

COLUMBIA UNIVERSITY
PSYC 3495 Gene-Environment Interactions & Epigenetics
Spring 2023 Syllabus
Mon-Wed 1:10-2:25pm Location

Instructor: Elif Aysimi Duman, Ph.D.

E-mail: ead2145@columbia.edu

Office hour: Wed 2:25-3:25pm or by appointment

Teaching assistant: Anna Vannucci (anna.vannucci@columbia.edu); Office hour **TBA**

Course description and learning objectives: The aim of this course is to examine the biological bases of individual differences in behavior. We will start by examining how individual differences in behavior and health are shaped by gene-environment interactions. We will complement these studies with the endophenotype approach and discuss its role in our contemporary views of complex disorders. We will then introduce behavioral epigenetics studies that are suggested to mediate the effects of gene-environment interactions at different levels of analysis. We will continue by discussing how these topics shape and are shaped by developmental programming. We will end the semester by discussing the major debates around these topics as well as their implications in real life and public policies. By covering these topics, students are expected to gain a better understanding of how our behavior is i) formed and shaped by gene-environment interactions over time, ii) influenced by the underlying physiological and epigenetic mechanisms, and iii) changed by developmental processes. With this information, the students are expected to view individual differences in behavior in a perspective that is highly interdisciplinary and dynamic.

Prerequisites: PSYC 1001 Introduction to Psychology is required. An introductory knowledge in neuropsychology (e.g. Behavioral Neuroscience (PSYC 2450)/Cognitive Neuroscience (PSYC 2430)) and statistics is highly recommended.

Course readings: For every class we will have readings from books and scientific articles. The books will be available at Science & Engineering Library on reserve. Articles & book chapters will be posted on Courseworks. A summary of the lecture slides will be posted on Courseworks after class.

Recommended books:

- Kendler, K. S., Jaffee, S. R., & Romer, D. (2011). The dynamic genome and mental health: The role of genes and environments in youth development. New York: Oxford University Press.
- Lamb, M. J., Jablonka, E. (2014). Evolution in Four Dimensions: Genetic, epigenetic, behavioral, and symbolic variation in the history of life. United Kingdom: MIT Press.

Course format, policies and grading:

The course consists of 5 main topics that will build upon each other. For each topic, we will start with a lecture that covers the background, followed by a discussion of related articles and book chapters. For more focused group work, we will have 3 group discussion days and 3 group presentation days throughout the semester.

During discussion sessions, students will be presented with introductory questions related to the topic and will discuss these questions in groups of 4-5 for the first 30 min of class. The same questions will then be discussed with the whole class for the remainder of class time, together with additional questions from the students. Participation in these discussions together with in-class activities will be worth 30% of your final grade.

Group presentations (15%) will include working in groups of 4-5 to present an empirical research article on the related topic. Each student will contribute to one group presentation and each presentation will last 15 minutes (10-12 min ppt, 3-5 min Q&A). Further details will be posted on Courseworks. Briefly, students are expected to prepare a ~10-slide presentation of the article covering each section (Introduction, Method, Results, Discussion; ~2 slides each) and end with a section that connects the findings of the article with the lecture content.

In classes with assigned readings, students will submit reading responses as 2 questions/comments on Courseworks by noon. You are expected to submit these responses 5 times during the semester (out of approx. 15 times) that will be worth 15% of your grade (3% each).

As a final assignment, you will write a mini APA-style literature review (4-5 pages excluding references) on a course-related topic (40%). We will talk about your potential topics throughout the semester and discuss your proposals in class to receive feedback from me and your peers.

Participation, in-class activities, discussions	30%
Group presentation	15%
Reading responses	15%
Final mini literature review	40%

Attendance, academic integrity and support:

Attendance & participation: Students are expected to attend all classes and participate in discussions. In case you will not be able to attend, you should notify me asap to guide you on how to catch up with the class/assignments missed. For discussion questions, since they are time sensitive and you only need to submit them 5 times during the semester, there will not be late submissions. For other assignments, if you miss a class/assignment, you should send me an email detailing the reason why you could not submit, preferably with evidence (e.g. Doctor's note). If you are experiencing any difficulty that influences your attendance and/or performance in the course, please notify me asap to find a solution together.

Academic integrity: Please review Columbia's policy on academic integrity at www.college.columbia.edu/faculty/resourcesforinstructors/academicintegrity/statement. All students are expected to avoid plagiarism in all submitted work. All essay assignments will be checked for plagiarism. If you have questions about avoiding plagiarism, please contact me at the beginning of the semester. In case of plagiarism, you will receive 0 points for that assignment, and you will be reported to the Dean of Student Affairs. If you need assistance in writing, I highly recommend contacting the Writing Center (www.college.columbia.edu/core/uwp/writing-center). In case you experience any difficulties or time pressure, please contact me to find a solution rather than violating your academic integrity to prevent its serious consequences on your academic career.

Academic support: If you request any consideration regarding a disability, please inform me and Office for Disability Services (ODS) at the beginning of the semester and we would be happy to accommodate all the necessary arrangements. You can find how to register with ODS from <https://health.columbia.edu/content/disability-services> or 212-854-2388.

Curriculum fulfillment:

This seminar is designed for undergraduates majoring in Psychology or Neuroscience & Behavior, and for students participating in the Psychology Post-Baccalaureate Certificate program. It fulfills the following degree requirements:

- For the Psychology major or concentration in Columbia College and in the School of General Studies, and for the Psychology Post-Baccalaureate Certificate program, this course meets the Group 2 (Psychobiology & Neuroscience) distribution requirement.
- For the Neuroscience & Behavior joint major, it will fulfill the Psychology requirement for an advanced psychology seminar.
- For Psychology Post-Baccalaureate students and for Psychology majors, it will fulfill the seminar requirement.

PSYC 3495 GENE-ENVIRONMENT INTERACTIONS & EPIGENETICS		
Tentative Course Schedule*		
Week	Date	Content
1	Jan 18	Course introduction Gene-Environment Interactions
2	Jan 23 Jan 25	Gene-Environment Interactions Gene-Environment Interactions
3	Jan 30 Feb 1	Gene-Environment Interactions: Challenges Gene-Environment Interactions: Depression
4	Feb 6 Feb 8	Group Presentations #1 Endophenotype Approach: Definitions and Comparisons
5	Feb 13 Feb 15	Endophenotype Approach Endophenotype Approach: Imaging
6	Feb 20 Feb 22	Endophenotype Approach: Neuroendo. & Immune Group Presentations #2
7	Feb 27 Mar 1	Course Discussion #1: GxEs and Endophenotype Approach Behavioral Epigenetics
8	Mar 6 Mar 8	Behavioral Epigenetics Behavioral Epigenetics
9	Mar 13 Mar 15	Spring Recess Spring Recess
10	Mar 20 Mar 22	Behavioral Epigenetics Group Presentations #3
11	Mar 27 Mar 29	Course Discussion #2: Behavioral Epigenetics Review paper proposals & feedback
12	Apr 3 Apr 5	Developmental Programming: Lifespan Approaches Developmental Programming: Health Disparities
13	Apr 10 Apr 12	Developmental Programming: Prenatal Effects Developmental Programming: Intergenerational Effects
14	Apr 17 Apr 19	Looking ahead: Evolution Looking ahead: Prevention & Interventions
15	Apr 24 Apr 26	Looking ahead: Public Policy Implications Course Discussion #3: Developmental Prog. & Looking ahead
* Schedule is subject to change anytime during the semester.		