

PSY 48S - Selected Topics in Neuroscience

'Dissecting Motivation: Translational Approaches and Clinical Implications'

Course Information

Term/Time: Summer 2015/T-W-TH 15:00-16:50

Location: T: M1170

W: NBZ 13

TH: YD 106

Instructor: Billur Avlar

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Office hours: Thursdays at 13:00 & by appointment.

Psychology Department Room 110

Course Description

This course aims to create a better understanding for how motivational processes guide our behavior by focusing on different levels of research. We will start with philosophical definitions for motivation and progress through the implications on clinical disorders that involve a core motivational deficit. We will concentrate on three disorders, Schizophrenia, Major Depressive Disorder and Parkinson's disease. In discussion of the motivational deficits observed in these disorders, brain mechanisms and neurochemistry of the disorders in connection to the cognitive and motivational disturbances will be delineated. A significant aspect of this class is to incorporate the animal models of clinical disorders to understand the mechanism of the dysfunction. Finally, at the end of this class we will have covered topics ranging from reinforcement learning, memory and decision making from neuroscience, clinical, cognitive and social psychology perspectives.

Schedule

Class/Date Tentative list of readings			
Week One: What is Motivation? - Theories			
1	TH 18/6	Course Introduction (no readings)	
2	T 23/6	Concept of pleasure in early Greek philosophy: principle of Hedonics and Eudaimonics Self-regulatory processes: social psychology perspective -Wolfsdorf, D. (2013). Pleasure in ancient Greek philosophy. Introduction Chapter. -Besser-Jones, L. (2014). Eudaimonic ethics: the philosophy and psychology of living well. Chapter 2. -Higgins, T. (1997). Beyond Pleasure and Pain. <i>American Psychologist</i>, 52(12):1280-1300. -Higgins, T. (2006). Value From Hedonic Experience and Engagement. <i>Psychological Review</i>, 113(3): 439-460.	
3	W 24/6	Behavioral and quantitative explanations- motivation as an intervening variable Reactions from Neuroscience -Leknes S. & Tracey I. (2009). Pain and pleasure: masters of mankind. In <i>Pleasures of the Brain</i>. Chapter 19. -Petrovic, P. (2009). Placebo analgesia and pain. In <i>Pleasures of the Brain</i>. Chapter 17. -Smith K. S., Mahler S. V., Pecina, S. & Berridge, K. C. (2009). Hedonic hotspots: generating sensory pleasure in the brain. In <i>Pleasures of the Brain</i>. Chapter 1.	
	TH 25/7	No class-Commencement Day	
Week Two: Motivation and Cognition			
4	T 30/6	Executive function -Smith, E. E. & Jonides, J. (1999). Storage and Executive Processes in the Frontal Lobes. <i>Science</i> (283): 1657-1661	

		-Pochon, J., Levy, R., Fossati, P. Lehericy, S. Poline, J. Pillon, B. Le Bihan, D. Dubois, B. (2002). The neural system that bridges reward and cognition in humans: An fMRI study. <i>PNAS</i>, 99(8): 5669-5674. -Pessoa, L. (2009). How do emotion and motivation direct executive control? <i>Trends in Cognitive Sciences</i>, 13(4):160-166 -McNab F, Varrone A, Farde L, Jucaite A, Bystritsky P, Forssberg H, Klingberg T (2009) Changes in cortical dopamine D1 receptor binding associated with cognitive training. <i>Science</i> 323:800-802.	
5	W 1/7	Declarative memory -Gabrieli, J.D. E. (1998). Cognitive Neuroscience of Human Memory <i>Annu. Rev. Psychol.</i> 49:87-115. (READ ONLY DECLARATIVE MEMORY SECTION) -Wimmer, G. E. & Shohamy, D. (2012). Preference by Association: How Memory Mechanisms in the Hippocampus Bias Decisions. <i>Science</i>, 338:270-273. -Murty, V., Adcock, A. (2013). Enriched Encoding: Reward Motivation Organizes Cortical Networks for Hippocampal Detection of Unexpected Events. <i>Cerebral Cortex</i>, 24(8): 2160-216. -Adcock, A., Thangavel, A. Whitfield-Gabrieli, S., Knutson, B. Gabrieli, J. (2006). Reward-Motivated Learning: Mesolimbic Activation Precedes Memory Formation. <i>Neuron</i>, 50(3): 507-517.	
6	TH 2/7	Reinforcement Learning -Pessiglione M., Seymour, M., Flandin, G., Dolan R.J. & Frith C.(2006). Dopamine-dependent prediction errors underpin reward-seeking behavior in humans. <i>Nature Letters</i>, 442:1042-1045. -Schultz, W. (2000). Multiple reward signals in the brain. <i>Nature Reviews Neuroscience</i>, 1(3), 199-207. -O'Doherty, J. P. (2004). Reward representations and reward-related learning in the human brain: insights from neuroimaging. <i>Current Opinion in Neurobiology</i>, 14(6), 769-776.	
Week Three: Clinical Disorders of Motivation-Schizophrenia			
7	T 7/7	Schizophrenia -Saks. E. (2007). Chapter 4 in <i>The center cannot hold: My Journey through Madness</i>. Hyperion, New York. -Barch DM, Dowd EC (2010) Goal representations and motivational drive in schizophrenia: the role of prefrontal-striatal interactions. <i>Schizophrenia bulletin</i>	

		36:919-934. -Carroll CA, Boggs J, O'Donnell BF, Shekhar A, Hetrick WP (2008). Temporal processing dysfunction in schizophrenia. <i>Brain and cognition</i> 67:150-161.	
8	W 8/7	Motivational deficits in reward-based learning in schizophrenia, anhedonia and avolition in Schizophrenia - Murray, G. K., et al. (2008). Substantia nigra/ventral tegmental reward prediction error disruption in psychosis. <i>Molecular Psychiatry</i>, 13, 267-276. -Gold, J. M., Waltz, J. A., Prentice, K. J., Morris, S. E., & Heerey, E. A. (2008). Reward processing in schizophrenia: A deficit in the representation of value. <i>Schizophrenia Bulletin</i>, 34, 835–847. -Heerey EA, Gold JM (2007). Patients with schizophrenia demonstrate dissociation between affective experience and motivated behavior. <i>Journal of abnormal psychology</i> 116:268-278. Trémeau, F., Antonius, D., Cacioppo J. T., Ziwich R., Butler, P., Malaspina, D. Javitt, D.C. (2009). Anticipated, on-line and remembered positive experience in schizophrenia. <i>Schizophrenia Research</i>, 122: 199-205	
9	TH 9/7	An animal model of schizophrenia -Drew MR, Simpson EH, Kellendonk C, Herzberg WG, Lipatova O, Fairhurst S, Kandel ER, Malapani C, Balsam PD (2007). Transient overexpression of striatal D2 receptors impairs operant motivation and interval timing. <i>J Neurosci</i> 27:7731-7739. -Simpson EH, Kellendonk C, Ward RD, Richards V, Lipatova O, Fairhurst S, Kandel ER, Balsam PD (2011). Pharmacologic Rescue of Motivational Deficit in an Animal Model of the Negative Symptoms of Schizophrenia. <i>Biological Psychiatry</i>	
Week Four: Clinical Disorders of Motivation-Major Depressive Disorder			
10	T 14/7	Major Depressive Disorder (MDD) & an animal model of behavioral despair -Drevets, W. C (2000). Neuroimaging studies of Mood Disorders. <i>Biological Psychiatry</i>, 48:813–829 - Joseph L. Price and Wayne C. Drevets (2012). Neural circuits underlying the pathophysiology of mood disorders. <i>Trends in Cognitive Sciences</i>, 16(1): 61-71 - Melissa R. Warden, Aslihan Selimbeyoglu, Julie J. Mirzabekov, Maisie Lo, Kimberly R. Thompson, Sung-Yon Kim, Avishek Adhikari, Kay M. Tye, Loren M. Frank & Karl Deisseroth (2012). A prefrontal cortex–brainstem neuronal projection that controls response to behavioral challenge. <i>Nature Letters</i>, 492(20): 428-432.	

11	W 15/7	Motivational deficits in reward-based learning in MDD -Pizzagalli, D. A., Holmes, A. J., Dillon, D. G., Goetz, E. L., Birk, J. L., Bogdan, R., et al. (2009). Reduced caudate and nucleus accumbens response to rewards in unmedicated individuals with major depressive disorder. <i>American Journal of Psychiatry</i>, 166, 702-710. -Pizzagalli, D., Jahn A, O'Shea, J. (2005). Toward an Objective Characterization of an Anhedonic Phenotype: A Signal-Detection Approach. <i>Biological Psychiatry</i>, 57:319-327 -Treadway , M. T., Bossaller, N. A. Shelton, R. C. & Zald, D. H. (2012). Effort-Based Decision-Making in Major Depressive Disorder: A Translational Model of Motivational Anhedonia. <i>Journal of Abnormal Psychology</i>, 121(3): 553–558. -Lindsey Sherdell, Christian E. Waugh & Ian H. Gotlib (2012). Anticipatory Pleasure Predicts Motivation for Reward in Major Depression. <i>Journal of Abnormal Psychology</i>, 121(1): 51-60.	
12	TH 16/7	No class/ Academic Holiday	
Week Five: Clinical Disorders of Motivation-Parkinson's Disease			
13	T 21/7	Parkinson's Disease - Rodriguez-Oroz , M. C., Jahanshahi, M., Krack, P., Litvan, I., Macias, R., Bezard, E. Obeso, J. A. (2009). Initial clinical manifestations of Parkinson's disease: features and pathophysiological mechanisms. <i>Lancet Neurol</i> ; 8: 1128–39 - Cools, R. (2006). Dopaminergic modulation of cognitive function-implications for L-DOPA treatment in Parkinson's disease, <i>Neuroscience and Biobehavioral Reviews</i> 30: 1–23	
14	W 22/7	Motivational deficits in reward-based learning in Parkinson's Disease - Omer Porat, Sharon Hassin-Baer , Oren S. Cohen, Andrey Markus and Rachel Tomer (2013). Asymmetric dopamine loss differentially affects effort to maximize gain or minimize loss. <i>Cortex</i>, 51:82-91. - Frank, M.J., Seeberger, L. O'reilly, R. (2004). By carrot or by stick: cognitive reinforcement learning in Parkinsonism. <i>Science</i>. 306 (5703): 1940-1943 - Schmidt, L., d'Arc, B., Lafargue G, Galanaud D, Czernecki V, Grabli D, Schüpbach M, Hartmann A, Lévy R, Dubois B, Pessiglione M. (2008). Disconnecting force from money: effects of basal ganglia damage on incentive motivation. <i>Brain</i>, 131(Pt5): 1303-1310	

		-Liane Schmidt, Erin Kendall Braun, Tor D Wager & Daphna Shohamy (2014).Mind matters: placebo enhances reward learning in Parkinson's disease. <i>Nature Neuroscience</i> , 17(12): 1793-7	
15	TH 23/7	• Incentive Saliency- the Role of Dopamine. What does dopamine really do? - Peciña S, Cagniard B, Berridge KC, Aldridge JW, Zhuang X (2003). Hyperdopaminergic mutant mice have higher "wanting" but not "liking" for sweet rewards. <i>J Neurosci</i> 23:9395–9402. - Smith, K. S., Berridge, K. C. & Aldridge, J. W. (2011).Disentangling pleasure from incentive saliency and learning signals in brain reward circuitry. <i>PNAS</i>, 108(27): 255-264 - Salamone. J. D., Wisniecki, A., Carlson, B. B. & Correa, M. (2001). Nucleus accumbens dopamine depletions make animals highly sensitive to high fixed ratio requirements but do not impair primary food reinforcement. <i>Neuroscience</i>, 105 (4): 863-870. - Salamone, J.D. , Arizzi, M.N., Sandoval, M.D., Cervone, K.M. & Aberman, J.E. (2002). Dopamine antagonists alter response allocation but do not suppress appetite for food in rats: contrast between the effects of SKF 83566, raclopride, and fenfluramine on a concurrent choice task. <i>Psychopharmacology</i>, 160:371-380.	
Week Six: Decision Making and Motivation			
16	T 28/7	• Decision making in the context of gains and losses. • Prospect theory, Approach and Avoidance Motivation -De Martino, B. Camerer, C. & Adolphs, R. (2010). Amygdala damage eliminates monetary loss aversion. <i>PNAS</i>, 107(8):3788-3792. -Breiter, H. C., Aharon, I., Kahneman, D. Dale, A. Shizgal, P. (2001). Functional Imaging of Neural Responses to Expectancy and Experience of Monetary Gains and Losses, <i>Neuron</i>, Vol. 30, 619–639. -Sanfey, A.G., Rilling, J. K. Aronson. J. A., Nystrom, L. E. & Cohen, J. D. The Neural Basis of Economic Decision-Making in the Ultimatum Game (2003). <i>Science</i>, 300:1755-1758.	
17	W 29/7	• Guest Lecture: Emotion, Cognition and Consciousness • Antonino Raffone, Sapienza, Universita di Roma, http://www.scholarpedia.org/article/Models_of_consciousness	

18	TH 30/7	Self regulation and goal-directed behavior -Freitas, A. L. & Higgins, E. T. (2002). Enjoying Goal-directed Action: the Role of Regulatory fit. <i>Psychological Science</i>, 13(1): 1-6. -Hare, T.A., Camerer, C.F., & Rangel, A. (2009). Self-control in decision-making involves modulation of the vmPFC valuation system. <i>Science</i>, 324(5927), 646-648.	
Week Seven: Translational Research and Individual Differences			
19	T 4/8	Translational Research -Ames D. L. and Fiske, S. (2015). Perceived intent motivates people to magnify observed harms. <i>PNAS</i>, 112(12): 3599-3605 -Franks, B, Higgins, E.T. , Champagne, F. (2012). Evidence for individual differences in regulatory focus in rats, <i>Rattus norvegicus</i>. <i>Journal of Comparative Psychology</i>, Vol 126(4), Nov 2012, 347-354 Foerde K., Braun, E. K., Higgins, E. T. & Shohamy, D. (2015). Motivational modes and learning in Parkinson's disease. <i>Social Cognitive and Affective Neuroscience</i>	
20	W 5/8	Last day of the class Wrap-up	

Grade

Participation & attendance (**15%** of total grade)

Weekly assignments- 3 short questions (**15%** of total grade)

1 group presentation (**30%** of total grade)

1 final assignment (**40%** of total grade)

—This is a tentative syllabus. Syllabus is subject to revision—

PLEASE READ THE INFORMATION ABOUT THE PLAGIARISM POLICY BELOW

Psychology Department Academic Dishonesty and Plagiarism Policy

Academic dishonesty:

The university provides severe penalties for different forms of academic dishonesty, such as cheating, plagiarizing and falsification or fabrication of data in order to obtain some form of credit that is not properly earned. Any suspected instance of academic dishonesty will be reported to the academic committees for disciplinary action.

Please note that in case of copied homework/assignments etc. the students who delivered their work to other students will run the risk of being equally punished since it is not a professor's duty to try to find out who had prepared the original work as opposed to who had cheated by copying and submitting it as if it were their own work.

Plagiarism:

Plagiarism is using others' ideas and words as if they are your own, without clearly indicating the source of that information. Students are continually exposed to other people's ideas through texts, lectures, talks. When you are using these materials, it is crucial that you give credit to their sources. If you don't, you are plagiarizing, which is whether intentional or unintentional considered a serious academic dishonesty.

Plagiarism (from APA manual, 5th Edition)- directly quoted:

Psychologists do not claim the words and ideas of another as their own; they give credit where credit is due. Quotation marks should be used to indicate the exact words of another. Each time you paraphrase another author (*i.e. summarize a passage or rearrange the order of a sentence and change some of the words*), you will need to credit the source in the text.

The key element of this principle is that the author does not present the work of another as if it were his or her own work. This can extend to ideas as well as written words. If an author models a study after one done by someone else, the originating author should be given credit. If the rationale for a study was suggested in the Discussion section of someone else's article, that person should be given credit. Given the free exchange of ideas, which is very important to the health of psychology, an author may not know

where an idea for a study originated. If the author does know, however, the author should acknowledge the source; this includes personal communications. (pp. 349-350)

Unacceptable paraphrasing occurs when: (from Indiana University web site:

<http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml>)

- "the writer has only changed around a few words and phrases, or changed the order of the original's sentences."
- "the writer has failed to cite a source for any of the ideas or facts."

Examples:

Here's the **ORIGINAL** text, from page 1 of *Lizzie Borden: A Case Book of Family and Crime in the 1890s* by Joyce Williams et al.:

The rise of industry, the growth of cities, and the expansion of the population were the three great developments of late nineteenth century American history. As new, larger, steam-powered factories became a feature of the American landscape in the East, they transformed farm hands into industrial laborers, and provided jobs for a rising tide of immigrants. With industry came urbanization the growth of large cities (like Fall River, Massachusetts, where the Borden family lived) which became the centers of production as well as of commerce and trade.

Here's an **UNACCEPTABLE** paraphrase that is **plagiarism**:

The increase of industry, the growth of cities, and the explosion of the population were three large factors of nineteenth century America. As steam-driven companies became more visible in the eastern part of the country, they changed farm hands into factory workers and provided jobs for the large wave of immigrants. With industry came the growth of large cities like Fall River where the Borden family lived, which turned, into centers of commerce and trade as well as production.

Acceptable paraphrasing:

- accurately delivers the original information, BUT AT THE SAME TIME,
- uses the writer's **own wording**, where **both the structure and the words have** been modified from the original source.
- provides the reader with the source of the information.

Here's an **ACCEPTABLE** paraphrase:

Fall River, where the Borden family lived, was typical of northeastern industrial cities of the nineteenth century. Steam-powered production had shifted labor from agriculture to manufacturing, and as immigrants arrived in the US, they found work in these new factories. As a result, populations grew, and large urban areas arose. Fall River was one of these manufacturing and commercial centers (Williams, 1890).

Please also visit the “Avoiding Plagiarism” webpage of the Boğaziçi University Writing Center:

→ <http://www.buowl.boun.edu.tr/fbuowlstudentsinfo.htm> --> “avoiding plagiarism”

NOTE: Please be aware that all the written documents you submit will be checked by an online plagiarism detection software in order to avoid instances of plagiarism.

Consequences of Academic Dishonesty and Plagiarism

In case of plagiarism or any other act of academic dishonesty, as a department policy, your act will be reported to the entire departmental council and you (and/or your group/team¹) will

- directly receive a “0” for that assignment or paper;
- NOT be able to receive any grade above DD;
- NOT be able to take any Readings & Research courses from the department;
- NOT be accepted to any of the department’s double-major, exchange, and graduate programs;
- NOT receive recommendation letters from any of the faculty members.

¹ In case you submitted a paper or assignment as a team, all listed consequences will apply to everyone of the team since it is not the professor’s duty to investigate who did it and who did not; so please note that you will all be responsible for each other.