a grade of 1 for an outline if you turned it in on time, and if you made a serious attempt to formulate an answer. You will receive a grade of 0 for an outline if you didn't turn it in, turned it in late, or if you didn't make a serious attempt to formulate an answer.

Grades

A student's grade will reflect the following three factors:

- | | |
|---|-----|
| • 9 grades for 9 integrative questions, 3 per exam (10 point scale) | 80% |
| • 9 grades for attendance at the 9 section meetings (1 or 0) | 10% |
| • 27 grades for turning in the 27 outlines (1 or 0) | 10% |

Although the percentages for section meetings and outlines are relatively small, failing to attend a few sections, or failing to turn in a few outlines, could lower your grade. A student's section leader will be responsible for his or her grade.

Readings

All of the readings for the course are on reserve in Harper Library. Five copies of each article are available.

Lecture Notes

Copies of the lecture notes for each lecture can be obtained from the Web page for the course. It is highly recommended that you obtain a copy of the notes for each lecture *prior to attending it*. The lecture notes are constructed in such a way as to reduce the amount of work that you have to perform in taking notes on the lecture when you hear it. Rather than having to copy a lot of materials off of the instructor's overheads, the lecture notes provide much of this information for you. This frees you up to think about the material as you're hearing it and to concentrate your note taking on high-level points that will be useful in formulating your answers to the integrative questions.

Please note: These lecture notes do *not* contain a complete account of a lecture's content. Typically, these notes must be embellished by notes taken in class to provide a comprehensible account of the presented material. Thus, these notes are not intended as a replacement of the notes that you would take in class for a lecture. Instead, they are intended primarily as a tool for helping you take better notes and for helping you get more out of the lecture.

The notes for the lectures will not all be on the Web page at the start of the course. Instead, you can only be certain that the notes for a given lecture will be available by noon of the day before a lecture.

Here are the instructions for downloading lecture notes off of the Web page:

1. Run **Netscape** on a Macintosh at Reg, Harper, or Crerar.
2. Click the "**Open**" icon at the top (or select **File** and **Open Location** from the pull down menu).
Type in the following location: **http://www.ccp.uchicago.edu**
3. You should be able to see the home page of Center for Computational Psychology at this point.
Select **The Psychology Department Web Pages** by clicking on it.
4. Select **Psychology Classes** by clicking on it.
5. Select **The Mind -3** by clicking on it.
6. You should be able to see a list of the course materials at this point. Click **Lecture Notes**.
7. Select the lecture notes you want by clicking the **date of the lecture**.
8. Print out the lecture notes by clicking the "**Print**" icon at the top. Alternatively, select "**File**" and "**Print**" from the pull down menu.
9. If you want an electronic copy of the notes, save the file in text format.
10. After you get a hard copy of the lecture notes, quit Netscape by selecting "**File**" and "**Quit**" from the pull down menu.

If you need help downloading the lecture notes, or if you have any problems, see the TA, *not* your section leader.

Course Schedule, Readings, and Integrative Questions

Week 1

Tues 3/26 **Introduction** (Lawrence Barsalou)

- Bruner, J.S. (1957). Going beyond the information given. In J.S. Bruner, E. Brunswik, L. Festinger, F. Heider, K.F. Muenzinger, C.E. Osgood, & D. Rapaport, (Eds.), *Contemporary approaches to cognition* (pp. 41-69). Cambridge, MA: Harvard University Press. [Reprinted in Bruner, J.S. (1973). *Beyond the information given* (pp. 218-238). New York: Norton.]
- Bransford, J.D., & Johnson, M.K. (1973). Considerations of some problems of comprehension. In W.G. Chase (Ed.), *Visual information processing* (pp. 383-438). New York: Academic Press.

Thurs 3/28 **Language and Thought** (Terry Regier)

- Whorf, B. (1956). The relation of habitual thought and behavior to language. Reprinted in John B. Carroll (Ed.), *Language, thought, and reality: Selected writings of Benjamin Lee Whorf* (pp. 134-159). Cambridge, MA: MIT Press.
- Pederson, E. (1995). Language as context, language as means: Spatial cognition and habitual language use, *Cognitive Linguistics, vol. 6, no. 1*, pp. 33-62.

Week 2

Tues 4/2 discussion sections on topics 1 and 2
outlines due for questions 1-6

Thurs 4/4 **Social Concepts** (Beth Hagen)

- Tajfel, H. (1981). *Human groups and social categories*. Cambridge, Cambridge University Press. Chapter 6, pp.127-142.
- Greenwald, A.G. and Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review, 102*,4-27.

Week 3

Tues 4/9 discussion sections on topics 1, 2, and 3, emphasizing topic 3
outlines due for questions 7-9

Thurs 4/11 exam on questions 1-9 for topics 1, 2, and 3 (in section rooms)

Integrative Questions

Topic 1: Introduction

1. Identify an example from your daily life of how knowledge structured your cognition on a particular occasion. Describe how knowledge affected your physical and/or mental behavior. To the best of your intuitive ability, describe the nature of the knowledge that produced these effects. If your knowledge about the same sort of thing had been different, how would your physical and/or mental behavior had been different?
2. Imagine that you have to convince a skeptical group of lay people that knowledge has ubiquitous and profound effects on human nature. What argument would you make to convince them? In your argument, be sure to include the most compelling examples you can think of that cover as broad a range of human activity as possible.
3. Select one specific effect of knowledge on cognition. Describe how you could use the scientific method to study this effect. Be sure to specify each step of the scientific method and how it would be realized. Give examples and be as concrete as possible.

Topic 2: Language and Thought

4. Why should our speech perception mechanism have evolved so as to give rise to the McGurk effect? Does it do any good? Is it a side-effect of something else that would do us some good? Or is it just a curiosity?
5. Similarly, why should we have evolved so as to be able to entertain such dissimilar spatial systems as those we see in rural Tamil and English? What does this buy us? Why shouldn't we all have the English (or Swahili, or Cantonese) system of spatial structuring as an innate endowment?
6. Polysemy is the phenomenon of a single word having several related meanings. For example, in Whorf's discussion (p. 135) of the phrase "empty gasoline drums" he points out that the word "empty" denotes a physical state of affairs but also suggests inertness—these two meanings are clearly related but not identical. Whorf's example stresses the disadvantages of polysemy: one may be misunderstood. Do you think there might also be advantages to polysemy? If so, what? And if not, why should we be stuck with a system of communication that exhibits this feature?

Topic 3: Social Concepts

7. Imagine that your business is reviewing applicants for an important job. The company is looking to hire one highly skilled individual and wants to make sure that its decision is not biased by social stereotypes. Identify how biases might come up in the applicant review process. What would you do to try to minimize these effects?
8. Henri Tajfel writes, "Stereotypes are certain generalizations reached by individuals. They derive in large measure from, or are an instance of, the general cognitive process of

categorizing." Do you agree or disagree? How are stereotypes like other categories? How are they different?

9. Imagine that you are working for a consulting firm that has been hired to do "image consulting" for a new and relatively unknown political candidate. Your bosses gave you the assignment of researching this candidate and planning a strategy that will produce a positive public image of him or her. In a memo to your bosses, briefly describe the candidate, discuss his or her inclusion in politically relevant social categories and explain your strategy.

Week 4

Tues 4/16 **Models of Concepts** (James Hampton)

Hampton, J.A. (1996). Psychological representations of concepts. Chapter in:
M.A.Conway & S.E.Gathercole (Eds.) *Cognitive Models of Memory*. London:
UCL Press. (in press)

Komatsu, L.K. (1992). Recent views of conceptual structure. *Psychological Bulletin*,
112,500-528.

Special issue (vol 4, 1989) of *Mind and Language* entitled "What is a concept"
including Hampton, J.A. (1989). Concepts and Correct Thinking. *Mind and
Language*, 4, 35-42.

Thurs 4/18 **Knowledge Grounding** (Lawrence Barsalou)

Johnson, M. (1987). *The body in the mind: The bodily basis of reason and imagination*
(pp. xix-40). Chicago: University of Chicago Press.

Glenberg, A.M. (in press). What memory is for. *Behavioral and Brain Sciences*.

Week 5

Tues 4/23 discussion sections on topics 4 and 5
outlines due for questions 10-15

Th 4/25 **Theory and Concepts** (James Hampton)

Murphy, G.L., & Medin, D.L. (1985). The role of theories in conceptual coherence.
Psychological Review, 92, 289-316.

Rips, L.J. (1989). Similarity, typicality and categorization. In S.Vosniadou &
A.Ortony (Eds.), *Similarity and analogical Reasoning*. Cambridge: Cambridge
University Press.

Week 6

Tues 4/30 discussion sections on topics 4, 5, and 6, with the emphasis on topic 6
outlines due for questions 16-18

Thurs 5/2 exam on questions 10-18 for topics 4, 5, and 6 (in section rooms)

Integrative Questions

Topic 4: Models of Concepts

10. Think of two concepts. Then compare how each of the three models described in the lecture might explain (or fail to explain): (a) how the concept might be learned by a child, (b) how the concept could be applied to a particular case, (c) how the concept would allow one to draw inferences about a particular case. Examples of concepts you might choose: Fish, Galaxy, Obscenity, Pain, Cause.
11. If concepts capture statistical regularities in the world, where does our sense of there being necessary truths come from? Are we justified in feeling that they are necessary?
12. Take any current controversial social or political issue, and discuss the extent to which differences in the definition of key concepts lie at the heart of the debate.

Topic 5: Knowledge Grounding

13. What kinds of symbols do you think constitute human knowledge? Why?
14. What is the relation between knowledge and language? How are they similar. How are they different? How do they interact, and what roles does their interaction serve?
15. Select an abstract non-concrete concept not addressed in the course. Describe how it could be represented using perceptual symbols? If you don't think that it can be represented with perceptual symbols, explain why and suggest how else it might be represented.

Topic 6: Theory and Concepts

16. How is it possible for concepts to be defined by the theories in which they occur, if theories are constructed from the concepts? How do we get out of this circularity?
17. If concepts are defined by theories does this mean that people with different beliefs possess different concepts? If so, how can we communicate with each other?
18. Putnam claims that "meaning ain't in the head". What led him to this conclusion, and if he is correct, then does this imply that there can be no psychological theory of concepts or meaning?

Week 7

Tues 5/7 **Creative Knowledge Use** (Lawrence Barsalou)

Barsalou, L.W., & Prinz, J.J. (in press). Mundane creativity in perceptual symbol systems. In T.B. Ward, S.M. Smith, & J. Vaid (Eds.), *Conceptual structures and processes: Emergence, discovery, and change*. Washington, DC: American Psychological Association.

Ward, T.B. (1994). Structured imagination: The role of category structure in exemplar generation. *Cognitive Psychology*, 27, 1-40.

Thurs 5/9 **Biological Mechanisms** (Terry Regier)

Kay, P. and McDaniel, C. K. (1978), The linguistic significance of the meanings of basic color terms, *Language*, 54, 610-646.

Regier, T. (in press), Connectionism and cognitive models. In T. Regier, *The Human semantic potential: Spatial language and constrained connectionism*. Cambridge MA: MIT Press.

Week 8

Tues 5/14 discussion section on topics 7 and 8
outlines due for questions 19-24

Thurs 5/16 **Concepts in Culture** (Beth Hagen)

Durkheim, E. and Mauss, M. (1963). *Primitive classification*. Chicago: University of Chicago Press. pp.3-9.

Shweder, R. and Miller, J.G. (1990). *Thinking through cultures*. Cambridge, MA: Harvard University Press. pp.174-185.

Kuhn, T.S. (1970). *The structure of scientific revolutions*. Chicago: University of Chicago Press. Chapter 6, pp.52-65.

Week 9

Tues 5/21 discussion sections on topics 7, 8, and 9, with the emphasis on topic 6
outlines due for questions 25-27

Thurs 5/23 exam on questions 19-27 for topics 7, 8, and 9 (in section rooms)

Week 10

Tues 5/28 review meeting for the final (in section rooms)
grades to this point in the course handed out

Thurs 5/30 no meetings, reading period

Finals Week

Wed 6/5 final 10:30-12:30 (in sections; rooms may be different)

Integrative Questions

Topic 7: Creative Knowledge Use

19. How does human knowledge go beyond knowledge acquired empirically? What functions might this serve? Do you think human knowledge is more creative than animal knowledge? Why?
20. What role might language play in creativity? How might the productivity of language be related to the productivity of knowledge? How might the absence of language in other species limit their creative use of knowledge?
21. Select some area in which people exhibit exceptional creativity (e.g., writing fiction, writing songs, designing cars, etc.). What limits on creativity might you observe if you studied their behavior? How might their behavior be expected to go beyond empirical learning and how might it be constrained by it? What recommendations would you give for how to increase people's creativity in this area?

Topic 8: Biological Mechanisms

22. Whorf has suggested that language affects perception, while Kay and McDaniel suggest that it is just the other way around: perception affects language. Are these two positions compatible? If so how, and if not why not?
23. For some, reduction to the neural level holds a very distinctive appeal, in that it holds the promise of getting at the actual building-blocks of cognition, the alphabet out of which our mental language is composed. Argue either for or against the idea that the reduction of psychological phenomena to the neural level is privileged over other forms of explanation.
24. Connectionist models are neurally inspired, in that they are composed of interconnected units that are loosely analogous to neurons. However, the degree to which connectionist models are actually viewed as models of neural function varies from model to model. Some researchers prefer to view the units and connections in their models as purely mental entities, and thus to downplay the neural angle. Indicate why this might or might not be a good idea, referring to the Seidenberg and McClelland model and the Shastri and Ajjanagadde model as examples to illustrate your points.

Topic 9: Concepts in Culture

25. First, consider the way we organize animals in a biological taxonomy. On what basis do we group animals together into a category and on what basis do we draw a category boundary between them? In other words, what aspects of the animals are relevant to our classification system? Next, imagine how some other culture might classify the animals differently (be creative!) and explain their system. Of these two classification systems, do you think one is better than the other? Why or why not?

26. Explain how scientific paradigms are maintained even in the face of conflicting findings. How is a paradigm beneficial to the progress of science? How might it hinder progress? Does Kuhn's philosophy of science contradict the idea of objectivity in science?
27. Three umpires are discussing how they call balls and strikes. The first umpire says, "I calls 'em as I sees 'em." The second umpire says, "I calls em as they are." The third umpire says, "They ain't nothing 'til I calls 'em." Discuss how these umpires are analogous to different views of category formation. Which do you agree with? Explain.