

**HC 444H Neuroscience and Inequality/Stress**  
Winter 2013

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**Prerequisites:** Good critical thinking skills and willingness to engage in classroom discussion

**Grading option:** Optional for all students

**Credits:** 4

**Time:** 1600-1720 Tuesday & Thursday

**Location:** 42 Library (LIB)

**Overview:** This course will examine social inequality and its consequences, as well as research on interventions designed to ameliorate its negative outcomes, all from the perspective of neuroscience. We will begin with definitions of stress and will review the remarkably similar effects of stress in plants, non-human animals and humans. We will read and discuss sets of research articles each week. Topics include the basic data on the physiological, anatomical and epigenetic effects of stress and social inequality, consequences across the lifespan from early childhood to adulthood, the neuroscience of stress and social stress, cognitive outcomes of inequality, and the impact of early and later interventions. As detailed below, this course is organized as a discussion-based seminar; there are no exams or papers.

**Course readings:** Weekly readings will be primary research and review papers that will be posted on Blackboard one week prior to in-class discussions. There is no textbook for this course.

Optional, but highly recommended, supplemental readings:

*The Status Syndrome: How Social Standing Affects Our Health and Longevity*, by Michael Marmot

*The Spirit Level: Why Greater Equality Makes Societies Stronger*, by Kate Pickett and Richard Wilkinson

### **Weekly Topics**

- Week 1:** Introductions, overview of syllabus and expectations, formation of topic groups
- Week 2:** Inequality, stress and socioeconomic status: definitions and parallels of consequences of stress in plants, nonhuman animals and humans
- Week 3:** Stress and inequality in nonhuman animals
- Week 4:** Stress, anxiety, neural outcomes in humans  
**DUE:** E-mail instructor brief statement of planned outreach project
- Week 5:** Early life stress
- Week 6:** Parental nurturance
- Week 7:** Interventions
- Week 8:** Genes and gene-environment/intervention interactions
- Week 9:** Neuroscience of sociality, altruism, 'fairness', perceived injustice
- Week 10:** Outreach project presentations  
**DUE:** Final outreach project

### **Grades will be based on the following:**

Participation in in-class discussions: **20%**

Hosting of in-class discussion: **50%**

Advance reading and attendance of planning meeting

Generating slide show with discussion topics and questions

Leading and moderating in-class discussions

Final outreach project: **30%**

### **Instructions for discussion hosts:**

Because this class is organized as a discussion-based seminar, half of your grade for this course will be based on your participation in a group that will host the in-class discussion in one given week. In the time before and during this week, you will have several mandatory responsibilities:

**Planning meeting:** It is your responsibility to read the assigned papers no later than Wednesday of **the week before** your turn as host. During that week, there will be a meeting with the instructor to help you with any questions you might have about the readings and to help you plan the discussion. This meeting will take place on Wednesday at either 2, 3, or 4 PM in the instructor's office (335 LISB).

**Slide preparation:** After this meeting, your group should prepare slides to help guide the in-class discussion. You can review the findings of each paper briefly, but this is not intended to be a lecture. Most importantly, you should raise critical questions about each paper: e.g., examine its larger implications, discuss its relationship to previous and future topics, discuss its limitations where appropriate. Another possible in-class activity is to host a debate by posting a debate question, dividing the class into two teams, and moderating the debate after giving the teams time to prepare their arguments. For these preparations, a division of labor is appropriate and necessary; how this take shape will be up to your group.

**In-class discussion:** During each class your group hosts, you should act as leaders and moderators of the in-class discussion using the slides you prepare as a guide. Each member of the group should be prepared to take questions and foster discussion from the larger group.

## **Instructions for students not hosting discussion:**

### **Participation in class discussions:**

Regular attendance is expected, and I kindly request that you alert me in advance if you are aware that you will have to miss a class session. Attendance will be taken, and multiple unexcused absences will count against your participation grade.

You are expected to read each article prior to class. This is non-negotiable, as the success of the seminar format relies on informed and in-depth discussions of the readings. You earn participation points by actively and voluntarily participating in the discussion (though discussion hosts reserve the right to call on students randomly). You can also earn participation points by conducting further research on questions that arise in class and then reporting back to the class. Please make an effort to contribute substantive comments (or questions) in every class.

### **Instructions for final outreach project:**

Neuroscience often is perceived as (and often can be) an enterprise removed from the day-to-day experience of real people. The outreach project is designed to give you an opportunity to think creatively about the relationship between neuroscience and real-world issues and to share this information with non-scientists. You have considerable latitude on this project. Think broadly. Be creative. Follow your passion.

You are encouraged to work in small groups of 2-3 students in designing a project. However, if you prefer, you may also choose to complete this project independently.

1. Individually or in a small group, decide what you would like to do.
2. Turn in a one-paragraph project proposal. Tell me what you plan to do, who is working on the project, and what you will turn in. Note that in all cases, your project should culminate in something tangible that I can evaluate – e.g., a video, a website, a set of lesson plans, etc. This proposal is due at the end of class on Tuesday Jan. 29, and on that day you will be asked to briefly share your idea with the rest of the class.
3. Note that because you have latitude in creating your project, there is not a one-size-fits-all evaluation model. Therefore, you are asked to create an evaluation rubric for your project. What does grades A, B, and C level work look like?
4. Complete your project.
5. Turn in your final product, grading rubric, and any supplementary materials no later than Thursday, March 15, at the start of class. During the last week of class (March 13/15), each group/person will present to the class a ~10 minute summary of the outreach project.

If you are having trouble getting started, here are a few sample ideas to get you started:

- Prepare and deliver a class unit on the brain to any K-12 grade classroom
- Design an informational website on the neurobiology of stress for a college health center

- Examine the evidence base for a “brain-based product” (e.g., Baby Einstein, Brain Gym) and prepare a pamphlet or video news segment describing the product and the results of your search
- Prepare an “activities manual” for cognitive neuroscience/neuroscience classes with interactive learning activities to supplement different class units (e.g., debate topics and materials, video suggestions/clips and discussion questions, popular press articles linked with research articles, etc).
- Create a week-long Brain Awareness Week curriculum for any K-12 grade class
- Make podcasts, webpages, etc. about how to evaluate evidence for claims made by researchers about “hot button” issues (e.g., vaccines and autism, effective educational curricula, the economics of investing in early education, the efficacy of different rehabilitation routines, etc.)

Some potentially useful websites:

Neuroscience for Kids: <http://faculty.washington.edu/chudler/neurok.html>

Great hands-on activities for teaching neuroscience to kids.

Nat'l Sci. Council on Developing Child: <http://www.developingchild.net/>

Excellent policy briefs on topics relevant to child development.

Society for Neuroscience: <http://www.sfn.org/index.cfm?pagename=publications>

*Brain Briefings* summarize key neuroscience findings for a lay audience

