Term Information

Effective Term	Spring 2015

General Information

Course Bulletin Listing/Subject Area	Psychology
Fiscal Unit/Academic Org	Psychology - D0766
College/Academic Group	Arts and Sciences
Level/Career	Graduate
Course Number/Catalog	8890
Course Title	Topical seminar in Decision Psychology
Transcript Abbreviation	Seminar DecPsych
Course Description	This course will provide an in-depth analysis of a specialized research area in decision psychology. The course will cover theoretical distinctions and might cover their application to practical domains such as health, finances, and the environment. The course is repeatable when the topic changes.
Semester Credit Hours/Units	Variable: Min 2 Max 5

Offering Information

Length Of Course	14 Week, 7 Week, 4 Week (May Session), 12 Week (May + Summer)
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	Yes
Allow Multiple Enrollments in Term	Yes
Max Credit Hours/Units Allowed	30
Max Completions Allowed	10
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Permission of instructor
Exclusions	

Cross-Listings

Cross-Listings	

Subject/CIP Code

Subject/CIP Code	42.0101
Subsidy Level	Doctoral Course
Intended Rank	Masters, Doctoral

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Students will learn knowledge of the latest theory and questions being addressed in the study of decision psychology
- Students will learn how to evaluate such research
- Students will learn how to critique the research of others

Content Topic List

- Understanding current theory in decision making
- Evaluating others' research
- Critiquing others' research

Attachments

- Psych 8890.docx: syllabus

(Syllabus. Owner: Paulsen,Alisa Marie)

Comments

- This syllabus is a sample of one of the topics that will use this course number. *(by Paulsen,Alisa Marie on 03/14/2014 12:18 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Paulsen,Alisa Marie	04/03/2014 08:54 AM	Submitted for Approval
Approved	Vasey,Michael William	04/03/2014 09:11 AM	Unit Approval
Approved	Haddad,Deborah Moore	04/03/2014 10:49 AM	College Approval
Pending Approval	Vankeerbergen,Bernadette Chantal Nolen,Dawn Jenkins,Mary Ellen Bigler Hogle,Danielle Nicole Hanlin,Deborah Kay	04/03/2014 10:49 AM	ASCCAO Approval

The dynamics and neuroscience of psychological and economic decision making (Psychology 8890)

Spring, 2015

Syllabus

Class meetings: Wednesday 1:30-4:15pm
location

Instructors: Roger Ratcliff
Office: 291B Psychology
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Course Overview and Objectives

In this course we will discuss the process by which organisms make decisions. We will focus on drift-diffusion and other related models of how decisions are formed over time. There will be discussion of both animal and human decision making, in domains ranging from perception and memory, to foraging and economics. We will explore the commonalities and differences between these types of decisions, and extensively discuss cutting-edge research on ways to look at these processes directly in the brain, or with other less direct techniques such as eye-tracking. This course is thus intended to familiarize students with the very latest research on the process of decision making and to develop students' own skills at evaluating such research.

Grading Policies

All students will be assigned a grade for this course (e.g., A, A–, B+, B, …). Grades will be based on three components:

1. 50% of grade. Each student will be required to write two ~10-page papers. For the first paper, students should pick a topic that interests them and review the literature on how dynamic models have been used to better understand these decisions. For the second paper, students should pick a different topic and review the neuroscience evidence for how these decisions are made.
2. 30% of grade. Students are expected to be actively involved in the weekly meetings. To be involved, you must first be present. Attendance is mandatory. Absences that are not approved prior to their occurrence will negatively affect your final grade. Beyond attendance we expect students to actively participate in the discussions. Obviously, not every student will ask a question or make a comment on a weekly basis, but students should try to contribute whenever

they can. Failing to speak during any of the meetings in an entire semester will negatively affect your final grade.

3. 20% of grade. There will be a couple short homework assignments that will involve simulating some datasets and looking at different model fits. No programming experience is required. The goal of these exercises is just for the students to gain some hands-on experience with the data and models.

Grades for all components of the course will be converted to percentages and averaged using the weights given above. Your final grade will be computed using the OSU standard grading scheme summarized below.

E	D	D+	C–	C	C+	B–	B	B+	A–	A
<60%	≥60%	≥67%	≥70%	≥73%	≥77%	≥80%	≥83%	≥87%	≥90%	≥93%

Course outline

Week 1: Introduction to the course, history of reaction-time research, features of reaction-time data (distributions, hazard functions, speed-accuracy tradeoff), different reaction-time measures (response signal, go-nogo). Drift-diffusion model.
Ratcliff & McKoon (2008) The Diffusion Decision Model: Theory and Data for Two-Choice Decision Tasks. *Neural Computation* 20(4): 873-922

Week 2: Different reaction-time models. Comparison and identification of different models.
Ratcliff & Smith (2004) A comparison of sequential sampling models for two-choice reaction time. *Psychological Review* 111(2) 333
Donkin et al. (2011) Diffusion versus linear ballistic accumulation: different models but the same conclusions about psychological processes? *Psychonomic Bulletin Review* 18 61-69
Usher & McClelland (2001) The time course of perceptual choice: The leaky, competing accumulator model. *Psychological Review* 108(3) 550-592
Jones & Dhzafarov (2013) Unfalsifiability and mutual translatability of major modeling schemes for choice reaction time. *Psychological Review* 121(1) 1-32
Smith, Ratcliff & McKoon 2014 The diffusion model is not a deterministic growth model: Comment on Jones & Dhzafarov 2013. *Psychological Review* in press

Week 3: Applications in psychology.
Ratcliff & Smith (2014) Modeling simple decisions and applications using a diffusion model. *Oxford Handbook of Computational and Mathematical Psychology* New York, NY. Oxford University Press

Week 4: Aging, clinical applications, individual differences.
Ratcliff, Thapar & McKoon (2010) Individual differences, aging, and IQ in two-choice tasks. *Cognitive Psychology* 60 127-157
White, Ratcliff, Vasey & McKoon (2010) Using diffusion models to understand clinical disorders. *Journal of Mathematical Psychology* 54 39-52

Week 5: Diffusion models of animal behavior
Seeley et al. (2012) Stop signals provide cross inhibition in collective decision-making by honeybee swarms. *Science* 335 108-111

Week 6: Introduction to neuroscience methods and neural models of perceptual decision making
Ruff & Huettel (2013) Neuroeconomics: Decision Making & The Brain – Chapter 6
Bogacz (2007) Optimal decision-making theories: linking neurobiology with behavior. *Trends in Cognitive Sciences* 11(3) 118-125
Lo & Wang 2006 Cortico-basal ganglia circuit mechanism for a decision threshold in reaction time tasks. *Nature Neuroscience* 9 956-963
Beck et al. (2008) Probabilistic population codes for Bayesian decision making. *Neuron* 60(6) 1142-1152

Week 7: Electrophysiology of perceptual decision making.
Roitman & Shadlen (2002) Response of neurons in the lateral intraparietal area during a combined visual discrimination reaction time task. *The Journal of Neuroscience* 22(21) 9475-9489
Smith & Ratcliff (2004) Psychology and neurobiology of simple decisions. *Trends in Neuroscience* 27 161:168
Gold & Heekeren (2013) Neuroeconomics: Decision Making & The Brain – Chapter 19
Ratcliff et al. (2007) Dual diffusion model for single-cell recording data from the superior colliculus in a brightness-discrimination task. *Journal of Neurophysiology* 97 1756-1774
Hanes & Schall (1996) Neural control of voluntary movement initiation. *Science* 274 427-430

Week 8: Human neuroscience of perceptual decision making
Heekeren et al. (2006) Involvement of human left dorsolateral prefrontal cortex in perceptual decision making is independent of response modality. *Proceedings of the National Academy of Sciences* 103(26) 10023-10028
Ratcliff, Philiastides & Sajda (2009) Quality of evidence for perceptual decision making is indexed by trial-to-trial variability of the EEG. *Proceedings of the National Academy of Sciences* 106 6539-6544
Wenzlaff et al. (2011) Neural characterization of the speed-accuracy tradeoff in a perceptual decision-making task. *The Journal of Neuroscience* 31(4) 1254-1266

Week 9: Human neuroscience of memory
Wagner, Shannon, Kahn & Buckner (2005) Parietal lobe contributions to episodic memory retrieval. *Trends in Cognitive Sciences* 9(9) 445-453
Rugg & Curran (2007) Event-related potentials and recognition memory. *Trends in Cognitive Sciences* 11(6) 251-257
*Cabeza, Ciaramelli, Olson, & Moscovitch (2008) The parietal cortex and episodic memory. *Nature Reviews Neuroscience* 9 613-625

Week 10: Economic decision making and attention
Roe, Busemeyer, Townsend (2001) Multialternative decision field theory: A dynamic connectionist model of decision-making. *Psychological Review* 108 370-392
Krajbich et al. (2010) Visual fixations and the computation and comparison of value in simple choice. *Nature Neuroscience* 13(10) 1292-1298
Johnson & Busemeyer (2005) A dynamic, stochastic, computational model of preference reversal phenomena. *Psychological Review* 112(4) 841-861

Week 11: Electrophysiology of economic decision making
Hayden et al. (2011) Neuronal basis of sequential foraging decisions in a patchy environment. *Nature Neuroscience* 14(7) 933-939

Week 12: Human neuroscience of economic decision making
Hare et al. (2011) Transformation of stimulus value signals into motor commands during simple choice. *Proceedings of the National Academy of Sciences* 108(44) 18120-18125
Polania et al. (2014) Neural oscillations and synchronization differentially support evidence accumulation in perceptual and value-based decision making. *Neuron* in press

Week 13: Economic applications of dynamic models
Krajbich et al. (2014) Benefits of neuroeconomics modeling: New policy interventions and predictors of preference. *American Economic Review – Papers & Proceedings* in press
Clithero & Rangel (2014) Combining response times and choice data using a neuroeconomics model of the decision process improves out-of-sample predictions. *Working Paper*

Week 14: Single option, multi-option and confidence models.
Ratcliff & Van Dongen (2011) A diffusion model for one-choice reaction time tasks and the cognitive effects of sleep deprivation. *Proceedings of the National Academy of Sciences* 108 11285-11290
*Dragalin et al. (1998) Multihypothesis sequential probability ratio tests part II: Accurate asymptotic expansions for the expected sample size. *IEEE Transactions on Information Theory*
Ratcliff & Starns (2013) Modeling response times, choices, and confidence judgments in decision making: recognition memory and motion discrimination. *Psychological Review* 120 697-719
Pleskac & Busemeyer (2010) Two-stage dynamic signal detection: a theory of choice, decision time, and confidence. *Psychological Review* 117(3) 864-901
DeMartino et al. (2013) Confidence in value-based choice. *Nature Neuroscience* 16(1) 105-110
Krajbich & Rangel 2011 Multialternative drift-diffusion model predicts the relationship between visual fixations and choice in value-based decisions. *Proceedings of the National Academy of Sciences* 108(33) 13852-13857

Academic Misconduct

All students at the Ohio State University are bound by the Code of Student Conduct (see http://studentaffairs.osu.edu/pdfs/csc_12-31-07.pdf). Violations of the code in this class will be dealt with according to the procedures detailed in that code. Specifically, alleged cases of misconduct will be referred to the Committee on Academic Misconduct. It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/pdfs/csc_12-31-07.pdf.

For good, concise, plain-English advice on how to stay out of academic trouble, see Ten Suggestions for Preserving Academic Integrity at http://oaa.osu.edu/coamtensuggestions.html

Students with Disabilities

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/. To ensure fairness to all students, requests for special accommodations will not be granted in the absence of ODS certification.