SPRING 2021
CONSTRUCTING EXPERTISE: SURMOUNTING PERFORMANCE PLATEAUS BY TASKS, BY TOOLS,
BY TECHNIQUES

Wayne Gray

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| Instructor: Wayne Gray | Individual Session with Instructor: tbd |
| Phone: 518.276.3315 | Reading Group Session: Thursday 10-13:45 |
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| Office: 3rd Fl Carnegie Bldg |

This is a graduate level course in Cognitive Science. Other graduate students, including all Co-term students, or Junior or Senior undergraduates may sign up with consent of the instructor.

OVERVIEW OF RESEARCH AREAS: This Graduate Research Seminar will focus on four themes related to Expertise, Aging, Talent, and Robots with a particular leaning towards Perception & Action

GENERAL DESCRIPTION OF SEMINAR: It is expected that students in this seminar will have a range of expertise in these areas in part because some students will be 5th year doctoral students and others will be 1st year ones. There may even be one or two ugrads in this seminar. All are welcomed and all will be judged based on their level of effort not on their prior knowledge.

Although this seminar is being offered by the Cognitive Science Department, students from all other departments of Rensselaer are invited and their contributions will be cherished. However, seats are limited so as to preserve the small group nature of the weekly discussions. Those outside of Cognitive Science should contact the instructor prior to registering. Finally, the syllabus may change during the semester with new readings being added and old ones pruned. Keep your eye on: http://homepages.rpi.edu/~grayw/courses/syllabi/nFa2019--Expertise&Decision-Making/ for more information.

DETAILS OF CLASS STRUCTURE: Details on course structure, expectations, and grading (with differences for Grad students and Ugrads) appear at the end of this syllabus (but before the list of REFERENCES).
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**Topic 1** WK01-JAN28: INTRO – A BRIEF HISTORY OF SKILL

[all read all]

  - how intelligence and practice ... influence the acquisition and retention of complex skills across the whole life span.

**Topic 2** WK02-FEB04: OLD AND NEW LOOKS AT AUTOMATIC AND CONTROL PROCESSES

[All students to read each of these papers and come to class prepared to discuss them.]


**Topic 3** LONG-TERM SKILL ACQUISITION IN COOPERATIVE HUMAN-HUMAN INTERACTIONS

3.1 WK03-FEB11: GAZE SHARING

3.2 WK04-FEB18: INTERACTING IN SPACE


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**END: LT Skill Acq in Cooperative Human-Human Interactions**

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**Topic 4 WK05-FEB25: TOOLING**


Be sure to come to class with talking points for each of the 6 sections of this paper.

“Strictly speaking, nothing is a tool unless during actual use.” Butler (1951, p. 121)

1. Introduction (p.1)
2. Concepts Essential for a Theory of Tooling (p.7)
3. Theory of Tooling (p.18)
4. Application to one System of Tooling: Bearded Capuchin Monkeys Cracking Nuts (p.39)
5. Conclusions (p.52)
6. Acknowledgments, References, Further Reading

**Topic 5 WK06-MAR04 – TEAM COGNITION**


• all read: Papineau, D. (2013). In the zone. *Royal Institute of Philosophy Supplement, 73*, 175–196

**Topic 6**  
**WK07-MAR11 – TWO MINDS, ONE DIALOG: COORDINATING SPEAKING AND UNDERSTANDING**


1. Introduction (p.302)
2. Dialog: Beyond Transcripts (p.304)
3. Process Models of Dialog (p.307)
4. The Role of Cues in Grounding (p. 313)
5. Partner-Specific Processing (p. 315)
6. Neural Bases of Partner-Adapted Processing (p. 324)
7. Conclusions (p. 335)

**Topic 7**  
**WHAT STUDIES OF INDIVIDUALS CAN TELL US ABOUT HUMAN COGNITION?**  

**WK08-MAR:18**

• Within-Ss Design Issues
  

• Longitudinal Studies of Expertise
Constructing Expertise
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• Why waste data by averaging over trials?

WK09-MAR25 – Exploiting Diversity


Topic 8  WK10-APR01 – JOINT ACTION - GAZE

• all read: background

• Eye Tracker 101


• **Super Gaze!! Super fast voluntary allocation of attention**

**Topic 9**  
**WK11-APR08 – Especial Skills**


**Topic 10**  
**WK12-APR15 – AGE AND EXPERTISE: THOMAS EDISON, CLASSICAL COMPOSERS, & COMPENSATORY ACTIVITIES**


**Topic 11  WK13-APR22 – MOTOR LEARNING AND SKILLS**


**Topic 12  WK14-APR29 – Open Mike**

- **Applied Motor Skill Instruction**

**Topic 13  WK15-MAY06 – Open Mike**


The official end of classes will be Monday, May 3rd. Our end of seminar will be Thursday, May 6th. The rationale being that we will NOT have final exam in the course. However, as sched-
ules can get complicated, especially for those of you who are TAing, the May 6\textsuperscript{th} class is optional for anyone who is TAing or anyone who is taking a course which has a final.

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**REQUIREMENTS**

90 REQUIREMENTS

90.1 PreRequisites

Permission of the instructor. This is a graduate research seminar in the Cognitive Science Department. However, all interested undergraduates and interested graduate students from other departments are encouraged to contact the instructor to discuss their participation in the seminar. Responsibilities and assignments for undergraduates will be discussed and agreed on, in writing, by the student and the instructor.

90.2 About the Instructor

Professor Gray has been a member of the Cognitive Science Department at RPI since the Fall of 2002. For details on his research interests and activities see his homepage.

90.3 Activities

Reading, Writing, Presenting, Discussing

- Group discussion.
  - The most important contribution each person can make is to our discussions of the readings. I believe a seminar course in which everyone actively participates can be the most productive and educational forum in grad school (often for the instructor as well). Bringing together the various backgrounds and training of everyone in the room generally leads to a much richer perspective than would otherwise be possible. There is a lot of individual variability in tendency to speak up in this type of environment, but it is critical to an academic career to be comfortable doing so. You cannot succeed in this field without a willingness (and desire) to share your ideas in the face of criticism, and this is perhaps the best context to practice. If you are someone who has no qualms about dominating a debate, this is also a good place to practice restraint and listening.
  - Students (graduate and undergraduate) will take a turn leading a discussion of each week’s core assigned readings. Advanced preparation for this includes the Response Paper for that week’s readings.

- Paper presentations. **Research papers only – NO REVIEW PAPERS.**
Each week, one to three students will each present a research paper selected by the instructor as relevant to that week’s topic. Generally, just one student will read and present each research paper. The number of presentations per student will be inversely proportional to class size.

The focus of the Paper Presentations is on Research Papers – REVIEW PAPERS CANNOT BE CHOSEN FOR PRESENTATION. My goal is to have you become familiar with the jargon and conventions of research papers across the wide swath of cognitive science research most relevant to humans.

In general, for timing purposes, when you are "rehearsing along", structure and pace your presentation so it is no longer than 20 minutes.

NOTE, however, that your in-class presentations will be interrupted by the Instructor and by other class members.

In class the presentation should not exceed 25 min (which is about the length of time you would get to present your work at a generous conference!)

A useful strategy is to copy key figures and tables out of each article and supplement with (scant) text stating the major points. Focus on summarizing the research, as the authors present it (including motivation, background, methods, results, and conclusions), but also allow us to hear your voice as well – however, be sure we know when the author is speaking and when you are speaking.

Undergraduate presentations.

As this is a communication intensive course, I will be asking our undergraduates (if any) to also do presentations. These will be fewer in number than the graduate student assignments; however, I will encourage each undergraduate to prepare her/his presentation a week in advance, in time for it to be delivered in a practice session to me or to one of the senior graduate students. This extra meeting is intended as a “practice” session to get you comfortable with this type of presentation.

91 Grading Policy

- Examinations – none
- Group Discussion: 45%
  - For active participation in all discussions on all weeks in which the seminar is held. Exceptions due to professional travel or other activities need to be discussed with the instructor ahead of time.
- Presentations: 55%
  - Throughout the semester, an average of one or two students each week will be asked to present the findings of a published research paper, assigned by the instructor. The presentation should be in the range of 20-30min. The student should as-
sume the role of the paper’s author and present the case made by the author in her paper. Use of figures, tables, and headings from the paper is encouraged, as well as original visualizations created by the student, as appropriate. The student may also step out of their role as “surrogate author” for various “meta” comments on the material but should, generally, maintain and represent the case made by the original author in her paper.

92 Honors Policy

- My expectation is that all of the work you do for me in this class will be the work of one individual. Exceptions to this rule will be broadcast to the class by email.

- As you will all find out, I explicitly encourage you to engage in public (using email and other media to broadcast a message to the entire) or private (one-to-one) discourse regarding the readings and topics raised in this class. Study groups are encouraged.

- If any of you have any questions regarding current situations or future situations, remember that I am your first contact on this. Please come and see me.
90 REFERENCES


This document contains 55 references.