SBI3U Homeostasis Unit

Viewing Notes: The Brain

The Evolution of the Brain could be compared to a very old house that changed over time, as renovations and additions happen.

The basement of the brain would be the Brain stem
The first floor would be the limbic sys. system, with 2 paired amygdala
The second floor would be the cerebral cortex & 2 frontal lobes

Let's consider the role of the specific brain structures in moderating the following:

Fear Responses:

1. How does the **amygdala** elicit fear responses? releases a flood of epinephrine
2. How does the **cortex** help us consciously control our amygdala? Higher functions, imposes structure or chaos.
3. How does the amygdala elicit the whole-body "fight or flight" response that we experience in primal fears? also epinephrine

Sexuality:

4. Why do scientists think that the human orgasm evolved? If reproduction is pleasureable, species will do it.
5. Summarize the differences between male and female human orgasms in the brain. Both start w dopamine,

♂ blood flows away from amygdala ↓ anxiety, inhibition)

♀ all centres reactivated (fear, anxiety, alertness)

Risk-Taking Behaviours:

6. What is **dopamine's** role in risk-taking behaviours? like the orgasm, but doesn't disable fear centres.
7. Describe the 'gambling game' experiment in the video, & its results. avoid shock by choosing 2 options; people avoid risks to avoid shock, but risk takers don't.

Psychopathic Behaviours:

8. Why are scientists interested in studying the brains of serial killers? to see if it's related to Δ in amygdala (fear) brain stem (dopamine) cortex (morals)
9. What have some of these studies revealed about the patterns of behaviour exhibited by psychopaths? Impulsive, nomadic lifestyles (frequent moves or relationship changes), always in trouble, sexually promiscuous

10. **Experiment 1** involves subjects (violent criminals) clicking on X's but not on K's as they flash on a screen. What did it reveal about their ability to appreciate making a mistake, and learning from it? Psycopaths don't care as much about making a mistake, + don't care to learn from it.
11. **Experiment 2** involves the same subjects ranking morally objectionable photos. What did this experiment reveal about the subjects? in psychopaths, frontal lobe + amygdala don't communicate well. Ratings are lower amygdalas 17% smaller
12. "White collar psychopaths" such as financial swindlers, embezzlers & scammers also were subjected to brain imaging studies. What did their brains reveal, and how were they different from those of serial killers? smaller amygdalas but normal F.L./Amygdala communication

Memory: smart liars, less ~~empathetic~~; good stress reactions, planning + control are strong.

13. British artist Stephen Wiltshire has an **idetic** memory; he is a **mnemonist**. Describe his particular talent. Reproduces cityscapes (savant)
14. Which brain areas help Wiltshire coordinate his particular skill? (*see more at: www.stephenwiltshire.co.uk) occipital (visual) parietal (drawing ability)
15. British conductor & musicologist Clive Wearing has what the medical community agrees is the world's worst case of **amnesia**. What brought it on? viral encephalitis
16. Which area of the brain moderates memory storage? Hippocampus
17. What's the difference between **procedural** and **episodic** memory? Give an example from Wearing's case. things that happened — things you do (he still can dress himself, play piano)
18. What is meant by **brain plasticity**? How have views on it changed over time? Ability of brain to Δ or reform post injury

Athletic Ability: Highest in infancy, learning phase of life.

19. Describe the role of the **cerebellum** in athletic ability. – Complex motions (plays, choreography) – Coordination – procedural memory reinforced by repetition + practice
20. What is **arousal modulation**? Why is it vital to an athlete? Has an evolutionary role, i.e. a prep for the hunt, etc. aka getting your game face on.