**Psychiatry 79**

*Fall Quarter Lecture/Reading Notes*

# General Notes/Questions

| Week 1 & Week 2  *Wk 1 Lecture: Introduction*  *Wk 2 Lecture 1: Stress and Exercise*  *Wk 2 Lecture 2: Scientific Evidence and Sleep*  *Readings:*  *The Upward Spiral, Spiral Using Neuroscience to Reverse the Course of Depression, One Small Change at a Time, Alex Korb* ***(Week 1)***  [*TED Talk: ​The power of believing that you can improve*](https://www.ted.com/talks/carol_dweck_the_power_of_believing_that_you_can_improve)***(Week 1)***  *TED Talk:* [*How to make stress your friend*](https://www.ted.com/talks/kelly_mcgonigal_how_to_make_stress_your_friend)  *Wunsch: The effect of physical activity on sleep quality, well-being, and affect in academic stress periods*  *Streeter, Gerbarg: GABA levels change in major depressive order after 12-week Iyengar Yoga and breathing intervention*  *Janse Van Rensburg: Acute exercises modulates cigarette cravings and brain activation in response to smoking-related images - fMRI reveals exercises reduced cravings*  *Altena: fMRI and treatment for insomnia* |
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| **Wunsch and colleagues conclude that physical activity mediates negative affect over time**  → TRUE  **What class of neurotransmitters does GABA belong to?**  → Inhibitory Neurotransmitter  NOT:   * Monoamines * Gastrotarnsmitters * Excitatory neurotransmitter   **Why are increased levels of GABA beneficial?**  → Silences overall brain activity  → Correlates with improvements of mood and anxiety  NOT:   * Plays a role in staying alert * Blocks acetylcholine release in PNS   **Van Rensburg: After abstaining from smoking for 15 hours, smokers who didn’t exercise exhibited increased activation in…**  → Reward and visuo-spatial attention regions  NOT:   * Frontal cortex * BA10 * Default mode network   **Insomnia patients had significantly increased activation in the prefrontal cortex compared to controls**  → FALSE  **Relationship between amygdala activation and sleep deprivation**  → Sleep deprivation group exhibited 60% greater amygdala activation intensity  → Sleep deprivation group showed 3X increased volume of amygdala activation  NOT:   * Sleep deprivation group showed 60% increased volume of amygdala activation * Sleep deprivation group exhibited 3X greater amygdala activation intensity |
| Specifics of the weeks  **Week 1: Course Introduction and Overview**   * *What Applied Positive Neuroscience can do for me*   + *Understand how the brain influences productivity and wellbeing, and what you can do about it*   + *Manage stress/time, improve mood and productivity, develop an appreciation of values/goals* * *Brain orientation*   + *Summary of brain evolution*   + *Important systems and neurochemicals*     - *Prefrontal cortex, limbic system, striatum*     - *Serotonin, dopamine, norepinephrine, etc*   + *Frontal-Limbic-Striatal Interactions*     - *The neural basis for planning, processing emotions, motivation and habits.*   **Week 2: Managing Stress and Building Resilience: Physiological**   * *Describe the benefits and drawbacks of stress* * *Know how exercise impacts the brain* * *Understand the basics of sleep* |
| Week 3 Kahoot  *Lecture 1: Psychological Stress*  *Lecture 2: Psychological Stress*  *Emmons: Counting blessings versus burdens: investigation of gratitude and subjective wellbeing in daily life*  *Kini: Effects of gratitude expression on neural activity*  *Ireland: What does mindfulness meditation do to your brain?*  *Berker: Uncertainty meditates acute stress responses in humans*  *Paulesu: Neural correlates of worry in GAD and in normal controls: fMRI study* |
| **According to the Ireland article, what was mindfulness found to reduce?**  → Symptoms of anxiety & depression  NOT:   * Prefrontal cortex activity * Dopamine activity * All of the above   **Environmental uncertainty plays a huge role in the effects of stress in humans**  → TRUE  **Which part of the Berket et al. experiment was an effective elicitor of cortisol release in the participant’s brains**  → Electric shock  NOT:   * Heart rate monitor * Snakes * Rocks   **What was a surprising finding in the Emmons 2003 “Counting Blessings Versus Burdens” article?**  → Social comparison group had an improved sense of wellbeing  NOT:   * Gratitude was seen as an obligation by many * Gratitude + positives group had the lowest psychosocial functioning   **“Expert meditators” in the Ireland article have practiced for approximately how many hours?**  → 40,000  NOT:   * 400 * 4,000 * 40 |
| Specifics of this week  **Stress and Resilience Continued: Psychological**   * *Psychological factors influencing stress: controllability, certainty and consequences* * *The benefits of therapy*   + *Cognitive-Behavioral Therapy: principles of re-evaluating one’s own thoughts*   + *Behavioral Activation Therapy: principles of aligning long-term goals & values with immediate actions*   + *Psychodynamic* * *The power of gratitude, cognitive reappraisal, acceptance, etc.* * *Social support and stress* * *Mindful awareness, brain function, and health* * *The placebo effect* |
| Week 4 Kahoot  *Lecture 1: Habits*  *Lecture 2: Changing Habits*  *Nestler: The Addicted Brain*  *Vollstädt-Klein: Alcohol habits shift from ventral to dorsal striatum*  *Allen: Getting Things Done* |
| **What does Allen say is the single best method for perfecting productivity and personal organization?**  → There is no single, all-for-1 solution  NOT:   * Organizational tools * Creating positive habits * Setting reasonable goals   **In ‘getting things done’ Allen argues that in order to maximize productivity we must**  → Get things out of your head  NOT:   * Keep a running to-do list in your mind * Take breaks when necessary * Learn when you work best   **In Vollstadt-Klein et al., light drinkers had greater activation of the ventral striatum and prefrontal areas**  → TRUE  **What is the primary neurotransmitter involved in the brain’s reward circuitry?**  → Dopamine  NOT:   * Serotonin * Norepinephrine * GABA   **Which of the following was an unexpected finding in the Positive Choice Weight Loss program?**  → Obese participants had high rates of traumatic life experiences  NOT:   * Supplemented fasting was a safe way to lose weight * Major weight gain is typically life-event related |
| Specifics of this week  **Bad Habits, Addiction, and Choice**   * *Dopamine System*   + *Neurobiology of addiction*   + *Mesolimbic dopamine system* * *Habit Formation and Behavioral Change* * *Goal-directed vs Stimulus-driven behaviors* * *Getting Things Done (GTD): David Allen’s system, with a focus on “stress-free” productivit***y** |

<https://bruinlearn.ucla.edu/courses/174488/files/14464088?wrap=1>

**Midterm review notes:**

Important brain regions:

· Prefrontal cortex: thinking, planning, and impulse control – humans have more of than any other animals – also leads to worry, indecisiveness plays a role

· Limbic system: emotion and memory

· Striatum: impulses, routine, and rewards

Neurotransmitters:

· Serotonin: improves will power, motivation and mood

· Norepinephrine: enhances thinking, focus and deals with stress

· Dopamine: increases enjoyment and necessary for changing bad habits – related to the striatum

Other chemicals found in brain:

· Oxytocin: promotes feeling of love, trust, connection and reduces anxiety

· Melatonin: improves sleep

· Endorphins: pain relief

· Endocannabinoids: improves appetite, and increases felling of peacefulness and wellbeing

· GABA: increases relaxation and reduces anxiety

Synapse:

· Connection from one neuron to the other occurs

· Glutamate most common neurotransmitter

The stress response:

· How the brain and body mobilize to react to changes in the environment

· Hypothalamic pituitary adrenal (HPA) axis

· Stress hormones: cortisol and adrenaline

Exercise and cortisol:

· Improves mood and reduces cortisol, reduces stress

· Exercise can increase BDNF (brain-driven neurotrophic factor) which helps grow new neurons in the hippocampus

· Older adults had more prefrontal cortex grey matter (cell bodies of neutron) who exercised in their midlife

Circadian rhythm:

· Internal clock that influences performance, mood and physiological functions – 24 hours

· Daily fluctuations in melatonin, cortisol, and body temperature – cortisol is high when you wake up increasing alertness and less at night, melatonin is opposite

· Hypothalamus controls internal clock which is influences by daylight – people who have insomnia are recommended not to look at light even from devices before they sleep as can mess up internal clock

Biofeedback: the body’s impact on the brain

· Breathing: modulates activity in vagus nerve, increased heart rate variability means less stress

· Relaxing muscles: facial muscles, stretching

· Posture

GABA:

· Primarily inhibitory neurotransmitter

· Target of anti-anxiety medication (valium, Xanax)

· Suspected to boost mood or have a calming, relaxing effect

Sleep and the limbic system:

· Sleep is important in memory consolidation – communication between hippocampus and PFC during slow-wave sleep

· Sleep reduces amygdala reactivity

Why is sleep restorative?

· Cleaning away metabolic junk via cerebrospinal fluid (CSF)

Is stress bad for you?

· Its essential to survival, it can enhance performance, its necessary for a excitement and other strong positive emotions

· It can cause physical and mental health problems, can impede your performance, can ruin your happiness and wellbeing

Yerkes-dodson law

· U-shape function of optimal performance with respect to arousal

· Optimal performance at an arousal level but if it goes higher it impedes performance due to anxiety – goldilocks rule

Voluntary vs forces:

· BDNF increased in voluntary and forces exercised but seen more strongly in voluntarily exercise

The insula:

· Processing emotional and physical sensations from internal organs

· When something stressful occurs your body starts to react before your brain realizes what is happening

Types of therapy:

· Cognitive-behavioral therapy – development of personal coping strategies for dealing with unhelpful cognitions or behaviors in emotion regulation – example: awareness, changing behaviors, changing environment, cognitive reappraisal which is reframing thoughts in positive way or identifying incorrect beliefs

· Psychodynamic/psychoanalysis – change problematic behaviors, feelings, and thought by discovering their unconscious meanings and motivations

Reinforcement, habits and addiction:

· Continuous reinforcement

· Partial reinforcement

Studies: what the takeover of the study was, why assign that study

50 MCQ questions – not very tricky but re-read