How We Learn

New York University
College of Arts & Science
FYSM-UA 728, Spring 2021
Credit hours: 4, Prerequisites: none
Friday, 9:30 AM - 12:00 PM
Location: TBD

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Office Hours: TBD

SEMINAR DESCRIPTION
How do humans and other animals learn, and how do we study this in the laboratory? What is the neurobiological basis of learning and memory? What are the genetic and environmental factors that have shaped the learning process throughout evolution? What other cognitive processes influence learning, and how can we apply this knowledge to our own studies? In trying to address these questions, this seminar gives an overview of modern neuroscience and psychology research on learning and memory, and illustrates how cognitive science can be used to develop strategies for effective learning, while also discussing implications for societal issues, disorders, and artificial intelligence.

SEMINAR FORMAT AND GOALS
The seminar will provide you with theoretical and methodological knowledge based on an interdisciplinary approach to learning, bridging evidence from neuroscience, cognitive psychology, and education. In addition, the seminar will help you develop three essential skills (the 3 C’s): critical thinking, communication, and collaboration. Our in-class experience will blend lectures, discussion, and collaborative work. Homework assignments will require you to read, analyze, and critique multimedia materials relevant to lecture topics. Throughout the seminar, you will learn how to engage with complex ideas while challenging your own assumptions, how to critically examine evidence, and how to learn from and collaborate with other students with diverse perspectives. Additionally, you will develop your ability to effectively communicate your ideas in writing and oral presentation. Finally, you will learn how to become better learners and how to develop metacognition skills that will aid you in the rest of your academic and professional careers.
LEARNING OBJECTIVES
Students who successfully complete this seminar will be able to:
1. Describe the general organization and function of the nervous system.
2. Give examples of major brain regions and the functions they control.
3. Relate the communication between individual nerve cells to the production of behavior.
4. Explain how major neuroscientific and psychology methods can be applied to the study of learning and memory in humans and other animal models.
5. Relate knowledge gained from cognitive science to brain disorders and other societal issues.
6. Analyze and think critically about multimedia content related to cognition.
7. Evaluate the scientific content in popular media and primary scientific articles.
8. Use the scientific method to propose hypotheses and experiments and to interpret results.
9. Apply cognitive science concepts to everyday life events.
10. Write and speak about these concepts precisely and concisely.
11. Build collaboration skills and use them to share novel ideas and perspectives in the context of problem-solving.

REQUIRED BOOK
Stanislas Dehaene, How We Learn: Why Brains Learn Better Than Any Machine... for Now

We’ll use Dehaene’s book as a blueprint to guide us on our exploration of the factors that influence “How We Learn”, but we will also draw on a variety of additional readings/multimedia material to gain diverse scientific and societal perspectives on learning. These additional materials will be assigned throughout the semester and posted on the NYU Classes site for this seminar.

ASSESSMENTS
Attendance and class participation 10%
4 in-class quizzes 20%
2 written personal reflections 10%
4 written media responses 40%
Group project 10%
Research paper based on group project 10%

100%

Attendance and class participation (10%): You are expected to attend and to be on time for each class. Absences and tardiness will result in loss of participation points. You are also expected to contribute to in-class discussions and to complete in-class assignments. Part of your participation grade will be based on your willingness to engage in discussion and to ask and answer questions in class.
In-class quizzes (20%): There will be a total of four announced, closed-book, in-class quizzes consisting of multiple choice, fill-in-the-blank, true/false, short answer and short essay questions. The material tested on quizzes will be derived from in-class lectures and discussions and from assigned readings.

Personal reflections (10%): You will be asked to write two ~500 words personal reflections. The first one, assigned at the beginning of the course, will ask you to reflect on your current learning practices and to identify factors that help you be an effective learner, as well as areas that need improvement. The second one, assigned at the end of the course, will ask you to reflect on how you can use the material learned in this seminar to become a better learner.

Media written responses (40%): Throughout the length of the seminar, you will be asked to read/listen to/view a variety of media (popular media articles, primary scientific literature, podcasts, TED talks, or videos) and to write ~500 word responses in which you discuss/analyze/critique the information presented in these forms of media through the lens of the knowledge and critical thinking you acquire in this seminar.

Group project and research paper (20%): At the end of the seminar, you and two of your classmates will present a group project on which you have worked throughout the second part of the seminar. In creating your group project, you and your teammates will play the roles of different professionals who use their diverse expertise and perspectives to attempt to solve a problem in the real world. You and your teammates will work in collaboration both in and outside the class to propose a problem and possible solutions, using knowledge acquired in this seminar. Grading of the group project (10%) will be based on your participation in collaborative work on the project throughout the second part of the seminar, on the oral presentation of the project, and on the quality of the project. Additionally, you will have to write an individual research paper of ~1000 words based on your contribution to the project.

TENTATIVE WEEKLY TOPICS AND ASSESSMENTS
* completion of readings from Dehaene’s book or from other book chapters provided by the professor will be required before class, as specified at the beginning of the semester; quizzes will be given at the beginning of class; written assessments will be assigned at the end of the class specified below and will be due at the beginning of the following class; guidelines for all assessments will be given at the beginning of the semester *
Week 1 - Introduction to cognitive science

Personal reflection 1

Week 2 - History of cognitive science / The scientific method
Discussion of personal reflections / Media response 1

Week 3 - How the brain works I: neural systems and functions

Week 4 - How the brain works II: neurons and neural communication

Week 5 - Nature vs. nurture in learning
Quiz 1 / Media response 2

Week 6 - What is learning?
Individual group project proposal

Week 7 - How does the brain learn? / Synaptic plasticity
Quiz 2 / Media response 3

Week 8 - Learning and emotion
Discussion of group project proposals with teammates

Week 9 - Learning and attention & motivation / Active learning
Quiz 3 / Group project brainstorming / Media response 4

Week 10 - Learning and regulatory mechanisms / Sleep

Week 11 - Learning and human communication / Abstract thought
Personal reflection 2 (groups I)

Week 12 - Learning and artificial intelligence
Quiz 4 / Personal reflection 2 (groups II)

Week 13 - Student group project presentations
Group project research paper (groups I)

Week 14 - Student group project presentations
Group project research paper (groups II)
Academic Integrity, Plagiarism, and Cheating: NYU expects its students to adhere to the highest possible standards of scholarship and academic conduct. Students should be aware that engaging in behaviors that violate the standards of academic integrity will be subject to the penalties set out in the NYU policy:
https://cas.nyu.edu/content/nyu-as/cas/academic-integrity.html

Academic integrity means that the work you submit is original. Obviously, bringing answers into an examination or copying all or part of a paper straight from a book, the Internet, or a fellow student is a violation of this principle. But there are other forms of cheating or plagiarizing which are just as serious — for example, presenting an oral report drawn without attribution from other sources (oral or written); writing a sentence or paragraph which, despite being in different words, expresses someone else’s idea(s) without a reference to the source of the idea(s); or submitting essentially the same paper in two different courses (unless both instructors have given their permission in advance). Receiving or giving help on a take-home paper, examination, or quiz is also cheating, unless expressly permitted by the instructor (as in collaborative projects).

Disability Disclosure Statement: Academic accommodations are available for students with disabilities. The Moses Center website is www.nyu.edu/csd. Please contact the Moses Center for Student Accessibility (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

Writing Center: http://www.nyu.edu/cas/ewp/html/writing_center.html

NYU Wellness Exchange: the access portal for university health resources, including mental health services: http://www.nyu.edu/students/health-and-wellness/wellness-exchange.html

Take care of yourself. Do your best to maintain a healthy lifestyle by eating well, exercising, avoiding drugs and alcohol, getting enough sleep, and taking time to relax. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often critical. If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, I strongly encourage you to seek support.