DECISION MAKING: LINKING BEHAVIOR TO BRAIN

PSYC 050.02 Fall 2014	TuTh, 2:00-3:50 pm, X-hour W 4:15-5:05 pm Class Location: Moore 110
Office Hours: Th 1:00-2:00 pm Location: Moore 356	Alireza.Soltani@dartmouth.edu

COURSE DESCRIPTION AND OBJECTIVES

In our daily lives we are faced with many decisions: what to eat for lunch, whether to spend the next hour on Facebook or on homework, or what courses to take next quarter. Some of those decisions require gradual deliberation while others can be made quickly. Nevertheless, to make any decision we rely on external information and what outcomes we expect from those decisions. Decisions are easy to make if information is complete and the outcomes are certain. But how does the brain combine different sources of partial information to make decisions in the face of uncertain outcomes?
In this course we will examine decision making from both behavioral and neurobiological points of view. Specifically, we will learn about different methods used in psychology, economics, and neuroscience (e.g. operant conditioning, game theory, reinforcement learning, electrophysiology, neuroimaging) to study decision making at various levels, from cognitive processes to underpinning neural activity.

The overall objective of this course is to:
1) learn about different aspects of decision making and how they are linked to neural processes in the brain.
2) learn about different methods and tools used to study decision making
3) apply what you learn in the class to daily life and become more conscious/mindful about your decision making and what affects it.

Overall, I hope this course changes the way you think about the faculty you use to think!
Being able to communicate what you have learned is valuable regardless of what you want to do with your life. Many interactive aspects of this course should improve both your learning and your communication skills.

During the first week I will provide an overall background and introduction for the course. Afterward, each week on Tuesdays and Thursdays I will give a lecture (about 45 minutes) on a specific topic. After each lecture we discuss your "brief notes" and "discussion points" (see Course Requirements for more details) for about 30 minutes. After the discussion on Tuesdays, we go over the ambiguous points from the last week using your "minute papers". After the discussion on Thursdays, we connect what we have learned on that week to previous topics, using keywords and concept maps. Wednesdays (X-hours) are used for going over the "reflection notes" and for the conceptual exams (see Course Requirements for more details).

REQUIRED TEXTBOOK

Neuroeconomics: Decision Making and the Brain (2nd Edition)
Edited by: Paul W. Glimcher and Ernst Fehr
Published by Academic Press (2103), Print Book ISBN :9780124160088

OTHER READING MATERIAL

There will be other required assigned readings throughout the term that will complement (or sometimes replace) the material in the textbook. These reading assignments will be available on *Canvas* and are due the day of the class they are assigned to.

COURSE REQUIREMENTS

Prerequisites
PSYC 1 or PSYC 6.

Grading
A = 93-100, A- = 90-92.9, B+ = 87-89.9; B = 83-86.9, B- = 80-82.9, etc.

Note: Depending on students' performance and score distribution I may use a grading curve to determine the final grades.

Grade Breakdown
1) Attendance and participation (including in-class assignments) (15%)
2) Brief notes on the readings (18%)
3) Discussion points (9%)
4) Minute papers (9%)
5) Reflection notes (9%)
6) Conceptual exams (20%)
7) Final exam (20%)

1) Attendance and participation (including in-class assignments) (15%)
This is an interactive course with a lot of discussions. Not only do I expect you to attend all classes, but also I ask for lively participation from all students in the class. To better engage you, in some classes we will have short in-class assignments. I will allow you **two non-consecutive,** excused absences during the semester for sickness, family emergencies, job interviews, conferences, or just relaxing in the mountains. **Use your excused absence wisely**. Any additional absences will only be excused if you have a doctor's note stating you have a health crisis. **Keep the X-hour open as we use them during the term.**

2) Brief notes on the readings (18%)
Each week you will write a brief (maximum 1.5 page, 12 pt font, single spaced) note on the readings assignments of the week. This note should be your personal critical, take-home message from all the readings, including the background/context for a given study, the objective of the study, main findings, and a conclusion/perspective. Your goal should be to demonstrate that you have read and understood the assigned readings. **These notes cannot be the copy of the assigned papers' abstract, etc.** These notes should be submitted on *Canvas* by 10pm the night before the class. For each assignment you may get 1 (good quality note), 0.5 (mediocre quality note), or 0 (missing note). At the beginning of the term, I will give you detailed feedback on your notes so you can improve them.

3) Discussion points (9%)
One of the best way to learn is to ask good questions. For most classes, we will read a book chapter or a few papers. You are required to generate at least one discussion question/issue for each reading and submit it via *Canvas* by 10pm the night before the class. For each reading, you can focus on one issue that you found interesting or on caveats that could undermine the conclusions. You get the complete grade as long as you post a proper, unique question on the discussion board. So if you are late in posting and somebody else has already posted the question you came up with, you have to generate a new question/discussion point.

4) Minute papers (9%)
Each week you write a minute paper (at most half a page) in which you briefly describe: a) the most important thing you learned during the week; b) the muddiest point(s) of the topic you learned about; and c) the most important question remained unanswered for you about the topic. We will use this minute papers to clarify ambiguous points and reiterate important concepts. These notes should be submitted on *Canvas* by 10pm on Fridays. For each assignment you may get 1 (good quality note), 0.5 (mediocre quality note), or 0 (missing note).

5) Reflection notes (9%)
Each week you will reflect on what we have learned about decision making, and write a note (200-300 words) on how what you learned is relevant to your/others daily life. These notes should be posted on Discussion board on *Canvas* by midnight on Fridays. On some Wednesdays, I will choose reflection notes by a few students and we will discuss them in the class. All students are required to read notes by their peers before the class. For each assignment you may get 1 (good quality note), 0.5 (mediocre quality note), or 0 (missing note). Your grade depends on how creative and thoughtful your reflection note is, as well as on the quality of your writing.

6) Conceptual exams (20%)
To enhance your learning and assess your synthesis and creative thinking skills, we will have four conceptual exams during the term (see important dates). During these exams you will work in small groups to create a concept map of the relationship between concepts you have learned prior to the exam (you will have the keywords in advance). Immediately after each exam, we will discuss the concept map produced by each group. All individuals in a group will get the same grade, so you are encouraged to work in a team to achieve the goal, in this case, a clear concept map of what you have learned.

7) Final exam (20%)
The final exam will be a mix of short answer/essays about key ideas in decision making and concept maps that you create individually. It will cover material from lectures and readings during the entire term.

Final note about grade
If you are inclined to challenge a grade, know that your paper will be reassessed in its entirety and your revised grade can rise or fall compared to the original grade.

IMPORTANT DATES

Wednesdays October 1: Conceptual exam I
Wednesdays October 15: Conceptual exam II
Wednesdays October 29: Conceptual exam III
Wednesdays November 12: Conceptual exam IV
Friday November 21, 11:30 am: Final exam

CLASSROOM POLICIES

Honor Code
Students in PSYC 50 are expected to strictly adhere to the Dartmouth Academic Honor Principle. As described in the Student Handbook, fundamental to the principle of independent learning is the requirement of honesty and integrity in the performance of academic assignments, both in the

classroom and outside. Dartmouth operates on the principle of academic honor. Students who submit work that is not their own or who commit other acts of academic dishonesty will forfeit the opportunity to continue at Dartmouth. If you have questions or concerns regarding this policy during the course, please contact Professor Soltani.

Missed Exam or Assignment
A student will only be excused from the mid-term exam or an assignment by permission of the Instructor and on the basis of a written note from a dean, doctor, or supervisor of official college-sponsored events being held off-campus and requiring a students' absence. If excused, a make-up must be taken as soon as possible (usually within 1 day of the originally-scheduled exam/assignment date).

Late Assignments
All papers and presentations are due at the date and time specified. Late papers, without an official documented College excuse (health or family emergency), will not be accepted with the exception of the final paper. No extensions will be granted due to computer failure, roommate difficulties, printing problems, etc. Scores of late final papers will be reduced by 10% for every 24-hour period a paper is late. According to College policy, there are no excused absences from class for participation in College-sponsored extracurricular activities.

Technology, etc
(1) Laptops and ipads **may not** be used in class, unless otherwise instructed for specific in-class assignments. I prefer and encourage you to take notes by hand, especially during lecture segments. Studies show that students learn more from taking notes by hand than if they type them. If you must use your laptop for taking notes, see me.
(2) Please shut your cell phone, iPhone, blackberry, or whatever other ringing, vibrating, singing gadget you carry with you or in your bag.
(3) **Eating or drinking** is not allowed in the class.

Email Policy
Do not email me regarding any assignment within 48 hours of the time it is due. This is so that you will start working on your assignments in advance of the due date – no help if you start too late. I will **never** accept any work through email, unless otherwise advised.

Disabilities
Any student with a documented disability needing academic adjustments or accommodations is requested to speak with me **by the end of the second week of the term**. All discussions will remain confidential, although the Academic Skills Center may be consulted to verify the documentation of the disability.

Religious Observances
Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance which conflicts with your participation in the course, please meet with me **by the end of the second week of the term** to discuss appropriate accommodations.

Final note about syllabus
Course readings and schedule are subject to change

COURSE SCHEDULE

Note: To increase your enjoyment, go through the readings in the order appeared here.

WEEK 1:

Sep 16 (Tu): Introduction to the course and the brain
Readings: Chapter 5

Sep 17 (W): Introduction to decision making
Readings: Introduction Chapter

Sep 18 (Th): Methods from neuroscience
Readings: Chapter 6, 7

WEEK 2:

Sep 23 (Tu): Perceptual decision making I: connecting behavior to neural activity
Readings: Chapter 19; Newsome et al 1989, Shadlen & Newsome 1996

Sep 24 (W): Perceptual decision making II: neurophysiology
Readings: Glimcher 2003 (pages 133-151)

Sep 25 (Th): Perceptual decision making III: altering the decision processes
Readings: Salzman et al 1990; Philiastides et al 2011

WEEK 3:

Sep 30 (Tu): Value-based decision making I: matching behavior
Readings: Herrnstein 1961; Baum 1974; Mazur 1981; Staddon & Hinson 1983

Oct 1 (W): Conceptual exam I

Oct 2 (Th): Value-based decision making II: neural mechanisms
Readings: Chapter 20; Chapter 23 (pages 441-446); Soltani & Wang 2006; Sugrue et al 2004

WEEK 4:

Oct 7 (Tu): Dopamine and learning
Readings: Chapter 15; Montague et al 1996; Redish 2004

Oct 8 (W): Discussion on reflection notes

Oct 9 (Th): Common currency for reward value?
Readings: Levy & Glimcher 2012; Ruedebeck et al 2006; Rushworth et al 2011; Chapter 22

WEEK 5:

Oct 14 (Tu): Decision under risk and uncertainty I: economic approach
Readings: Chapter 1; Chapter 9; Kahneman & Tversky 1979; Trepel et al 2005

Oct 15 (W): Conceptual exam II

Oct 16 (Th): Decision under risk and uncertainty II: neuroscientific approach
Readings: Gonzalez & Wu 1999; Hsu et al 2009; Wu et al 2009

WEEK 6:

Oct 21 (Tu): Loss aversion and framing effect
Readings: Tom et al 2007; De Martino et al 2006

Oct 22 (W): Discussion on reflection notes

Oct 23 (Th): Intertemporal choice and delayed reward
Readings: Chapter 10; McClure et al 2004; Kable & Glimcher 2007; Kim et al 2008

WEEK 7:

Oct 28 (Tu): Game theory and social decision making
Readings: Chapter 26; Fehr & Gacher 2002; Lee 2008

Oct 29 (W): Conceptual exam III

Oct 30 (Th): Pharmacology of decision making
Readings: Chapters 14; Kosfeld et al 2005; Knoch et al 2006

WEEK 8:

Nov 4 (Tu): Context-dependent choice behavior
Readings: Chapter 24; Soltani et al 2012

Nov 5 (W): Discussion on reflection notes

Nov 6 (Th): Optimality and rational decision making
Readings: Mazur 1981; Staddon & Hinson 1983; Gigerenzer & Goldstein 1996

WEEK 9:

Nov 11 (Tu): Decision making and the question of free will
Readings: Koch 2012; Libet et al 1983; Hallet 2007; Baumeister 2008; Roskies 2006

Nov 12 (W): Conceptual exam IV

Nov 13 (Th): Conclusion and final discussion (no class on Nov 18)
Readings: