

Lecture 3: Science and Statistics

- If something can be tested with an experiment, science can have a strong view on it. That is why science succeeds when it comes to medicine, materials, chemical reactions, and biology.
- However you **cannot run a simple experiment to determine whether a course of action is right** or wrong. For guidance on such issues people seek the advice of moral philosophers, holy people, holy texts, and social norms.
- If you can correctly categorise a realm of debate into the scientific and non-scientific then you'll know when to switch on your science skills and forcefully argue on the basis of acquired evidence, and when to put your science skills aside, and accept with great tolerance and humility that **a question can have many valid answers**.
- The first way **we acquire knowledge** in our lives is **by revelation** when our parents instruct us to do or not do something. We also generate knowledge through our emotions, intuitions, and opinions.
- The scientific method is a way of acquiring knowledge as well, and sometimes it is in conflict with our opinions and revealed knowledge.
- The biggest misunderstanding about science is that its strength arises from its collection of knowledge and the expert scientists who understand that knowledge.
- **Science has no authorities, no experts, and no 'sacred knowledge' that is beyond criticism.** You commit a logical fallacy (called the "appeal to authority") if you believe something is true because someone very important said it, or endorses it.
- Conversely you commit a **logical fallacy (called an "ad hominem")** if you disagree with what someone says, but instead of attacking their claim or their evidence, you attack them for being of low status or disreputable.
- In science, statements, theories and evidence should all be considered open to criticism.
- Something can still be criticised even if it has been believed for thousands of years ('something is true because it has been known for a long time' is a logical fallacy: "argument from antiquity").
- The greater lessons to be had in science are about how to obtain knowledge, how to report it (citation), how to evaluate it, and how to criticize it.
- Science must be open to all possibilities – an attitude that everything is open to criticism implies that strongly. Always strive to be completely neutral when it comes to questions for which no evidence exists, or in situations when you do not know the evidence.
- Open-mindedness should mean considering everything, but evaluating it before accepting. Accepting everything before evaluating it is not open-mindedness it is blind credulity.
- **Ad Hominem** – Attacking the arguer and not the argument.
- **Argument from authority** – Something is true because the person who said it is of high status.
- **Appeal to ignorance** – If you are not certain about your argument, then mine must be true.
- **Begging the question** – Assuming an answer in the way the question is phrased.
- **Observational selection** – Counting the hits and forgetting the misses
- **Slippery slope** – Unwarranted extrapolation of the effects
- **Confusion of correlation and causation** – Since two things go together, one must have led to the other.
- **Straw man** – Caricaturing (or stereotyping a position to make it easier to attack)
- **Weasel words** – Use of euphemisms and misleading terminology.
- **The pragmatic fallacy** – Something is true because it works.
- **Excluded middle** – Considering only the two extremes in a continuum of intermediate possibilities.

Lecture 4: Psychoanalytic and psychodynamic approaches to personality

- **Psychic Determination:** Everything that happens in a persons mind has a specific cause.
- This cause lies in the structure and processes (dynamics) of personality.
- Freud identified the id, the ego and the super ego.
- The purpose of psychoanalysis is to find those causes, by exploring the hidden part of the mind.
- The key to understanding personality is understanding the unconscious.

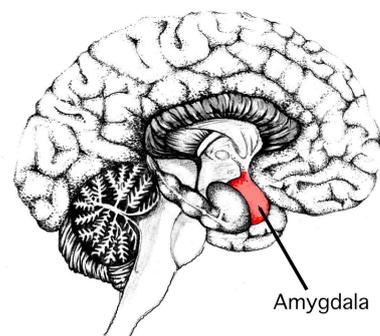
- Mind: The psychological result of mainly the brain's & partly the rest of the body's physiological functions.
- **Sigmund Freud:**
 - Lived in the same era as Darwin and was therefore influenced by his naturally selective theories.
 - Treated nervous problems: hysteria, irrational fears, obsessions and anxieties.
 - Used psychoanalysis to treat conversion disorders → a conversion disorder causes patients to suffer from neurological symptoms, such as numbness, blindness, paralysis, or fits without a definable organic cause. It is thought that symptoms arise in response to stressful situations affecting a patient's mental health.
 - Freud's psychoanalytic theories grew out of interaction with patients.
 - **Personality** is the result of early childhood experiences, unconscious motives and conflicts, and defences against sexual and aggressive urges.
 - Developed psychoanalysis 'talk therapy' probing the unconscious, identifying the unconscious conflicts that are causing mental health problems
- **Controversies:**
 - Individuals governed by unconscious motives/conflicts
 - Personalities shaped in childhood
 - Centrality of sexual urges (conflicted with Victorian conservatism)
- **Contribution:**
 - The first personality theories
 - The first theories to propose the existence and the influence of unconscious processes and forces
 - Developed the first theories to explain the effects of early development on adult personality.
- **Criticism:**
 - Too vague / conjectural e.g. the ID cannot be proven to be entirely unconscious.
 - Relies heavily on case studies
 - Freud may have distorted patient's experiences to fit with psychodynamic theories.
 - Sexism: Psychodynamic approach is male centred. Freud theorised that women had weaker superegos and were more prone to neurosis than men.
- **Levels of awareness**
 - Conscious: the content of one's awareness at any given point in time. (10%)
 - Preconscious: material just beneath awareness that is easily retrievable, e.g. personal phone number.
 - Unconscious: greatly influential material, such as memories and desires, that a person is not consciously aware of.
 - Collective unconscious: latent memory traces (archetypes) inherited from people's ancestral past.
 - Jungian Archetypes: Narratives (e.g. hero, mother), symbols (e.g. Mandala), concepts (e.g. hell, holiness) → universal to stories in all cultures therefore must be part of a collective unconscious.
 - **Internal structure:** The mind consists of specific functionally independent, and at times conflicting, parts (communication no collaboration).
 - **id:** The irrational and emotional part of the mind.
 - Pleasure principle: The need of an immediate gratification of id's urges (raw biological desires) e.g. desire for power, to procreate, source of bodily needs. Unrestrained id is seen in babies.
 - **Ego (aka I):** The rational and decision-making part of the mind. Balances the id, external world and superego. Reality principle: The force that delays the gratification of the id's needs until the appropriate conditions are present.
 - **Superego (aka Over-I):** The moral part of the mind, "conscience". Reflects the internalisation of moral rules mainly taught by parents. Criticises or inhibits drives, feelings, functions.
- **Psychic Conflict:** The friction between the different parts of the mind.
 - The ego's main job is to find a middle course (a psychic compromise) between the competing demands of motivation, morality and practicality.
 - The most important of these conflicts centre on sexual or aggressive impulses.
 - Without reasonable internal compromises the individual is faced with an internal conflict between their needs and impulses that can have disastrous results → mental illness, criminal behaviour.

- Prolonged and unresolved conflict between the parts of the mind can lead to considerable levels of anxiety and/or guilt.
- The ego is anxious about the ID getting out of control and doing something terrible or the superego getting out of control and making you feel guilty about thoughts or desires.
- **Defence mechanisms** e.g. rationalisation – Creating fake but plausible excuses to justify unacceptable behaviour → Watching TV instead of studying as extra study wouldn't help anyway.
- Differential utilisation: Not everyone uses the same defence mechanism
- **Mental energy:** The energy that the mind requires to function.
- Consists of two fundamental drives (motives):
 1. Libido or life drive or sexual drive: a motive towards creation, protection, enjoyment of life, productivity and growth – fuels the id.
 2. Thanatos (death): a motive towards destruction, disorder, and ultimately death (i.e. the unconscious will to die, to end pain / suffering).
- **Psychosexual stages:** Developmental periods with a characteristic sexual focus (urge for physical pleasure) that shape one's personality. E.g. oral focus as an infant (from 0 to 1)
- Fixation: a failure to move forward from one stage to another, due to excessive gratification or frustration of needs at a particular stage.
- Patterns of fixation are thought to be related to specific adult personalities.

Lecture 5: Built for Emotion (II)

- **The Facial Feedback Hypothesis (FFH):** For Ekman and others, the face has a particularly important role in our emotional experience: there is an intimate link between experienced emotion and facial expression.
- Facial expressions occur rapidly and automatically → they provide feedback that contributes to the subjective experience of an emotion.
- Ekman believed that producing a certain facial expression would make an individual feel a certain way e.g. babies imitate their caregivers smile as it allows them to feel safe and happy.
- **Ekman, Levison and Friesman 1983: Designed an experiment to test FFH**
- Two conditions:
 - a. Subjects move facial muscles in ways designed to mimic emotional expression
 - b. Subjects mentally relive a strong emotional event (i.e., imagine it)
- Procedure:
 - a. Subjects were allocated to either condition (randomly)
 - b. Physiological measurements were taken while they were simulating emotional expression and imagining strong past emotional events.
- Results:
 1. Patterns of physiological arousal were very similar for the two conditions. → Didn't matter if subjects mimicked the expression or simply remembered the emotional event.
 2. Different emotions were consistently associated with distinctive patterns of physiological arousal → each emotion has its own physiological blue print.
 3. Remarkable finding: just simulating a facial expression brings on, to some extent, the distinctive pattern of bodily arousal associated with a given emotion.

- **The Fear System**
 Amygdala → the emotion regulation centre
 Frontal Lobe
 Hippocampus



- The amygdala is part of the Lymbic System that sits between the older (i.e., brain stem), in evolutionary terms, and newer (i.e., cerebral cortex) parts of the brain.
- Lesions to temporal lobes in monkeys (including damage to or removal of the amygdala specifically) results in psychic blindness: **see objects but fail to appraise psychological / emotional significance.**
- Similar patterns of psychic blindness are observed in humans with damage to the amygdala and surrounding areas.
- In rats, lesions to specific areas of the amygdala terminate fearful responses to stimuli that had previously been paired with a painful shock – suggesting that the amygdala has some evaluative capacity.
- **Frontal Lobes**
- There are strong neural connections between the amygdala and the frontal cortex (which are asymmetrical).
- Severing the connections between the amygdala and the frontal cortex often results in crippling emotional experience.
- Studies measuring brain activity reveal certain activities correlating with different emotional stimuli:
- Happiness / anger (approach behaviour) → left frontal cortex
- Fear / sadness (withdrawal tendencies) → right frontal cortex
- **Activation Experiment:**
- Subjects are presented with an initial fleeting expression of fear for 17ms but have no conscious perception of seeing it.
- The second, neutral, expression is shown for 183ms and consciously perceived, it is said to mask the initial stimulus.
- The initial expression can be modified in various ways and brain activity measured.
- Amygdala activation is associated with whites of the eyes in initial expression, which is characteristic of fear → other emotions require more of the face to be seen.
- Activation does not mean an actual feeling of fear.
- **The role of the Hippocampus:**
- Aside from the specific features of the feared stimuli (e.g., a bear), the context in which it is encountered is also of significance (e.g., a zoo or the woods), and can also be the source of fear (or not!) – A rat, for example, develops fear reactions to the shock tone but also the chamber in which it hears the shock tone.
- The formation and consolidation of contextual fear associations depend on the hippocampus. Lesions of the hippocampus made prior to rats being exposed to the shock box prevented the rat from fearing the box while having no effect on its fear of the shock tone.
- Hippocampal lesions made after training can interfere with the retention of contextual fear associations → rats were still afraid of the tone but not afraid of the box (the context).
- The amygdala is not solely responsible for fear.
- The weight of evidence suggests that the hippocampus and the amygdala can operate somewhat independently, to acquire different kinds of representations of fearful stimuli and situations.
- Contexts that trigger fear in the hippocampus can lead to an activation of the amygdala, i.e. in situations where people expect to encounter fear there is a top-down activation of the amygdala.
- Expectation can cause fear.
- Studies have shown that there are two pathways through which the amygdala's fear responses can be triggered: a **fast "low road"** from the **thalamus to the amygdala**, and a **slower "high road"** that passes from the **thalamus to the neocortex and only then to the amygdala.**
- The two paths do not always reach the same conclusions. The relatively crude "low road" may respond to a long, thin object as a dangerous snake, and trigger an immediate fear response, while the slower "high road" is determining that the object is a harmless stick.