Psychology 607: Translational Neuroscience Seminar
Fall 2014, LISB 217, Tuesdays, 10:00-11:50am

Instructor Information

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Course overview

Translational neuroscience is an emerging field at the interface between intervention science and neuroscience. The approach embraced by the field is to leverage knowledge and methods from neuroscience, particularly human neuroimaging, to develop and refine efficacious interventions that improve mental and physical health and/or prevent the onset and progression of a range of pathologies. This course will provide a survey of recent and foundational studies in translational neuroscience and common methods in the field, as well as an opportunity for critical analysis of the approach. By the end of the quarter, we hope that you will be an informed consumer of this research and have the skills to design a translational neuroscience study on your own. This will be accomplished through a combination of readings, stimulating in-class discussions, and critical and grant writing.

This course has several goals:

1. To survey key findings and methods in the emerging field of translational neuroscience.
2. To help you become a better consumer of translational neuroscience research.
3. To develop your critical thinking by reading empirical papers and writing a grant proposal.

Required texts

- All papers will be distributed on the course webpage at: **http://blackboard.uoregon.edu**
- There is no textbook

Course organization and requirements

Class meetings and trial structure

The weekly meetings will consist of a combination of light lecturing and heavy discussion of the material for the week. Part of your participation grade will be based on the quality and amount of your involvement in these discussions. (The other part consists of your amicus briefs, which are described in the section below.) Each week we will discuss 4-6 articles organized around a sub-topic within translational neuroscience. Two or three articles will be *background* pieces, and one or two will be *target* articles for discussion. Following an initial discussion of the background articles, the target articles will be put **on trial**. One student will act as the prosecutor and one as the defense of each article. Each will have up to 5 minutes to present his or her case, followed by a 1-minute rebuttal to the opponent. After the initial arguments, the floor opens for jury deliberations. The jury is to decide whether the article makes a substantial contribution to science, beyond a shadow of a doubt.

Amicus briefs to the court

Each week that you are not on the prosecution or defense, you must submit a brief to the judges via Blackboard that is a one-paragraph summary (no more than one double-spaced page) of the pertinent issues in one or both of the target articles. These briefs may also reference and draw upon the background articles. To enable a thorough review, your briefs are due at 5pm the day before the trial.

Grant proposal

Being able to develop an innovative study design and communicate that design in a clear and concise way is a critical skill in your development as an academic. To help you develop that skill, and to solidify your understanding of the translational neuroscience approach and relevant background data, your requirement for the final paper is to compose an NIH-style grant proposal on a topic of your choice that adopts a translational neuroscience approach. Think about your own research and how it might lend itself to neurally-informed intervention, and generate a novel research idea. The paper should be *10 pages* (double-spaced, Times New Roman 12-pt font, not counting figures, tables, and references), and must contain all of the following sections:

Specific Aims (2 pages max). This section should provide the motivation for your research question. What is known, what are the gaps in knowledge, why are these gaps important to close, and how will your project close them? This section should end with 2-3 Specific Aims that are the concrete objectives of your proposed project. It is best if the Aims are not mutually dependent.

Significance. This section is about why your proposed research is important or valuable. Suppose you perfectly achieve all of your Specific Aims; what is the expected return to public health for NIH's investment in your research? What specifically knowledge will be obtained, how might that knowledge be valuable immediately or in the future, and how will it improve quality of life?

Innovation. What is new about your research in terms of your theory and/or methods? Is there something special about your design or about the theories you're testing? What does this add to what is already out there? How does your research push the field to boldly go where it hasn't gone before?

Approach. This is where you detail what you're going to do. This should include everything that a "Methods" section from a paper has, a backup plan if something fails, and a timeline of the project.

We will give you more details about the particulars of the paper later in the quarter. For now, suffice to say that the paper is due **Tuesday, December 9th at 5pm** with no exceptions.

Grading

Grant Proposal: 40% Prosecution: 20% Defense: 20% Briefs & Participation: 20%

Due dates for each assignment are listed in the schedule below. All assignments are due at the beginning of class. Late assignments will not be accepted.

Policies

Cheating/plagiarism. Don't do it! You're missing the point of graduate school if you do. Enough said – but if you have *any* questions about this please come talk to us.

Students with special needs. The UO works to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in disability-related barriers to your participation, please notify us as soon as possible. You may also wish to contact Disability Services in 164 Oregon Hall at 346-1155 or disabsrv@uoregon.edu.

Course Schedule and Readings

Week 1 (Sept 30): Background and overview of human neuroimaging methods

What is translational neuroscience?

Wiggins, J. L., & Monk, C. S. (2013). A translational neuroscience framework for the development of socioemotional functioning in health and psychopathology. *Development and Psychopathology*, *25*(4pt2), 1293–1309. doi:10.1017/S095457941300062X

Neuroscience background

Berkman, E. T., Cunningham, W. A., & Lieberman, M. D. (2012). Research Methods in Social and Affective Neuroscience. In H. T. Reis & C. M. Judd (Eds.), *Handbook of Research Methods in Personality and Social Psychology* (2nd ed.), pp. 1–96. New York, NY: Cambridge Univ Press.

Cunningham, W. A. (2010). In defense of brain mapping in social and affective neuroscience. *Social Cognition*, *28*(6), 717–722.

Poldrack, R. A. (in press). Is "efficiency" a useful concept in cognitive neuroscience? *Developmental Cognitive Neuroscience*. doi:10.1016/j.dcn.2014.06.001

Week 2 (Oct 7): Overview of intervention science and stress neurobiology [Guest]

Bruce, J., Gunnar, M. R., Pears, K. C., & Fisher, P. A. (2013). Early adverse care, stress neurobiology, and prevention science: Lessons learned. *Prevention Science*, *14*(3), 247–256. doi:10.1007/s11121-012-0354-6

Fisher, P. A., Bruce, J., Abdullaev, Y., Mannering, A. M., & Pears, K. C. (2011). The effects of early adversity on the development of inhibitory control. In M. T. Bardo, D. H. Fishbein, & R. Milich, *Inhibitory Control and Drug Abuse Prevention* (pp. 229–247). New York, NY: Springer New York. doi:10.1007/978-1-4419-1268-8

Kendall-Taylor, N., Erard, M., Davey, L., & Simon, A. (2010). *Air traffic control for your brain*. FrameWorks.

Korte, S. M., Koolhaas, J. M., Wingfield, J. C., & McEwen, B. S. (2005). The Darwinian concept of stress: Benefits of allostasis and costs of allostatic load and the trade-offs in health and disease. *Neuroscience and Biobehavioral Reviews*, *29*(1), 3–38. doi:10.1016/j.neubiorev.2004.08.009

Shonkoff, J. P., & Fisher, P. A. (2013). Rethinking evidence-based practice and two-generation programs to create the future of early childhood policy. *Development and Psychopathology*, *25*(4pt2), 1635–1653. doi:10.1017/S0954579413000813

Week 3 (Oct 14): Early adversity and genetic polymorphisms as risk factors

Karg, K., Burmeister, M., Shedden, K., & Sen, S. (2011). The serotonin transporter promoter variant (5-HTTLPR), stress, and depression: Meta-analysis revisited. *Archives of General Psychiatry*, *68*(5), 444–454. doi:10.1001/archgenpsychiatry.2010.189

Pollak, S. D. (2008). Mechanisms linking early experience and the emergence of emotions: Illustrations from the study of maltreated children. *Current Directions in Psychological Science*, *17*(6), 370–375. doi:10.1111/j.1467-8721.2008.00608.x

Raposa, E. B., Hammen, C. L., Brennan, P. A., O'Callaghan, F., & Najman, J. M. (2014). Early adversity and health outcomes in young adulthood: The role of ongoing stress. *Health Psychology*, *33*(5), 410–418. doi:10.1037/a0032752

Shonkoff, J. P., Boyce, W. T., & McEwen, B. S. (2009). Neuroscience, molecular biology, and the childhood roots of health disparities: Building a new framework for health promotion and disease prevention. *JAMA*, *301*(21), 2252–2259. doi:10.1001/jama.2009.754

Taylor, S. E. (2010). Mechanisms linking early life stress to adult health outcomes. *Proceedings of the National Academy of Sciences*, *107*(19), 8507–8512. doi:10.1073/pnas.1003890107

Week 4 (Oct 21): Adolescent risk-taking and related contextual factors

Background
2-3 papers

Target
2 papers

Week 5 (Oct 28): Autism

Background
2-3 papers

Target
2 papers

Week 6 (Nov 4): Anxiety

Background
2-3 papers

Target
2 papers

Week 7 (Nov 11): Depression

Background
2-3 papers

Target
2 papers

Week 8 (Nov 18): Substance use (alcohol, nicotine, and illicit drugs)

Background

Brewer, J. A., Worhunsky, P. D., Carroll, K. M., Rounsaville, B. J., & Potenza, M. N. (2008). Pretreatment brain activation during Stroop task is associated with outcomes in cocaine-dependent patients. *Biological Psychiatry*, *64*(11), 998–1004. doi:10.1016/j.biopsych.2008.05.024

Galván, A., Poldrack, R. A., Baker, C. M., Mcglennen, K. M., & London, E. D. (2011). Neural correlates of response inhibition and cigarette smoking in late adolescence. *Neuropsychopharmacology*, *36*(5), 970–978. doi:10.1038/npp.2010.235

Kober, H., Mende-Siedlecki, P., Kross, E. F., Weber, J., Mischel, W., Hart, C. L., & Ochsner, K. N. (2010). Prefrontal–striatal pathway underlies cognitive regulation of craving. *Proceedings of the National Academy of Sciences of the United States of America*, *107*(33), 14811–14816. doi:10.1073/pnas.1007779107

Target

Wetherill, R. R., Squeglia, L. M., Yang, T. T., & Tapert, S. F. (2013). A longitudinal examination of adolescent response inhibition: Neural differences before and after the initiation of heavy drinking. *Psychopharmacology*, *230*(4), 663–671. doi:10.1007/s00213-013-3198-2

Volkow, N. D., Wang, G.-J., Telang, F., Fowler, J. S., Alexoff, D., Logan, J., et al. (2014). Decreased dopamine brain reactivity in marijuana abusers is associated with negative emotionality and addiction severity. *Proceedings of the National Academy of Sciences*, *111*(30), E3149–E3156. doi:10.1073/pnas.1411228111

Week 9 (Nov 25): Eating and obesity

Background

Epel, E., Lapidus, R., McEwen, B., & Brownell, K. (2001). Stress may add bite to appetite in women: a laboratory study of stress-induced cortisol and eating behavior. *Psychoneuroendocrinology*, *26*(1), 37–49.

Gearhardt, A. N., Yokum, S., Orr, P. T., Stice, E., Corbin, W. R., & Brownell, K. D. (2011). Neural Correlates of Food Addiction. *Archives of General Psychiatry*. doi:10.1001/archgenpsychiatry.2011.32

Volkow, N. D., Wang, G.-J., Fowler, J. S., & Telang, F. (2008). Overlapping neuronal circuits in addiction and obesity: Evidence of systems pathology. *Philosophical Transactions of the Royal Society of London Series B, Biological Sciences*, *363*(1507), 3191–3200. doi:10.1098/rstb.2008.0107

Target

Demos, K. E., Heatherton, T. F., & Kelley, W. M. (2012). Individual Differences in Nucleus Accumbens Activity to Food and Sexual Images Predict Weight Gain and Sexual Behavior. *The Journal of Neuroscience*, *32*(16), 5549–5552. doi:10.1523/JNEUROSCI.5958-11.2012

Stice, E., Yokum, S., & Burger, K. S. (2013). Elevated Reward Region Responsivity Predicts Future Substance Use Onset But Not Overweight/Obesity Onset. *Biological Psychiatry*. doi:10.1016/j.biopsych.2012.11.019

Week 10 (Dec 2): Brain-based interventions

Background

Berkman, E. T., Graham, A. M., & Fisher, P. A. (2012). Training self-control: A domain-general translational neuroscience approach. *Child Development Perspectives*, *6*(4), 374–384. doi:10.1111/j.1750-8606.2012.00248.x

Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science*, *333*(6045), 959–964. doi:10.1126/science.1204529

Fisher, P. A., Stoolmiller, M., Gunnar, M. R., & Burraston, B. O. (2007). Effects of a therapeutic intervention for foster preschoolers on diurnal cortisol activity. *Psychoneuroendocrinology*, *32*(8-10), 892–905. doi:10.1016/j.psyneuen.2007.06.008

Target

Brown, K. W., Weinstein, N., & Creswell, J. D. (2012). Trait mindfulness modulates neuroendocrine and affective responses to social evaluative threat. *Psychoneuroendocrinology*, *37*(12), 2037–2041. doi:10.1016/j.psyneuen.2012.04.003

Miller, G. E., Brody, G. H., Yu, T., & Chen, E. (2014). A family-oriented psychosocial intervention reduces inflammation in low-SES African American youth. *Proceedings of the National Academy of Sciences*, *111*(31), 11287–11292. doi:10.1073/pnas.1406578111

Finals Week (Tues, Dec 9): FINAL PAPER DUE VIA EMAIL AT 5PM