NATURE VS. NURTURE: GENETIC & ENVIRONMENTAL DETERMINANTS OF BEHAVIOR

Fall 2013 – PSYC 428-010 and 428-080 (Honors)

MWF 10:10-11:00a, Purnell Hall Room 331

Instructor: Dr. Tania Roth

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Office Hours: Wolf Hall 131 – M & F 4:00-5:00p 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. Honors students will be given supplementary reading assignments and will participate in additional bi-weekly discussions.

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:

For 428-010 and 428-080 students:

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.

For 428-080 students only, we will meet separately during the semester to discuss readings from:

Richard C. Francis (2012). *Epigenetics: how environment shapes our genes*. W.W. Norton & Company.

http://www.barnesandnoble.com/w/epigenetics-richard-c-francis/1110790390?ean=9780393342284

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 2010 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: **November 13** – 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		Dr. Roth
Sep 2	***No class* (Labor Day Holiday)**		
Sep 4	Overview of history of nature nurture debate		Dr. Roth
Sep 6	From genetics to epigenetics	Ch 1 & 2 (Rutter)	Dr. Roth
Sep 9	Study designs and genetic and environmental influences	Ch 3-5 (Rutter)	Dr. Roth
Sep 11	Study designs continued		Dr. Roth
Sep 13	Institutional rearing and behavioral outcomes	Sakai Resource	Kim Swezey Katie Grant Albert Lo
Sep 16	Institutional rearing and structural CNS changes	Sakai Resource	Dr. Roth
Sep 18	Heritability of phenotypes (ERPs)	Sakai Resource	Dr. Roth
Sep 20	Brain responsivity in PTSD	Sakai Resource	Damien Allen Casey Zuccarelli Alex Miller
Sep 23	Cumulative life stress and executive function	Sakai Resource	Dr. Roth
Sep 25	**Test 1**		
Sep 27	What genes do and their responses	Ch 6 & 7 (Rutter)	Dr. Roth
Sep 30	What genes do cont'd		Dr. Roth
Oct 2	Gene response to traumatic experience	Sakai Resource	Dr. Roth
Oct 4	Gene responses in the brain to chronic stress	Sakai Resource	Erin Balletta Sonia Surdykowski Kathleen Baxa
Oct 7	Susceptibility genes in behavior	Ch 8 (Rutter)	Dr. Roth
Oct 9	Genotype and attachment behavior	Sakai Resource	Shelby Borst Heather Sowards Andrew McLaughlin
Oct 11	Genotype and learned behavior	Sakai Resource	Dr. Roth
Oct 14	Genotype and prosocial decision making	Sakai Resource	Timothy Brandt Josh Sarnecky Grace McIntosh
Oct 16	**Test 2**		
Oct 18	Gene-environment interactions	Ch 9-11 (Rutter)	Dr. Roth
Oct 21	The classic Caspi studies (2002, 2003)	Sakai Resource	Dr. Roth
Oct 23	5HTT GxE (adolescent emotional problems)	Sakai Resource	Sam Brown Janae Robinson Rose McAllister
Oct 25	*Crf1* GxE (adult depression)	Sakai Resource	Dr. Roth
Oct 28	*Bdnf* GxE (attention problems)	Sakai Resource	Wesley Brown Harini Reddy Melissa Manos
Oct 30	*COMT* GXE	Sakai Resource	Dr. Roth
Nov 1	Telomeres	Sakai Resource	Dr. Roth
Nov 4	Childhood adversity and cellular aging	Sakai Resource	Christina Cardone Tiffany Reams Hoshi Laureano

Nov 6	**Test 3**		
Nov 8	Writing assignment work time	Sakai Resource	
Nov 11	Ghosts in your genes		Dr. Roth
Nov 13	Epigenetics to understand GxE interactions ***Writing assignment due***		Dr. Roth
Nov 15	Epigenetics of maternal behavior	Sakai Resource	Dr. Roth
Nov 18	Diet and epigenome	Sakai Resource	Allie Citro Bo Polite Sarah Graeff
Nov 20	Transgenerational epigenetics	Sakai Resource	Dr. Roth
Nov 22	TSST and epigenetic marking of genome	Sakai Resource	Connor Corsini Walter Pendleton Hannah Friel
Nov 25	Benefits of exercise through epigenetics	Sakai Resource	Kimmie Dahl Raemarie Mitchell Kelsey Doolittle
Nov 27	***No class (Thanksgiving Break)***		
Nov 29	***No class (Thanksgiving Break)***		
Dec 2	Epigenetics and GxE	Sakai Resource	Dr. Roth
Dec 4	**Test 4**		