NATURE VS. NURTURE: GENETIC & ENVIRONMENTAL DETERMINANTS OF BEHAVIOR

Fall 2014 – PSYC 428-010

MWF 10:10-11:00a, Gore Hall 115

Instructor: Dr. Tania Roth

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Office Hours: Wolf Hall 131 – Tues 9-10a, Fri 4-5p, and by appointment

Course description:

This course will examine the contribution of biological and environmental determinants to individual differences in behavior and disease. Students will also be introduced to a new interdisciplinary field combining behavioral and developmental sciences, neuroscience, and psychiatry to study the roles of genes and the environment in a variety of complex behaviors in humans and animals, including attachment, memory, emotion, stress, and psychiatric disorder.

Course objectives will include:

- To understand that phenotypes (behavior and disease) are a product of both genetic and environmental influences.
- To understand the basic principles and methods used in a new interdisciplinary field (*epigenetics*) aimed at understanding gene-environment interplay in phenotypic outcome.
- To survey current clinical and basic research regarding genes, environmental influences, and their interaction on behavior and disease.

Course materials:

Primary textbook: M Rutter (2006). *Genes and Behavior: Nature-nurture interplay explained*. Oxford: Blackwell Publishing.

Additional readings are posted on the course website (Sakai). Assigned readings are mandatory and must be read prior to the class for which they are assigned.

Course format:

My lectures will cover background rationale for the course material, an introduction to specific topics, and the basic molecular biology and neuroscience necessary for understanding literature. Instructor and student led discussions of research articles will compliment lecture content.

If you miss a lecture, you are responsible for obtaining lecture notes from one of your classmates.

Assessment and grading:

Your course grade will be based on a total of 425 points.

4 exams, each worth 75 pts *Exam format: multiple choice, short answer, essay.*

1 writing assignment – 50 pts

1 presentation – 25 pts

Class participation – 50 pts

Note: Participation points from coming to class, speaking up in class, and evaluations (you will help evaluate your peers' presentations). You are expected to read and think about the assigned readings before each class. You are also expected to actively participate in class lecture and discussions. You cannot be an active participant if you are not here. Bottom line- come to class and bring the reading materials with you!

18 pts in-class assignments + 20 pts peer evaluations + 12 pts for regular class attendance and contribution = 50!

Grade scale

A	100-94%	425-398
A-	93-90%	397-381
B+	89-87%	380-368
B	86-84%	367-355
B-	83-80%	354-338
C+	79-77%	337-326
C	76-74%	325-313
C-	73-70%	312-296
D+	69-67%	295-283
D	66-64%	282-270
D-	63-60%	269-253
F	59-0%	252-

Presentation:

This project has been designed to give you some experience at giving oral presentations and critically reviewing scientific research. Student led seminars will consist of a group-led detailed description of a single published research article (chosen by the instructor) describing an experiment/study related to topics in this course. Additional guidelines are available on Sakai. You will be evaluated by your peers and instructor, and your grade will be based on presentation, clarity, and your understanding of the article. Your presentation is worth 25 pts.

After the first week of class, you will be assigned a date/group for your article presentation.

Writing assignments:

This assignment has been designed to give you some experience at scientific writing, in which you will summarize a block of information in a concise, organized manner. You will need to find 1 recent (published 2011 or after) empirical (where authors have conducted an actual study/series of experiments, not a literature review) article that is relevant to any of the ideas/research we have discussed, and must be relevant to the course (i.e. examining genetic, environmental, or

epigenetic influences on behavior and disease). It cannot be one listed on the syllabus/presented in class. You will write a 2 page summary of the article, in which you will summarize the article (question addressed, overview of methods, results and conclusion) and discuss how it relates to this course and understanding biological and environmental determinants to individual differences in behavior and disease. Additional guidelines are available on Sakai.

Your summary is worth 50 pts. *No late summaries accepted!*

Your article summary is due: **Nov 21** – Please hand in to instructor at beginning of class, with the article attached.

Statement for students with disabilities:

Any student who thinks he/she may need an accommodation based on a disability should contact me personally as soon as possible, as well as contact the Disability Support Service (DSS) office. The DSS office is located at 119 Alison Hall, Phone: 302-831-4643, www.udel.edu/DSS.

Statement on academic integrity:

"All students must be honest and forthright in their academic studies. To falsify the results of one's research, to steal the words or ideas of another, to cheat on an assignment, or to allow or assist another to commit these acts corrupts the educational process. Students are expected to do their own work and neither give nor receive unauthorized assistance. Any violation of this standard will be reported to the Office of Student Conduct."

Statement regarding cell phones

You are expected to silence your cell phone and stow it during class. Receiving/placing calls or texts during class is disruptive and discourteous to both the instructor and classmates. Using your cell phone during an exam will result in the immediate expulsion from the exam.

Date	Topic	Reading	Lecturer/leaders
Aug 27	Syllabus review		Dr. Roth
Aug 29	Story of David Reimer (Assignment 1)		Dr. Roth
Sept 1	Labor Day- No classes		
Sept 3	Overview of history of nature nurture debate		Dr. Roth
Sept 5	From genetics to epigenetics	Ch 1 & 2 (Rutter)	Dr. Roth
Sept 8	Study designs and genetic and environmental influences	Ch 3-5 (Rutter)	Dr. Roth
Sept 10	Study designs continued		Dr. Roth
Sept 12	Institutional rearing and structural CNS changes	Sakai Resource	Dr. Roth
Sept 15	Institutional rearing and brain/behavior changes	Sakai Resource	1. 2. 3.
Sept 17	Heritability of phenotypes (ERPs)	Sakai Resource	Dr. Roth
Sept 19	Brain responsivity in PTSD	Sakai Resource	1. 2. 3.
Sept 22	Cumulative life stress and executive function	Sakai Resource	Dr. Roth
Sept 24	**Test 1**		
Sept 26	What genes do and their responses	Ch 6 & 7 (Rutter)	Dr. Roth
Sept 29	What genes do cont'd		Dr. Roth
Oct 1	Gene response to traumatic experience	Sakai Resource	Dr. Roth
Oct 3	Gene responses in the brain to chronic stress	Sakai Resource	1. 2. 3.
Oct 6	Susceptibility genes in behavior	Ch 8 (Rutter)	Dr. Roth
Oct 8	Genotype and attachment behavior	Sakai Resource	1. 2. 3.
Oct 10	Genotype and learned behavior	Sakai Resource	Dr. Roth
Oct 13	Genotype and prosocial decision making	Sakai Resource	1. 2. 3.
Oct 15	**Test 2**		
Oct 17	Gene-environment interactions	Ch 9-11 (Rutter)	Dr. Roth
Oct 20	The classic Caspi studies (2002, 2003)	Sakai Resource	Dr. Roth
Oct 22	5HTT GxE (adolescent emotional problems)	Sakai Resource	1. 2. 3.
Oct 24	*Crf1* GxE (adult depression)	Sakai Resource	Dr. Roth
Oct 27	*Bdnf* GxE (attention problems)	Sakai Resource	1. 2. 3.
Oct 29	*COMT* GXE	Sakai Resource	Dr. Roth
Oct 31	Telomeres	Sakai Resource	Dr. Roth
Nov 3	Childhood adversity and cellular aging	Sakai Resource	1. 2. 3.

Nov 5	**Test 3**		
Nov 7	Epigenetics to understand GxE interactions		Dr. Roth
Nov 10	Epigenetics of maternal behavior	Sakai Resource	Dr. Roth
Nov 12	Ghosts in your genes (Assignment 2)	Sakai Resource	Dr. Roth
Nov 14	Writing assignment lab		Dr. Roth
Nov 17	Writing assignment lab		Dr. Roth
Nov 19	Transgenerational epigenetics (Assignment 3)	Sakai Resource	Dr. Roth
Nov 21	Diet and epigenome ***Writing assignment due***	Sakai Resource	1. 2. 3.
Nov 24	TSST and epigenetic marking of genome Benefits of exercise through epigenetics	Sakai Resource Sakai Resource	1. 2. 3. 1. 2. 3.
Nov 26	Thanksgiving Holiday- no classes		
Nov 28	Thanksgiving Holiday- no classes		
Dec 1	Epigenetics and GxE	Sakai Resource	1. 2. 3.
Dec 3	**Test 4**		