Emotion & Motivation

- Fig 8.2 Valence & Arousal: The Emotional Map. Practice using 'Two Dimensions of Emotions' for the next exam.

- Emotion: a positive or negative experience that is associated with a particular pattern of physiological activity

- An **appraisal** is the conscious or unconscious evaluations and interpretations of emotion-relevant aspects of a situation or event.

- An **action tendency** is the readiness to engage in a specific set of emotion-relevant behaviors.

- James-Lange Theory: A stimulus triggers activity in the body, which in turn produces an emotional experience in the brain.

- **Cannon-Bard Theory**: A stimulus *simultaneously* triggers activity in the body and emotional experience in the brain.

- **Schacter-Singer** (Two-factor) Theory: A stimulus triggers a general physiological arousal whose cause the brain interprets, and this interpretation leads to emotional experience. Emotions are based on the inferences of the causes of physiological arousal.

- A change in a physiological state—through drugs or exercise—can lead us to attribute different emotions to different external experiences. We find cartoons funnier after we exercise (Byrne et al., 1975)
Physiology of Emotion

The Schacter-Singer theory has not stood the test of evidence. The theory that different emotional responses as nothing but different interpretations of a single bodily response has been refuted.

- Anger, fear & sadness all produce a higher heart rate than does disgust.
- Fear & disgust both produce higher sweating responses than does sadness or anger.
- Anger produced a larger increase in finger temperature than did fear.
- Some physiological responses are unique to a single emotion (the blush of embarassment).
- Certain patterns of activity in the parasympathetic branch of the autonomic nervous system are uniquely related to prosocial emotions such as compassion.
- James & Lange were right that patterns of physiological response are not the same for all emotions.
- Cannon & Bard were right that people are not perfectly sensitive to these patterns of response, which is why we can make incorrect inferences about what we or others feel.
- Our bodily activity and our mental activity are both the causes and consequences of our emotional experience.
The Emotional Brain

- The amygdala plays a special role in emotions such as fear.
- Downer (1961) performed an operation such that the information from a monkey's left eye was transmitted to its amygdala, but information from the right eye was not.
- When the monkey was allowed to see a threatening stimulus with its left eye only, it responded with fear and alarm; but not with the right eye.
- People have a superior memory for emotionally evocative words, but people whose amygdalae are damaged—or blocked with drugs—do not.
- People with amygdalae damage often do not feel fear when they see a threat, but feel fear when they experience a threat.
- Before we can feel fear, we do an appraisal (not necessarily conscious).
- The amygdala is an extremely fast and sensitive threat detector.
- When subjects are asked to experience sadness, fear & anger, amygdala activity increases, cortex activity decreases. Asked to inhibit these emotions, the reverse is true.
- Other centres: anterior insula = disgust; anterior cingulate cortex = sadness; orbitofrontal cortex = anger.
Regulation of Emotion

- Emotion regulation refers to the strategies we use to influence our own emotional experiences.
- Most people would rather feel good than bad (rather listen to Justin Bieber than Nine Inch Nails).
- Some strategies are behavioural: avoiding situations that trigger unwanted emotions; some are cognitive: recruiting memories that elicit positive emotions.
- Suppression—inhibiting the outward signs of emotion—is not an effective strategy.
- Affect labelling—putting one's feelings into words—is effective in reducing the intensity of emotional states.
- Re-appraisal: changing one's emotional experience by changing the way one thinks about emotion-inducing stimulus.
- Ochsner et al., 2002: participant's brains were scanned as they viewed negative emotions; if the image was interpreted as a woman crying at a funeral, and the amygdala became active. Re-appraising the image as her crying at a wedding, and the cortex became active.
- Participants were able to turn down the activity of their own amygdalae simply by thinking about the image in a different way.
Emotional Communication

- Emotional expression: an observable sign of an emotional state.
- Listeners can infer emotional states from vocal cues along with better-than-chance accuracy. Also, the direction of a person's gaze, the rhythm of their gait, and even from a brief touch on the arm.
- Underneath the skin of your face are 43 muscles that are capable of creating more than 10,000 unique configurations.
- Fig. 8.5 Human observers agree on 20 different facial expressions of emotion.
- The two most important muscle groups are zygomaticus major, and orbicularis oculi. The combination of these produces true (Duchenne) smile, more commonly known as a 'twinkle in the eye'.
- Darwin proposed a 'universality hypothesis', that facial expressions of emotion have the same meaning for all humans (implying a genetic basis). Humans all over the globe generally agree on anger, disgust, fear, happiness, sadness, and surprise.
- Eg: the feeling of happiness causes the contraction of the zygomaticus major, but there is also the facial feedback hypothesis.
- Emotional expressions can cause the emotions they typically signify. This is the scientific basis for Method Acting. https://www.theatrgrp.com
Deceptive Expression

- **Display rules**: intensification; de-intensification; masking; neutralizing. Universally, one can show contempt for a peer, but not a superior.

- People are better at recognizing facial expressions from their own cultures.

- **Micro-expressions**: morphology; symmetry; duration; temporal patterning.

- Tell tale signs: a liar's speech lacks the little imperfections of truthful speech, such as superfluous detail. *Remember Sammy Jenkis!*

- People are dreadful at discerning truth from lies, performing barely better than chance. We have a strong bias towards believing that others are sincere; we also are uncertain about what to attend to, and what to ignore.

- The correlation between a person's ability to detect lies, and that same person's confidence in that ability is essentially zero. (DePaulo et al., 1997)

- Polygraphs are obsolete. Instead, focus on the figure 'Lie Detection Machines'. Some areas of the brain are more active when people tell lies than when they tell the truth, and vice versa. Also, heat from blood flow to the zygomaticus major, the orbicularis oculi, and the 'mouth ring' or **orbicularis oris**.

- At this time, however, fMRI scans are not considered valid legal evidence for a conviction.
Motivation

- Motivation: the purpose for or psychological cause of an action. Because the world influences our emotions, our emotions can provide information about the world.

- Compare this to Capgras syndrome, a condition where the facial recognition neural networks are disconnected from the limbic system. Patients with this syndrome believe that their loved ones have been replaced by impostors; they look right, but don't feel right. (Hirstein & Ramachandran, 1997)

- We would be lost without the information we get from our emotions. (Damasio, 1994)

- We need feelings like anxiety to help us make everyday decisions, as well as calculated risks.

- **Hedonic principle:** We are motivated to pursue pleasure, and avoid pain. We tolerate pain only if it leads to greater pleasureable rewards.

- **Instincts** are inherited (genetic) tendencies within an organism. In the early days of psychology, behaviourists wanted to do away with any talk of instinct, as it was overused by Freudians and others. Instead they argued that all behaviour was learned. It was the neuroscience revolution that ended this argument.

- But we humans do have instincts, inherited from our primate ancestors. Examples of instinctive behaviors in humans include many of the primitive reflexes, such as rooting and suckling, behaviors which are present in mammals.
**Drives**

- **Homeostasis:** Bodies are like thermostats. There is a tendency for a system to keep itself in a particular state.

- **Drive:** an internal state caused by physiological needs.

- **Maslow's Hierarchy of Needs.** One cannot jump from a lower level to a higher one without going through an intermediate.

- Gropp et al., 2005: Our bodies have hormonal switches that turn hunger on and off.

- **Ghrelin** intensifies hunger, and also binds to neurons in the hippocampus, temporarily improving learning and memory.

- **Leptin** is secreted by fat cells, turning hunger off.

- Animals compensate for macronutrient deficiencies by selectively consuming food high in that missing nutrient (like protein).

- **Lateral hypothalamus** receives orexigenic signals; the **ventromedial hypothalamus** receives anorexigenic ones. So, what is orexin?

- **Orexin:** either of two hormones (orexin-A or orexin-B) produced by the mammalian hypothalamus and functional in the regulation of appetite and sleep.
Eating Disorders

- **Bulimia**: binge/purge. Believed to be pure emotional.

- **Anorexia nervosa**: a distorted body image that leads sufferers to believe they are fat. They have extremely high levels of ghrelin in their blood; hunger's call is being suppressed, ignored, or overridden by an unknown cause.

- Although it primarily affects women, men have a sharply increased risk if they have a female twin with the disorder.

- Study the Fig 8.14 'Geography of Obesity' for the next exam.

- Obesity is highly heritable (genetic); there are also 'obesogenic' toxins in our environment; obese people may lack 'good bacteria' to break down food.

- Obese people are often leptin-resistant.

- Our evolutionary history is out-of-sync with our technological present.


- If we try to reduce percentage body fat by dieting, our bodies respond by decreasing our **metabolism**, the rate at which energy is used by the body. This was a great advantage for most of our evolutionary history, as high quality food was generally scarce, especially fats and sugars.
Sexual Motivation

- Glands secrete hormones that travel through the blood to the brain and stimulate sexual desire.

- **DHEA** seems to be involved in the onset of sexual desire, beginning at age 6 and sparking initial interest at age 10. This is because the adrenal glands mature before the testes or ovaries.

- **Testosterone** and **estrogen** are the main hormones; testosterone increases sexual desire in male rats by acting on a particular area of the hypothalamus; estrogen for female rats on a different part of the same brain area.

- Something different from all the other mammals happens in human females; they can be interested in sex at any point in their monthly cycle. Somewhere in our evolution, women's sexual interest became independent of their cycle.

- Theories abound; the strongest one is that this biological adaptation strengthens the bond between mates, keeping the male around to fend for the family.

- Testosterone is the hormone that is the basis of the sex drive for both sexes; when women are given testosterone, their sex drives increase.

- Men are more likely to think about and act out many more sexual behaviours than women, but a single hormone is still the driving force behind sex.
Sexual Activity

• Memorize the Fig 8.15 'Human Sexual Response Cycle' for the next exam; focus on physiological arousal.

• Key phrases: excitement phase; plateau phase; orgasm phase; resolution phase.

• Although sex is typically a prerequisite for reproduction, the vast majority of sexual acts are not meant to have babies. Study the Fig 'Reasons for Sex' for the next exam. Note that most sexual display (not the physical act) is about social status.

• Here is an example: view the MTV Awards for 2020. Which gender is showing more skin? Where is that skin made visible?

Intrinsic vs Extrinsic

- **Intrinsic motivation**: taking actions that are themselves rewarding. *For this class, refine this to the nucleus accumbens pathway to pleasure.*

- **Extrinsic motivation**: taking actions that lead to reward.

- Our ability to engage in behaviours that are unrewarding in the present because we believe they will bring greater rewards in the future is one of our species' most significant talents. This is **delayed gratification**.

- Duckworth & Seligman, 2005: this ability to delay gratification is a better predictor of a child's grades in school than is the child's I.Q.

- Henderlong & Leper, 2002: Extrinsic rewards can undermine intrinsic ones. It appears that under some circumstances people take rewards to indicate that an activity is not inherently pleasurable.

- Punishment can create intrinsic motivation (Aronson, 1963). If a forbidden act is desirable, a paradoxical consequence occurs, promoting the very behaviour that is to be discouraged.

- When threats and rewards change intrinsic motivation into extrinsic motivation, unexpected consequences can follow.
Conscious vs. Unconscious

- To fine-tune the text, a **conscious motivation** is one of which a person is aware, and which they can communicate to themselves and others, usually in words. A **unconscious motivation** makes people act, but they cannot explain why.

- The strongest of these is **achievement motivation**, which has characteristics of both. This motivation to solve worthwhile problems can be assessed using the Thematic Aperception Test, can reliably predict a child's grades in school.

- People are usually aware of their general motivations for behaviour and only become aware of their more specific motivations when they encounter problems.

- **Approach motivation**: to run to pleasure; **avoidance motivation**: to run from pain. These are independent experiences that occur in different parts of the brain.

- On average, avoidance motivation is stronger than approach motivation, but the relative strengths of these two tendencies does differ between persons. People who are described by **high approach** items in the questionnaire of Table 8.2 are happier when rewarded than those who are not.

- People who have a **promotion focus** tend to think in terms of achieving gains whereas people who have a **prevention focus** tend to think in terms of avoiding losses. Fig 8.18 is particularly relevant!

- Finally: Terror Management theory = **mortality salience hypothesis**. Awareness of one's own death will focus one on goals that have high societal value.