Processing the Environment

Sensory Perception

Visual Cues

- Depth, Form, Motion, Constancy
- **Binocular Cues** -
  - **Retinal disparity** (eyes are 2.5 inches apart)
  - **Convergence** – things far away, eyes are relaxed. Things close to us, eyes contract.
- Monocular Cues
  - **relative size**, **interposition** (overlap), **relative height** (things higher are farther away), **shading and contour**, **motion parallax** (things farther away move slower)
  - Constancy – our perception of object doesn't change even if it looks different on retina.
    - Ex. size constancy, shape constancy, color constancy.

Sensory Adaptation

- Hearing - **inner ear muscle**: higher noise = contract.
- Touch - temperature receptors desensitized
- Smell – desensitized to molecules
- Proprioception – mice raised upside down would accommodate over time, and flip it over.
- Sight – down (ex. Light adaptation, pupils constrict, rods and cones become desensitized to light) and upregulation (dark adaptation, pupils dilate)

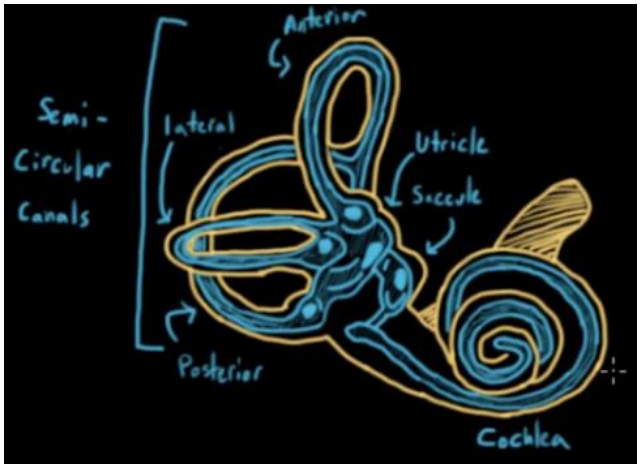
Weber's Law

- 2 vs. 2.05 lb weight feel the same.
- 2 vs. 2.2 lb weight difference would be noticeable.
- The threshold at which you're able to notice a change in any sensation is the **just noticeable difference (JND)**
- So now take 5 lb weight, in this case if you replace by 5.2 weight, might not be noticeable. But if you take a 5.5 lb it is noticeable.
- I = intensity of stimulus (2 or 5 lb), delta I = JND (0.2 or 0.5).
- Weber's Law is delta I to intensity is constant, ex. .2/2 = .5/5 = .1.
  - **Delta I/I = k** (**Weber's Law**)
- If we take Weber's Law and rearrange it, we can see that it predicts a **linear relationship** bet
- ween incremental threshold and background intensity.
  - Delta I = Ik.
  - If you plot I against delta I it's constant

Absolute threshold of sensation

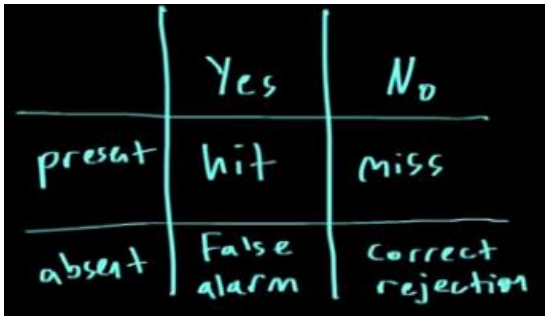
- The minimum intensity of stimulus needed to detect a particular stimulus **50%** of the time
- At low levels of stimulus, some subjects can detect and some can't. Also differences in an individual.
- Not the same as the **difference threshold (JND)** – that's the smallest difference that can be detected 50% of the time.
- Absolute threshold can be influenced by a # of factors, ex. Psychological states.
  - Expectations
  - Experience (how familiar you are with it)
  - Motivation
  - Alertness
- **Subliminal** stimuli – stimuli below the absolute threshold.

The Vestibular System



- Balance and spatial orientation
- Focus on **inner ear** - in particular the **semicircular canals** (posterior, lateral, and anterior)
- Canal is filled with **endolymph**, and causes it to shift – allows us to detect what direction our head is moving in, and the strength of rotation.
- **Otolithic organs** (utricle and saccule) help us to detect linear acceleration and head positioning. In these are Ca crystals attached to hair cells in viscous gel. If we go from lying down to standing up, they move, and pull on hair cells which triggers AP.
- Also contribute to dizziness and vertigo
  - Endolymph doesn't stop spinning the same time as we do, so it continues moving and indicates to brain we're still moving even when we've stopped – results in feeling of dizziness.

Signal Detection Theory

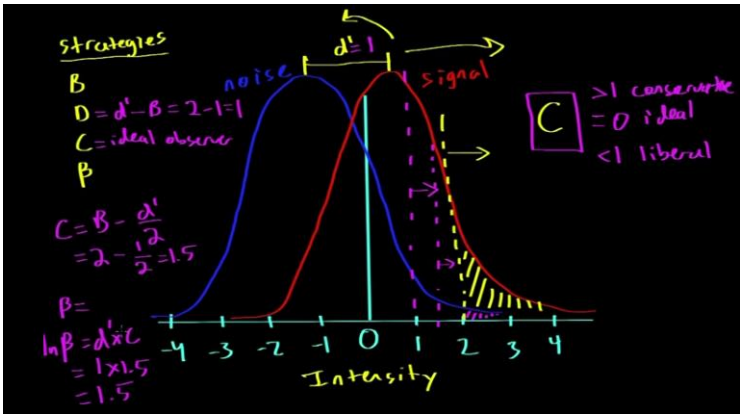


- Looks at how we make decision under conditions of <u>uncertainty</u> – discerning between <u>important stimuli</u> and unimportant "noise"
- At what point can we detect a signal
  - Origins in radar – is signal a small fish vs. large whale.
  - Its role in psychology – which words on second list were present on first list.
  - Real world example – traffic lights. Signal is present or absent (red).

Strength of a signal is variable **d'**, and **c** is strategy

- d': hit > miss (strong signal), miss <hit (weak signal)
- c: 2 strategies – conservative (always say no unless 100% sure signal is present. Bad thing is might get some misses). Or liberal (always say yes, even if get false alarms).

For any signal, have noise distribution. And get a second graph – the signal distribution.

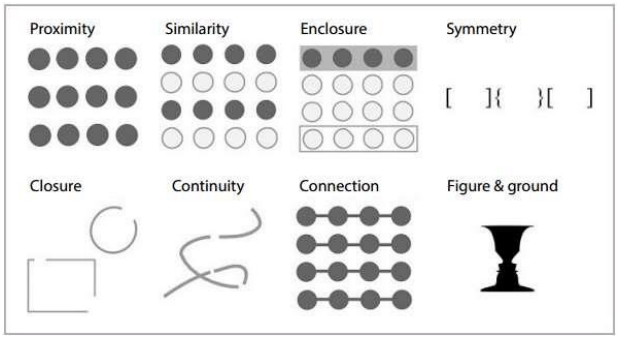


- The difference between means of the two is d'. So if signal shifted to right, d' would be big and easy to detect. If left, d' very small and more difficult to detect.
- X-axis have intensity.
- The strategy C can be expressed via choice of threshold – what threshold individual deems as necessary for them to say Y vs. N. Ex. B, D, C, beta, just dif variables.
- If we were to use B, let's say choose this threshold – 2. So anything greater than 2 will say Y to, anything less say N. So probability of hit is shaded yellow, and false alarm is pink.
- D = d'-B, so let's say d' in this example is 1, so 2-1=1. So if we use D strategy, anything above 1 = Y.
- C strategy is an ideal observer. Minimizes miss and false alarm. C = B – d'/2. So in our example, it's 2- ½ = 1.5. So anthing above a 1.5
  - When C = 0, participant is ideal observer. If <1, liberal. If >1, conservative.
- Beta, set value of threshold = to the ratio of height of signal distribution to height of noise distribution. lnbeta = d' x C = 1 x 1.5 = 1.5

Bottom-Up vs. Top-Down Processing

- **Bottom up**: stimulus influences our perception.
  - Processing sensory information as it is coming in (built from smallest piece of sensory information)
- **Top-down**: background knowledge influences perception. Ex. Where's waldo
  - Driven by cognition (brain applies what it knows and what it expects to perceive and fill in blanks)

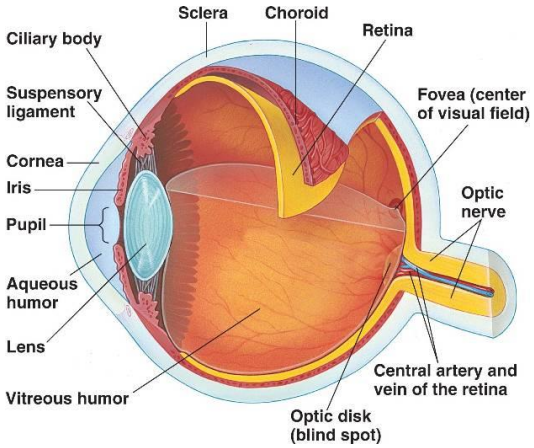
Gestalt Principles



- Similarity – items similar to one another grouped together
- Pragnanz – reality is often organized reduced to simplest form possible (Ex. Olympic rings)
- Proximity – objects that are close are grouped together
- Continuity – lines are seen as following the smoothest path
- Closure – objects grouped together are seen as a whole

Sight (Vision)

Structure of the Eye



- **Conjunctiva** is first layer light hits
- **Cornea** – transparent thick sheet of tissue, anterior 1/6th.
- **Anterior chamber** – space filled with aqueous humour, which provides pressure to maintain shape of eyeball.
- **Pupil** is hole made by iris, which determines <u>eye color</u>
- **Lens** bends the light so it goes to back of eyeball.
- ***Suspensory ligaments***, attached to a **ciliary muscle**. These two things together form the ciliary body, what secrets the aqueous humor.
- **Posterior chamber Is** area behind the ciliary muscle, also filled with aqueous humor.
- **Vitreous chamber** – filled with vitreous humour, jelly-like substance to provide pressure to eyeball.
- **Retina** is filled with photoreceptors.
  - Macula – special part of retina rich in cones.
  - Fovea – completely covered in cones, no rods.
- **Choroid** – pigmented black in humans, a network of blood vessels. Bc black all light is reflected.
- **Sclera** – whites of the eye, thick fibrous tissue that covers posterior 5/6th of eyeball. Attachment point for muscles.

Visual Sensory Information

Sensation requires **light** -> **neural impulse**, by a **photoreceptor**

What is light?

- Electromagnetic wave part of a large spectrum
- EM spectrum contains everything from gamma rays to AM/FM waves. Visible light is in the middle
  - Violet (400nm) – Red (700nm)
- The Sun is one of most common sources of light

Light enters pupil and goes to retina, which contains **rods** and **cones**

- There are 120 million **rods,** for <u>night vision</u>
  - Light comes in, goes through pupil, and hits rod. Normally rod is turned on, but when light hits turns off.
  - When rod is off, it turns **on** a bipolar cell, which turns on a retinal ganglion cell, which goes into the optic nerve and enters the brain.
- There are 6-7 million **cones**
  - 3 types: red, green, blue
  - Almost all cones are centered in **fovea**

Phototransduction Cascade – when light hits rods and cones

- Retina is made off a bunch of dif cells – rods and cones.
- As soon as light is presented to him, he takes light and converts it to neural impulse. Normally turned on, but when light hits it's turned off.

PTC is set of steps that turn it **off.**

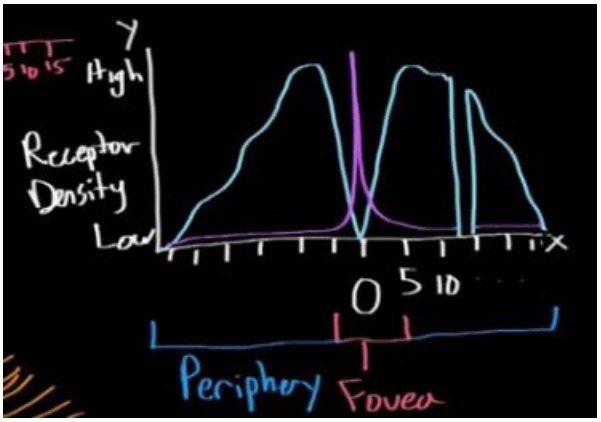
- Inside rod are a lot of disks stacked on top of one another.
- A lot of proteins in the disks. One is **rhodopsin,** a multimeric protein with 7 discs, which contains a small molecule called **retinal** (11-cis retinal). When light hits, it can hit the retinal, and causes it to change conformation from bent to straight.
- When retinal changes shape, rhodopsin changes shape.
- That begins this cascade of events – there's a molecule in green called **transducin** made of 3 dif parts **–** alpha, beta, gamma
  - Transducin breaks from rhodopsin, and alpha part comes to disk and binds to **phosphodiesterase** (PDE).
  - PDE takes cGMP and converts it to regular GMP. Na+ channels allow Na+ ions to come in, but for this channel to open, need cGMP bound. As cGMP decreases, Na channels closes.
  - As less Na+ enters the cell, rods hyperpolarize and turn off. Glutamate is no longer released, and no longer inhibits ON bipolar cells (it's excitatory to OFF bipolar cells).
  - So bipolar cells turn on. This activates **retinal ganglion cell** which sends signal to optic nerve to brain.

Photoreceptors (Rods and Cones)

- A photoreceptor is a **specialized nerve** that can take light and convert to neural impulse.
- Inside rod are **optic discs**, which are large membrane bound structures – thousands of them. In membrane of each optic disc are proteins that fire APs to the brain.
- **Cones** are also specialized nerves with same internal structure as rod.
- **Rods** contain **rhodopsin**, cones have similar protein **photopsin**.
- If light hits a rhodopsin, will trigger the phototransduction cascade. Same process happens in a cone.
- Differences:
  - 120 M rods vs. 6 million cones.
  - **Cones are concentrated in the fovea.**
  - **<u>Rods are 1000x more sensitive to light</u>** <u>than cones. Better at detecting light</u> – telling us whether light is present, ie. BW vision
  - Cones are less sensitive but detect **color** (60% Red, 30% Green, 10% Blue)
  - Rods have <u>slow recovery time</u>, cones have <u>fast recovery time</u>. Takes a while to adjust to dark – rods need to be reactivated.

Photoreceptor Distribution in Retina

- Where optic nerve connects to retina, **blind spot** – no cones or rods.
- Rods are found mostly in <u>periphery.</u>
- Cones are found throughout the fovea, and few in rest of eye.
- If we zoom in on fovea – no axons in way of light, so get higher resolution. If light hits periphery, light has to go through bundle of axons and some energy lost. So at fovea light hits cones directly.



Visual Field Processing

How our brain makes sense of what we're looking at. Right side of body controlled by left side, vice versa.

- How does it work in vision?
  - All right visual field goes to left side of brain, all left visual field goes to right side of brain.

Feature Detection and Parallel Processing

- Color (cones, **trichromatic theory** of color vision), form (parvocellular pathway – good at spatial resolution, but poor temporal), motion (magnocellular pathway, has high temporal resolution and poor spatial resolution, no color)
- **Parallel processing –** see all at same time; simultaneous processing of incoming stimuli that differs in quality

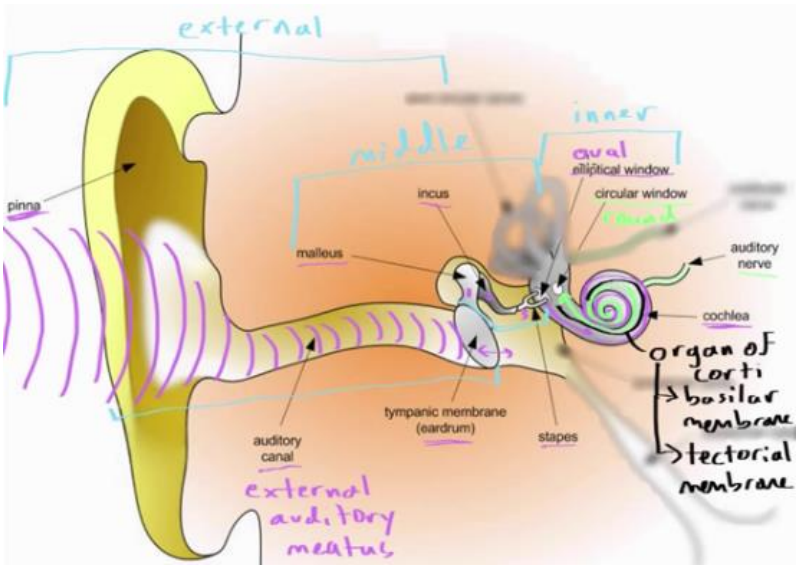
Sound (Audition)

Auditory Structure – Part 1

- Need 1) **pressurized sound wave** and 2) **hair cell**
- Ex. In between your hands are a bunch of air molecules, and suddenly hands move towards each other, so space is a lot smaller.
- Air molecules are pressurized and try to escape, creating areas of high and low pressure – known as **sound waves**
  - Sound waves can be far apart or close together
  - How close peaks are is the **frequency.**
  - Different noises have different sounds
  - You can listen to <u>different frequencies</u> at same time – if you add dif frequency waves together, get weird frequency. Ear has to break this up. Able to do that because sound waves travel different lengths along cochlea.

Hair cells – first hit outer part of ear, known as the **pinna**. Then go to **external auditory meatus** (aka auditory canal). Then hit the **tympanic membrane** (Eardrum)

- As pressurized wave hits eardrum, it vibrates back and forth, causes these 3 bones to vibrate – **malleus**, **incus**, and **stapes**.
- Stapes is attached to **oval window** (aka elliptical window). As it gets pushed, it pushes fluid and causes it to go around **cochlea**. At tip of cochea, it can only go back, but goes to the **round window** and pushes it out.
- Reason doesn't go back to oval window, is because in middle of cochlea is a membrane – the **organ of Corti** (includes the basilar membrane and the tectorial membrane).
- Keeps happening until energy of sound wave is dissipated. Meanwhile hair cells in cochlea are being pushed back and forth and send info to auditory nerve.
- General classification –
  - From pinna to tympanic membrane is the **outer/external ear.**
  - From malleus to stapes, **middle ear**.
  - Cochlea and semicircular canals is the **inner ear.**



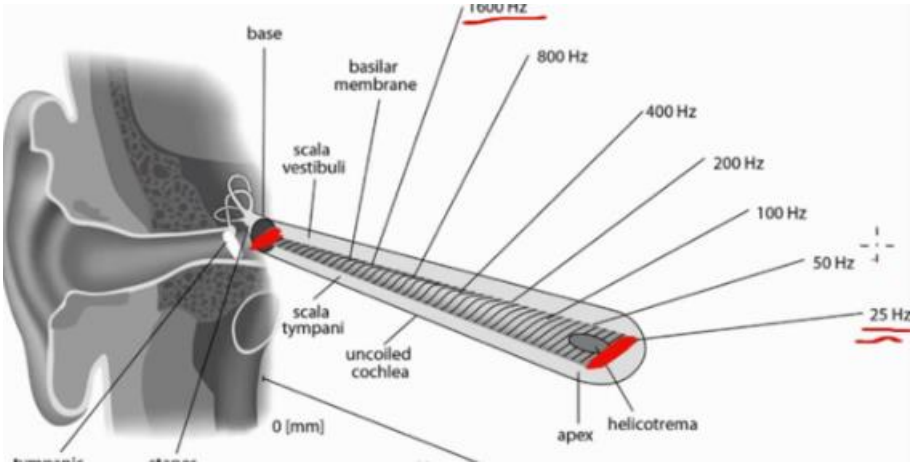
Auditory Structure – Part 2

- Focus on cochlea and inner ear
- Let's unroll the cochlea.
- **Stapes** – moving back and forth at same frequency as stimulus. It pushes the elliptical window back and forth.
  - There's fluid inside the cochlea which gets pushed around cochlea, and comes back around**. Organ of Corti** splits cochlea into 2.
- Cross section of **Organ of Corti**
  - **Upper and lower membrane**, and little hair cells. As fluid flows around the organ it causes hair cells to move back and forth.
  - The **hair bundle** is made of little filaments. Each filament is called a **kinocilium**.
  - Tip of each kinocilium is connected by a **tip link**.
  - Tip link is attached to gate of **K channel**, so when get pushed back and forth they stretch and allows K to flow inside the cell.
  - Ca cells get activated when K is inside, so Ca also gets activated, and causes AP in a **spiral ganglion cell** which then activates the auditory nerve.

Auditory Processing

Brain relies on **cochlea** to differentiate between 2 different sounds.

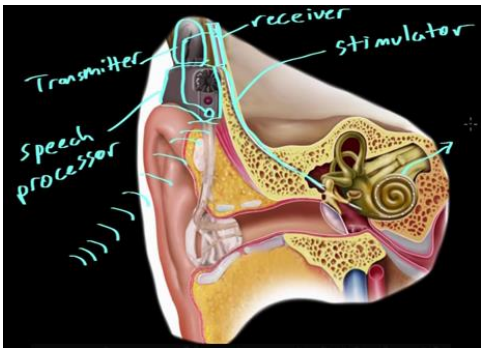
- Base drum has low frequency, whereas bees have high frequency.
- We can hear between 20-20000Hz.
- Brain also uses **basilar tuning –** there are varying hair cells in cochlea. Hair cells at base of cochlea are activated by high frequency sounds, and those at apex by low frequency sounds.
  - Apex = 25 Hz, base = 1600 Hz.
  - Only certain hair cells are activated and send AP to the brain – **primary auditory cortex** receives all info from cochlea.
  - Primary auditory cortex is also sensitive to various frequencies in dif locations.
  - So with basilar tuning, brain can distinguish dif frequencies – **tonotypical mapping**.

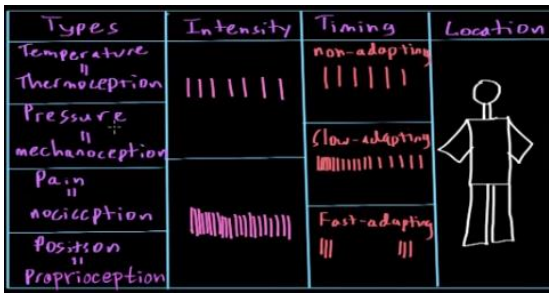


Cochlear Implants

A surgical procedure that attempts to restore some degree of hearing to individuals with **sensory narrow hearing loss** – aka `nerve deafness`

- They have a problem with conduction of sound waves from cochlea to brain.
- **Receiver** goes to a **stimulator** which reaches the cochlea. Receiver receives info from a **transmitter**. Transmitter gets electrical info from the **speech processor**. Speech processor gets info from microphone.
- Sound -> microphone -> transmitter (outside the skull) sends info to the receiver (inside). Then it sends info to the stimulator, into the the cochlea, and cochlea converts electrical impulse into neural impulse that goes to brain.





Somatosensation

- Types of Sensation, Intensity, Timing, and Location
- **Types:** Temperature (thermoception), pressure (mechanoception), pain (nociception), and position (proprioception)
- **Timing:** Non-adapting, slow-adapting, fast-adapting.
- **Location:** Location-specific nerves to brain

Sensory Adaptation and Amplification

Adaptation is change over time of receptor to a constant stimulus – **downregulation**

- Ex. As you push down with hand, receptors experience constant pressure. But after few seconds receptors no longer fire.
- Important bc if cell is overexcited cell can die. Ex. If too much pain signal in pain receptor (capsaicin), cell can die.

Amplification is **upregulation**

- Ex. Light hits photoreceptor in eye and can cause cell to fire. When cell fires AP, can be connected to 2 cells which also fire AP, and so on.

Somatosensory Homunculus

- Your brain has a map of your body – the cortex.
- This part of cortex is the **sensory cortex** – contains the homunculus.
- Info from body all ends up in this somatosensory cortex.
- If there was a brain tumor, to figure out what part it's in neurosurgeons can touch diff. parts of cortex and stimulate them. If surgeon touches part of cortex patients can say they feel it. Do it to make sure they aren't removing parts in sensation.
- This creates topological map of body in the cortex.

Proprioception and Kinaesthesia

How can you walk in a pitch black room? You rely on your sense of balance/position –**proprioception**.

- Tiny little sensors located in our muscles that goes up to spinal cord and to the brain. It's sensitive to stretching.
- Sensors contract with muscles – so we're able to tell how contracted or relaxed every muscle in our body is.

Kinaesthesia is talking about movement of the body. Proprioception was cognitive awareness of body in space. Kinaesthesia is more behavioural.

- Kinaesthesia does not include sense of balance, while proprioception does.

Pain and Temperature

- Pain = nociception, temp = thermoception
- In order for us to sense temperature, we rely on the **TrypV1 receptor**.
  - Interestingly, this receptor is also sensitive to pain.
  - There are thousands of these in membranes. Heat causes a **conformational change** in the protein.
  - When cell is poked, thousands of cells are broken up, and releases different molecules that bind to TrypV1 receptor. Causes change in conformational change, which activates the cell and sends signal to brain.
- **3 types of fibres** – fast, medium, slow.
  - **A-beta fibres -** Fast ones are thick and covered in myelin (less resistance, high conductance)
  - **A-delta fibres** -– smaller diameter, less myelin.
  - **C fibres** - small diameter, unmyelinated (lingering sense of pain).

Pain also changes conformation of receptors – capsaicin binds the TrypV1 receptor in your tongue, and triggers the same response.

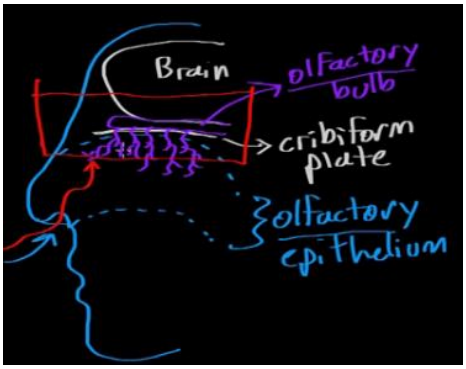
Taste and Smell

Olfaction – Structure and Function

- When you have a cold, you aren't able to taste things very well.
  - When you eat, molecules travel up back of throat and some go into back of your nose. So you're using your sense of smell in conjunction with taste.
  - If your smell is knocked out, you can't taste things as well.

Smell is also known as **olfaction**

- Area in nostril called the **olfactory epithelium**. Separating the olfactory epithelium from the brain is the **cribriform plate**. Above the plate is an extension from the brain – **olfactory bulb** – a bundle of nerves that sends little projections through cribriform plate into the olfactory epithelium, which branch off.
  - At end of each connection are receptors, each sensitive to 1 type of molecule.
  - Molecule travels into nose, binds one of receptors on nerve endings.
- Zoom in on **olfactory bulb**
  - Imagine there's olfactory cell sending projection to olfactory bulb. There are thousands of types of epithelial cells, each with dif receptor. Say this one is sensitive to benzene rings.
  - When it binds to receptor, triggers events that cause cell to fire. AP will end up in olfactory bulb. All cells sensitive to benzene will fire to one olfactory bulb – called a **glomerulus**.
  - They then synapse on another cell known as a **mitral/tufted cell** that projects to the brain.
- The molecule binds to the GPCR receptor, G-protein dissociates and causes a cascade of events inside the cell. Binds to ion channel, which opens and triggers an AP.



Pheromones

Why do dogs pee on fire hydrant? There are molecules released in the urine, which can be sensed by other animals through the nose – **pheromones**.

- They're specialized olfactory cells.
- Cause some sort of response in animal smelling them.
- Pheromone is a chemical signal released by 1 member of the species and sensed by another species to trigger an **innate response**.
- Really important in animals, particularly insects – linked to mating, fighting, and communication.

Specialized part of olfactory epithelium in animals – the **accessory olfactory epithelium**. It sends projections to the **accessory olfactory bulb**.

- Within the accessory olfactory epithelium, you have the **vomeronasal system.**
- In vomeronasal system, there are **basal cells** and **apical cells**. They have receptors at tips.
- Triangle will come in and activate receptor on basal cell here. Basal cell sends axon through accessory olfactory bulb to glomerulus, which eventually goes to the **amygdala.**
  - Amygdala is involved with emotion, aggression, mating etc.
- ***Humans*** have vomeronasal organ, but no accessory olfactory bulb.

Gustation – Structure and Function

- We have 5 main tastes, localized on the tongue – bitter, salty, sweet, sour, and umami (ability to taste glutamate).
- Taste buds are concentrated anteriorly on the tongue. Taste buds can be **fungiform** (anterior), **foliate** (side), and **circumvallate** (back).
  - In each taste bud are the 5 receptor cells that can detect each taste. Each taste can be detected anywhere on the tongue.
  - Mostly on anterior part of tongue.

- Each receptor has an axon, which all remain separate to the brain. And they all synapse on dif parts of the gustatory cortex. Known as the **labelled lines model**.
  - Ex. Glucose hits tongue, activates sweet cell (because it has sweet sensitive receptors), triggers cascade of events so cell depolarizes, and travels down axon to the brain.
  - Glucose binds GPCR, conformational change, G-protein dissociates, opens ion channels, cause cell to depolarize and fire an AP
- Sweet, umami, and bitter cells **GPCR** receptors.
- Sour and salty rely on **ion channels**. They bind to receptor directly, ex. NaCl binds to receptor and causes ion channel to open, and + ions outside flow in. Cell depolarizes and fires an AP.
- What happens if we put salty receptor inside a sweet cell? Receptors in membrane bind to glucose. But let's insert a salty receptor. Since axon from cell leads to brain, if NaCl comes in, it activates the receptor, + ions go inside, sweet cell depolarizes and fires AP, and brain interprets it as a sweet signal.

Sleep and Consciousness

States of Consciousness

- **Consciousness** is awareness of our self and environment – dif levels of awareness can be induced by external factors such as drugs or internal mental efforts. Range from alertness to sleep.
- **Alertness** – you're awake
- **Daydreaming**- feel more relaxed, not as focussed. Can also be light meditation (self-induced)
- **Drowsiness -** just before falling asleep/after waking up. Can also be self-induced in deep meditation.
- **Sleep** – not aware of world around you.4 main types (Each type oscillates at dif frequency)
  - ***Beta*** (13-30Hz) – associated with awake/concentration. Increased stress, anxiety, restlessness. Constant alertness.
  - ***Alpha waves*** (8-13 Hz) – in daydreaming. Disappear in drowsiness but reappear in deep sleep. During relaxation.
  - ***Theta waves*** (7 Hz) – Drowsiness, right after you fall asleep.
  - ***Delta waves*** (0.5-3 Hz) - Deep sleep or coma.
  - EEGs can measure brainwaves

Sleep Stages and Circadian Rhythms

Your brain goes through distinct brain patterns during sleep. 4 main stages that occur in 90 min cycles

- (Order is from N1 -> N2 -> N3 -> N2 -> REM - Order within cycle goes How long each stage lasts depends on how long you've been asleep and your age)

First is **non-rapid eye movement** sleep (non-REM) – N1, N2, N3

- **N1 (Stage 1)–** Dominated by ***theta waves***. Strange sensations – **hypnagonic hallucinations**, hearing or seeing things that aren't there.
  - Ex. Seeing flash of light, or someone calling your name, doorbell, etc. Or the **Tetris effect** – if you play Tetris right before bed, you might see blocks. Also a feeling of falling – **hypnic jerks**. Theta waves.
- **N2 (Stage 2)** – deeper stage of sleep. People in N2 are harder to awaken. We see ***more theta waves***, as well as **sleep spindles and K-complexes**.
  - **Sleep spindles** help inhibit certain perceptions so we maintain a tranquil state during sleep. Sleep spindles in some parts of brain associated with ability to sleep through loud noises.
  - **K-complexes** supress cortical arousal and keep you asleep. Also help sleep-based memory consolidation. Even though they occur naturally, you can also make them occur by touching someone sleeping.
- **N3 (Stage 3)** – slow wave sleep. Characterized by ***delta waves***. Where walking/talking in sleep happens.

REM (rapid-eye movement) stage. Most of your other muscles are paralyzed. Most dreaming occurs during REM sleep, so paralysation inhibits actions. Most important for **memory consolidation.**

- Combination of ***alpha, beta, and desynchronous waves***, similar to beta waves seen when awake.
  - Sometimes called **paradoxical sleep**, because brain is active and awake but body prevents it from doing anything.
  - Waking up during REM sleep prevents memory formation of the dream.

Circadian Rhythms – why you get sleepy in afternoon. They're our regular body rhythms across 24-hour period. Controlled by **melatoni**n, produced in the **pineal gland**.

- Control our body temperature, sleep cycle, etc.
- Daylight is big queue, even artificial light.
- Also change as you age – younger people are night owls, but older people go to bed early.

Dreaming

- Everybody dreams during REM sleep. Can tell someone is dreaming because eyes are moving rapidly under eyelids, and brainwaves look like they are completely awake.
- Activity in **prefrontal cortex** during REM sleep is decreased – part responsible for logic. Why things in our things that defy logic don't seem weird.

Sigmund Freud

- Dreams are our unconscious thoughts and desires that need to be interpreted. Little scientific support.

Evolutionary biology

- Threat simulation, to prepare for real world.
- Problem solving
- No purpose

Other

- Maintain brain flexibility
- Consolidate thoughts to long-term memory, and cleaning up thoughts. People who learn + sleep retain more than those who do not sleep. But role of REM is unclear.
- Preserve and developing neural pathways. Because infants constantly developing new neural networks spend most of time in REM sleep.

Dream Theories – Freud and **Activation Synthesis Hypothesis**

Do our dreams have a meaning? **Sigmund Freud's** theory of dreams says dreams represent our unconscious feelings/thoughts. Like an iceberg.

- 1. What happens? **Manifest content** (Ex. Monster chasing you)
- 2. What is hidden meaning? **Latent content** (Ex. Job pushing you out)
  - Can help us resolve and identify hidden conflict.

Activation Synthesis Hypothesis

- Brain gets a lot of neural impulses in brainstem, which is sometimes interpreted by the frontal cortex.
- Brainstem = activation, and cortex = synthesis.
- Our brain is simply trying to find meaning from random brain activity. Therefore might not have meaning.

Sleep Disorders

People with **sleep deprivation** might be more irritable and have poorer memory. Could be dangerous when it comes to flying airplanes or driving cars.

- Also more susceptible to obesity – body makes more cortisol, and the hunger hormone.
- Can also increase your risk for depression. REM sleep helps brain process emotional experiences, which can help protect against depression (not certain).
- Can get back on track by paying back "sleep debt"
  - How much is enough sleep? **7-8 hours for adults**. Varies with age and individual. Babies need a lot more.

More serious form – **insomnia** (persistent trouble falling asleep or staying asleep). Various medications but taking them too long leads to dependence and tolerance.

- Exercising or relaxing before bed can help

Other end of spectrum is **narcolepsy** – can't help themselves from falling asleep. Various fits of sleepiness, going into REM sleep. Can occur any time. 1 in 2000.

- Indications it's **genetic**, and linked to absence of alertness neurotransmitter.

Sleep apnea – 1 in 20 people. People with it are often unaware. Stop breathing while sleeping – body realizes you're not getting enough oxygen, wake up just long enough to gasp for air and fall back asleep without realizing. Can happen 100x/night!

- Don't get enough ***N3 (slow-wave) sleep***.
- Snoring is an indication, or fatigue in morning.

Sleepwalking/sleep talking – mostly genetic, occur during **N3** and are harmless. Occur more often in children (have more N3).

Breathing-Related Sleep Disorders

- Sleeping problems can arise from brain, airways, or lungs/chest wall.
- Obstruction to airways causes problems breathing at night
  - Air going into nose/mouth reaches the lungs. Tissues around neck may block this airflow – snoring/gasping/pauses in breathing. Called an **apnea** (absence of airflow).
  - Called **obstructive sleep apnea**, very common and gets worse as people get older.
  - People are tired/sleepy and unrefreshed when they wake up.
  - 5+ apneas an hour (measured by polysomnography)
- In the brain, called **central sleep apnea**. Presence of apneas without obstruction. Problem with the control system for ventilation.
  - **Cheyne-Stokes breathing** (period of oscillations, then flat, etc.) pattern in polysomnography
- In lungs or chest wall, hyperventilation can occur (high pCO_2, low pO_2). Caused by medication/obesity. Chronically elevated pCO_2 can lead to right-sided heart failure.

Hypnosis and Meditation

Hypnotism usually involves getting person to relax and focus on breathing, and they become more susceptible to suggestion in this state – but only if they want to. More ***alpha waves*** in this stage – an awake but relaxed state.

- Some use hypnosis to retrieve memories, very dangerous because memories are malleable. Can create false memories.
- 2 theories for how it works:
  - **Dissociation Theory** - hypnotism is an extreme form of divided consciousness
  - **Social Influence Theory** - people do and report what's expected of them, like actors caught up in their roles
- Refocused attention, so sometimes it's used to treat pain. Reduced activity in areas that process sensory input. Although it doesn't block it out, it might inhibit attention

Meditation – training people to self-regulate their attention and awareness. Can be guided and focused on something in particular, like breathing, but meditation can also be unfocussed – mind wanders freely.

- More alpha waves than normal relaxation in light meditation.
- In deep meditation have increased theta waves in brain.
  - In people who regularly go to deep meditation, increased activity in prefrontal cortex, right hippocampus, and right anterior insula – increased **attention control** (goal of meditation).
- Can be helpful for people with ADHD, or in aging.

Drug Dependence

Psychoactive Drugs

Depressants and Opiates

Depressants are drugs that lower your body's basic functions and neural activity, ex. Heart rate, reaction time, etc. The most popular depressant is **alcohol**.

  - Think more slowly, disrupt REM sleep (and form memories), removes your inhibitions
- **Barbiturates** – used to induce sleep or reduce anxiety. Depress your CNS.
  - Side effects are *reduced memory*, *judgement and concentration*, with alcohol can lead to death (most drugs w/ alcohol are bad)

- **Benzodiazepines** are the most commonly prescribed suppressant. Sleep aids or anti-anxiety
  - Enhance your brain's response to ***GABA***. They open up GABA-activated chloride channels in your neurons, and make neurons more negatively charged.
  - 3 types: short, intermediate, and long-acting. Short and intermediate are usually for sleep, while long acting are for anxiety.
- **Opiates** are used to treat pain and anxiety. Ex. Heroine and morphine. NOT a depressant.
  - Used to treat pain because they act at body's receptor sites for ***endorphins***.
  - Different class than depressants, even though overlapping for anxiety, rest act on GABA receptors while opiates act on endorphin Rs.
  - Lead to euphoria, why taken recreationally

Stimulants

Stimulate or intensity neural activity/bodily functions.

- Range from caffeine to cocaine, amphetamines, methamphetamines, and ecstasy. In between is nicotine.
- **Caffeine** (inhibits ***adenosine receptors***) can disrupt your sleep. **Nicotine** also disrupts sleep and can suppress appetite.
  - At high levels, nicotine can cause muscles to relax and release stress-reducing neurotransmitters (to counteract hyper alertness).
  - Both physiologically addicting.
  - Withdrawal symptoms from both. Like anxiety, insomnia, irritability.
- **Cocaine** is even stronger stimulant – releases so much ***dopamine, serotonin, and norepinephrine*** that it depletes your brain's supply. Intense crash and very depressed when it wears off.
  - Regular users can experience suspicion, convulsions, respiratory arrest, and cardiac failure.
- **Amphetamines and methamphetamines** also trigger release of ***dopamine***, euphoria for up to 8 hours.
  - Highly addictive
  - Long-term addicts may lose ability to maintain normal level of dopamine

Hallucinogens

These drugs cause hallucinations, altered perception. Many types of hallucinations. Some even have medical uses.

- **Ecstasy** – synthetic drug both a stimulant and hallucinogen.
  - Increases ***dopamine and serotonin*** and euphoria. Also stimulates the body's NS. Can damage neurons that produce serotonin, which has several functions including moderating mood.
  - Causes hallucinations and heightened sensations, ex. artificial feeling of social connectedness.
- **LSD** – interferes with serotonin, which causes people to experience hallucinations.
  - Hallucinations are visual instead of auditory
- **Marijuana** is also a mild hallucinogen. Main active chemical is THC, which heightens sensitivity to sounds, tastes, smells.
  - Like alcohol, reduces inhibition, impairs motor and coordination skills.
  - Disrupt memory formation and short-term recall.
  - Stays in body up to a week.
  - Used as medicine to relieve pain and nausea

Some hallucinogens are used for **PTSD treatment**. Allow people to access painful memories from past that's detached from strong emotions – so they can come to terms with it.

Drug Dependence and Homeostasis

Homeostasis is how you maintain temperature, heartbeat, metabolism etc.

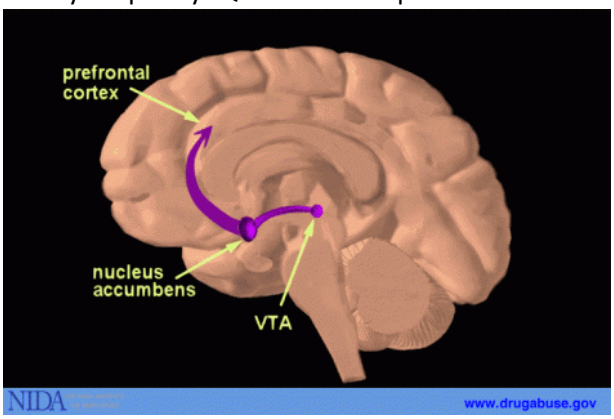
- If you take amphetamines, body quickly tries to lower HR and get back to normal. Brain is smart about this.
  - If regular drug user, might take it at same time of day.

- If you're cocaine addict, your brain starts to recognize external cues like room, needles, etc. and knows it's about to get big dose of drug. Brain tells body to get head start – lowers HR before you take drugs. Why you need higher dose over time.

– What would happen if you get those cues and don't get the drug? You get a crash.
– If you're in a new location but take same level of drugs, might get overdose.

Routes of Drug Entry
Oral, injection, inhalation,

– **Oral** is ingesting something, one of slowest routes because goes through GI tract – half hour.
– **Inhalation** is breathing or smoking, because once you inhale goes straight to brain – 10 seconds.
– **Injection**- most direct, intravenous means goes right to vein. Takes effects within seconds. Can be very dangerous.
– **Transdermal** – drug is absorbed through skin, ex. Nicotine patch. Drug in patch has to be pretty potent, released into bloodstream over several hours.
– **Intramuscular –** stuck into muscle. Can deliver drugs to your system slowly or quickly. Quick for example is epipen. Or vaccines, slowly.
  - Faster route of entry = more addictive potential.



Reward Pathway in the Brain
When you first experience pleasure, brain releases neurotransmitter called **dopamine**. Produced in the **ventral tegmental area** (VTA), in the **midbrain.**

– VTA sends dopamine to the:
  - **Amygdala**
  - **Nucleus accumbens** (controls motor functions)
  - **Prefrontal cortex** (focus attention and planning)
  - **Hippocampus** (memory formation).
    - Nuc. Accum., amygdala and hippocampus are part of the **mesolimbic pathway**.
– Different stimuli active circuit to dif degrees.
– VTA releases dopamine and receptors uptake dopamine – amygdala says this was enjoyable, hippocampus remembers and says let's do it again, and nucleus accumbens says let's take another bite. Prefrontal cortex focuses attention to it.
  - At same time **dopamine goes up**, ***serotonin goes down***, partially responsible for feelings of satiation. Less likely to be satiated or content.
– Increased genetic risk.
– Biological basis comes from animal models
  - Ex. Rats and drug experiment, rats keep increasing dosage. Or if sick drug + favorite food = avoids it, addictive drug + fav food = wants more.
– Addiction takes over rational mind.

Tolerance and Withdrawal
Tolerance means you get used to a drug so you need more of it to achieve the same effect.

– Ex. Just took cocaine, lots of dopamine in synapse. Post-synaptic neuron has receptors for dopamine. ***Long-term stimulation*** can lead to brain shutting down some receptor – same amount of drugs won't cause same high.

If you go through period of not having the drug, you experience **withdrawal symptoms**.

– Things less strong as cocaine won't give you as strong of an effect, so dopamine levels decrease and you feel depressed, anxious, etc. (varies).
– Will do whatever it takes to get that high.
– Once you've built up tolerance, need drug to feel "normal" again.
– However, with time and effort brain can reverse back.

Substance Use Disorders

- Drugs include alcohol, tobacco, cannabis, opioids (heroin/morphine), stimulants (cocaine), hallucinogens (LSD), inhalants, and caffeine
- We have to consider what happens when drugs enter the body and when they exit. 2 different processes: **intoxication** and **withdrawal**.
  - Intoxication refers to behavioural and psychological effects on the person, drug-specific. Ex. "drunk" or "high"
  - Withdrawal is when you stop after using for prolonged time.
- Can result in **substance-induced disorders**. Could be disorders of mood (mania/depression), anxiety, sleep, sexual function, psychosis (loss of contact with reality).
- Which can lead to **substance use disorders**. Causing real degree of impairment in life, at work, school, or home.
  - How do you know? By looking at their **usage**. Are they using increasingly large amounts, stronger cravings, more time recovering from it, failing to cut back, affecting obligations at work/home/school?
  - Second factor is presence of **withdrawal**.
  - Also **tolerance**.
- With caffeine, can't develop substance-use disorder.

Treatments and Triggers for Drug Dependence

- Treatments address physiological + psychological symptoms.

To treat, detox. But sometimes require strong medications to address symptoms.

- ***For Opiates*** such as heroine act at neural receptor site for endorphins to reduce pain and give euphoria.
  - **Methadone** activates opiate receptors, but acts more slowly, so it dampens the high. Reduces cravings, eases withdrawal, and can't experience the high because receptors are already filled.
- ***For stimulants*** like tobacco, medications replace nicotine by delivering low levels of nicotine through patch, or deliver chemicals that act on nicotine receptors in brain. In this case prevents release or reuptake of dopamine. Help reduce cravings.
- ***For alcoholics***, meds block receptors in reward system of alcohol. Also reduce symptoms of withdrawal.
  - Important to prevent relapse during this early stage by minimizing negative symptoms.

- **Inpatient** treatments require residence at a hospital or treatment facility, **outpatient** means they can live at home and come in for treatment.
- **Cognitive behavioural therapy** (CBT) addresses both cognitive and behavioural components of addiction. Recognize problematic situations and develop more positive thought patterns and coping strategies, and monitor cravings. ***Long-lasting!***
- **Motivational interviewing** involves working with patient to find intrinsic motivation to change. Very few sessions and can be doorway for patient to engage in another treatment.
- **Group meetings** such as AA involve 12-step program – acceptance, surrender, and active involvement in meetings. (Evidence they're helpful)
- **Relapse** is when patient can slip and go back. More addictive substances make relapse more likely. Why it's hard for people to stay clean.

Attention

Divided Attention, Selective Attention, Inattentional Blindness, and Change Blindness

Attention is a limited resource

- **Divided Attention**. doing two things at once you end up switching between tasks rather than doing them simultaneously.
- When you switch you're exercising your **selective attention** – process of reacting to certain stimuli selectively as they occur simultaneously. There are two types of cues that can direct our attention:
  - **Exogenous** - don't have to tell ourselves to look for them (Ex. Bright colors, loud noises, "pop-out effect")
  - **Endogenous** (require internal knowledge to understand the cue and the intention to follow it, ex. A mouse arrow, or the cocktail party effect).

- **Cocktail party effect** – ability to concentrate on one voice amongst a crowd. Or when someone calls your name.

– **Inattentional blindness** – we aren't aware of things not in our visual field when our attention is directed elsewhere in that field.
– **Change blindness** – fail to notice changes in environment.

Theories of Selective Attention
How do we filter out the unimportant information?
– **Shadowing task** – left ear hear one thing, right ear another thing. Told to repeat everything said in one ear and ignore the other. We can learn about how selective attention works by seeing what they filter out in other ear.

1) Broadbent's Early Selection Theory
– All info in environment goes into **sensory register**, then gets transferred to **selective filter** right away which filters out stuff in unattended ear and what you don't need to understand it (accents etc.), and finally **perceptual processes** identifies friend's voice and assigns meaning to words. Then you can engage in other cognitive processes.
  - Some problems – if you completely filter out unattended info, shouldn't identify your own name in unidentified ear. Cocktail party effect.

2) Deutch & Deutch's Late Selection Theory
– Places broadband selective filter after perceptual processes. Selective filter decides what you pass on to conscious awareness.
– But given limited resources and attention, seems wasteful to spend all that time assigning meaning to things first.

3) Treisman's Attenuation Theory
– Instead of complete selective filter, have an ***attenuator*** – weakens but doesn't eliminate input from unattended ear. Then some gets to perceptual processes, so still assign meaning to stuff in unattended ear, just not high priority. Then switch if something important.

The Spotlight Model of Attention and Multitasking
Spotlight model of attention Selective attention – takes info from 5 senses, but don't pay attention to everything.
– Aware of things on an unconscious level
  - **Priming**, where exposure to one stimulus affects response to another stimulus, even if we haven't been paying attention to it.
  - We're primed to respond to our name. Why it's a strong prime for pulling our attention.

Resource model of attention – we have limited resources in attention.
– Both models say something about our ability to multitask – not very good at it. Supported by research study.

Multitasking/divided attention
– What about talking on phone or texting while driving?
  - Maybe not multitasking, just switching spotlight back and forth.
– What about singing to radio?
  - **Task similarity** – ex. Listening to radio while writing a paper. Better to listen to classical music, because harder to multitask with similar tasks.
– **Task difficulty** – harder tasks require more focus.
– **Practice** – activities well practiced become automatic, or things that occur without need for attention. Whether task is automatic or controlled (harder).

Memory

Information Processing Model: Sensory, Working, and Long-term Memory

Information processing model proposes our brains are similar to computers. We get input from environment, process it, and output decisions.

- First stage is getting the input – occurs in sensory memory (sensory register). Temporary register of all senses you're taking in.
- You have **iconic** (what you ***see***, lasts half a second) and **echoic** (what you ***hear,*** lasts 3-4 seconds) memory

Working memory is what you're thinking about at the moment.

- Verbal info – any words + numbers in both iconic and echoic memory
  - Is processed in the **phonological loop**.
- Visual + verbal info – Need coordination of the two – the **central executive** fills that role.
  - Creates an integrated representation that stores it in the **episodic buffer** to be stored in long-term memory.
- Visual + spatial info are processed in the **visuo-spatial sketchpad**

- ***Magic number 7*** – can hold **7 +/- 2** pieces of info at a time. Why phone #s are 7 digits long.
- Explains the **serial position effect** (primacy and recency effects)

The **dual coding hypothesis** says it's easier to remember words associated with images than either one alone.

- Can use the **method of loci** – imagine moving through a familiar place and in each place leaving a visual representation of topic to be remembered.

Final stage is **long-term memory**. Capacity is unlimited. 2 main categories: explicit (declarative) and implicit (non-declarative).

- **Explicit Memory (Declarative) -** are facts/events you can clearly describe.
  - Anytime you take vocabulary test or state capitals you're using **semantic memory** (has to do with words). So remembering simple facts.
  - Second type is **episodic memory** (event-related memories).
- **Implicit memories (Non-declarative)** involve things you may not articulate – such as riding a bicycle, **procedural memories**.
- Other is **priming** – previous experiences influence current interpretation of an event.

Encoding Strategies

Encoding is transferring sensory information into memory.

- If you want to remember more than 7 things, need to process that info so it stays in long-term memory.
- 1. **Rote rehearsal** –You say same thing over again.
  - Least effecive
- 2. **Chunking** – we group info we're getting into meaningful categories we already know.
- 3. **Mnemonic Devices** – imagery (crazier the better), pegword system (verbal anchors like words that rhyme with the number – 1 is gun), method of loci (tying info to locations), acronym
- 4. **Self-referencing** – think about new info and how it relates to you personally.
  - Also preparing to teach – learning it as if to teach it to someone else (putting more effort into understanding + organizing info)
- 5. **Spacing** – spreading out studying to shorter periods.

Retrieval Cues

- **Priming** – prior activation of nodes/associations, often without our awareness.
  - Ex. hearing apple and asked to name word starting with A
- **Context** – the environment you encode and take the test.
  - Scuba divers who learned and tested on same place scored better than learned in one place and took test in another.
  - But not always the case, if you can't take test in same place studying in different places gives you diff cues for retrieval – so multiple cues that will help you.
- **State-dependent Memory** – your state at the moment.
  - Ex. If you learn something while drunk you'll remember next time you're drunk. Or combining a mood with an advertisement – next time you're in that mood will remember the product.

Retrieval Cues: Free Recall, Cued Recall, and Recognition

Anytime you pull something out of long-term memory, you're engaging in retrieval.

- **Free recall** - no cues in recalling.
  - Better recalling first items on a list (**primacy**) as well as last few (**recency**). Harder in middle.
  - Curve is called the **serial position curve/effect**
- **Cued recall –** give you "pl" for "planet".
  - Get more retrieval cues, tend to do better than free recall.
- **Recognition** – best out of the 3 tests.
  - Present two words, and say which one you heard.

Memory Reconstruction, Source Monitoring, and Emotional Memories

Brain doesn't save memories exactly. Every time we retrieve a memory we change it in small ways, according to our goals/mood/environment. Or due to our own desires. If gap brain fills it in with something desirable.

- Sometimes information we retrieve is based on a **schema** - mental blueprint containing common aspects of world, instead of reality.
- **False information** – inaccurate recollections of an event.
- **Misleading information** – observed video of car crash, and asked how fast cars were going. Some people got word "hit" and some got "smash". If people received "smashed", more likely to say there was glass on the ground.
- **Source monitoring Error –** memory error where source of memory is incorrectly attributed to a specific recollected experience (when people recall information they often forget the information's source) –
  - Ex. angry with someone but forgot it happened in a dream. Or recognize someone but don't know from where.
- **Emotional memories** can be positive or negative
  - Highly vivid memories are called **flashbulb memories** – even if they seem as real as life, still susceptible to reconstruction.

Long Term Potentiation and Synaptic Plasticity

- Brain doesn't grow new cells to store memories – connections between neurons strengthen. Called **long-term potentiation**, one example of **synaptic plasticity.**
  - Neurons communicate using electrochemical signals – through synapse. Pre-synaptic neurons release neurotransmitters on post-synaptic neurons, allowing Na and Ca to flow in. Dif in charge between outside and inside is the **potential.**
- With repeated stimulation, the same pre-synaptic neuron converts into greater post-synaptic neuron – stronger synapse, and when it lasts longer called **long-term potentiation**. This is learning!

Decay and Interference

Decay – when we don't encode something well or don't retrieve it for a while, we can't at all anymore. Connections become weaker over time. Initial rate of forgetting is high but levels off over time.

- **Ebbinghaus** was first investigator of decay. Found his rate of forgetting very fast, but if he remembered it after initial stage it levelled out.

– Just because you can't retrieve something doesn't mean it's completely gone – **relearning**. Even if Ebbinghaus couldn't reproduce everything, took less time to learn list second time around. Called **savings**.
– Works with procedural skills too – ex. With piano.

Sometimes **interference** is the problem though – 2 types:

– **Retroactive** - new learning impairs old info (ex. Writing new address)
– **Proactive** - something you learned in past impairs learning in future (Ex. New password).

Aging and Cognitive Abilities

– **Stable** – implicit memory (ex. riding a bike), and recognition.
– **Improve** – semantic memories improve around age 60, so older adults have better verbal skills. Also crystallized IQ (ability to use knowledge and experience). Also emotional reasoning.
– **Decline** – recall, episodic memories (forming new memories is difficult, old memories stable), processing speed, and divided attention. Also **prospective memory** (remembering to do things in future) is decreased.

Alzheimer's Disease and Korsakoff's Syndrome

Excessive forgetting can be problematic.

Dementia is forgetting to point of interfering with normal life – results from excessive damage to brain tissue, ex. From strokes.

– Most common form is **Alzheimer's Disease**. Neurons die off over time. Earliest symptoms are memory loss, attention, planning, semantic memory, and abstract thinking. As it progresses, more severe language difficulties and greater memory loss, emotional stability and loss of bodily functions. Cause is unknown – have buildup of **amyloid plaques** in brain.

Korsakoff's Syndrome – caused by lack of vitamin B1 or thiamine. Caused by malnutrition, eating disorders, and especially alcoholism.

– **Thiamine** converts carbohydrates into glucose cells need for energy. Imp for neurons.
– Damage to certain areas causes poor balance, abnormal eye movements, confusion, and memory loss. At this stage called **Wernicke's encephalopathy** – precursor to KS. If diagnosed in time can prevent further damage. If untreated, will progress to Korsakoff's. Main symptom is severe memory loss, accompanied by confabulation (patients make up stories to fill in memories).
– Treatment is healthy diet, abstain from alcohol, take vitamins, and relearn things.

Retrograde amnesia is inability to recall info previously encoded, **anterograde amnesia** is inability to encode new memories.

Piaget's Stages of Cognitive Development

Piaget argued children weren't miniature adults. Believed they actively construct their understanding of world as they grow.

- **Sensorimotor stage** (0-2 years) - smell, hearing, touch etc. + active
  - Also develop **object permanence** – don't realize objects still exist if they can't see them. Can also use accommodation to acquire knowledge about novel experiences.
- **Preoperational stage**. (2-7 years)– When children are going to develop/engage in **pretend play**.
  - Very **egocentric** – no empathy.
- **Concrete operational stage**. (7-11 years) –Learn idea of **conservation**.
  - Can do test to find out if they're in this stage – take 2 glasses with same amount of water, pour one into short fat glass and other into tall skinny glass, and ask child which one has more. Before this stage will say tall glass, but once they reach concrete operational stage, have same amount of water.
  - Also begin to learn **empathy**.
- **Formal operational stage** (12+) – reason abstract consequences, and reason consequences. Where sophisticated moral reasoning begins to take place.

Problem Solving

We are excellent problem solvers. Well-defined (clear) and ill-defined (more ambiguous starting/ending point) problems. There are some methods we can imply in problem solving:

1. **Trial + error –** not the most efficient.
2. **Algorithm** – logical procedure of trying solutions till you hit the right one.
3. **Heuristics** – mental shortcut to find solution quicker than other 2, ex. Focusing on one category of solutions.
   - **Means-end analysis** – we analyze main problem and break it down into smaller problems, and reduce differences between problem and goal.
   - **Working backwards** – start with goal and use it to suggest connections back to current. Used in mathematical proofs.
4. **Intuition** – relying on instinct. High chance of error.
   - **Fixation** – getting stuck on a wrong approach. What happens might be **insight** – that aha moment. Or can let problem **incubate** – insight comes after some time.
   - **Type I error** = false positive
   - **Type II error** = false negative

Decision Making

You use **heuristic** shortcuts to make a decision – it's a quick decision rule/rule of thumb, ex. putting hand on shoulder when someone is sad.

- **Availability** method – using examples that come to mind.
  - Helpful, but our memories don't match real state of the world.
- **Representativeness** – a heuristic where people look for the most representative answer, such as if person matches a prototype.
  - But can lead to a **conjunction fallacy**, which means co-occurrence of two instances is more likely than a single one (ex. Feminist bank teller vs. bank teller – actually more likely she's just a bank teller, but people tend to think the probability of 2 events occurring together is higher than the probability of one alone).

Availability vs. representativeness

- Availability = actual memories in mind
- Representativeness = not thinking of exact memories, thinking of a prototype of idea.

Biases that prevent us from making correct decision

1. **Overconfidence** – ex. Going into test without knowing a lot of info.
   - Could be due to fluency during studying.
2. **Belief perseverance** – ignore/rationalize disconfirming facts
   - Ex. During elections ignore facts about someone you like.
3. **Confirmation bias** – seek out only confirming facts.
   - Ex. Only read stories about how wonderful candidate was.

Framing effects – how you present the decision. Ex. Disease that will kill 600 people, option A is 100% chance exactly 200 people saved, option B 30% chance all 600 saved. Which do you pick? OR A. 100% chance 400 die B. 1/3 chance no one dies and 2/3 chance 600 die.

- In first, you'd pick A. In second, you'd pick B.

Semantic Networks and Spreading Activation

To solve problems, you have to access info already in your brain.

- **Semantic Networks** - concepts are organized in mind in terms of connected ideas. Parallel to how info might be stored in a computer. Links can be shorter for closely related ideas, or longer for less related ideas.
  - First semantic network model was **hierarchical** – higher order to lower order categories.
    - Ex. Animal -> bird -> ostrich.
    - More specific characteristics like sings, long legs, stored at lower nodes. Can breathe at higher nodes.
  - Longer it takes us to verify connection between nodes longer it takes for us to make that link.
- Not true for all animals/categories, ex. People verify pig is animal takes longer than pig is mammal. Therefore proposed **modified semantic network.**
  - Rather than hierarchical, says every individual semantic network develops based on experience and knowledge.
  - Means all ideas in head are connected together. When you active one concept, pulling related concepts with it. Called **spreading activation**. (Can explain false memories, or remembering wrong but related info).

Intelligence (IQ is Intelligence Quotient)

What is intelligence?

- A mental quality that allows you to learn from experience, solve problems, and use your knowledge to adapt to new situations. Use numerical scores to measure aptitude for those tasks and compare them to how well others do.
- One theory is there's **1 general intelligence.**
  - Evidence comes from fact people who score well on one test also tend to score well on other types of test, ex. Verbal and math.
  - Factor underlying these consistent abilities is called **g factor** (g = general intelligence)
- Also support for theories of **3 intelligences –** analytical (Academic), creative (generate novel ideas and adapt), practical (solve ill-defined problems).
  - IQ score measures only analytical intelligence.
- Another psychologist proposed **emotional intelligence** –perceive, understand, and manage emotions in interactions with others.
- Another way is 2 major categories – **fluid and crystallized intelligence**.
  - **Fluid** is ability to reason quickly and abstractly.
    - Tends to decrease as we move into older adulthood
  - **Crystallized** refers to accumulated knowledge and verbal skills.
    - Usually increases or stays same into adulthood

Question of **nature vs. nurture**: How much is due to genes and how much due to environment/experiences?

- Study heritability by looking at correlation scores of twins who grew up in different homes, identical twins raised together, and fraternal twins raised together.
  - Strongest correlation between ***identical twins (monozygotic)*** raised together.
  - Twins raised apart not as high, suggesting environment component.
  - ***Fraternal twins (dizygotic)*** even lower, suggesting also a genetic component.
- No recipe for structuring environment to make a genius, even though we know environments that would impair intelligence.
- Some people have a
  - **Fixed mindset** - intelligence is biologically set and unchanging
  - Or a **Growth mindset** - intelligence is changeable if you learn more. Those with growth mindset accomplish more.

Total theories:

- **1. Spearman's idea of general intelligence** – single g factor responsible for intelligence that underlies performance on all cognitive tasks
- **2. Gardner's idea of 8 intelligences** – differentiates intelligence into different modalities
- **3. Galton's idea of hereditary genius** – human ability is hereditary
- **4. Binet's idea of mental age** – how a child at a specific age performs intellectually compared to average intellectual performance for that physical age in years.

Language

Theories of Language and Cognition

- **Behaviorists**– empiricist, believe language is just conditioned behavior.
- **Nativists** – rationalist, language must be innate.
- **Materialist** – look at what happens in the brain when people think/speak/write.
- **Interactionist** – emphasizes interplay between environmental cues and innate biology

Some languages only have 2 words for color. But does that mean we think about color differently? Great language debate.

- **Universalism** - thought determines language completely.
- **Piaget** – he believed once children were able to think a certain way, and then developed language to describe those thoughts.
- **Vygotsky** (middle) **– language and thought** are both *independent*, but converge through development.
  - Eventually learn to use them at same time.

Linguistic Determinism/Relativity – weak and strong hypothesis

- **Weak:** language influences thought (reading right to left vs. left to right influences what direction you imagine girl pushing boy)
- **Strong** (aka **Sapir-Whorfian hypothesis**): idea that speakers of different languages utilize different cognitive processes that influence how they think; people understand their world through language, and language in turn shapes how we experience the world.
  - Ex. tribe called Hopi without grammatical sense – they couldn't think about time in same way.

Theories of Language Development: Nativist, Learning, Interactionist

Nativist perspective (Noam **Chomsky**) - emphasizes innate biological mechanisms and that children are born with ability to learn language.

- All people have a **language acquisition device** (LAD, later renamed **universal grammar**) that allowed them to learn language (syntax and grammar).
- Idea that this ability exists – all languages shared same basic elements like nouns, verb, etc.
  - This allows child to pick up on that. Goes along with idea there's a "critical period", thought to be from birth to age 9, the period of time a child is most able to learn a language.

Learning theory (**Skinner**) – language is a form of behavior and is learned through *operant conditioning*

- Children aren't born with anything, only acquire language through reinforcement.
  - Child learns to say "mama" because every time they say that, mom reinforces child. But doesn't explain how they can produce words they've never heard before.

Interactionist approach (**Vygotsky**) – believe biological and social factors have to interact in order for children to learn language. Childrens' desire to communicate with adults makes them learn language.

- Social role that language plays and human brain develops to be receptive to new language, and children are motivated to practice and expand vocabulary

Behaviorist – (also skinner?) BF Skinner's behaviourist model says infants are trained in language by operant conditioning.

- The **linguistic relativity hypothesis** asserts that cognition and perception are determined by language one speaks.

Language and the Brain: Aphasia and Split-Brain Patients

- 90% of people, language is in **left hemisphere**.

Whatever is dominant, 2 main areas are:

- **Broca's area** (speech production) located in the frontal lobe
  - When broca's is damaged, people have trouble producing speech but understanding is unaffected. (***Broca's/expressive aphasia*****)**
- **Wernicke's area** (understand language) located in the temporal lobe
  - **Wernicke's aphasia** - words they make don't make any sense and cannot understand what others say, but they can hear words and repeat them back
- When both damaged**, global aphasia.**
- 2 areas are connected by bundle of nerves **arcuate fasciculus**, also found in deaf people who know sign language. Not specific to spoken language, but brain adapts to whatever modality is needed for communication.
  - When this is damaged, **conduction aphasia** – ability to conduct between listening and speaking is disrupted.
- **Agraphia (**inability to write), ***anomia*** (inability to name things).

Language is example of big tasks broken into small tasks, spread into other parts of brain. Good thing because if you have localized brain damage, won't completely lose everything.

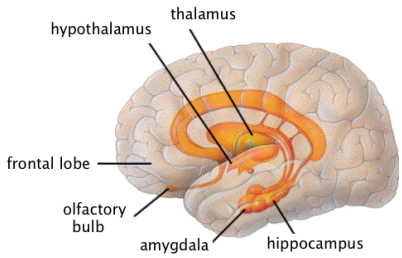
- When functions are divided, easier for brain to adapt
  - Ex. When stroke affects left hemisphere, and can't speak, over time with therapy some can retrain other speech-related parts of brain by creating new connections – **neural plasticity.** Can speak again with some fluency.
- If you sever the **corpus callosum**, also disrupts communication. Creates a **split-brain patient**. This surgery creates side effects with language – right side of brain can't communicate with language side.
  - ***Left side*** needed for language, ***right side*** needed for action/perception/attention.
  - If you see object on left, won't be able to name it. Can pick it up with left hand (since right side controls left), but has to be in right visual field before brain can name it.
    - Ex. showing colors on left side of visual field, information is sent to right hemisphere, which is responsible for perception/attention, but can't speak it, because left brain is needed for language.

Emotion

Emotions: **Limbic System**

- Responsible for storage/retrieval of memories, especially ones tied to emotions (serves as control for basic emotion and drives)
  - Mnemonic: ***Hippo wearing a HAT***. Hypothalamus, amygdala, thalamus, and hippocampus.

Thalamus – sensory relay station, everything you hear/taste/etc. end up in thalamus, which directs them to appropriate areas in cortex.



- Emotions contingent on senses.
- Smell is only one that bypasses the thalamus – goes to areas closer to amygdala.

Amygdala – aka aggression center.

- If you stimulate amygdala, produces anger/violence and fear/anxiety.
- If you destroy it, get mellowing effect.
  - **Kluver-Bucy syndrome** – bilateral destruction of amygdala, can result in hyperorality (put things in mouth a lot), hypersexuality, and disinhibited behavior.

Hippocampus – key role in forming new memories. Convert short to long-term memory.

- If destroyed, still have old memories intact, just can't make new ones.

Hypothalamus (below the thalamus, tiny) – for limbic system, it regulates the ANS (fight or flight vs. rest and digest).

- Controls endocrine system.

Emotions: **Cerebral Hemispheres** and **Prefrontal Cortex**

Role of **cerebral cortex** in emotions. One way is in terms of the *L and R hemispheres*.

- Positive emotions evoke more activity on ***left side***, and negative emotions evoke more activity on ***right side***.
  - Little kids playing in group – more social kids had more activity in left hemisphere, and isolated kids more activity in right.
  - More positive, cheerful people had more activity in left, more depressed and timid had more in right

Dividing into functional divisions – focus on **prefrontal cortex**

- Responsible for many higher-order functions, everything that distinguishes humans.
  - ***Executive control*** - solve problems, make decisions, how you act in social situations.
  - Ex. Phineas Gage had iron rod penetrate his prefrontal cortex. After incident, rude and rough, behaved inappropriately.

Autonomic Nervous System (ANS) and Physiological Markers of **Emotion**

Physiological changes that occur which aren't under your control due to the ANS.

- Has 2 branches – **sympathetic** (fight or flight) and **parasympathetic** (rest and digest).
  - Sympathetic: pupils dilate, decrease in salivation, increase respiration/heart rate/glucose release/adrenaline, decrease in digestion
  - Parasympathetic: pupils constrict, decrease respiratory rate/heart rate, increase glucose storage, decrease in adrenaline, increase digestion.

Three Components of Emotion and the Universal Emotions

Emotions are subjective experiences accompanied by physiological, behavioural, and cognitive changes. All interrelated

- **Physiological** components – when surprised HR increase, muscles tense, temperature increase.
- **Cognitive** – vary person to person, they're mental assessments that can include thoughts and assessments of situation. Cognitive experiences result from emotions, and can cause emotions.
- **Behavioural** – emotions may bring about behaviours.
- Emotions are temporary, and can be negative or positive. Also vary in intensity. They're involuntary.
- **Paul Ekman** found **6 universal emotions** identified by everyone around the world
  - happiness, sadness, fear, disgust, anger and surprise. Consistent expressions across culture.
- **Darwin** hypothesized ability to understand emotion is an innate ability that allowed them better survival.

Theories of Emotion

Emotion is made of 3 components: cognitive, physiological, and behavioural responses. Which come first?

- **James-Lange theory** – (Physiologically based) experience of emotion is due to perception of physiological responses.
  - Ex. Holding pet cat, increased HR/neurotransmitters/smile, then happiness. When sad, don't cry because you're sad, you're sad because you cry.
  - Ex. physiological arousal followed by aggressive emotions (not simultaneous)
    - **Physiological → Emotion**
- **Cannon-Bard theory** – disagreed with James-Lange, noticed many different emotions had same physiological responses. Believed physiological response and emotion occurred simultaneously.
  - Simultaneously experience arousal and aggression
    - **Physiological = emotion**
- **Schachter-Singer** – physiological and ***cognitive*** responses simultaneously form emotion. We don't feel emotion until we're able to identify reason for situation.
  - Arousal and interpretation of arousal leads to aggressive emotion.
    - **Physiological + Cognitive → Emotion**
- **Lazarus Theory** – experience of emotion depends on how the situation is appraised (labelled).
  - Stimulus → labelling situation (cognitive) → emotion + physiological response.
  - How we label event is based on cultural/individual differences.
  - Interpretation of event leads to arousal and aggression
    - **Cognitive → Emotion + Physiological**

People perform best when they are moderately aroused – the **Yerkes-Dodson Law**

- Defined as people tend to perform at their optimum ability when they are moderately emotionally stimulated
  - Extremely emotional or non-emotional people are less likely to perform their best

Stress

What is **Stress**? Strain that experienced when an organism's equilibrium is disrupted

- Ex. There is a **stressor** (source of stress) such as a dog, and the **stress reaction** (bunny's physical and emotional response). Stress is the process encompassing both.

Stress arises less from actual events & more from our cognitive interpretation of events – **appraisal theory of stress**.

- **Primary appraisal** – evaluating for presence of a potential threat.
  - 3 categories of response to this primary appraisal – ***irrelevant***, ***benign (positive)***, ***stressful (negative)***.
  - If primary appraisal is negative, move forward with secondary appraisal.
- **Secondary appraisal** – assessing capability to cope with the threat or to deal with stressor.
  - Appraisal of harm, threat, and challenge (how to overcome it).

4 major categories of stressors.

1. **Significant life changes** – ex. Death of loved one, loss of job, having children, leaving home, etc.
2. **Catastrophic events** – cyclone appears.
3. **Daily hassles** – long store lines, forgetting car keys, etc.
4. **Ambient stressors** – Perceivable, but hard to control. Noise, crowding. Can impact us without us being aware of them.

Responding to Stress

- The ANS works with the limbic system and ***reticular activating system*** to allow us to experience and understand our emotions
  - Reticular activating system – nuclear structures in the midbrain composed of nerve fibers going to and from higher brain centers, which controls our arousal and alertness levels
  - Midbrain – cerebral peduncle, corpora qudrigemina, and cerebral aqueduct

Stressors like threats and dangers trigger our **fight or flight** system – the **sympathetic nervous system**.

- Inc. heart rate and respiration (more energy + oxygen), increased peripheral vasoconstriction (push more blood to our core area – harder to live without blood), and turn off digestion/immune/etc.
- **Endocrine response** - adrenal glands release ***epinephrine*** and ***norepinephrine,*** and ***cortisol***
- **Tend and befriend** response - sometimes better response to stress is to have support systems.
  - ***Oxytocin*** is important for this – peer bonding. Oxytocin is strongly linked to estrogen, so why this response is stronger in women.

Distinct stages of stress – **general adaptation syndrome**, 3 phases.

- 1. Alarm phase – stress kicks in, heart races.
- 2. Resistance – fleeing, huddling, etc. Bathed in cortisol.
- 3. Exhaustion – if resistance isn't followed by recovery, our tissues become damaged and we become susceptible to illness.

Physical Effects of Stress

Damaging effects of stress on our **heart**

- Increased blood pressure, blood vessels distend, so they build up more muscle and become more rigid. Can lead to **hypertension** and **vascular disease** (disease of blood vessels – get damaged with higher force of blood movement). Spots attract fat and narrow blood vessels. Worst place to experience this is coronary arteries – **coronary artery disease**.

Metabolism

- During stress, body secretes cortisol and glucagon, which converts glycogen to glucose.
- If stress is psychosocial, we don't need all this extra glucose, which can exacerbate metabolic conditions like ***diabetes***.

Reproductive

- Reproduction huge energy expense in women, so this gets shut down during stress response. ***Impotence*** is also often caused by stress.

Immune Function

- Causes inflammation – acute stress can lead to overuse of immune system. Can attack our own body.

Behavioral Effects of Stress

2 areas of brain with most glucocorticoid receptors are the **hippocampus** and **frontal cortex**

- Hippocampus is associated with learning and memory.
- Frontal cortex is responsible for impulse control, reasoning, etc. *Atrophy* during chronic stress.

One of major emotional responses of stress is **depression** (problem is anhedonia – inability to experience pleasure, so perceive more stressors).

- **Learned helplessness** – you learn from having control ripped out of hands that you don't have control, so lose ability to identify coping mechanisms because taking less control of outcome of your life.
- **Anger** - Stress is associated with increased vulnerability to heart disease. **Type A** is easily angered individuals, and Type B others. Those who had heart attacks later were mostly type A.
- **Anxiety** – centers on *amygdala*. Amygdala has to do with our fears and phobias, fits in perfectly with response to stress. Perceive more things as fearful.
- **Addiction** – lots of terrible options for relieving stress, ex. Alcohol, tobacco, etc. Impairment to frontal cortex (reasoning), so impaired judgement can increase likelihood of inappropriate coping mechanisms.

Stress Management (Coping with Stress)

- **Perceived control** - many studies show lack of control associated with higher stress. Look for areas of life where you can take back some control.
- **Optimism**
- **Social support** – one of best coping mechanisms of stress. Helps us understand we're not alone in stress, which helps our perceived control and optimism.

Managing stress

- **Exercise** – regular exercise requires control
- **Meditation** – helps us lower our heart rate, BP, and cholesterol.
- **Religious beliefs/faith** – generally healthier lifestyle, social support.
- **Cognitive Flexibility** – perspective change is huge in our perception of what is stressing us out. Good way is working with counselor.

Behavior

Biological Basis of Behavior: Nervous System

Structure of the Nervous System
CNS and PNS
CNS = brain and spinal cord.

- Brain includes cerebrum, cerebral hemispheres, brainstem (midbrain, pons, and medulla), and cerebellum.
- Forebrain, midbrain, hindbrain. Forebrain becomes cerebrum, midbrain becomes midbrain, and hindbrain becomes pons/medulla/cerebellum

PNS = everything else. Cranial (12 pairs) + spinal nerves (31 pairs)

- Nerves, ganglia. Afferent and efferent neurons.

Functions of the Nervous System
(Basic and higher functions.)

- Basic = motor (control of skeletal muscle), sensory (the senses), automatic (reflexes)
- Higher = cognition (thinking), emotions (feelings), and consciousness

Motor Unit

- **Lower motor neurons** – efferent neurons of the PNS, control skeletal muscle. Skeletal muscle cells it contacts is the other end of the motor unit. Form a **neuromuscular junction**.
- Abnormalities can occur in the motor unit – weakness.
- Abnormalities of lower motor neurons can cause the **lower motor neuron signs** (LMN signs), which can happen in addition to weakness.
  - Signs: **atrophy** of skeletal muscle, **fasciculations** (involuntary twitches of skeletal muscle), **hypotonia** (decrease in tone of skeletal muscle – how much muscle is contracted when person is relaxed), **hyporeflexia** (decreased muscle stretch reflex)

Peripheral Somatosensation
Somatosensation includes 5 main ones - position sense, vibration, touch, pain, temperature.

- Position + vibration + touch = **mechanoreceptors**, pain = **nociceptors**, temperature = **thermoreceptors**.
  - One of differences between two types is how big their axons are – position/vibration/touch receptors have large diameter axons. Have thick myelin sheath. Fast.
  - Rest have small diameter axons. Slower.
- Touch is both. Fine touch travels in fast neurons, less precise info travels in slower ones.

Many receptors found in the skin such as mechanoreceptors, one type close to skin, another type lower. Also some in deep tissue, deep in muscle that detects stretch. One sin muscle important for position, while ones in skin are imp for vibration/touch.

- Pain and temperature receptors end in uncovered terminals, don't have big structures like mechanoreceptors.
- Receptors send info down **afferent** axons

Muscle Stretch Reflex

Reflexes have 2 parts – **afferent** (stimulus) and **efferent** (response).

- The **muscle stretch reflex** causes a muscle to contact after it's stretched, as a protective response.
  - Ex. ***Knee jerk response*** – involuntary response of leg kicking out. The hammer hits the tendon right below the knee cap, which hooks onto the lower leg bone on one end, and a large group of upper muscles on the other. Muscles are called **muscle spindles**.
  - **Somatosensory neurons** (afferent) in muscle spindles form excitatory synapse in spinal cord with another neuron in the spinal cord, which sends axon out back to same muscle that was stretched, and excite skeletal muscle cells to contract – **lower motor neurons** (efferent).
  - Muscle on underside of leg are inhibited when the topside of leg is excited. Necessary for reflex to occur.

Gray and White Matter

- **Gray matter** contains most of the neuron somas.
- White matter contains **myelinated axons**.
  - In spinal cord, grey is on inside and white matter on outside.
  - For brain, different. White on inside and grey on outside. Axons go down tracts of white matter.

Upper Motor Neurons

- LMNs control muscles of limbs and trunk, while LMNs that pass through cranial nerves control muscles of head and neck.
- UMNs control the LMNs. Found in the ***cerebral cortex***, and synapse on LMNs in the brainstem or spinal cord.
- Can divide them into tracts depending if they go to brainstem, or spinal cord.
  - UMN starts in cerebral cortex, axon travels down through brainstem, and where it meets the spinal cord most of these axons cross and travel down other side until they reach LMN. This collection of axons is called the **corticospinal tract**.
  - If it goes to brainstem, called **corticobulbar tract**

Upper motor signs:

- **Hyperreflexia** – increase in the muscle stretch reflexes.
  - Cause is unclear, but when muscle spindle receptors are activated, without periodic stimulation of LMNs by UMNs, they become hypersensitive and you get bigger reflex.
- **Clonus** – rhythmic contractions of antagonist muscle.
  - Ex. Foot goes involuntarily up and down. Cause is ***hyperflexia***, because if doctor pulls on foot activates muscle stretch reflex, so triggers antagonist muscles.
- **Hypertonia** – increased tone of skeletal muscles.
- **Extensor Plantar Response** – if you take a hard object and scrape along bottom of foot, normal response is flexor – toes will come down on the object. But with extensor, toes extend up.

Somatosensory Tracts

- **Somatosensory information** travels in different pathways. In general, 2 big categories:
  - 1) position sense, vibration sense, and fine touch
  - 2) pain, temperature, gross touch
- Deliver info to spinal cord.
- Spinal cord carries info to the brain in one of the tracts. Crosses other side immediately, then goes to cerebrum.
- It is why injury to one side of brain often results in damage to other side

Overview of the Functions of the **Cerebral Cortex**

- **Frontal lobe** – motor, prefrontal, Broca's area
- **Parietal lobe** – somatosensory cortex, spatial manipulation
- **Occipital lobe** – vision, "striate cortex"
- **Temporal cortex** – sound, Wernicke's area

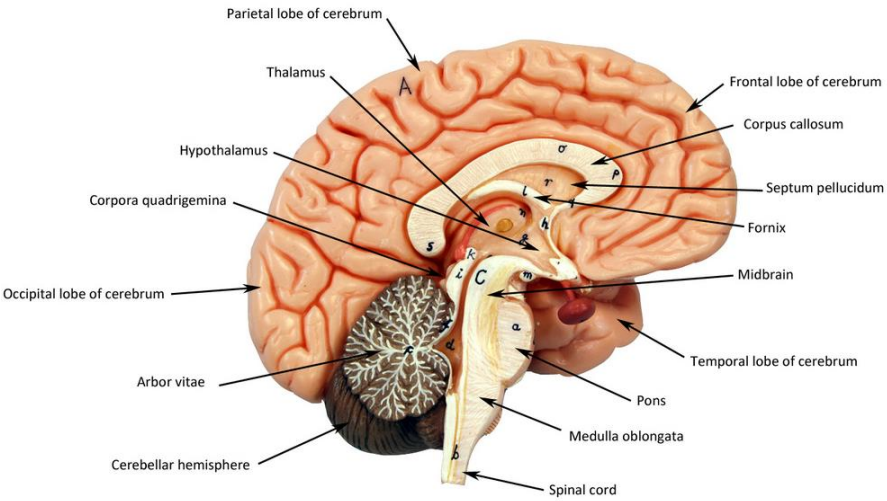
Cerebellum

- Coordinates movement: **motor plan** info is sent to cerebellum, also receives **position sense** information (ex. Muscle stretch fibres), and sends feedback to the cerebellum and motor areas of motor cortex.
- Middle of cerebellum coordinates middle body movement and walking, while the sides are involved in movements of the limbs – arms and legs. Also speech and movement of eyes.

Brainstem

- Connects all parts of the brain together, including the cranial nerves.
- Midbrain, pons, medulla.
- Neuron somas scattered throughout brainstem is the **reticular formation** – big role in autonomic functions, and controlling things like respiration, digestion, and lower/higher functions.
- **Long tracts** – collections of axons connecting cerebrum and brainstem.
  - 2 long tracts that are important: **motor** (UMNs), and **somatosensory**.

Cranial nerves – most of cranial nerves are attached to the brainstem, doing many things. 12 pairs. All sorts of functions.



Subcortical Cerebrum

Subcortical cerebral nuclei that are located deep part of the cerebrum

- **Internal capsule –** contains many important pathways, including the corticospinal tract
- **Corpus collosum –** connects right and left cerebral hemispheres.
- **Basal ganglia** – major role in motor functions, don't have UMNs but help motor areas to perform proper movements. Also cognition + emotion.
- **Thalamus** – Sensory functions, because all senses have pathways that travel to the thalamus. Also higher functions of brain such as cognition and emotion.
- **Hypothalamus** – controls the pituitary gland, the master gland that controls all other glands in body.

Neurotransmitter Anatomy

- **Glutamate** – most common excitatory neurotransmitter.
  - **Reticular activating system** (required for **consciousness**) has diffuse projection of glutamate to the cerebral cortex.
- **GABA** (brain) and **Glycine** (spinal cord) – most common inhibitory NTs
- **Acetylcholine** – nuclei in frontal lobe that releases it to cerebral cortex, called the Basilis and septal nuclei.
  - Released for LMNs, and the autonomic nervous system.
- **Histamine** – hypothalamus sends it
- **Norepinephrine** – area in pons called the **locus ceruleus** that releases it.
  - Also ANS, but less so than Ach.
- **Serotonin** – raphe nuclei in midbrain/medulla release it.
- **Dopamine** – VTA and substantia nigra

Lesion Studies and Experimental Ablation

Deliberately making brain lesions in order to observe changes on animal's behavior. Not done with humans!

- **Tissue removal**: surgical removal, surgical aspiration (sucking out brain tissue), or nerve cuts.
- **Radiofrequency lesions** – used to destroy tissue on surface of brain and deep inside brain. Wire is inserted into brain to determine the area. Then pass high freq current which heats up and destroys tissue. Can vary current to change size, but destroys cells and axons.
- **Neurochemical lesions** – excitotoxic lesions, cause influx of calcium that it kills the neuron and excites it to death.
  - One example is **kainic acid**. Destroys cell bodies but doesn't influence axons passing by.
  - Also **oxidopamine** (6-hydroxydopamine) selectively destroys dopamine and NE neurons. Can model Parkinson's Disease.
- **Cortical cooling** (Cryogenic blockade)- involves cooling down neurons until they stop firing.
  - ***Cryoloop*** – surgically implanted between skull and brain. Most important part is it's temporary/reversible, unlike other techniques.

Modern Ways of Studying the Brain

- Brain structure
  - **CAT scans (CT scan)**
  - **MRI**
- Brain function
  - **EEG** – external, can't tell us about activity of individual/groups of neurons. Can only look at sum total. Can tell us about seizures, sleep stage, cognitive tasks.
  - **MEG** (aka SQUIDS) – better resolution than EEG, but more rare because requires a large machine and special room to shield it.
- Can we combine brain structure and function? Yes!
  - **fMRI** – same image from MRI but can look at which structures are active (can see **BLOOD FLOW**)
  - **PET scans** – can't give us detail of structure, but can combine them with CAT scans and MRIs. Inject glucose into cells and see what areas of brain are more active at given point in time.

Behaviour and Genetics

Temperament, Heredity, and Genes

- Differences between children – **temperament**, not same as personality. It's their characteristic emotional reactivity, their sociability. Temperament seems to be established before babies are exposed to environment. And persistent as person ages.
  - Talking about **heredity** – passing traits from parents/ancestors to offspring through genes.
  - We have approx. 20 000 genes
- **Personality**, unlike psychological characteristics/abnormalities is believed to be **constant** over a person's lifetime.

Twin Studies and Adoption Studies

Classical twin study – compare monozygotic + dizygotic each raised in same household

- **Monozygotic (identical)** vs. **dizygotic twins (fraternal)**
  - Monozygotic – egg splits into 2 after fertilization. Share 100% of genes
  - Dizygotic – develop from 2 separately fertilized eggs. Share 50% of genes, like regular siblings.
  - Share same environment in womb, and also share same parents. So both can be said to share 100% environment.
  - Regular siblings don't share 100%, similar, but can vary depending on parenting/age.

Ex. What causes schizophrenia?

- ***Nature*** – genetic component or ***Nurture*** – environmental component?
- Monozygotic twins vs. dizygotic twins – can hold environment constant.
- If schizophrenia was caused by genes, expect to see different rates in identical vs. fraternal twins.
  - Higher in identical twins.
- But if environmental, ***similar rates*** of disorder in both sets of twins.
  - Wouldn't matter if they were identical vs. fraternal.
  - Problems with twin studies: identical twins treated more similarly than fraternal twins are.

Adoption studies – adopted child is compared to biological family and their adopted family. If no relation between individual and biological parents, but there is relation between individual and adoptive parents, then can assume environment was a factor. If opposite, then genetic factor.

- Problems: incomplete info about biological families. Also adoption isn't random, adoptive family sometimes matched to biological family.

Identical twins adopted by different family – genetically similar, different environments. But families who adopt are usually similar.

Heritability

- Variability of traits can be attributed to differences in genes.
- Assume we say heritability of intelligence is 50%. NOT saying that intelligence is 50% genetic, saying that the difference in intelligence is 50% attributable by genes.
  - Ex. Control boys environment 100%, but IQ not the same. Difference couldn't be attributed to environment, so we'd say their IQ difs heritable because environment was 100% same. So h^2 = 99%. Close to 100%.
  - Alternatively you can say 4 identical quadruplets (genetically identical), but completely different environments. Since variability can't be due to genes, must be environmentally-caused so H^2 = 0%.

Gene-Environment Interaction

- Nature vs. nurture.
  - Ex. Attractive baby and hideous baby. As a result, attractive baby receives more attention and is more sociable and well-adjusted. But say both have genes that predispose for depression, that are triggered by environment. Beautiful baby's genes are not activated, while ugly baby's genes are making proteins all the time since his life is tougher.
  - Another example is **phenylketonia**, caused by mutations to a gene that encodes a liver enzyme phenylalanine hydroxylase. But because enzyme is missing amino acid phenylalanine, it doesn't get converted into tyrosine. Build-up of phenylalanine can cause brain problems.
  - During infant screening, placed on phenylalanine-free diet, and most grow up without major problems.

Regulatory Genes

- (Watson & Crick) **Central dogma** of genetics. DNA codes for RNA, which code for 1 of 20 amino acids, and eventually become building blocks of proteins, which affects our behavior.
- We can now look at genes that may contribute to a trait, and compare and contrast.
  - Ex. Vast majority of our genes, 95% don't code for proteins, but regulate how proteins are coded.
- Called **epigenetics** – changes to gene expression other than to gene. Ex. Addition of methyl groups to the gene, which make it more difficult for TFs to come in and activate gene.

Adaptive Value of Behavioral Traits

- Function of behavior – **homeostasis**. Behavior is coordinated internal and external response of organisms to their environment, aka **adaptation**.
- **Ethology** focuses on the observation of animal behaviours, call these **overt** behaviours (not necessarily obvious, just means observable).
  - Innate, learned, and complex behaviours.

Innate behavioural traits – genetically programmed behavior.

- **Inherited** – innate behaviours are encoded by DNA
- **Intrinsic** – present even if you're raised in isolation. Ex. Pooping, peeing, etc.
- **Stereotypic** – performed the same way each time.
- **Inflexible** – not modifiable by experience.
- **Consummate** – fully developed right away, at first performance. Not influenced by experience.
  - Ex. Nausea in women during pregnancy helps them avoid toxic foods in critical period of development. Thought of as programmed.
- 3 main types: **reflexes** (ex. Knee-jerk response), **orientation** (ex. Kinesis, our change in speed, or taxis, movement towards/away from stimulus), and **fixed-action pattern** (performed without interruption).

- **Learned** behavioural traits
  - Non-inherited – acquired only through observation/experience
  - Extrinsic – absent when animals are raised in isolation, ex. social skills
  - Permutable – changeable
  - Adaptable – capable of being modified in response to changing conditions
  - Progressive – improvement or refined practice over time

- **Complex** behavior – can be a spectrum, most behaviours are between the two.
  - Ex. ability of insects to fly, starts off as innate but through learning become more efficient.

Motivation and Attitudes

Physiological Concept of Positive and Negative Feedback

- Positive, increase production of product.
- Negative, works to decrease product.
- Negative feedback is put into place to inhibit production of product.

Instincts, Arousal, Needs, Drives: Drive-Reduction and Cognitive Theories
Motivation asks the question why?
5 schools of thought:

- **Evolutionary** – role instincts play in motivation. Think about baby, cries, sleep, eats. Basic instincts all humans have.
- **Drive Reduction Theory** – drives vs. needs. Need is lack or deprivation that will energize the drive, or aroused state. That drive is what will reduce the need. Maintains homeostasis. Ex. need for water, driven by thirst, doing pushups is means to fulfill drive for water. Or sleeping.
- **Optimum Arousal Theory** – people want to reach full arousal/alertness. Why people go to amusement parks. Drive to get full arousal, and natural high.
- **Cognitive** – thought processes drive behavior.
- **Maslow's Hierarchy of Needs** – we want to satisfy needs in particular order. Why we use a pyramid.

In reality, all schools are related.

Maslow's Hierarchy of Needs

A pyramid. Needs must be fulfilled from bottom to top.
1. **Physiological** – food, water, breathing, sleep. Essential to survive.
2. **Safety** – safety of employment, health, resources, property. Can only be fulfilled after physiological needs are met.
3. **Love –** need to belong, intimacy, love. Social needs.
4. **Self-esteem –** feel confident and sense of achievement, recognition. Respect.
5. **Self-actualization** – one reaching their maximal potential, achieving the most one can be. Differs from person to person.

Incentive Theory

- Reward, intangible or tangible is presented after an action. Associating positive meaning to a behavior.
  - Ex. doing well at work is getting promotion. Or intangible, job satisfaction.
  - Incentive for team is winning a game and recognition.
  - Studies have shown is if reward is given immediately, chance of it happening again is higher.
  - If person isn't rewarded, less likely to do again.
- **Positive reinforcement** is done through continuous positive stimulation.
- Removal of a punishment would be **negative reinforcement**, not what incentive theory is focussed on.
- Skinner, most distinguished incentive theory psychologist said person will more likely do action that's positively received, and less likely to do action that is negatively received.

Biological and Sociocultural Factors – Food, Sex, and Drugs
Many factors that regulate our intake of food, sex, and drugs.
2 categories: **biological and socio-culture**.
Food

- Biological: Hypothalamus sends positive signal to stomach, when full sends leptin to tell us we're full. Another one is insulin. Brain can detect level of insulin to see amount of sugar and fat store in blood. Metabolism rate. Genetic predisposition to our weight, influenced by parents.
- Socio-culturally: Eat for different occasions, time, desire, appeal, availability

Sex –Investigated by Master & Johnson.

- Biological: Sexual response cycle. First part of cycle is excitement phase, marked by increased heart rate, BP, etc. Second is plateau. Then orgasm. 4th is resolution. They noticed activity was related to testosterone for women and men. Also have genetic predisposition to sexuality, found by looking at homosexuality.
- Socio-culturally: age, cultural, stimulus, emotions, and desires to procreate or not.

Drugs

- Biological: family history/genetic predisposition, withdrawal and cravings, biochemical factors, dopamine – affects our limbic system and leads to feelings of euphoria
- Socio-culturally: curiosity, rebel, poor control, cope with stress, low self-esteem, relief from fatigue, feel good, and more prevalent in areas of higher poverty

Components of Attitude

- What is **attitude**? A learned tendency to evaluate things in a certain way – people, events, objects.
- 3 components – **affective** (emotional), **behavioural** (how we act or behave towards object/subject), **cognitive** component (form thoughts/beliefs, and our knowledge)
- Called the **ABC model of attitude**
  - "I love yoga because I get to mediate and I believe it helps me relax so I will go to class each week." – 'I love yoga' is emotional,' I believe it helps me relax' is cognitive, and behavioural is 'I will go to class each week'
  - "I am frightful of rollercoasters and believe they are stupid so I will be on the carousel." Affective – 'I am frightful', behavioural is 'I will be on the carousel', and cognitive is 'I believe they are stupid'

Attitudes Influence Behavior

4 theories that answer question how do our attitudes influence behavior.

1. **Theory of planned behavior**

- We consider the **implications** of our **intensions** before we behave.
- Intensions are based on 3 things – our attitudes towards a certain behavior (ex. I like studying), subjective norms (what we think others think about our behavior), and perceived behavioural control (how easy/hard we think it is to control our behavior)

2. **Attitude to behavior process model**
- An event triggers our attitude (something that will influence our perception of an object)
- Then attitude + outside knowledge together determines behavior.
- Ex. Tommy has attitude that junk food is unhealthy, because many of his relatives have diseases. So when he's at home he does not eat chips/soda/candy.

3. **Prototype Willingness Model**
- Behavior is a function of 6 things: past behavior, attitudes, subjective norms, our intentions, our willingness to engage in a specific type of behavior, prototypes/models – a lot of our behavior is carried out from prototyping/modelling.

4. **Elaboration Likelihood Model for Persuasion**
- More cognitive approach – focuses on the why/how of ***persuasion***.
- 2 ways info is processed:
  - **Central** - depends on quality of arguments by persuader
  - **Peripheral** - superficial/non-verbal persuasion cues, such as attractiveness/status of persuader

People are more likely to be honest when social influences are reduced (ex. secret ballot), when general patterns of behavior are observed versus a single one (**principle of aggregation**), when specific actions are considered, and when attitudes are made more powerful through self-reflection.

Behavior Influences Attitude
Is it possible for our behaviours to shape our attitudes? Yes.
Strong social attitudes can cause our attitudes to follow our behavior.

1. **Foot in the door phenomenon**
- We have a tendency to agree to small actions first. Eventually over time comply with much larger actions.
- Basic concept of how people are brainwashed too. Door is eventually pushed completely open.

2. **Role-playing**
- Everyone plays roles in life. Picture yourself in a new role. First few days are a bit fake – we're trying to follow social quota in that role. Trying to sound professional. But over time, what feels like acting starts to feel like you.
- Changed attitude as a result of our behavior and carrying out that role.
- Ex. Zimbardo's prison experiment

Also **public declarations** (more likely to follow through if you've told everyone), and **justification of effort** (people do something they don't want to justify effort they put into it, such as going to med school after working so hard)

Cognitive Dissonance Theory
2 or more conflicting cognitions – ideas, beliefs, values, or emotional reactions.
Feelings of discomfort can lead to alterations in our beliefs/behaviours.
4 things we do to reduce that discomfort.
- 1. **Modify our cognitions** – ex. smoker might say, I really don't smoke that much.
- 2. **Trivialize** – make less important, ex. evidence is weak that smoking causes cancer.
- 3. **Add** – adding more cognitions, ex. I exercise so much it doesn't matter
- 4. **Deny –** denying the facts, ex. smoking and cancer are not linked.

People strive for harmony in our thoughts, actions, words. As soon as our cognitions, attitudes and behaviours don't align, we have cognitive dissonance.

Situational Approach
Social psychology – emphasizes influence of changing environmental circumstances over stable personality traits.
Situational approach of behavior is under this branch of psychology.
- Focuses on interactions between individual and their environment.
- People behave differently depending on their situation – **externa**l instead of internal.
- Hard to predict behavior based off 1 situation. Have to acknowledge we sometimes behave differently.

Attribution is the process of inferring causes of events/behaviours.

- Can be internal or external, our focus will be on external.
- Everyday, we make tons of attributions on environment/etc.
- Inference a person is behaving a certain way based on situation they're in.
- 3 parts: **consistency** (does person usually behave this way), **distinctiveness** (does person behave differently in different situations), and **consensus** (do others behave similarly in situation?).
- If yes to last 2, then we know situation is influencing their behaviour.
- If person is consistent in all situations, then maybe not environment, and more internal.

Theories of Personality

Psychoanalytic Theory

- **Sigmund Freud** was a neurologist and went to study hypnosis, but this turned him to medical psychopathology. Psychology as we knew it was unknown before his work.
- **Psychoanalytic theory** says personality is shaped by a person's unconscious thoughts, feelings, and past memories (particularly in childhood).
    - 2 instinctual drives motivate human behavior: **libido** (motivation for survival, growth, pleasure, etc.) and **death instinct** (drives aggressive behaviours fuelled by unconscious wish to die or hurt oneself/others).

Individual influences on behaviour: **projection** (projecting own feelings of inadequacy on another), **reaction formation** (defence mechanism where someone says or does exact opposite of what they actually want/feel), **regression** (defence mechanism where one regresses to position of child in problematic situations), **sublimation** (defence mechanism where unwanted impulses are transformed into something less harmful).

- Central to his theory is **libido**. Libido is natural energy source that fuels the mechanisms of the mind.
    - When this energy is stuck/fixated at various stages of **psychosexual development**, conflicts can occur that have lifelong effects.
    - **Fixation** at a particular stage is what predicts adult personality.
    - Ex. someone fixated at oral stage (first stage) might have oral personality characteristics, such as smoking habits/overly talkative when they grow up.

3 parts (like an iceberg):

Top of iceberg is the conscious part of mind, and unconscious.

1) **Id** at the bottom, it's the unconscious part. It develops after birth and demands *immediate* gratification.
2) **Ego** – part of conscious & uncons. Inv. in our perceptions, thoughts, judgements, & seeks *long-term* gratification.
3) **Superego** – develops around 4, and it's our moral conscience. Also part of conscious and unconscious.
    - Our libido impulses are what want to be gratified – when overgratified or partially/not gratified at all, fixation occurs at a certain stage. Face conflict/anxiety. It's a conflict between these 3 mental structures – ego, id, and superego. They're all competing for demand, so in conflict.
        - Ex. Id is on one shoulder and it's not getting immediate gratification, then we have superego on other shoulder, preaching to id about what's moral, and ego is in middle.
        - Id wants gratification, and is going back and forth with superego, so ego here is trying to gratify the id but it also has to take into account what the superego is saying. It's moral oversight.
        - The ego is part of the conscious and unconscious mind, so it acts as mediator between the unconscious desires of the id and the moral demands of the superego.
        - Ex. a **Freudian slip** is example of mental conflict. Ex. financially stressed patient, please don't give me any bills – meant any pills.

Especially problematic when there's a problem with development at a particular psychosocial stage.

Humanistic Theory

The **humanistic theory** (developed by **Carl Rogers)** focuses on healthy personality development, and humans are seen as inherently good. The most basic motive of all people is the **actualizing tendency** (**self-actualization**), innate drive to maintain and enhance oneself. Person will grow towards self-actualization as long as there are no obstacles.

- Primary difference between Freud's psychoanalytical theory is *Freud's theory was deterministic – behaviour is determined by unconscious desires.*
- Humanistic Theory focuses on the **conscious**, and says people are **inherently good**, and we are **self-motivated to improve** (so we can reach self-actualization).

First theorist of this theory was **Maslow**, who formed **hierarchy of needs**.

- Must first fulfill physiological needs of pyramid and work our way up, then safety, then love, self-esteem, and finally self-actualization.
- Self-actualization is rarely achieved, only 1% of people ever reach it.

Carl Rogers says qualities Maslow described are nurtured early in life, self-actualization is a constant growth process nurtured in a growth-promoting process.

- In order for this climate to help someone reach self-actualization, 2 conditions that need to be met:
  - Growth is nurtured by when individual is **genuine,** one has to be open and revealing about themselves without fear of being wrong.
  - Second is growth is nurtured through **acceptance** from others – allows us to live up to our ideal selves.
- Central feature of our personality is **self-concept**, achieved when we bring genuineness and acceptance together to achieve growth-promoting climate.
  - When there's discrepancy between conscious values and unconscious true values leads to tension, must be resolved.
  - **Genuine + acceptance = self-concept**
  - Importance of **congruency** between self-concept and our actions to feel fulfilled.

Biological Theory

Many variations to this theory, some relate to the **brain** and some to **behaviour** instead of traits

- Ex. Evolutionary psychology theorizes that males + females have dif mating strategies that influence cost of passing on genes. Males can have many mates, females more selective due to cost of pregnancy.

The biologic theory suggests important components of personality are **inherited**, or determined in part by our **genes**.

- **Hans Eysenck** proposed **extroversion level** is based on differences in the reticular formation – introverts are more easily aroused and therefore require less.
- **Jeffrey Alan Gray** proposed personality is governed by **3 brain systems**, such as the fight-or-flight system.
- **C. Robert Cloninger** linked personality to brain systems in **reward/motivation/punishment**, such as low dopamine correlating with higher impulsivity.
- Researchers always try to look at identical twins, because used to tease out environmental vs. genetic characteristics – same genetic makeup.
  - Results show even if twins reared separately, still had similar personalities.
  - **Social potency** trait – the degree to which a person assumes leadership roles in social situations. Common in twins reared separately.
  - **Traditionalism** – tendency to follow authority also shown to be common in twins.
  - Weaker genetic traits – achievement, closeness
  - Specific genes that relate to personality, people with longer **dopamine-4 receptor** gene are more likely to be thrill seekers.
  - But of course, just because you have gene doesn't mean you'll express it – depends on environment.
  - **Temperament** – innate disposition, our mood/activity level, and is consistent throughout our life.
- Important takeaway – our inherited genes to some degree leads to our traits, which leads to our behaviour/personality.

Behaviourist Theory

The **behaviourist theory** says personality is the result of learned behavior patterns based on a person's environment – it's **deterministic**, in that people begin as blank states and the environment completely determines their behavior/personalities.

- Focuses on **observable** and measurable **behaviour**, rather than mental/emotional behaviours.
  - The psychoanalytic theory would be the most opposite of this theory (focuses on mental behaviour).

1. **Skinner** – strict **behaviourist**, associated with concept of **operant conditioning**. Uses rewards/punishment to increase/decrease a behaviour.

2. **Pavlov** – associated with **classical conditioning**, ex. the Pavlov dog experiment. Places a neutral stimulus with an unconditional stimulus to trigger an involuntary response. Ex. ringing a bell in presence of food causes dog to start salivating.
   - People have consistent behaviour patterns because we have specific response tendencies, but these can change, and that's why our personality develops over our entire lifespan.
- What connects the observable to mental approach? The **cognitive theory**, a bridge between classic behaviourism and other theories like psychoanalytic. Because cognitive theory treats thinking as a behaviour, and has a lot in common with behaviour theory.

Trait Theory

A **personality** trait is a stable predisposition towards a certain behavior. Straightforward way to describe personality – puts it in **patterns of behavior**.

- **Surface traits** are evident from a person's behavior, while **source traits** are factors underlying human personality (fewer and more abstract).
- What is a ***trait***? A relatively **stable characteristic** of a person that causes individuals to **consistently** behave in certain ways. Combination of traits forms the personality.

1) Gordon **Allport** – all of us have different traits. Came up with list of 4500 different descriptive words for traits. From those he was able to come up with 3 basic categories of traits: **cardinal**, **central,** and **secondary** traits.

- **Cardinal** traits are characteristics that direct most of person's activities – the dominant traits. Influence all of our behaviours, including secondary and central traits.
- **Central** trait is ex. honesty, sociability, shyness. Less dominant than cardinal.
- **Secondary** trait is love for modern art, reluctance to eat meat – more preferences/attitudes.

2) Raymond **Cattell** – Proposed we all had 16 essential personality traits that represent basic dimensions of personality. Turned this into the 16 personality factor questionnaire, or **16 PF**.

3) Hans **Eysenck** – We have 3 major dimensions of personality, which encompass all traits we all possess, but the degrees to which we individually express them are different. Allport said we have dif unique subsets, Eysenck says we all have them but just express them in different degrees. These 3 are **extroversion**, **neuroticism** (emotional stability), and **psychoticism** (degree to which reality is distorted). However, Eysenck said not all necessarily have psychoticism.

4) **5 Factor Model (Big 5)** – found in all people of all populations.

- **Openness** (independent vs. conforming, imagining vs. practical),
- **Conscientiousness** (careful vs. careless, disciplined vs. impulse, organized or not),
- **Extroversion**,
- **Agreeableness** (kind vs. cold, appreciative vs. unfriendly),
- **Neuroticism**.
  - Use acronym OCEAN

Cattell, Eysenck, and Big 5 all use **factor analysis** – a statistical method that categorizes and determines major categories of traits. Allport's theory did not, he used different methods.

Observational Learning: Bobo Doll Experiment and Social Cognitive Theory

- Observational learning (aka social learning/vicarious learning) is learned through watching and imitating others – such as **modeling** actions of another.
  - **Mirror neurons** found that support this.
- **Social Cognitive Theory** is theory of behaviour change that emphasizes ***interactions*** between people and their environment. Unlike **behaviourism** (where environment controls us entirely), cognition is also important.
  - Social factors, observational learning, and environmental factors (ex. opinions/attitudes of friends and family) can influence your beliefs.
- **Albert Bandora** studied it – and did the **Bobo Doll Experiment**. Cited when people debate if they should ban violent video games. It's a blow-up doll you can punch.
  - Had group of children doing arts and crafts, but in middle of it suddenly man appeared and started hitting this inflatable doll. Also screaming "kick it, hit it, etc". Did for 10 minutes straight. Some children observed it, others weren't fazed.
  - Then man left, and researchers gave kids an impossible puzzle to solve to frustrate them. Researched how the kids reacted to frustration. In the room was a bobo doll. Many children would come up to the doll and hit it, and ones hitting it were yelling kick it, hit it. Revealed that kids can observe and learn from it.
  - Why people use this to argue to ban violent games and movies.
  - But learning behavior vs. performing it is different. Many of the kids were aggressive to the doll, others weren't. So how come some kids different?
  - Did second experiment, set up TV that showed a bobo doll and someone being aggressive to it. But difference here was video showed afterwards that person was punished. Some of the kids again walked up to bobo doll and hit it. What about kids that didn't?
    - Researchers bribed kids, offered them stickers/juice to imitate behavior. Kids were able to imitate. Concept called **learning-performance distinction** – learning a behaviour and performing it are 2 different things.
    - Not performing it doesn't mean you didn't learn it!
- Am I motivated to learn something?
  - **A**ttention, **M**emory, **I**mitation, **M**otivation
  - Ex. Want to teach you to draw a star. In order to learn it, need a long enough attention span, the memory to remember it, and be able to imitate it. Question is, are you motivated enough to do it? If so, you do it.

Psychological Disorders

Mental Disorders

- Major public health problem, affects the higher functions of the brain including cognition, mood, and **behaviour**.
- **Biomedical** vs. **biopsychosocial models**.
  - Bio = biological, physical abnormalities.
  - Psychosocial = psychological and cultural/social factors.
- Difficult to categorize mental disorders
- 2 classification systems: ICD-10 and DSM-5
  - **ICD-10** is International Classification of Diseases, 10th revision. System from the WHO.
  - **DSM-5** is Diagnostic and Statistical Manual of Mental Disorders, 5th edition, from the American Psychiatric Association (APA).
- According to the National Institute of Health (NIH), each year in the USA about 25% will meet criteria for 1 mental disorder, and 6% will have a serious mental illness that cause severe disability/distress.

Categories of Mental Disorders

- Types of mental disorders – enormous #, many with overlapping features.
- Not due to use of medication, drugs, other medical conditions, etc. Also cultural differences.
- Usually causes **distress/disability**. Key point because person who's unusual/eccentric does not have psychological disorder.
- We'll go through DSM-5

20 top-level categories

1. **Neurodevelopmental Disorders** – involve distress/disability due to abnormality in development of nervous system. Includes intellectual disability, autism spectrum disorders, and ADHD.
2. **Neurocognitive Disorders** – Loss of cognitive/other functions of the brain after nervous system has developed. Big categories within this, one is delirium (reversible episode of cognitive/higher brain problems, many causes – drugs/blood/infections). Dementia and its milder versions are usually irreversible and progressive.
3. **Sleep-wake Disorders** result in distress/disability from sleep-related issues. Include insomnia and breathing-related sleep disorders.
4. **Anxiety Disorders** – abnormal worry/fear. Some are specific to certain stimuli like phobias, while others are not specific to certain stimuli, including generalized anxiety disorder. Panic disorder involves panic attacks.
5. **Depressive Disorders** – abnormally negative mood. Mood refers to long-term emotional state. Mood is also subjective experience person has of their experience. High risk of suicide.
6. **Bipolar and Related Disorders** – abnormal mood, but these may have periods of abnormally positive mood called mania. Leads to social/legal problems.
7. **Schizophrenia Spectrum and other Psychotic Disorders** - involves distress/disability from psychosis. Psychosis involves delusions (not explainable by experiences/culture), hallucinations.
8. **Trauma/Stressor-Related Disorders** - occurs after stressful/traumatic events. Post-traumatic stress disorder, common after wars.
9. **Substance-Related and Addictive Disorders** – distress/disability form use of substances that affect mental function. Include alcohol, caffeine, cannabis, hallucinogens, opioids, etc.
10. **Personality Disorders** – related to personality. Involves long-term mental and behavioural features characteristic of a person, huge spectrum of personality types considered acceptable. Personality disorders involve ones outside those accepted of societal norms**.**
    - **Cluster A** odd/eccentric,
    - **Cluster B** intense emotional/relationship problems,
    - **Cluster C** is anxious/avoidant/obsessive
11. **Disruptive, Impulse-Control, and Conduct Disorders** – inability to control inappropriate behaviours
12. **Obsessive-Compulsive and Related Disorders** – compulsions are unwelcome thoughts that occur repeatedly. Ex. obsession with hands being dirty, compulsion to wash them many times a day.
13. **Somatic Symptom and Related Disorders** - Distress/disability from symptoms similar to those that may occur to illness unrelated to mental disorder, but of psychological origin. Example is someone that has abdominal pain, caused by stress.
14. **Feeding and Eating Disorders** – behavioural abnormalities related to food, ex. anorexia, bulimia.
15. **Elimination Disorders** – urination/defecation at inappropriate times.
16. **Dissociative Disorders** – abnormalities of identity/memory. Multiple personalities, or lost memories for part of their lives.
17. **Sexual Dysfunctions** – abnormalities in performance of sexual activity.
18. **Gender Dysphoria –** caused by person identifying as a different gender
19. **Paraphilic Disorders –** having sexual arousal to unusual stimuli
20. **Other Disorders** – any person that appears to have a mental disorder causing distress/disability but doesn't fit into other categories. Rare.

Biological Basis of Schizophrenia

- Prototype of psychotic category of disorders. Rare disorder with both biological and environmental etiology.
- **Abnormal perceptions of reality – hallucinations, delusions**.
- 3 categories of symptoms:
  - **cognitive** (attention, organization, planning abilities),
  - **negative** (blunted emotions),
  - **positive** (hallucinations, delusions)

Our understanding of the cause is very limited.

- **Cerebral cortex seems to have decreased size**, in frontal and temporal lobes.
- Some features of schizophrenia also involve **abnormalities in dopamine (increase)**; medications affect dopamine transmission often improve symptoms
- The **mesocorticolimbic** pathway. Meso = VTA in the midbrain, cortico = cortical cortex, they project to frontal and temporal lobe, and limbic – inside of brain involved in ***emotions/motivations***/etc. Abnormal activity here. One way of thinking about schizophrenia is abnormal activity is:
  - ***Mesocorticolimbic pathway*** leads to dysfunction in parts of frontal cortex that cause cognitive symptoms
  - ***limbic structure*** causes negative symptoms
  - ***temporal cortex*** causes positive symptoms.

Causes: genes, physical stress during pregnancy, and psychosocial factors (negative family interaction styles affect development of brain).

Biological Basis of Depression

- Feelings of hopelessness, loss of interest in activities. Our understanding of cause is limited. No consistent abnormalities in brain tissues, but scans have suggested functional abnormalities.
  - Areas with abnormal activity involve the **frontal lobe** and **limbic structures**. Decreased activity in frontal lobe and increased activity in limbic lobe.
  - Ex. Stress hormones like cortisol are controlled by the hypothalamus, which communicates with limbic and frontal lobe. Hormones affect the brain themselves too.
- Abnormal pathways in depression.
  - One starts in the **raphe nuclei** of the brainstem responsible for **serotonin** release.
  - Also the **locus coeruleus**, which sends long axons to cerebrum and releases **norepinephrine.**
  - Also the **VTA** sends long axons to different areas of cerebrum, supplies **dopamine**.
- Medications that affect serotonin, NE, and dopamine often improve symptoms. Ex. monoamine oxidase inhibitors (**increase amount of monoamines in synapse**)
  - Monoamines include adrenaline, norepinephrine, dopamine, serotonin, and melatonin (involved in onset of darkness).
- Another newer idea is may be abnormalities of **neural plasticity** - brain changes in response to behaviour. But unclear if cause or effect.
- May include genetics, but psychosocial factors can also be linked to childhood stress, etc. So likely combination of biological and psychosocial factors.

Biological Basis of Alzheimer's Disease

- Most common disorder in ***dementia category***, or neurocognitive disorders. Loss of cognitive functions. Memory also decreases. But normal motor functions are fine until later stages where they lose basic **activities of daily living (ADL)** – toileting, eating, bathing, etc.

Cause of disease is limited.

- Brain tissue has decreased in size significantly – shrivelled up, **atrophy**.
  - It's the **cerebrum** that often dramatically decreases in size. Severity of atrophy correlates with severity of dementia.
  - ***Starts in temporal lobes***, important for memory.
  - Later, atrophy spreads to parietal and frontal lobes. Many other cognitive functions.

Under microscope, 3 main abnormalities:

- **loss of neurons**,
- **plaques** (amyloid, because plaques are made of beta-amyloid. Occur in spaces between cells, outside of neurons in abnormal clumps),
- and **tangles** (neurofibrillary tangles, clumps of a protein **tau**. Located inside neurons. Develop proteins normally in the brain, but changed so it's abnormal and causes them to clump together).
  - ♦ Not clear if they're what's killing neurons, or if they're a by-product.

- Group of neurons at base of cerebrum, called the **nucleus basalis** is often lost early in course of Alzheimer's. Important for cognitive functions – send long axons to cerebral cortex and through cerebrum, and release **acetylcholine**. Contribute to cognitive functions of disease.
- Synapses appear to not function clearly long before disease.
  - Also **genetic mutations**, many involved in processing of amyloid protein.
  - Also **ApoE4** involved in metabolism of fats is strongly related to AD.
  - Also, **high blood pressure** increases risk of disorder too.
- Things that decrease it – higher education, challenging jobs with difficult thinking.

Biological Basis of **Parkinson's Disease**

- Progressive neurological disorder involving **motor abnormalities** and neural too. A tremor, increased muscle tone, abnormal walking, and poor balance. Muscles are stiffer and slow with tremor. Later in disease when motor abnormalities are severe, patients may not be able to care for themselves.
- Brains of patients have abnormalities visible to naked eye – in brainstem, the **substantia nigra** is less dark or not dark at all. **Loss of ONLY dopaminergic neurons** observed, suggesting 1 type involved. Motor abnormalities related to this.
  - Dopaminergic neurons in other areas are lost as well.
  - Substantia nigra is part of the **basal ganglia**, major role in motor functions and some mental functions. Receives info from many places in NS, and basal ganglia processes that info and sends it back to areas of cerebral cortex to influence areas such as motor cortex.
  - SN also projects to area called **striatum**, and loss of DA neurons causes most of neural abnormalities. Can see diseased neurons. Many contain **lewy bodies** in DA neurons, which contain a protein **alpha synuclein**, a normal protein in brain cells but in PD it appears clumped together.
- Risk factors: genetic mutations in families with inherited form of disease, agricultural chemicals.
- Leading candidate for treatment with stem cells since only 1 type of cell affected.

Social Psychology

Conformity and Groupthink

- People act differently in groups than individually

Conformity – "peer pressure", tendency for people to bring behaviour to line with group norms. Powerful.

- When behaviours are negative/wrong, why do people still conform to group norms?
- 2 reasons why you'd conform:
  - 1) **Informative influence:** look to group for guidance when you don't know what to do, and ask what to do.
  - 2) **Normative influence**: even if you know what's right, do what group does to avoid social rejection.
- 2 different ways a person can conform **– publically** or **privately**.
  - If you privately conform, change behaviours to align with group. If publically you're outwardly changing but inside you maintain core beliefs.

Decision-making often takes place in groups. Group interactions shape the outcome.

- **Group polarization is** a phenomenon where group decision-making amplifies the original opinion of group members. First, all the view does not have equal influence. Second, arguments made tend to favour popular view and any criticism is minority – **confirmation bias**.
- **Groupthink** – occurs when maintaining harmony among group members is more important than carefully analyzing problem at hand. Happens in very cohesive, insulated groups. Often have important/respected leaders, and in the interest of group "**unity"** individuals suppress own opinions.

Conformity and Obedience

Refer to different, but related things. Conformity – how we adjust our behaviour/thinking to match group, **obedience** – how we obey authority. Both are helpful in society.

- **Anomie –** breakdown of social bonds between an individual and community.
- We conform in little ways, ex. don't question cereal is breakfast food, or obey traffic lights.
- Can have dark side – peer pressure can lead to questionable behaviours. Or the holocaust.

# of types of conformity and obedience.

- One is through **compliance**, situations where we do a behaviour to get a reward or avoid punishment. Tendency to go along with behaviour without questioning why. Goes away once rewards/punishments removed. Ex. paying taxes.
- **Identification** – when people act/dress a certain way to be like someone famous. Will do this as long as they maintain respect for that individual.
- **Internalization** – idea/belief/behaviour has been integrated into our own values. Stronger than other types of conformity.

- **Normative Social Influence -** If we do something to gain respect/support of peers, we're complying with social norms. Because of this we might go with group outwardly, but internally believe something differently.
- **Informational Social Influence** – when we conform because we feel others are more knowledgeable than us, because we think they know something we don't.

Asch Conformity Studies (Asch Line Studies)

One of most famous conformity experiments.

- **Solomon Asch** was part of the ***Gestalt Psychologists*** – believed not possible to understand human behaviour by breaking down into parts, have to be understood as whole.
- "Most social acts have to be understood in their setting, and lose meaning if isolated."

Holocaust influenced his studies of conformity. (Milgram)

- ***Many Nazis said they were "just following orders".***

Ex. Participant in study, many other participants too. The experiment is boring – holds target line and 3 comparison lines, need to figure out which comparison line matches target.

- First trial, everyone gives what is obviously right answer.
- Second trial, same.
- Third trial, answer is obvious, but other participants all give wrong answer. 75% of participants conformed and gave the wrong answer more than once, and 37% gave it wrong to everyone else.
- Other participants were **confederates** (actors, told what to do).
- No prize for doing well/poorly on the study – no actual pressure to perform, only perceived pressure.
    - Example of **normative social influence**. Others reasoned if everyone else gave correct answer, must be correct one – **informational social influence**. When we change our behavior. For some participants, errors they made seemed to be **perceptual error** – truly believed answer given by others were correct.

Why not conform? Some were really confident, others not confident but stuck with their answers.

- Problems with study: **population** (all male undergrads), **participant suspicions**, **ecological validity** (line in lab not same as real world), **demand characteristics** (how participants change behaviour to match expectations of experimenter).

Migram Experiment on Obedience

Milgram studies were done to **study willingness of participants**, average Americans to **obey authority figures** that conflicted with their personality and morals.

- Kept studies from finding out, he used deception – posted ad about memory/learning.

When arrived at lab, study that looked at effects of punishment on memory.

- Learner was hooked to electrodes, and told learner would be shocked when gave wrong answer. Teacher was taken to different room without visual contact, sat in front of shock box. First 15V, and switches increased until 450V.
- Whenever they made error, teacher was instructed to give higher shocks with each wrong answer (no actual shocks were given).
- After several increasing shocks, learner would cry out in pain and complain about their heart condition. As shocks increased, continued to yell they want to quit.
- Finally, all responses would cease and only silence.
- Teacher instructed to continue, experiment requires you continue, it is absolutely essential you continue, you have no choice.
    - When **results of study** came out, very disturbing – 65% of participants shocked all the way. They had protested and were trembling, but **still obeyed commander**. In conditions with heart condition actor, dropped a bit, but not much – 63%.

What Can We Learn from Milgram Experiment

- Study has been **replicated**, no matter what time period/location.
- Study was perceived to be unethical at the time too.
- Things we should avoid:
    - Many participants really felt ashamed about it, but tended to speak poorly of the victims – he wouldn't have been shocked if he answered correctly, the **"just world phenomenon" –** belief good things happen to good people, and vice versa. Some people use this to justify their actions.
    - Also, many participants were comforted by **passing responsibility of actions to others** (when experimenter said they'd take full responsibility). "I was just following orders".
    - Also, caution ourselves against **self-serving bias** – that we could never commit acts like this, because most of us would.
    - **Fundamental attribution error** – focuses only on actions of others, tendency to believe that others in ***out-groups*** behave a certain way based on inherent personalities/flaws. Idea of attributing character too strongly to explain another group's actions. Real takeaway of study – how easy it is to think others are atrocious and evil, while people like us would only perform evil acts because they're misguided. Truth is we're all misguided.
- Important to have compassion for all people – victims and aggressor, don't know how you'd act in their place.

Zimbardo Prison Study – the Stanford Prison Experiment

Study was conducted in 1971, how **conformity** can result in acts different from usual. Complicated. In certain situations can make otherwise ordinary people behave in strange ways. How social conventions can influence behaviours of prisoners/guards.

- Got so caught up in roles had to stop experiment early.
- Participants knew all about the study – no deception. And participants were definition of normal, with no medical/psychological problems. Male, middle class students.
- 18 students randomly assigned to be guards or prisoners. All knew it was random.
- Had participants in prisoners arrested at unexpected times on a random day. No windows and clocks. Separate prisoners from outside world.
- Also met with guards and told them they were not supposed to physically harm prisoners, but could create fear/loss of control/loss of individuality. Given batons, and sunglasses. Instructed to refer to prisoners by #s and not names.

- Day 1 uneventful. Then prisoners began to rebel against guards. Guards had to decide what to do. Guards fought back. Prisoners cursed at guards. At some point, guards began to see prisoners as actual dangerous prisoners. And used fire extinguishers on them and forced them to strip down.
- Prisoners put into solitary confine., couldn't rest. After 36 hrs prisoners began to break down. Not only one.
- Day 3, situation went even further. Participants went on hunger strike. In response, forced to repeat their #s over and over again, exercise, withheld bathroom privileges, and make them turn on each other.
- Day 5, same. Zimbardo involved himself as prison warden. Never realized things had gone wrong. 6 days his girlfriend Maslach visited prison and so upset by what she saw she made him stop the experiment.

– By this time, half of prisoners already left from breakdowns. No guards had left.

Closer Look at the Stanford Prison Experiment

Prisoners did not band together usually, pretty distrustful of each other. And guards didn't encourage solidarity, tended to reward those they saw as good prisoners by giving better foods, etc. By giving privileges to some, broke solidarity of prisoners.

– Some released early – none of the prisoners just stopped and left, even if told at beginning that they could.
– Guards placed most of their behaviours on the prisoners – thought they were wimps, troublemakers, or faking distress.
– Shows us the influence <u>situation can affect our behavior</u> – might be due to: **situational attribution** (due to situation), not **dispositional attribution** (internal characteristics)
  - Also shows us becomes much easier to behave badly towards individuals who suffer from **deindividualization** (loss of self) – prisoners forced to dress same, and addressed as number.
  - Also shows <u>bad behavior</u> can result from **cognitive dissonance** – guards knowing their behavior was inappropriate, justified by saying everything happened because of prisoners.
  - Also role of **internalization** – prisoners <u>incorporated their roles into beliefs</u>, and let it <u>influence their attitudes/behaviours.</u>
    - ♦ But many problems – Zimbardo himself played role of prison warden, but by doing so he compromised his objectivity. Allowed a lot of unethical behavior. Why didn't stop? He said he thought they were just faking it.

    - ♦ Also, methodology weren't goods. What were his operational definitions of dependent/independent variables? What was being measured, where were controls, etc.? Also small sample size. Also good example of **demand characteristics** (how much of behavior was influenced by how they thought experimenter wanted them to behave).
– Also **selection bias** – no deception in study, so what kind of student willingly signs up to be in prison for 2 weeks? So, was this really random?

<u>Factors</u> that Influence Obedience and Conformity

Likelihood someone will **conform** (changing how they think):

– **Group size** – more likely to conform in <u>groups of 3-5</u>.
– **Unanimity** – when opinions of group are <u>unanimous</u>. We're not aware of effects a defector can have (someone who doesn't conform).
– **Group status** – why children more likely to go along with popular group. Why we trust doctors over gardeners about health.
– **Group cohesion**- if we feel no connection with group, feel less of need to go along with that group.
– **Observed behaviour** – whether we believe our <u>behaviour is observed</u>. Because participant came in late. If response in Asch line was not shared with group, much less likely to conform.
– **Public response** – if we think we're met with <u>acceptance vs. shunning</u>.
– <u>Internal factors</u> **– prior commitments** (if we say something earlier, less likely to say something different later). Or **feelings of insecurity** – more likely to follow judgements of others.

Likelihood someone will **obey** – following orders without question/protest.

- Depends on type of authority giving orders.
- Our **closeness** to authority giving orders.
- **Physical proximity** – more likely to comply in Milgram when authority standing close by.
- **Legitimacy** of authority – if wearing labcoat
- Also **institutional authority** – well-respected university. Can also be symbolic, ex. police/government.
- **Victim distance** – in original Milgram study, couldn't see participant. If could see participant, reduced likelihood participant would obey. But still didn't stop everyone.
- **Depersonalization** – when victim is made to seem less human.
- **Role models for defiance** – more likely to obey when we see others doing the same.

No one type of **personality** makes someone subjectable to authority. But people's **moods** can have an effect – those with rough day less likely to conform. Status and culture can play a role, those of low socioeconomic status are more likely to conform. Also cultures like US/Europe that emphasize ***individual achievement*** less likely to conform than collective cultures.

Just 1 non-conformer can make others not conform as well.

Bystander Effect

Person falls to ground nearby, would you help? People say yes, research says no. If in group, less likely to help. In group, people feel less inclined to take action. Called **bystander effect**. Individual may feel less inclined to take action because of presence of others in the group.

- Why? One may be lack of medical knowledge, or limited experience in assistance and think someone else would do it – **diffusion of responsibility theory**. When individuals are in presence of others, feel less personal responsibility.
- Amplified by amount of people in the group. If you were to collapse in small group, less chance of bystander effect. If only few people, more likely that people would be more inclined to take action and help you. Feel more personal responsibility.
- Bystander effect can lead to little happening by any individual. One example is story of **Kitty Genovese** who was stabbed, raped, and robbed while 38 people were in vicinity. Spanned over half an hour.

Deindividuation – those in group are more likely to act inappropriately because crowd conceals person's identity. Good example is behavior of some on Black Friday. Presence of large group of individuals decreases their inhibition/guilt. Or the internet.

Social Facilitation and Social Loafing

Social facilitation – how would presence of others affect your behavior? **Help or hinder** your performance?

- According to social facilitation, most **dominant response** for particular behavior would be shown. Dominant response refers to response most likely to occur. If you practice inside and out, presence of others will lead you to perform well. If you haven't practiced well, presence of others will make you perform more poorly.
- Presence of others increases your **arousal** – nervous energy. Increased energy/arousal increases likelihood of dominant response occurring. Whether correct or accurate depends on how easy the task is, and how well you've learned it. Presence of others improves performance on **simple tasks**, and hinders it on **difficult tasks**.

Social loafing is a tendency to put forth less effort in group task if the individual contributions aren't evaluated.

- **Group-produced reduction of individual effort** – groups experiencing social loafing put less productive, put forth less effort, and perform poorly.
- Can be reduced by making task more difficult, or separate grades.

So does presence of others help or hinder performance? Depends.

Agents of Socialization

Socialization is a life-long process that we learn how to interact with others. Everything we consider to be normal is learned through socialization – we walk/talk/feed ourselves, and behavioural norms that help us fit in.

Important agents of socialization – what's used to transmit culture and pass it around. Agents include organizations and institutions that help us learn about our social world.

- Our **family**, how to care for yourself, beliefs/values/norms, how to talk to others. How wealthy parents raise kids vs. less fortunate parents raise children. One example is trip to doctors – wealthy parents encouraged to ask questions, while less fortunate unlikely to criticize doctor. Wealthy kids encouraged to challenge authority, while less wealthy kids taught to listen to authority.
- **School** is important. Schools teach life skills – don't learn from academic curriculum, but learn social skills – importance of obeying authority, act interested, etc. Part of the "hidden curriculum", subtly taught by teachers.
- **Peers** teach us how to develop our behaviours. Contradict our parents at times, and influence us. Influence what movies/music we watch and listen to.
- **Mass media** – exposed to a lot of content intended for mature audiences. Enforces gender and other stereotypes.

Normative and Non-Normative Behavior

What is Normal? Exploring Folkways, Mores, and Taboos

Norms are standards for what behaviours are acceptable, and which are not. Rules that dictate how person should behave around certain group of people – defined by that group.

- Norms vary by culture and by country. Can change with time as individual's behaviours change.
- Norms are reinforced by **sanctions** – rewards/punishments for behaviours in accord with or against norms.
- **Formal norms** are written down, **informal norms** are understood but less precise and have no specific punishments.

Can be classified into 4 groups: folkways, mores, laws, and taboos. Dictate how important the norm is and consequences for deviating.

- **Folkways** – the mildest type of norm, just common rules/manners we are supposed to follow. Traditions individuals have followed for a long time, ex. opening the door, helping a person who's dropped item, or saying thank you. Consequences are not severe/consistent. No actual punishment.
- **Mores** – norms based on some moral value/belief. Generally produce strong feelings. Usually a strong reaction if more is violated. Ex. truthfulness. Don't have serious consequences.
- **Laws** – still based on right and wrong, but have formal consequences. Ex. if you lie under oath, done something morally wrong but also violate laws of court.
- **Taboos –** completely wrong in any circumstance, and violation results in consequences far more extreme than a more. Often punishable by law and result in severe disgust by members of community. Ex. incest and cannibalism.

Perspectives on Deviance: Differential Association, Labelling Theory, and Strain Theory

When norm is violated, it's referred to as **deviance**. Not negative, just individuals behaving differently from what society feels is normal.

- Ex. most Americans eat meat, but someone who's vegetarian is deviant.

The **Theory of Differential Association** states that deviance is a learned behavior that results from continuous exposure to others that violate norms and laws – learn from observation of others. Rejects norms/values and believes new behavior as norm.

- Relationships a person forms are very important – if strong relationship to someone deviant, more likely to learn deviance than someone not.

Labeling Theory – a behavior is deviant if people have judged the behavior and labelled it as deviant. Depends on what's acceptable in that society. Ex. steroids can be labelled as deviant and wrong by those who think so.

- **Primary deviance** – no big consequences, reaction to deviant behavior is very mild. Individual behaves in same way without feeling wrong.
- **Secondary deviance** – more serious consequences, characterized by severe negative reaction that results in stigmatizing behavior.

Strain Theory – if person is blocked from attaining a culturally accepted goal, may turn to deviance. Pushed to attain certain goals, but may not have legitimate ways to achieve success.

Aspects of Collective Behavior: Fads, Mass Hysteria, and Riots

What happens when large numbers of individuals behave in ways not in line with societal norms?

Collective behavior is not the same as group behavior, because of a few reasons. First, collective behavior is time-limited, and involves **short social interactions**, while groups stay together and socialize for long period of time.

- Collectives can be **open**, while groups can be exclusive.
- Collectives have **loose norms**, while groups have strongly defined norms.
- Collective behavior is often driven by group dynamics, such as deindividualization. Certain group dynamics can encourage people to engage in acts they may consider wrong in different circumstances.

3 types of collective behavior: **fads, mass hysteria**, and **riots**.

- **Fad** is something that becomes incredibly popular very quickly, but loses popular just as quickly. Last for short period of time, but reach influence of large # of people in that time. Perceived as cool/interesting by large group of people. Good example is a "cinnamon challenge" – person has to eat large spoonful of ground cinnamon in under a minute and posting video online.
- **Mass hysteria** is large # of people who experience delusions at same time, reach more people through rumours and fears. Often takes the form of panic reactions and negative news. Ex. severe weather warnings (mild form). Can also be result of psychology, when large amount of people believe they have same illness despite lack of disease – mass psychogenic illness, or epidemic hysteria. Ex. after anthrax attack in US, over 2000 false alarms.
- **Riots** – characterized by large # of people who engage in dangerous behavior, such as vandalism. Chaotic and cost cities millions in damages. Individuals who act case aside societal norms and behave in very destructive ways, and violate laws. Often seen as a collective act of defiance/disapproval, due to perceived issue (ex. sports game outcome).

Learning

Types of Learning

- **Nonassociative learning** – when an organism is repeatedly exposed to one type of stimulus, ex. **habituation** and **sensitization**.
  - In **habituation**, person tunes out the stimulus.
  - **Dishabituation** occurs when previously habituated stimulus is removed.
  - **Sensitization** is increase in responsiveness to a repeated stimulus.
- **Associative learning** – when one event is connected to another, ex. classical and operant conditioning.

Classical Conditioning: Neutral, Conditioned, and Unconditioned Stimuli and Responses

Ex. Guinea pig gets excited about carrot at first, but after time gets excited just at refrigerator door opening. Same with every other time refrigerator door opened.

- Called **classical conditioning**. Classical does not involve change in behaviour like operant conditioning. op
- Carrot is an **unconditioned stimulus** because no one had to teach guinea pig to like carrots. Triggers excitement in guinea pig, an **unconditioned response**.
  - Unconditioned means it's innate, and not learned. While conditioned means it's a learned behavior.

- Right before guinea pig got carrot, heard refrigerator door – a **neutral stimuli**. Doesn't cause excitement on its own.
- Conditioning is produced when the neutral stimulus is presented shortly before the unconditioned stimulus – pairing the two together. Occurs when neutral stimulus is able to elicit the same response as the unconditioned stimulus).
  - Ex. guinea pig was conditioned to refrigerator door.
  - Refrigerator door becomes the **conditioned stimuli**, and elicits a **conditioned response**.

Classical Conditioning: Extinction, Spontaneous Recovery, Generalization, Discrimination

- Recall last experiment, guinea pig also responds to desk door opening because it sounds similar to the refrigerator door – **generalization**. Ability of something similar to the conditioned stimulus to elicit the conditioned response, and more similar they are the bigger the response.
  - Generalization allows us to make appropriate response to similar stimuli. Ex. meeting someone new who smiles, reminds us of other smiles.
- Guinea pig doesn't respond to dresser drawer – **discrimination**, when you respond to some stimuli but not others.
- If you open refrigerator door and don't get a carrot anymore, over time she would no longer react – **extinction**.
- But suddenly she hears refrigerator door open later, and makes a response – **spontaneous recovery** (when old conditioned stimulus elicits response). Don't know why it happens, usually infrequently and less strong.

Operant Conditioning: Positive and Negative Reinforcement and Punishment

- Associated with **B.F. Skinner**
- **Operant conditioning** focuses on the relationship between behavior and their consequences, and how those in turn influence the behaviour (classical conditioning no change in behaviour)
- Behaviours have consequences – two types: **reinforcement** (increase a behavior) and **punishment** (decrease a behavior)
  - **Positive reinforcement** = something is being added to increase behavior, ex. a gas gift card for safe driving
  - **Negative reinforcement** = taking something away to increase tendency safe behavior will occur again. Ex. taking loud buzzing noise keeps going until you put on your seatbelt. Taking away sound of buzzer when you put on seatbelt is negative reinforcement, because taking something away in effort to increase behavior.
  - **Positive punishment** = punish behaviours that are unsafe. Positive punishment means something is added to decrease tendency something will occur again. Ex. giving speeding ticket.
  - **Negative punishment** = something taken away in effort to decrease chance it'll occur again. Ex. taking away your license.
- **Primary reinforcers** are innately satisfying/desirable, like food. **Secondary reinforcers** are those learned to be reinforcers, such as previously neutral stimuli.
- **Token economy** – system of behaviour modification based on systematic reinforcement of target behaviour, reinforcers are "tokens" that can be exchanged for other reinforcers (ex. Prizes).

Operant Conditioning: **Shaping**

"I want to learn to do a headstand" – emphasize **learn**. Learning through practice is **shaping**.
Idea is you successively reinforce behaviours that approximate the target behavior.
What is the **target behavior?** Ex. headstand.

- Showing up to yoga class, won't necessarily make you learn it.
- Next, put hands on mat (downward dog). Then forearms on mat. Each is the reinforced behavior until next step.
- Finally, put legs up – the target.

Operant Conditioning: **Schedules of Reinforcement**

Most of our behaviours are on a ***partial reinforcement*** schedule – behavior is reinforced only some of the time. More resistant to extinction than continuous reinforcement.

- **Fixed-Ratio** – ex. car salesman gets bonus every 5 cars he sells. Reinforcement only occurs after a fixed # of responses. Contingent on # of cars sold regardless of how long it takes.
- **Fixed-Interval –** ex. receives pay check every 2 weeks – in this case, time is constant. Doesn't change if he sells 1 car or 100 cars. Less incentive.
- **Variable-Ratio** – Reinforcement is delivered after average # of right responses has occurred. Similar to fixed-ratio, except # changes. Just fixed-ratio but varies. Ex. bonus can be 5 cars for first bonus, 3 for second, 7 for third, 6, then 4 etc. Average is 5.
  - Another example is slot machine.
- **Variable-Interval** – Responses are reinforced after a variable amount of time has passed. Ex. bonus can come randomly on different days.

Operant Conditioning: **Innate vs. Learned Behaviours**

- **Innate behavior** is performed correctly the first time in response to a stimulus – they innately possess.
  - Simple – **reflexes** (squint or blinking), **taxis** (bugs fly towards light, can be towards or away from stimulus – a purposeful movement), **kinesis** (rats randomly scurrying in different directions – no purpose).
  - Complex – **fixed action patterns** (mating dance), **migration** (birds flying south), **circadian rhythms** (biological clock, waking up early to sing)
- **Learned behaviours** are learned through experience.
  - **Habituation –** response to alarm decreases over time. Ex. curing phobia by repeated exposure to the fear until intensity of emotional response decreases.
  - **Classical conditioning –** associate alarm with fire
  - **Operant conditioning –** consequences that follow behavior increase/decrease likelihood of behavior happening again
  - **Insight learning** – solve a problem using past skills, the "aha" moment is insight learning
  - **Latent learning**- learned behaviour is not expressed until required

Operant Conditioning: **Escape and Avoidance Learning**

2 types of **aversive control**, situations where behavior is motivated by threat of something unpleasant – examples of negative reinforcement (removing undesirable stimulus following correct behavior)

- **Escape** – escape an unpleasant stimulus ex. fire, element of surprise because you're thrown in condition where you have to find way to get out
- **Avoidance** – avoid fire before it arrives

Theories of Attitude and Behavior Change

Persuasion, Attitude Change, and the Elaboration Likelihood Model

Persuasion is a method for attitude/behavior change. **The elaboration likelihood model** explains when people will be influenced by the **content of a speech** vs. more superficial features.

3 main characteristics that impact on how we are persuaded for/against a message:

- 1) **Message characteristics** – message itself, clarity, how well thought message it. Also includes how well written it was, does speaker have good grasp of grammar, appropriate vocabulary, length of talk, etc.
- 2) **Source characteristics** – what is their level of expertise, trustworthy, and is information credible or not. Physical environment, venue of event.
- 3) **Target characteristics** – characteristics of listener such as mood, self-esteem, alertness, intelligence, etc. How we receive a message.

According to model, we process info along 2 target paths: **central** and **peripheral routes**.

- **Central** – people are persuaded by the content of the argument. Leads to **deep processing** of information. Results in a ***lasting attitude change***. People will only choose this route when they are interested in the topic.
- **Peripheral** – don't care about topic, little motivation/interest. Leads to **shallow processing** of information, such as the speaker's looks. Creates a ***temporary attitude change***.

Reciprocal Determinism

Reciprocal determinism is the interaction between a person's behaviours, personal factors (motivation), and environment.

The **Social-Cognitive Theory** view behaviours as being influenced by people's actions/cognitions and their social context. Talking about interactions between individual and situation they're in.

- Cognition -> Environment -> Behavior
- Ex. Meg is interested in soccer (**cognition**), joins a soccer team (**environment**), and spends time with soccer players (**behavior**).
- Or, she can spend a lot of time with soccer players, become interested in it, and joins a soccer team. Behavior leads to a cognition.
- Other direction: hangs with soccer players, so she joins a soccer team , and then after a while develop a real interest in soccer, which then reinforces her hanging with the team.

This theory was developed by **Bandura** (same scientist who did work on observational learning).

Personal Control (Locus of Control, Learned Helplessness, and the Tyranny of Choice)

Important element of social cognitive theory is **personal control.** Internal or external.

- I should have studied harder – **internal locus of control**, can control fate of own destiny
- That was an unfair test – **external locus of control**, perceive outside forces that help to control your fate

Those internal achieve more in school/work, cope better with stress and lower depression. External do not as well and higher rates of depression.

Learned helplessness – when tone is sounded dogs receive electric shock, but could press button to stop the shock. Group 2 had no way to turn off the shocks.

- After, dogs placed in new environment and had 2 sides separated by low partition in middle. Given electric shocks, but dogs in group 1 learned to escape shock by jumping over barrier. Dogs in group 2 didn't try to escape the shock.
- Therefore, uncontrollable bad events can lead to a **perceived** lack of control, which leads to general helpless behavior.

Increasing people's control over very small things, like TV remote can increase the health and well-being of people in nursery homes.

What about too much control? Too many choices can also negatively impact our cognition and behavior – the **tyranny of choice**.

- Ex. too many choices at stores
- Those who had to pick 1/6 were more satisfied with their behavior, those who had to pick 1/30 less happy with their choice.
- One result is **information overload**, and can lead people to **decision paralysis** and **increased regret** over choice made.

Personal control is important, any control people have on environment even a little has good effect on well-being. On other hand too much is not good either.

Self-Control

The ability to control our impulses and delay gratification.

Humans have **desires** which aren't necessarily bad, but they can become a **temptation** (when they conflict with our long-term values and goals).

- So self-control is focussing on long-term goals while putting off short-term temptations.

The most famous experiment is commonly referred to as the **marshmallow test**. Kids in preschool given marshmallow and could eat it whenever, but if they waited 15 minutes they could get another marshmallow.

- Some ate it right away, but other kids licked it.
- Those who were able to wait tended to have better life outcomes when followed 10 years later.

Ego depletion – idea that self-control is a limited resource. If you use a lot of it it can get used up, and less to use in the future.

- Demonstrated by experiment that those who resisted eating cookies ended up giving up sooner on another unrelated task that also requires self-control.
- Muscle is used as a metaphor for self-control. Can be strengthened, but also depleted.
- Training self-control in one area can improve it in other areas.

How to improve self-control

- 1) **Change environment** – ex. moving snacks to more difficult to reach shelf.
- 2) **Operant conditioning** – reinforcing good behaviours with rewards. Positive/negative reinforcement or punishment.
- 3) **Classical conditioning** – ex. eat healthy chocolate every time you crave chocolate.
- 4) **Deprivation**? – Removing something completely is problematic. Can make you want it more, and leads to ego depletion.

Individuals and Society

Self-Identity

Self Concept, Self-Identity, and Social Identity

Self-concept is how someone perceives/evaluates themselves, aka self-awareness.

- Development of self-concept has 2 parts: first, an **existential** self and then a **categorical** self.
  - **Existential self** is most basic part of self-concept, the sense of being **separate** and **distinct** from others. Awareness that the self is **constant** throughout life.
  - **Categorical self** comes once baby realizes they're separate – becoming aware that even though we're separate, we also exist in the world with others. And each of those entities have properties.
    - Ex. **age** and **gender** are first babies learn, then **skills** and **size**. Then compare ourselves with others – **traits**, **comparisons**, **careers**.

Carl Rogers (**Humanistic Theory**), believed self-concept had 3 different components.

- **Self-image**: what we believe we are
- **Self-esteem**: how much value we place on ourselves
- **Ideal-self**: what we aspire to be
- When the ideal self and real self are similar, the result is a positive self-concept. When the ideal self does not match the real self, the result is **incongruity**.

We can use the **social identity theory** – 2 parts: personal identity and social identity

- All humans **categorize** ourselves and others without really realizing it, ex. race/job/etc
  - If we assign categories to others, we make pre-judgements about them.
- Next is **identification**. When we adopt identity of group, we see us as belonging – behaving and acting like the category we belong to, ex. a student. Our self-esteem starts to become bound with this group identification and sense of belonging.
- Final step is social **comparison** – how we comparing ourselves with other groups, to maintain our self-esteem. Critical to understanding of prejudice, because once two groups develop as rivals, we compete to maintain self-esteem.

Self-Esteem, Self-Efficacy, and Locus of Control

- **Self-esteem** is the respect and regard one has for oneself
- **Self-efficacy** – belief in one's abilities to succeed in a particular situation. Developed by Bandora due to his dissatisfaction with idea of self-esteem.
  - People with **strong** self-efficacy **recover** quickly from setbacks, have strong **interest**, **strong** sense of commitment, and **enjoy** challenging tasks (**RISE**)
  - People with **weak** self-efficacy focus on personal **failures**, **avoid** challenging tasks, quickly **lose** confidence in personal abilities, and believe they **lack** the ability to handle difficult tasks and situations (**FALL**)
- Look at these sources to determine if person has strong/weak sense of self-efficacy:
  - 1. **Mastery of experience** – strengthens self-efficacy
  - 2. **Social modeling** – seeing people like ourselves complete the same task
  - 3. **Social persuasion** – when someone says something positive to you, helps overcome self-doubt
  - 4. **Psychological responses** – learning how to minimize stress and control mood in difficult situations can improve self-efficacy

A person with low self-esteem can have high self-efficacy, and vice versa. Ex. a perfectionist can have low self-esteem but still see themselves as capable of doing tasks.

Locus of control – the extent to which people perceive they have control over events in their lives.

- **Internal** - when person believes he or she can influence events/outcomes. Results come primarily from their own actions.
- **External** – attribute events to environmental events/causes.

Overview of **Theories of Development**

The theories of changes that occur in a lifespan, and each stage builds up over another.

Freud – Proposed the **psychosexual theory** of development.

- Believed early **childhood** was the most important age/period it developed. Plays large role in personality development.
- **5 stages** – if completed successfully, result is a healthy issue. If issues aren't resolved at a certain stage, then **fixation occurs**

Erikson – **Psychosocial development theory**.

- Proposed personality/identity development occurs through one's entire **lifespan**.
- Each stage depends on overcoming a **conflict,** and success/failure at each stage affects overall functioning of theory.
- **8 stages**

Vygotsky – **Sociocultural development theory**

- Believed children learned **actively** through **hands-on** processes, and suggest parents/cultural beliefs/language/attitudes are all responsible for higher function of learning.
- Child internalizes interactions with others.

Kohlberg – **Moral development theory .**

- Focused on **moral reasoning** and difference between right and wrong.
- Moral reasoning develops through cognitive development, and people pass through **3 stages** of development (each with 2 stages) **– 6 levels total**

In general, Freud and Erikson were interested in how personality develops, and Vygotsky and Kohlberg were interested in how cognition develops

Freud's Psychosexual Development

Proposed psychological development in childhood developed through these stages, and concept of tension and pleasure – the build-up of tension could cause a lot of conflicts.

- **Fixation** was due to concept of **libido** – a natural energy source that fuels mechanisms of mind. And when fixated, can have lifelong effect well into adulthood. Libido is centered at different parts of the body at different times of development.
- First **5 years** are crucial
  (Mnemonic – OLD AGE PARROTS LOVE GRAPES)
  - Old = oral, age = anal, parrots = phallic, love = latent, grapes = genital

Depending on what stage we're at, going to be different fixation of energy at certain body part.

- For oral stage – focus is mouth. For anal stage, anus, phallic is genitals, latent is none, and genital stage is the genitals.

Oral stage – age **0-1** yrs., libido is centered around baby's mouth, vital for sucking/eating. Because completely dependent on caretakers, baby also develops sense of trust and comfort.

- If fixation here, issues with ***dependency or aggression***. Also smoking or biting fingers.

Anal stage – age **1-2**, centered around anus, ex. toilet training. Leads to developing control/independence, encouraging positive outcomes. Serve as basis for competent adults.

- If fixation occurs, have problems with ***orderliness and messiness***.

Phallic stage – age **3-6**, children discover difference between males and females. ***Oedipus complex*** (desire for sexual involvement with other parent) also develops. Resoled through process of **identification**, where child starts to understand and develop similar characteristics as same-sex parent.

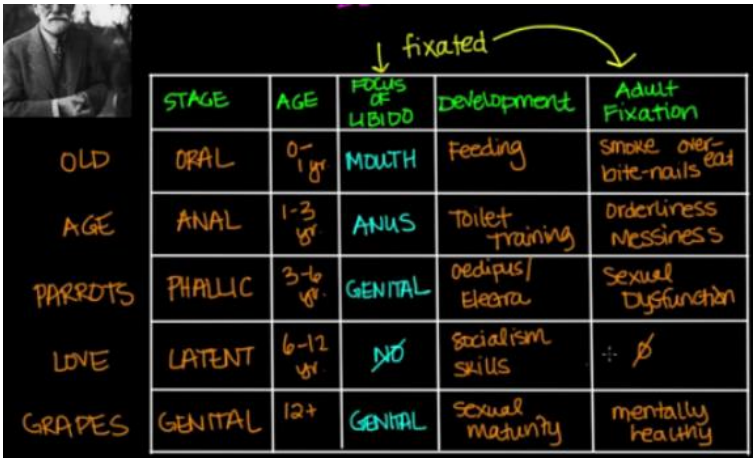
- If fixation occurs, cause ***sexual dysfunction***. Oedipus complex and Electra complex at this stage.

Latent period – no focus of libido. A period of exploration, libido present but directed into other areas such as intellectual pursuits and social interactions. Important in development of social and communication skills.

- Fixation doesn't develop into adult fixation.

Genital stage – back on libido, because individual develops strong sexual interests. Before this stage, focus on individual needs. Now, focus on needs of others.

- No adult fixation – person is mentally healthy.



Erikson's Psychosocial Development

Greatly influenced by Freud, but his theory was **based on culture and society**

- Another key difference between his and Freud's theory was he suggested there was plenty of room for growth throughout one's life (not just childhood).
- Assumed a **crisis** can occur at each stage of development, between needs of individual and society. Successful of 8 stages results in acquisition of basic virtues and healthy personality.

Failure in certain stage results in reduced ability to move on to further stages.

I. ***1 yrs***., **trust vs. mistrust**. If an infant's physical and emotional needs are not met, as an adult he or she may mistrust everyone. Virtue is **hope**, and failing to acquire of virtue can lead to suspicion/fear/mistrust.

II. ***2 yrs***., **autonomy vs. shame/doubt**. Around 18 months to 3 yrs. children develop independence by walking away from mother, what they eat, etc. Critical that parents allow children to do that. Virtue achieved is **will** (independence). If child is overly criticized/controlled, feel inadequate and lack self-esteem, and have shame.

III. ***3-5 yrs***., **initiative vs. guilt**. Children feel more secure in their ability to lead others and play, so ask questions. Virtue they reach is a sense of **purpose** in what they do and choices/decisions they make. If tendency to ask questions is controlled, develop guilt – as if they're annoying other people and act more as a follower. Inhibits their creativity, and outcome is inadequacy.

IV. ***6-12***. **industry vs. inferiority**. Where teachers take an important role in a child's life, and child works towards competence. Child will gain greater significance and self-esteem, and try to win approval from others. Will feel industrious, but if initiative is restricted child feels inferior. Some is good though, so child has modesty.

V. ***12-18***, ***adolescence.*** **identity vs. role confusion** Transition from childhood to adulthood, so one of most important crisis. Want to start feeling they belong in society. In this stage, the child has to learn rules, so may re-examine identity to figure out who they are. Body image plays big role. Virtue is **fidelity**, seeing oneself as unique. Can cause rebellion/unhappiness.

VI. **intimacy vs. isolation.** Try to find love and relationships. Completion leads to comfortable relationships, avoiding intimacy can lead to isolation/loneliness.

VII. ***40-65***, **Generativity vs. stagnation** so settle down, make families the center of their lives, and sense of being part of bigger picture.. Adults feel like they give back through raising children/work/community activities, so develop sense of care for others. Negative outcome is they feel stagnate and unproductive.

VIII. ***65+***, **integrity vs. despair** slowing in productivity. Contemplate on lives, reminisce. May feel guilt about past or unaccomplished, dissatisfied. Virtue is wisdom, but if we feel unproductive leads to despair/dissatisfaction upon death.

	AGE	CRISIS	VIRTUE	(-) OUTCOME
1	1 yr	trust v. mistrust	hope	fear, suspicion
2	2 yr	autonomy v. doubt	will	shame
3	3-5	initiative v. guilt	purpose	inadequacy
4	6-12	industry v. inferiority	competence	inferiority
5	12-18	identity v. role confusion	fidelity	rebellion
6	18-40	intimacy v. isolation	love	isolation, unhappy
7	40-65	generativity v. stagnation	care	unproductive
8	65+	integrity v. despair	wisdom	dissatisfaction

Vygotsky Sociocultural Development

Studied the role social interaction plays in development of **cognition**.

- Focussed on **social interactions** between growing children and interactions with those around them in development of higher order learning.

Said babies have 4 elementary mental functions:

- **Attention, sensation, perception, and memory.**
- These elementary mental functions are developed into more sophisticated and mental processes – **higher mental functions**. Most develop from skillful "tutor" – a model, ex. parent/teacher.
- Independent learning and thinking
  - 1. Requires cooperative and collaborative dialogue from a **MKO** (**more knowledgeable other**).
  - 2. **Zone of proximal development –** part where most sensitive instruction/guidance should be given. Ex. between ability of not being able to do something and being able to do something. ZPD is the link between the zone of can't do and can do.
  - 3. **Language** – the main means by which adults transmit info to children, and a powerful tool of intellectual adaptation. Ex. private/internal speech, when people speak out loud to themselves – happens most in children. Way for children to plan activities/strategies, and aids their development.

Kohlberg Moral Development

Moral theory of development, different from previous 3, but based on **cognitive** development similar to Vygotsy.

- Looked at how people developed their morals, and the way moral reasoning changes as people grow.
- Also looked at children. He told stories to children and gauged their response.
  - Most famous story was the **Heinz Dilemma**, his wife was dying from cancer and drug was discovered made my local chemist that could save her. Chemist charged 10x the price it took to make the drug, and more than Heinz could afford. Only had half the family, so explained to chemist his wife was dying, but chemist refused. He broke into chemist's office at night and stole the drug.
    - ♦ Asked children questions like what if Heinz didn't love his wife, if person dying was a stranger, should he have stolen it, and should police arrest chemist for murder if woman died.
    - ♦ After analyzing these, he came up with 3 moral stages, each split into 2.

1. **Pre-Conventional** (pre-adolescent)

- 1. ***Obedience vs. Punishment*** – reasoning is based on physical consequences of actions, so obeying the rules is a means to avoid punishment.
- 2. ***Individualism and Exchange*** – recognize not just one right view by authorities, different individuals have different viewpoints.

2. **Conventional**

- 3. ***Good Boy and Good Girl*** - Authority is internalized, but not questioned, and reasoning is based on group person belongs. Individual is good in order to be seen as good by others, emphasis on conformity.
- 4. ***Law and Order*** – maintaining social order, child is aware of wider roles of society and obeying laws.

3. **Post-Conventional** (moral)

- 5. ***Social Contract*** – Individual becomes aware that even though rules and laws exist for greater good, there are times this law works against interest of particular people.
  - Ex. for Heinz, is protection of life more important than breaking/stealing? People at this stage said yes.
- 6. ***Universal Ethical Principle*** – people develop own set of moral guidelines, which may or may not fit the law, and principles apply to everyone. People who uphold and believe in these have to be prepared to act towards these even if they have to obey consequences. Very few people who reach this stage, ex. Ghandi.

Social Influences

How imitation, roles, reference groups, and culture are all parts of social influence.

Imitation – a type of individual social influence, one of most basic forms of social behavior. Begins with understanding there's difference between others and self.

- Andrew Meltzoff questioned theory that understanding between self and others happens soon after birth. Picture baby 12-21 days old, baby copies sticking tongue out. Imitating experimenter.
- Was it true imitation or something else? Picture you opening mouth, baby should also open mouth. Had to ensure it wasn't a reflex or conditioning either.
- Suggests we are born with built-in capacity to imitate others.
- Evidence suggests we have **mirror neurons**, when one fires another fires when we observe same action performed by other person.

Roles – define what we do and who we are. Social norms are the accepted standards of behavior of a social group, use it to guide our behaviours. We respond to their approval when we play our roles well, and disapproval when we play roles badly. Expect people to behave in way that fits that role, and have them even more when roles are stereotyped.

- Ex. Prison experiment

Reference groups – the group to which people refer in evaluating themselves. People's beliefs, attitudes, behaviours.

- Constantly looking for external groups that align with our beliefs/attitudes/behaviours. Influences our social decisions.

Culture and socialization – important contributions of society to our personal development, the people and culture in which we live.

George Herbert Mead: The I and the Me

Charles Cooley and **George Herbert Mead** both thought **others** could play a significant role in how we view ourselves, but differed in how they thought this would happen.

- Cooley thought everyone a person interacts with in a lifetime influences their identity
- Mead thought this was more restricted – only certain people can and only in certain periods of life.

Mead developed the idea of **social behaviourism**, the mind and self-emerge through the process of communicating with others (beginning of ***symbolic interactionism***).

- Infants + children were not influenced by others in any way, merely imitate others, and see themselves as being the focus of their own world and don't care what others think of them. Lack ability to take perspective of another person – related to **Piaget's** concept of egocentrism.

As we grow up, how others perceive us is more important, 3 stages:

1. **Preparatory stage** – imitation, ex. play with pots and pans when parents are cooking. As they grow older, focus more on communication with others instead of simple imitation, and get practice using symbols (gestures/words).
2. **Play stage** – more aware of social relationships, reflected in children's tendency to **pretend role play** as others like firefighters, doctors, etc.
   - Mentally assuming perspective of others and acting based on their perceived point of view.
3. **Game stage** – Start to understand attitudes/beliefs/behavior of "**generalized other**" (society as a whole). With this comes whole new understanding of society. Also realize people can take on multiple roles. Also realize others perceive them, and are influenced by these perceptions and are concerned by reactions of others to what they do. But don't care about reactions of everyone, only significant others (important relationships, ex. parents/teachers/close peers).
   - Believe this last stage led to development of the **"I"** and **"me".**
   - **Me** = how the individual believes the generalized other perceives it, the social self, and the "I" is our response to the "me".
   - **I** = the response of the individual to the "me" aka attitudes of others.
   - **Me** = society's view (that's me!), the part of self-formed in interaction with others and social environment, and I = individual identity stepping in and our personal responses to what society thinks.
     - The "I" is the spontaneous and autonomous part of our unified self.

Charles Cooley – **Looking Glass Self**

Socialization describes the process by which people learn the attitudes, behaviours, and values expected by their culture/community.

- Can be learned through parents, peers, person at supermarket, celebrity, etc.
- Socialization also shapes our **self-image**, and **Charles Cooley** used the term "**looking glass self"** to describe this process – idea that a person's sense of self develops from interpersonal interactions with others.

Thought this happened in 3 steps

1) *How do I appear to others?*
2) What must others think of me? (shy, intelligent, awkward)
3) *Revise how we think about ourselves* (based on correct OR incorrect perceptions).

Critical aspect of this theory is Cooley believed we are not actually being influenced by opinions of others, but *what we **imagine** the opinions of other people to be.*

- Ex. Say we have teacher grading paper harshly, and doing it because they think that student has a lot of potential. But student gets paper back, think the teacher did so because student is not very intelligent, and came to conclusion they're not very good at literary analysis. Might result in student putting less effort into the class.
- But can also be influenced by future interactions – student might talk to teacher, and student was able to revise their incorrect perceptions and develop a different perspective.

Perception, Prejudice, and Bias

Attribution Theory – Basic Covariation

Explain the behavior of other people by breaking down our understanding/explanation of their behaviours to factors about them, and factors related to their environment/surroundings.

- **Internal (dispositional attribution)** – about them
- **External (situational attribution)** – environment
- When we consider our own behaviours, we are more likely to blame our behaviour on **external factors**.
  - This is called **attribution theory** – explaining behaviours around us.

Optimism bias is belief bad things happen to others, but not to us.

Covariation model – 3 cues of **Kelley's covariation model**:

- ***Consistency*** (time)
- ***Distinctiveness*** (situation)
- ***Consensus*** (people)

- Ex. Take flaky friend, friend forever cancels. Consistent behavior over time. High level of consistent behavior over time, we are more likely related to them as opposed to situation.
  - When ***consistency*** is high = internal factors
- Ex. Very nice friend Jim, but one day he gets so mad at the pizza place. Out of character and distinctive. So much more likely to be related to the environment. **Distinctiveness** = situational.
- Third factor in covariation model – "**group lateness**" – if you arrive late at meeting but if 20 other people are late too, high degree of ***consensus***. When a lot of people demonstrate same behavior, we are more likely to attribute behavior to situational cause.

Attribution Theory – **Attribution Error** and Culture

We look at behaviour as coming from person's ***internal attributes***, and as being fuelled by situation/external factors

- If in middle, we are a **neutral judge** and see a combination as both.

But often when we look at behaviour of others, we're more likely to attribute their behaviour to **internal factors** instead of considering complex external factors.

- We term this the **fundamental attribution error.**
  - Problematic when looking at complex patients – we under-recognize the situational and social problems, and healthcare barriers they can have, blaming them for their own problems.

Actor-Observer Bias: we are victims of circumstance, but others are wilful actors. *******

- **Actor**
- **Observer**

There's also a **cultural** component: the fundamental attribution error occurs more in individualistic societies (NA and Europe), collectivist (Africa and Asia)

- Cultures have different ways they explain success and failure
- In **individualistic** cultures (Western), success is attributed to internal and failure to external
- In **collectivist** cultures (Eastern), success is attributed to external and failure to external (favour situational attributions when situational factors are emphasized)

Self-serving bias: preserving our self-esteem, more common in individualistic cultures. If we succeed it's due to our internal qualities, but if we fail no hit on self-esteem because likely to do with things outside of our control.

Stereotypes: Stereotype Threat and **Self-fulfilling Prophecies**

Stereotyping is attributing a certain thought/cognition to a group of individuals, and **overgeneralizing** (COGNITIVE ACTION)

- Can involve race, gender, culture, religion, shoe size.
- Disadvantages: it's inaccurate
- Advantages: allows us to rapidly assess large amounts of social data

Stereotype threat – self-fulfilling fear that one will be evaluated based on a negative stereotype.

- Ex. Blue and red students, both perform equally. Next time, implement negative stereotype about blue students, blue students perform worse.
- What **stereotype threat** is – exposure to a negative stereotype surrounding a task can actually cause decrease in the performance of an individual. It threatens performance.

Self-fulfilling prophecy – stereotypes can lead to behaviours that affirm the original stereotypes.

- "City dwellers are rude" (cognition, stereotyping) -> I don't like them (affective component, prejudice) -> I will avoid them (behavioural component, discrimination)
- They think I'm rude (cognition) -> They may not like me (affective)-> They avoid me (behavioural) -> City dwellers are rude
    - Continuous circle that feedbacks on itself.

Emotion and Cognition in **Prejudice**

All attitudes have 3 components: affect, behavioural, and cognition.

- At the core of prejudice is often fear of frustration.
- **Scapegoats** are group of people towards whom the aggression is directed, ex. Jews during World War II.

There are types of personality more subject to prejudice – the **authoritarian personality**.

- They're obedient to superiors, but don't have much sympathy for those they deem inferior to themselves – ***oppressive***. And rigid thinkers, ***inflexible*** with their viewpoints.
- They use prejudice to **protect their ego** and **avoid confronting** aspects of themselves because they're always focussed on others.
- Personality type is hard to change.

Frustration Aggression Hypothesis – not personality based, but more emotional.

- Ex. Someone getting **frustrated** can lead to prejudice. When someone's frustrated, frustrations turn to aggressive impulses, and direct that towards the employer. But you may lose your job, so you keep bottling up the aggression – and rechannel it somewhere else. Often towards **minorities**.
- Display aggression towards other people – **scapegoating**. Often seen in times of economic hardship.

Hypothesis of Relative Deprivation –upsurge in prejudice when people are deprived of something they feel entitled to.

- Leads to collective unrest, upsurge in prejudice and discrimination.

Prejudice and Discrimination Based on ***Race, Ethnicity, Power, Social Class, and Prestige***

Prejudice and discrimination usually talked about in relation to racial and ethnic groups.

- ***Physical characteristics*** with social significance – some have more meanings than others. Ex. skin color, but not eye color. Attached meaning to skin color.
- ***Ethnicity*** – ex. Puerto Rican, Irish, Japanese. Also include groups like Jews defined more by cultural practices than country of origin.

Can also be based on power, social class, or prestige.

- **Power** – political power, economic (unfair hiring policies to minorities), personal (laws can limit where someone lives/etc.)
- **Social Class** – status is relative, often sets stage for prejudice (people on top maintain differences between themselves and lower class – the Just World Phenomenon contributes to prejudice).
- **Prestige** – often based on occupation.

Stigma – Social and Self

Extreme disapproval/discrediting of individual by society – 2 forms: **social stigma** and **self-stigma**

- **Social stigma** can be fuelled or associated with several other key concepts: **stereotypes, prejudices, discrimination**. Relationship between stigma and these is unclear.
  - Stigma against mental health is big problem – ex. stereotype is mentally ill are violent (cognition), I become scared of mentally ill (affect, prejudice), so may not want to live with them or hire them (behavior, discrimination)
- **Self-stigma** is individual can internalize all the negative stereotypes, prejudices, and discriminatory experiences they've had, and may feel rejected by society.
  - Ex. someone who has HIV/AIDS and feels the stigma may go into denial that they have the condition, experiences hits from self-esteem and suffer from depression, and display behaviours that isolate themselves from society.

Social Circles

- 1st = self
- 2nd = family
- 3rd = society
- 4th = media
- Bidirectional relationships between all these groups.

- **Media** is major source of stigma, because can depict conditions as being dangerous, etc. Social media is also huge component.
- **Society** – interactions between self and society like education/employment/health care and stigmatizing views can affect individual to get a job, healthcare, etc. Use of **legislation and anti-discrimination laws.**
- **Family** – family can be shunned by society, or shun individual themselves. Ex. isolate the individual and keep as secret within family. May be detrimental to personal/intimate relationships, and interventions like education/therapy are important.
- **Self** – Can lead to avoidance, denial of condition, suffering of mental health conditions, and no longer participating in society. Useful interventions include educating, access to support groups/resources.

Social Perception – **Primacy and Recency Bias**

First impressions are

- 1) **long** (lasts a long time)
- 2) **strong** (tough to overcome) and
- 3) **built up** (put extra emphasis on info that helps reinforce first impression, and not info that doesn't).
- Called the **primacy bias** – assessor selection is made based on information presented earlier in the process

Your most recent actions are also very important, and people place a lot of emphasis on your recent actions/performances, more than ones before – the **recency bias**.

- Information retention (memory) also has primacy and recency bias.

Social Perception – **The Halo Effect**

The **halo effect** is tendency people have inherently good/bad natures, rather than looking at individual characteristics.

- The **physical attractiveness stereotype** – believe attractive people have more positive personality traits.
  - Ex. Jim, overall impression is in the middle. His accounting bar is very high, sales negative, leadership is moderately good.
- Now imagine, he has overall good impression, even though he has the same actual skillset. We would perceive that the person is much better at other skills not demonstrated. We may perceive he's actually pretty good at sales, regardless of evidence. Same with leadership and accounting.
- Almost as if he has a halo on his head – the **halo effect**.
- Often happens with celebrities, and greater attractiveness.

Now imagine someone who we think is overall very poor. Even if baseline skills are same, we perceive them to all be lower – the **reverse halo effect**. Can carry over into how we see other attributes about the person.

Social Perception – **The Just World Hypothesis**

"You got what you deserve".

The **"Just World Hypothesis**" - Noble actions performed by an individual, while evil acts are always punished.

- Suggests there is some kind of special force, cosmic justice at play.
- Reason people think in this way because it helps individuals rationalize their good or misfortune. Ex. if I go to school I will be rewarded in life
- However, world doesn't always work this way, and using this hypothesis we may blame people in poverty for being poor.

When the "just world hypothesis" is *threatened*, we can use these **rational techniques**

- 1. Accept reality
- 2. Prevent or correct injustice – with petition or changes to legal system

Irrational techniques can also be used

- 1. Denial of the situation
- 2. Reinterpreting the events - the outcome, the cause, and the character of the victim.

How do we explain the behavior of other people?

- ***Attribution Theory*** – explaining other people's behavior based on internal vs. external causes
  - JWH overemphasizes the internal factors rather than external (***fundamental attribution error***)

Ethnocentrism and **Cultural Relativism** - **In Group** and **Outgroup**

Judging someone else's culture from the position of your own culture – **ethnocentrism**

- Viewing our own culture to be superior to that of others
- Can lead to ***cultural bias*** and ***prejudice***

Or you can judge and understand their culture from within their culture – **cultural relativism**

- No absolute right or wrong, but we have different cultures who are themselves valid.
- Can falter if someone uses it to conduct activities that violate rights of humans no matter what culture they're from.

People within groups share psychological connection between peers, related to culture/spirituality.

- **"In" group** – the one we are connected with. Stronger interactions than with those in the out group, and more influential as well.
- **"Out" group –** group we're not associated with
- **Group favouritism** – we favour people in our own group, but those in outgroup are neutral – we don't give them favours we do to our in group.
- **Out group derogation** – we are super friendly to our in group, but not friendly to out group – we discriminate. Happens if we feel that the out group is threatening to the in group's success.
- **Group polarization** – Group makes decisions that are more extreme than any individual member in the group would want. This can turbo charge the group's viewpoints.

Social Behaviour

Proximity and the Mere Exposure Effect

Geographical proximity is most powerful predictor of friendships and relationships.

- Mating starts with meeting – we aren't going to fall in love with someone we don't meet. Even with social media, still true.

Mere exposure effect = repeated exposure to novel people or objects increases our liking for them. More often we see something, more often we like it. Applies to everything – music, numbers, objects, etc.

- There are exceptions, but in general true. Especially with attraction.
- Ex. study where males rated women's attractiveness, took 2 women rated similarly and placed them in same class as the male. After 15 classes males rated the woman in their class higher than the other one they initially rated the same.
- Ex. study with individuals who had **anterograde amnesia** (retrograde amnesia is loss of memory before accident, anterograde is loss of memory after). Showed them faces, and show them faces again at later date, some new some old. Ask individual if they've seen before, say no. But if ask which one attractive, they pick the face they've seen before.
- Shows us how subtle this effect is.
- **Advertisers** know this effect. They depend on the mere exposure effect to sell you different products. More times we see a brand more likely we are to think positively.

Physical Attraction

What does physical attraction mean, and are there things attractive to all people?

- There are cultural differences, but some things are **universal** – skin clarity/smoothness, body symmetry. For women, low waist-hip ratio and full breasts. For men, muscular chest and V-shaped torso.

Facial attraction is more important than body attraction. For women, high forehead/small chin and nose/full lips/high cheekbone are attractive. For men, strong chin, jaw, cheekbones, and long lower face.

- Both men and women are attracted to high sexual dimorphism – the difference between male and female traits.
- Also **averageness** – turns out unique traits are not most attractive. Most respondents pick 32 face average as most attractive, and 2 face average less.
    - Even if you average 32 different faces, still looks the same as the average of 32 other faces. Suggests there's some prototype.

More subtle things also influence attractiveness – ex. red background more attractive than white background.

- Unrelated physiological arousal also influences attraction – individuals who just walked across narrow bridge (sympathetic arousal) leads to increased rating of woman. Because during attraction sympathetic arousal occurs as well, ex. fast heartbeat.

Similarity

How similar someone is to us is huge predictor of attraction.

- Close friends and couples are more likely to share common attitudes, beliefs, and values. We tend to partner up with people who match our age, race, religion, and economic status/educational level.
  - One study showed person is more likely to trust/cooperate with photo of someone whose facial features are morphed with their own.
  - Also more likely to think individual is attractive when their facial features are morphed with their own.

Similarity can help people stay together. Does it help them stay together? Research has shown yes.

- Couples can also stay together due to **perceived similarity** – because over time interests/beliefs are more aligned. Become similar as time goes on.
- Could result in a **similarity bias** – implies we will not befriend people different from us.
- A **projection bias** is when we assume other share the same beliefs we do.
- **False consensus** is when we assume everyone else agrees with what we do, even if they do not.

Harlow Monkey Experiments

What causes **attachment** between mother and child? Scientists used to think it was food.

Scientists conducted the **Harlow monkey experiments**

- Separated monkeys from mothers at young age, then given choice between 2 substitute mothers (vaguely monkey-shaped structures).
  - First option was wire mother – vaguely face like shape on top of it, and chicken wire wrapped in cylinder. And in middle was feeding tube.
  - Second mother was the cloth mother – same shape/size, but instead of chicken wire had soft cloth blanket around it, so it can provide comfort.
  - Baby monkeys overwhelmingly preferred to cloth mother – spent a large majority of time clinging to her. If had to eat, tried to eat while staying attached to cloth mother.
  - Cloth mother acts as a **secure base** – eventually monkey is comfortable enough to explore world on its own, because it knows cloth mother will still be there.

Secure and Insecure Attachment

Babies are passed around, but then around 8 months stranger anxiety sets in. Child ends up being wary of strangers and even people they know. Some don't have stranger anxiety though.

Mary Ainsworth's Strange Situation – done to try to understand why some have stranger anxiety and some don't.

- Mother and child in room with a stranger, then mom leaves and returns. Wanted to see how child reacts.
- Researchers found children in 2 groups – those with secure attachment and insecure attachment.
- 60% were **secure**. Child was secure with parent and explored room, but when parent left, child was upset/distressed, but happy when mother returned.
- **Insecure** children clinged to mother, and stayed with mother and did not explore. When mother left became upset, but distress did not go away when she came back.
- Others were avoidant – ignored mother when she returned.

What causes this?

- **Parenting style**
  - Those sensitive to child and responsive had ***secure*** attachment
  - Those insensitive/unresponsive formed ***insecure*** attachments.
- Effects after childhood? Yes. Early attachment style forms basis of adult relationships later in life, especially with intimacy/relationships.
- Parenting styles can be
  - **Authoritarian**
  - **Permissive**
  - **Authoritative** (best).

Aggression

Aggression = any physical/verbal behavior intended to harm or destroy.

Aggression comes from combination of the 3:

- 1) **Biology:**
  - Genes (identical twins more aggressive than fraternal twins, and we can breed animals for aggression).
  - Circuits in brain can inhibit/facilitate aggression. The **amygdala** facilitates our fear response, and when stimulated triggers aggressive behavior. The **frontal lobe** is responsible for impulse control, criminals have *decreased* frontal lobe activation.
  - **Testosterone** is hormone released by testes in men and ovaries in women. High levels of high testosterone can lead to aggression, muscle building, and wider faces. Can lead to irritability/impulsiveness, and low tolerance for frustration. Drugs that reduce testosterone reduce aggressive tendencies.
- 2) **Psychological:**
  - **Frustration-aggression principle**, the idea that frustration creates anger which can spark aggression. Higher temperatures can lead to frustration.
  - **Reinforcement-modeling** can lead to aggression through positive reinforcement. Parents who give into temper tantrums lead to more temper tantrums in future. Also if parents yell/hit each other, child will pick up on behavior too.
- 3) **Socio-cultural**
  - People act more aggressively in groups (ex. riots) – **deindividuation**, such as on the internet.
  - **Social scripts** – when people are in new situations they rely on social scripts, or instructions provided by society on how to act.
    - Ex. violent video games model aggressive behavior for them. Viewing media can give them example of how they should act.

Seems to be a combination of all 3 factors that lead to aggressive factor, not only 1.

Altruism

Studies found connection between volunteerism and future health and well-being. Also higher life satisfaction and decreased risk for depression/anxiety.

However, altruism can sometimes have ulterior motives.

- **Kin selection** - people act more altruistically to close kin than distant/non-kin.
  - Same when people share last names, especially rare last names.
- **Reciprocal altruism** - People are also more cooperative if they will interact with that person again in the future.
  - We feel more obliged to help those who have helped us.
- **Cost signalling** – signals to others that person who's giving has resources. People have increased trust in those they know have helped others in the past.

Empathy-Altruism Hypothesis – suggests some people are altruistic due to empathy. Those who score higher on empathy are more altruistic.

- **Early developmental trajectory** – some newborns cry when other newborns cry. Helping behavior begins around **age 2**, children share toys and play act helping. Age 4 actually begin helping.

Social Support

Emotional support – love, trust, caring. The type that involves listening and emphasizing.

- Provided by those closest to you.

Esteem support – expressions of confidence/encouragement.

- Can come from therapists, teachers, coaches.

Informational support – sharing information with us or giving us advice.

- Can come from family/friends or even articles online.

Tangible support – financial support, goods, or services.

- Can come from a bank, people who bring you dinner when you're sick, or lend you money between jobs.

Companionship support – the type that gives someone sense of social belonging. Companionship while you engage in an activity.

Social support is major determinant of health and well-being. Can help us deal with stress.

- People with low social support report more symptoms related to depression/anxiety, and alcohol and drug problems. Also higher risk of deaths from cancer and heart disease.
- Why it's important to provide support for people around you too.

Social Interactions

Status

Status is a person's social position in society. Each person has many statuses, ex. Son, student, friend, etc. They affect the type of interactions we have – some equal, some not.

  - Ex. Friends are equal, but if you are interacting with professor they are superior to you. Of if you're president of school organization you can be superior over members.
- **Ascribed statuses** – statuses you can't change, given from birth.
  - ex. Prince of royal family
- **Achieved status** – status you earn yourself after working for it,
  - ex. Olympic athlete

Role Strain and Role Conflict

Role strain – when you can't carry out all obligations of a status, tensions within one status.

- Causes individual to be pulled many directions by one status, ex. a student.

Role conflict – conflict between two different statuses, unlike role strain.

- Ex. someone who's a parent, friend, husband, and worker.

Primary and Secondary Groups

Primary groups – closest members of the group to you, ex. in a wedding the bridesmaids/groomsmen. They provide an anchorpoint. You are born into a primary group – your family. Often seen as a source of close human feeling/emotion.

Secondary groups – formal and business-like relationships, based on a limited purpose/goal. Usually short-term, and only see them sometimes. Only part of the group to accomplish a task or earn money.

Dramaturgical Approach

Erving Goffman studied nature of people's interactions. He noticed people planned their conduct, want to guide and control how they're seen, and act differently alone than in public.

- Says people do all these things through process of **dramaturgy**

2 parts of dramaturgy:

- **Front stage** – when people are in a social setting. Ex. someone watches baseball with friends even if he doesn't like baseball. Manipulating how he's seen to make friends.
- **Back stage** – more private area of our lives, when act is over. You can be yourself.

Some people are crossing over from back stage to front stage due to social media – putting on a front in their backstage to make a good impression.

Impression management

Impression management – our attempt to control how others see us on the front stage. There are multiple front stages, and you have to play a different role every time.

Backstage – where you work on impression management. Ex. put on makeup, look in mirror and try different outfits.

Discrimination – Individual vs. Institutional

Discrimination is differential treatment and harmful actions against minorities. Can be based on different factors including race, age, religion, etc. Can occur at individual or organizational/institutional level.

- **Individual discrimination –** ex. a science professor who doesn't let women into his class.
- **Institutional discrimination** – governments, banks, etc.
  - Example: Brown vs. Board of Education in 1954. In this court case, overturned separate schools for whites and African-Americans. Brown said these schools aren't equal, and Africans were being mistreated.

Unintentional discrimination – how policies can discriminate unintentionally

- **Side-effect discrimination** – talks about how one institution/sector can influence another negatively.
  - Ex. a small town where African American always get unfair verdict of guilty. Then while applying to a job later, don't get the job because of record. Criminal justice reached unfair verdict, and potential employers are swayed too.
- **Past-In-Present** discrimination – how things done in the past, even if no longer allowed they can have consequences for people in the present.
  - Ex. After Brown vs. Board verdict, but girl in integrated school still doesn't feel welcome in her classroom.

Prejudice vs. Discrimination

Prejudice = attitudes that prejudge a group, usually negative and not based on facts. Make same assumptions about everyone in a group without considering their differences. (cognition)

- Ex. CEO doesn't think women are capable of running a team.

Discrimination = differential treatment and harmful actions against minorities. (action)

- Ex. say there's a woman who's very good at the job, but doesn't promote her just because she's a women.

Organizations and Bureaucratization

Organizations and bureaucracies play a large role on our lives.

Organizations are institutions designed for a specific purpose, and try to achieve maximum efficiency.

- Ex. Postal Service, McDonalds, etc.
- **Utilitarian Organizations** – members are paid/rewarded for their efforts, ex. Businesses and government jobs, and universities.
- **Normative Organizations** – members come together through shared goals, ex. religion groups or MADD. Positive sense of unity and purpose.
- **Coercive Organization** – members don't have choice about membership, ex. people in a prison, or the military.

Organizations achieve maximum efficiency through **bureaucracy** – the rules, structures, and rankings that guide organizations.

- **Bureaucratization** - process by which organizations become increasingly governed by laws and policy.
  - Ex. customer service, move through 12 menu options before reaching someone to help you.
- **Iron rule of oligarchy –** even most democratic of organizations become more bureaucratic over time until they're governed by select few.
  - *Why?* Once person gains leadership role they might be hesitant to give it up**. Also have skills that make them valuable.**
- **McDonaldization** – fast food organizations have come to dominate other organizations in society. Principles of efficiency, calculability, predictability, and control – have dominated everything, from medicine to sporting events to entertainment
  - Ex. Movie theatres all look and work similarly, with same brands and movies.

Characteristics of an **Ideal Bureaucracy**

Max Weber (sociologist) studied structure of organizations,

5 main characteristics of an ideal bureaucracy, regardless of goal of organization:

- **Division of labour** – people are trained to do specific tasks.
  - Pro – people are better at tasks, and *increased efficiency*.
  - Con – *increase alienation* in workers, separating them from other works, and they don't see work from beginning to end. Also trained incapacity, where workers are so specialized lose touch with overall picture.
- **Hierarchy of organization** – each position is under supervision of higher authority.
  - Pro – clarify who's in command
  - Con – deprive people of voice in decision making, and shirk responsibility, especially in unethical tasks. Also allows them to *hide mistakes*.
- **Written rules and regulations**
  - Pro – clear expectations, uniform performance, equal treatment of all employees, and sense of unity/continuity to organization.
  - Con – stiffens creativity, and if too much structure discourages employees from taking initiative. Goal displacement (rules become more important than goals)
- **Impersonality** – how individuals and officials conduct activities in unbiased manner
  - Pro - equal treatment
  - Con – *alienation*, discourage loyalty to the group
- **Employment based on technical qualifications** –hiring in bureaucracy is based on qualifications on person has and not favouritism
  - Pro – decrease discrimination
  - Con – decrease ambition (only secure job and do nothing more). ***Peter Principle***, where every employee in hierarchy keeps getting promoted until they reach level of incompetence.

Self-Presentation and Interacting With Others

Animal Communication

Humans communicate with each other through **language**, **non-verbal cues** (smile, frown, etc)., and **visual cues** (ex. painting rooms pink vs. black)

- Other animals have ways of communicating as well, with many non-verbal cues and visual cues, and other cues not used by humans.

Who are animals communicating with?

- Members of same species, or members of other species like humans.
- **Autocommunication** – can give information to themselves. Ex. bats and echolocation

What are they trying to communicate?

- ***Mating rituals***, to attract opposite sex
- To establish/defend territory
- To ***convey information*** about food location
- ***Alarm calls***, to warn others about predators
- ***Signal dominance*** and submission

Watch about for ***anthropomorphism*** – attributing human characteristics to non-human animals, ex. pet sleeping with you at night.

Types of Animal Communication

- **Sound** – can convey a lot of information
  - Ex. mating calls, warning sounds, etc. Useful because it's fast, can reach many, but not very private and exposes the animal's location.
- **Chemical signals** – Gain info from the environment through smells. They can release scents called **pheromones**. Can detect predators using smell, or presence of other animals. Tends to be a lot slower than sound, but a lot longer lasting. But can be "noisy" – a lot of chemical signals in a given area.
- **Somatosensory communication** – Touch and movement.. Can also convey food location (bees), pair bonding (birds cuddle/prune mates), body language. Also seismic communication (ex. movement of bug in spider's web signals to spider to find it), electro-communication (fish)
  - Ex. mating dances
- **Visual cues** – to find a mate
  - Ex. color on birds. Mimicry, camouflage.

Biological Explanations of Social Behavior in Animals

Animal Behavior: **Foraging**

Foraging is the search for food in animal's environment. Can't survive or reproduce without it.

- Cost-benefit analysis associated with it – going out to get food can take up time and energy. Goal is to get highest yield while expending least amount of energy.
  - Includes looking for food, stalking prey.

2 main foraging strategies:

- 1) **solitary foraging** and 2) **group foraging** (can potentially lead to competition when food is scarce, but also means they can take down larger prey and can benefit everyone)
  - Foraging behavior is driven strongly by **genetics**, but can also be gained through learning, ex. young copy adults.

Mating Behavior and Inclusive Fitness

Mating is the pairing of opposite sex organisms for purpose of reproduction and propagation of genetic material.

- Includes act of mating and the behaviours associated with it. Also events that occur after mating, like nest building.
  - Ex. The Superb Bird of Paradise does a complicated dance

Mating strategies

- 1) **Random mating**- all equally likely to mate with each other, not influenced by environment/heredity or social limitation. Ensures a large amount of genetic diversity.
- 2) **Assortative Mating** – Non-random mating where individuals with certain personalities tend to mate with each other at a higher frequency, ex. large animals with large animals. Problem is if animals too genetically similar mate (inbreeding), can be harmful to species overall.
- 3) **Disassortative Mating (Non-Assortative Mating)** – opposite of assortative mating – situation where individuals with different or diverse traits mate with higher frequency than with random mating.

Which is best? Scientists think assortative mating, because despite dangers of inbreeding, help to increase inclusive fitness of an organism.

- **Inclusive fitness** is the # of offspring an animal has, how they support them, and how offspring support each other. Inclusive fitness is thinking about fitness on a larger scale – evolutionary advantageous for animals to propagate survival of closely related individuals and genes in addition to themselves.

Evolutionary Game Theory

Game theory is talked about in reference to decision making, but can also use it for evolution and animal behavior.

- **Evolutionary game theory** tells us those with best fit to environment will survive and pass on to offspring, and those genes will become more common in successive generations.
  - Reproduction and environment are central to evolutionary game theory. Helps us predict traits and evolutionary stable strategies/behaviours that persist in population once present.
  - Predicts the **availability of resources** and **social behavior**. Strategy of each individual depends on strategy exhibited by other players.
- However, game theory involves ***intention reasoning*** about behaviours of others. Evolutionary game theory different because decisions might ***not be conscious intention*** on part of players.
- Ex. **Altruism** – 2 groups of monkeys, one selfish and one not. Selfish group doesn't alarm others of predators. Non-selfish group alerts others and leads to overall success of group over time.

Society and Culture

Social Structures

Macrosociology vs. Microsociology

2 different analysis of sociology to study societies. Need a place to start or it'll be overwhelming – individual people, different groups, and communities/cultures/subcultures in a population.

Macrosociology – large scale perspective, looking at big phenomena that affect big portion of population. Social structures and institutions, whole civilizations/populations. Looking for patterns and effects the big picture has on lives on small groups. Broad social trends in cities, and statistical data (as long as you're careful about not making wrong interpretations).

- Deals with matters like poverty, war, health care, world economy
- **Functionalism** comes from macrosociology – looks at society as a whole and how institutions that make up the society adapt to keep society stable and functioning.
- **Conflict theory** is also a macroperspective – the idea society is made of institutions that benefit powerful and create inequalities. Large groups are at odds until conflict is resolved.

Microsociology – face to face interactions, families, schools, other social interactions. Interpretive analysis of the society, look at sample of society and how individual interactions would affect larger groups in society. Ex. doctor-patient interactions, or family dynamics.

- **Symbolic interactionism** - social theory that's a microperspective, focuses on the individual and significance they give to objects, events, symbols, etc. in their lives.

Social Institutions

Institutions are essential parts of a society, ex. police stations, hospitals, businesses. Impose structure on how individuals behave. Guide what we do.

- They don't need any one individual, just need many of them, and each individual is very replaceable. Whereas without institution major changes can occur to individual. Imbalance in power.
- A form for filling the need.
- Sometimes need to be redesigned if they are to be helpful to society, ex. businesses.

We think of institutions as a business/corporation, sociologists thinks of social structures, governments, families, hospitals, schools, laws, religion, businesses, etc. All continue without any 1 individual.

Social Institutions – **Education, Family, Religion**

Education, Family, Religion – each of these institutions play a fundamental role in creating and supporting society, and each shape the individual in that society.

Education – more than going to school, but there's a **hidden curriculum**: we learn how to stand in line, wait our turn, and treat our peers. We internalize social inequalities, when boys and girls are treated differently by their teachers.

- Expectation of teachers affects how students learn. Teachers tend to get what they expect.
- Teachers put students in categorizations with different expectations, but what if categorization is wrong? Sometimes limiting factor comes from outside the classroom.
- Sometimes limiting factor comes from outside classroom. Schools experience educational **segregation** and stratification, because we fund schools through property taxes, which is why different districts are funded differently. Residential segregation.

Family – defined by many forms of kinship, including marriage, blood, or adoption. Small nuclear family is more emphasized.

- Different family values go with different social values of family and economy, ex. rural families were production based, so large. Urban families consumption based, so more strained.
- **Marriage** – when people join together. Now, people can experience multiple marriages. Serial monogamous. Why **divorce** is more common, and creates tension. Some families also contain violence, ex. in **child abuse**. Also abuses through neglect – children's basic needs aren't met**. Elder abuse** also occurs when family isn't ready for responsibility of taking care of elders and expense of nursing homes. **Spouse abuse** also common, and not only physical but also psychological. Women's shelters don't always get kids, while social stigma of men not getting abused keeps them quiet.

Religion – how religious a person is can range from spiritual/private to being in an institutionalized religion, celebrating certain holidays, etc.

- **Ecclesia** – dominant religious organization that includes most members of society, ex. Lutheranism in Sweden and Islam in Iran.
- **Churches** are established religious bodies in a larger society.
- **Sects** tend to be smaller and are established in protest of established church. They break away from churches. Ex. Mormon/Amish
- **Cults** are more radical, reject values of outside society. Rise when there's a breakdown of societal belief systems, but usually short-lived because depend on inspirational leader who will only live so long.
- **Secularization** is the weakening of social and political power of religious organizations, as religious involvement declines.
- **Fundamentalism** – reaction to secularization, go back to strict religious beliefs. Create social problems when people become too extreme.

Social Institutions – Government, Economy, Health and Medicine

Government – we give government the power and authority to manage the country.

- Some governments take into account will of people, like **democracy**.
- Others rule autonomously like **dictatorships**, no consent of citizens.
- **Communism** – classless, moneyless community where all property is owned by community.
- **Monarchy** – government embodied by single person, king/queen is the figurehead.

Economy

- **Capitalism** – private ownership of production with market economy based on supply and demand
- **Socialism** – motivated by what benefits society as whole, common ownership of production that focuses on human needs and economic demands.

Division of labour in government and economy is **functionalist** – everyone is required to have responsibility in society.

- We value certain labours differently. Ex. Garbage men not as valued as athletes. We value jobs that require lots of specialization, rather than jobs essential in our society – creates inequalities because not everyone has access to those valued professions, due to limited education/resources.

Healthcare and Medicine – medicine exists to keep people healthy.

- **Medicalization** occurs when human conditions previously considered normal get defined as ***medical conditions*** and are subject to studies, diagnosis, and treatment. Ex. mental health type issues, and physical issues like birth. People are over diagnosed. Ex. discovery of HIV.
- **Sick role** – expectation in society that allows you to take a break from responsibilities. But if you ***don't*** get better or return, you're viewed as deviant.
- **Delivery of healthcare** – massive inequalities in terms of access. We take care of elderly through Medicaid and Medicare, and children through health child insurance. But people in between are left behind – those who populate working force. Affordable Care Act is trying to fix this but too early to tell. Spend a lot of $ on healthcare without desired outcomes, because we invest a lot more in helping people when they are sick instead of preventative medicine.
- **Illness experience** – process of being ill and how people cope with illness. Being ill can change a person's self-identity. Diagnosis of chronic disease can take over your life where every decision revolves around the disease. Stigmas associated with certain diseases like mental illness and STDs. How people experience disease varies too if they have access to resources like palliative care.
- **Social epidemiology** looks at health disparities through social indicators like race, gender, and income distribution, and how social factors affect a person's health. Correlation between social advantages/disadvantages and distribution of health + disease.

Functionalism

Functionalism is a system of thinking based on ideas of Emile Durkheim that look at society from **large-scale perspective,** and how each part helps keep society stable.

- It says that society is heading towards equilibrium. Ex. local businesses must adapt to new ways to cater to new ways to customers

Durkheim imagined a balance between institutions and social facts

- **Institutions** are structures that meet the needs of society like education systems, financial institutions, marriage, laws, etc.
- **Social facts** are ways of thinking and acting formed by society that existed before any one individual and will still exist after any individual is dead.
  - Unique objects that can't be influenced and have a coercive effect over individual only noticed when we resist. (Ex. the law)
  - Others are moral regulations, religious fates, and social currents like suicide/birth rate (one person committing suicide has no effect of suicide on society)

Society is dependent on structures that create it, like cell is dependent on parts that make it up.

- Intended consequences of institutions are **manifest functions**, ex. businesses provide a service.
- Unintended consequences, ex. schools expose students to new activities, and businesses connect people across society – **latent functions**, indirect effects of institutions.
- **Social dysfunction** is process that has undesirable consequences and may reduce the stability of society.

Durkheim questioned how do societies stay together

- **Small societies** are held together by similarities, but only works for small ones
- In **large societies** individuals become interdependent on each other as everyone is specialized in different roles. In functionalism, a change to production/distribution/coordination will force others to adapt to maintain stable state society. ***Social change*** threatens mutual dependence of people in that society. Institutions adapt only just enough to accommodate change to maintain mutual interdependence.

Problems – functionalism focuses entirely on institutions without regard for individual (only acknowledged). Also largely unable to explain social change and conflict, so focused on equilibrium little change and conflict is modelled.

Conflict Theory

Focuses on inequalities of different groups in society, based on ideas of Karl Marx that believed society evolved through several stages: **feudalism -> capitalism -> socialism.**

- 19th century Europe was capitalist – rich upper class called bourgeoisie and poor lower class was proletariat and majority. Upper class had more power. Lower class depended on upper class, but upper class also depended on lower class for their labour. Significant inequality, which Marx believed led to change. Lower class united to create **class consciousness**.
- The **thesis** was that bourgeoisie ran factories and working class provided labour. Desire of working class to change was the **antithesis.** Thesis + antithesis can't exist peacefully. One side is leave things, other side is looking for change.
- Struggle would lead to a compromise - a **synthesis** of the two by creating a new state. Would eventually become new thesis.

Ludwig **Gumplowicz** expanded on Marx by proposing that society is shaped by war/conquest, and cultural/ethnic conflicts lead to certain groups becoming dominant over others.

Max Weber said he did not believe collapse of capitalism was inevitable, but argued that several factors moderate people's reaction to inequality.

The **equal rights** and **women's suffrage** movements were all conflicts that resolved in a new thesis.

- Conflict theory models drastic changes that occur in a society, but doesn't explain the stability a society can experience, how society is held together (unity), and doesn't like the status quo.

Social Constructionism

Social constructionism argues that people actively shape their reality through *social interactions* – it's something constructed, not inherent. Things are **social products** made of the values of the society that created it.

- A **social construct** is concept/practice everyone in society agrees to treat a certain way regardless of its inherent value, ex. money.

Social constructionism is theory that knowledge is not real, and only exists because we give them reality through social agreement – nations, books, etc. don't exist in absence of human society.

- The **self** is a social construct too – our identity is created by interactions with other people, and our reactions to the other people.

2 types: weak and strong

- **Weak** social constructionism proposes that social constructs are dependent on **brute facts**, which are the most basic and fundamental facts. Ex. brute facts are what explain quarks in atoms, not the atoms themselves.
  - **Institutional facts** are created by social conventions and do rely on other facts. Ex. money depends on the paper we have given value.
- **Strong** social constructionism states that whole of reality is dependent on language and social habits; all knowledge is social construct and no brute facts. We created idea of quarks and everything we know to explain it. No facts that just exist.

Main criticism to social constructionism is it doesn't consider effects of natural phenomenon on society, and for strong social constructionism it has difficulties explaining those phenomena because they don't depend on human speech or action. Strong SC only explains reality through thoughts of humans, not using fundamental brute facts.

Symbolic Interactionism

Takes a **small-scale view** of society, focuses on small interactions between individuals like hanging out with a friend. Sees society as buildup of everyday typical interactions.

- Addresses the **subjective meanings** people believe to be true – **meaning** is the central aspect of human behavior. Humans ascribe meanings to things, and act towards those things based on ascribed meaning. **Language** allows humans to generate meaning through interactions, and humans modify meanings to **thought processes**.
- Particularly interested in symbols use that people use to contribute values/beliefs to others.

Developed by **George Herbert Mead**,f believed development of individual was a social process as were the meanings individuals assigned to things. People change based on interactions with objects, events, ideas, others, and assign meaning to things to decide how to act.

Herbert Blumer continued Mead's work. He proposed 3 tenants to explain symbolic interactionism:

- 1. We act based on meaning we've given something, ex. tree is place to rest.
- 2. Different people assign different meanings to things. We give meaning to things based on social interactions, ex. someone tells us tree is infested with ants. But we have different views of the tree and we act differently.
- 3. The meaning we give something isn't permanent, ex. something bites my back, so might not sit under next one I find.

Criticism – doesn't ask same questions as large scale sociologists do. Sometimes considered as supplemental instead of full theory, because restricted to small interactions between individuals. But gives different perspective necessary for fully understanding society. How societies can change when created/recreated by social interactions.

Feminist Theory

A contemporary approach of looking at world from **macroperspective**, developed from *feminism movement* originating from **conflict theory** by focusing on stratifications/inequalities in society. It examines women's social roles in education, family, and workforce.

- It looks beyond more common male-based perspective to focus on gender inequalities in society.
- Women face **discrimination**, **objectification**, **oppression,** and **stereotyping**.

Different types of feminist theory

- 1) **Gender differences** – expectations for gender are passed down from generation to generation. Examines how women's position in social situations differ from men – different values with feminity than men. Seen as soft, care, submissive. And different social roles, women stay home while men go to war. Objectified as sexual instruments.
- 2) **Gender inequality** – central to all behavior. Women subordination is viewed as inherent feature. Our society is a **patriarchy** – men are governing body as heads of families and communities. Married women have higher stress levels than married men/unmarried women, and have less influence in public sphere. Men occupy higher paying jobs.
  - Ex. Ben Barres began his life as women, and after sex change he noticed people thought his research was much better than his sister Barbara's. However, Barbara was the same person.
- 3) **Gender oppression** – women are not only unequal as men, but they're oppressed and abused. Institution of family is especially beneficial to men. Family was split into 2 types of labour – domestic labour was done by women, while men worked outside home in labour. Without men working, family wouldn't survive.
  - Created educational and economic gap between men and women.
- 4) **Structural oppression** – women's oppression and inequality are due to capitalism, patriarchy, and racism. Direct parallel to conflict theory. Women like working class are exploited because of capital model, but not all women express oppression in same way. Linked to race, class, sexual orientation, age, and disability. Men are associated with mind, while women are associated with body.

Feminist theory is not an attempt to replace men – different perspective on society to point out inequalities between men and women due to institutions of society.

Rational Choice Theory and Exchange Theory

Rational Choice Theory and Exchange Theory centre on economics.

Rational Choice Theory - people not only motivated by money, but do what's best to get more good

- Main assumption is the idea that everything people do is ***fundamentally rational*** – a person is acting as if they were weighing ***costs and benefits*** of each action.
- People act in self-interest, driven by personal desires and goals.
- How do we calculate value of these actions? Social resources being exchanged – time, information, prestige, etc.
- 3 main assumptions:
  - **Completeness** (every action can be ranked)
  - **Transitivity** (since A is preferable to B, A is also preferable to C)
  - **Independence of irrelevant alternatives** (if I have a fourth option, won't change order of how I ranked first 3 options. Just add it in to existing order).

Exchange Theory – application of rational choice theory to social interactions.

- Looks at society as series of interactions between individuals.
- Used to study family relationships, partner selection, parenting, etc.
  - ***Sexual selection*** – natural selection arising through preference for one sex for characteristics in individuals of the other sex
  - ***Social selection*** – idea that an individual's health can influence their social mobility. Also that social conditions can affect reproductive rates of individuals in a population.
- Interactions are determined by weighing ***rewards and punishments*** of each action.

Basic principle behind exchange theory – behavior of individual in interaction can be figured out by comparing rewards and punishments.

Assumptions: People seek to rationally maximize their profits, behavior results in a reward is likely to be repeated - more often reward is available the less valuable it is, interactions operate within social norms, people access have information they need to make rational choices, human fulfillment comes from other people, and standards people use to evaluate interaction changes over time – reward to one is punishment for another.

- What kind of interactions? ***Self-interest*** and ***interdependence***. We form relationships to benefit ourselves, no one is self-sufficient.
  - Subjective interactions of rewards + punishments of each interaction.

Critiques – are we really rational? Some people's choices are limited by gender/ethnicity/class, and make choice not in best interest. And why some people follow social norms that act in best interest of others. And is it really possible to explain every social structure by actions of individuals? Relationships aren't always linear too.

Social Theories Overview

Functionalism – how society can exist over time. Society is always trying to come to an equilibrium. Institutions remain constant and only make minor change when stability is lost. Ex. Business institution had to adapt to online shopping boom.

Conflict Theory – how societies changes and adapt over time through conflict. Two opposing positions would merge to create a new society where both are content.

Social Constructionism – what society is rather than how it exists/changes. Everything is created from the mind of society. Agreement that something has meaning and value that it doesn't have intrinsically, ex. Money. Everything only has value because everyone agrees it has value; we construct the world around us.

Symbolic Interactionism – Puts a lot of focus on individual and how they behave – based on meanings we give to things, ex. Tree = shade. People are created by their society, and act based on past experiences, and meanings they've given things. Not everyone gives same meaning to same things. We interact with the world to give it meaning.

- Functionalism = looking at stability of society, conflict theory = how society changes, social constructionism = how things are given value, symbolic interactionism = how individuals act.

Feminist Theory - macro level perspective on society, focussing on gender inequalities inherent to patriarchal capitalist societies, where men occupy governing positions in family and community. Both men and women often forced into gender-based roles. Focuses on gender differences, gender inequalities, gender oppression, and structural oppression.
Rational Choice Theory – people always take rational actions, weighing costs and benefits of each action to gain most benefit. 3 assumptions: completeness, transitivity, and independence of irrelevant alternatives.
Exchange Theory – application of RCT to social interaction. Family, work, interpersonal relationships. People behave with goal of maximizing own rewards while minimizing punishments, and people can make rational choices in social norm, and self-interest and interdependence guide interactions, and from relationships from cost-benefit analysis.

Relating Social Theories to Medicine
1. Functionalism – if we look at medicine from this point of view, when people become ill medicine ensures they return to **functional state**.
- Being sick is detrimental to well-being of society as a whole. Assumption is you're not supposed to participate in society when sick, affecting society on small scale.
- Medicine stabilizes social system in emergency situations like earthquakes, etc. to provide medical assistance needed.
    - Day-to-day, it improves quality of life for aging population to allow them to contribute longer to society.

2. Conflict Theory – Wealthier people can pay for best medical care, the poor can't afford the deductibles/insurance so they skip hospitals, and are sick for longer.
- Unequal access to valuable resources in society (education, housing, jobs) leads to heath disparities and limited access to medical care.
- Power struggle between different interest groups can affect health of individual, ex. Factories vs. people living nearby.

3. Social Constructionism – we attach different meanings to different behaviours, and have preconceptions of different people (stereotypes)
- We have preconceptions about different races, genders, and subcultures. Assumptions dangerous to medical profession – affect how you treat patient and their diagnosis.
    - There are ***stereotyped assumptions*** on both sides – patient may feel some symptoms aren't important enough to mention, or doctor makes false assumption based on how patient appears.
- Can't declare characteristic of person based on circumstance, ex. people who don't work can still afford healthcare while those who work hard can't afford it.
- **Medicalization** – patients/doctors construct illness out of ordinary behavior.

4. Symbolic Interactionism
- **Doctor-patient** relationship, given meanings to lab coat/stethoscope can affect interaction. Important for realize the meaning the patient has given to tools of medicine, ex. Lab coat is sign of authority.
- **Changes in society** – recently, medicalization of society, where everything has a medical fix. Standards of beauty have made many undergo unneeded plastic surgery, or have C-sections. Normal behaviours are being shown as illnesses. Ex. Depression.

5. Feminist Theory – medicine is still a male-dominated field, heads of doctors and hospitals usually men, and disparity in jobs/salary between the two. Translates into a disparity in power.
6. Rational Choice-Exchange Theories – what's purpose of medical system as a whole? Or is it a capitalist competition to earn the most money?
- People run every aspect of medical system and those people will make decisions that benefit themselves more than random sick stranger, may affect why people go to doctor or not. Some people avoid doctors if they don't think it will benefit them.
- Self-interested behavior of people in charge will trickle down and affect patients

Outside these theories – where you live can affect your health (food deserts), and nearly impossible to get nutrition a body needs from only these sources. Some neighbourhoods have no gyms/playgrounds.

Demographics

Demographic Structure of Society – Age

Sociology looks at different age **cohorts** (groups), specifically at age groups/generations, because they all live through the same events in certain time.

- Baby boomers is large population in US, now up to 60s. Grew up in post-WWII periods, leaving work force.
- Silent generation, older than baby boomers born during Great Depression
- GI generation – oldest people alive today.

Because of new advancements people live longer, estimated by 2025 that 1/4th of population will be >65, right now only 13.5%. 65 is when people retire.

Can look at **dependency ratio**, an age-based measurement takes people <14 and >65 who are not in the labour force, and compares that to # of people who are.

- Higher the ratio, more dependent people there are.

Although living longer means can contribute longer to workforce. But as we become older our body breaks down.

- Older people are 5x more likely to use health services, but age affects what kind of healthcare they can get – discrimination.
- Need for society to readjust expectations of old age
- Can still contribute to social, economical well-being of society.
  - **Life Course Theory** – aging is a social, psychological, and biological process that begins from time you born till time you die.
    - Age-based expectations no longer apply as they used to as people live longer
  - **Age Stratification Theory** – suggests age is way of regulating behavior of a generation
  - **Activity Theory -** looks at how older generation looks at themselves. Certain activities or jobs lost, those social interactions need to be replaced so elderly can be engaged.
  - **Disengagement Theory** – older adults and society separate, assumes they become more self-absorbed as they age. But considers elderly people still involved in society as not adjusting well, which is debatable.
  - **Continuity Theory -** people try to maintain same basic structure throughout their lives. As they age make decisions to adapt to external changes and internal changes of aging.

Although need more healthcare professionals and other services to support them, we have a great social/cultural/economic resource is available to us.

Demographic Structure of Society – **Race and Ethnicity**

Race – a socially defined category based on physical differences between groups of people**. Racial formation theory** looks at social/economic/political forces that result in racially constructed identities.

- Sometimes differences are real, but sometimes only defined by history.
- In the US, race is defined by skin color but hair color is irrelevant. Latin America can be broken down to 5-6 races in SA.

Ethnicity is also socially defined, but these groups are defined by shared language, religion, nationality, history, of some other cultural factor. Less statistically defined than racial groups and can change over time.

- A **minority** can be absorbed into majority after a few generations. A minority is a group that makes up less than half the total population and is treated differently due to some characteristic.

Racial differences can cause drastic events such as:

- Genocide or population transfer (forcefully moved)
- Intercolonialism (minorities segregated and exploited)
- **Assimilation** – person's culture comes to resemble that of another group

- Many differences in healthcare, education, wealth, morality rate, etc.
- Interesting discrimination is present in criminal justice system. More incarceration of minorities.

Pluralism encourages racial and ethnic variation.

Dominant groups have racialized minority groups – ascribes some racial identity to members of racial group they didn't identify for themselves.

Demographic Structure of Society – **Immigration**

Immigrants face severe challenges when arriving to a new country. People want to help them but are wary of their different cultures.

# of immigrants can put pressure on welfare capabilities of a country, as they tend to move to industrialized nations like NA, Middle East, and Europe/Asia.

- Can be functional by alleviating labour shortages and reducing population dam in heavily populated origin countries.
- However, can be exploited by countries unconcerned about global inequalities from profit seeking.

Immigration itself can cause problems

- If too much immigration, area can't handle demand for social services
- Too many skilled people may leave their home country.
- Fear/dislike of immigrants a different race than host country.
- People immigrate because of war, famine, or can't make a living in home country. Better jobs and education.
- Transnational corporations take advantage of cheap labour to bring costs down.

Every country has own policies, but often biased depending on where applicant is from.

- In 1986 US passed the Immigration Reform and Control Act, forbade hiring of illegal immigrants. But extended amnesty and legal status to illegal immigrants already there.
- Some policies encourage families of immigrants to move, to keep money in local economy instead of sending them money.
- European Union, residents in EU can live and work anywhere in EU.
- Since 9/11 immigration more difficult, increased security checks.

Demographic Structure of Society – **Sex, Gender, and Sexual Orientation**

Media often portrays gender as **binary** – female vs. male.

However, there's 5 considerations: **biological**, **identity** (gender they identify as), **expression** (gender they express), **attraction** (gender they're romantically attracted to), and **fornication** (gender they're sexually attracted to)

- **Biological** – XX or XY, but some **intersex** people have 1 or 3+, so express different sex characteristics. Some intersex characteristics are born with both male and female characteristics due to hormones.
- **Gender** – a social construction, two factors – **identity and expression**. Many possible combinations, ex. someone biological male and identify as male (**cis-gender**), or identify as female (**trans-gender**). Cis-gender male can express a socially male or female appearance. Some people are **gender queer** (not male or female), and can present as gender queer or identify as male/female.
- **Sexual Orientation** – not dependent on sex/gender of a person. You can be attracted to any gender but only have sex with females, or any combination. You can be attracted to no gender. Stereotype norm is **straight**.
  - Is there a "gay gene"? No answer. Even if there is, does that make their love any less real?
  - If it is genetic, discrimination is as wrong as it is in race. If it isn't and is a choice, still equally bad because race itself is a social construction.
  - Restrictions on rights of homosexuals – ex. marry or visit partner in hospital.

Many differences between men and women, discrimination, pay, expected roles. Men more likely to get heart disease while women more likely to have psychological illness.

- Societal expectations affect what problems will be reported.

Gender schema theory – cognitions that constitute the male identity.

Gender script – organized information regarding order of actions appropriate to familiar situation.

Urbanization

Urbanization is movement of people from rural to urban areas.

Rural is anywhere with <1000 people per square mile. Has to have les than 25000 residents.

Urban areas include cities/towns with >1000 people per square mile.

- **Cities** have over 50 000 people.
- **Metropolis** have over 500 000 people.
- If many metropolises are connected, called **megalopolis** (ex. 44 million people in NYC area).

Cities are sites of culture, but also host to more crime. According to conflict theory, they're sources of inequality. From symbolic interactionism viewpoint, cities are places where people can get different perspective of looking at life.

Why people move to urban areas?

- More job opportunities, and more options for education/healthcare/etc.
- Isn't enough land for everyone to farm.
- Crowding can occur in cities. And less sense of belonging, so we join groups to form communities.

Suburbanization is movement away from cities, but commute for work can be long and harder to get medical help. However, suburbs form their own economic centres. Ex. Silicon Valley.

- Beyond suburbs are **exurbs**, prosperous areas outside the city where people live and commute to city to work, like suburbs.

Urban renewal – revamping old parts of cities to become better. But can lead to **gentrification**, which means when redone they target a wealthier community which increases property value. People there before are pushed out because they can't afford it – leads to great inequality in cities.

Rural rebound – people getting sick of cities and moving back to rural areas. People who can afford to leave the city.

- Often move to scenic rural areas

Population Dynamics

Looks at how population of a region changes - factors that increase/decrease a population.

3 factors contribute to total **growth rate**: fertility, migration, mortality

- **Fertility** is ability to have babies, which add to the population. **Fecundity** is the potential reproductive capacity of a female.
- **Migration** is number of people moving permanently into/out of countries. Doesn't change total people on planet but does change it in a region.
- **Mortality** is death, decreases population.

To measure these, we use rates. Measure rates over **1 year**, and per **1000** people so rates are comparable.

What affects population changes:

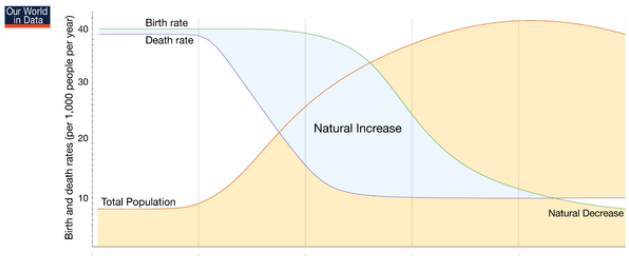
- Increase: **Births** and **immigration.** Can also look at births in terms of fertility rate. On avg women in US gives birth to 2.1 children in her life**.** If 2, no increase/decrease in population.
- Decrease: **Death** and **emigration**. Can calculate mortality rate by age group, or country.

Growth rate is not always a positive number. While world population grows, growth rate of some countries is negative.

Demographic Transition

Demographic transition is a model that changes in a country's population – population will eventually stop growing when country transitions from high birth/death rates to low fertility/mortality.

- This stabilization often occurs in developed countries.
- When immigrants travel to developed countries, they affect demographic transition of the country by increasing fertility and decreasing mortality (often healthier people migrate).



	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Birth rate	High	High	Falling	Low	Very low
Death rate	High	Falls rapidly	Falls more slowly	Low	Low
Natural increase	Stable or slow increase	Very rapid increase	Increase slows down	Stable or slow increase	Stable or slow decrease

5 stages:
1) **High birth rates** due to limited birth control, advantage for more workers, and high death rate due to disease. Most countries at this stage prior to 18th century when death rates fell in Europe. Large young and small old population.
2) Seen in beginnings of developing populations. **Population rises as death rate decreases**. 19th century Europe.
3) **Death rates and birth rates fall** because of birth control, fewer childhood deaths, and children no longer needed to work – not economically beneficial. Slower expansion and longer lived elderly.
4) **Population stabilizes**, both birth and death rates are low. Population is large.
5) Speculation. **World population stabilizes**, Malthusian Theorem suggests. Run out of resources, food shortage. Leads to public health disaster and force population to stabilize and decrease birth rate **– negative growth rate.**

Globalization Theories
Globalization is the sharing of culture, money and products between countries.
Not recent – ex. 1st century BCE Silk Route.
World-Systems Theory – importance of world as a unit, divides world into 3 countries: core, periphery, and semi-periphery.
- **Core** = Western Europe and US.
- **Periphery** = Latin America and Africa. Greatly influenced by and depend on core countries and transnational corporations.
- **Semi-periphery** = India and Brazil, middle-ground.
  - Criticized on being too focused on core countries and ignoring class struggles of individual countries.

Modernization Theory – all countries follow similar path of development to modern society.
- With some help traditional countries can develop similarly to today's developed countries did.

Dependency Theory – Reaction to Modernization theory. Uses idea of Core + Periphery countries to look at inequalities.
- Periphery countries export resources to Core countries, and don't have means to develop.

Hyperglobalist Perspective sees it as a new age in human history – countries become interdependent and nation states themselves are less important. Don't agree if good or bad.
Skeptical Perspective – critical, considers it as being regionalized instead of globalized.
- Third world countries aren't being integrated into global economy with same benefits.

Transformationalist Perspective - doesn't have specific cause or outcome. Believe national governments are changing, perhaps becoming less important but difficult to explain change so simply.
- They see the world order is changing. Just a new world order is being designed. Outcome unknown.

Globalization – **Trade and Transnational Corporations**
Trade has been created and supported by international regulatory groups like World Trade Organizations, and agreements like the NA Free Trade Agreement. No country completely independent.
- Without groups trade would be impractical. They regulate flow of goods and services between countries, reduce tariffs, and make customs easier.
- Agreements often benefit **private industries** the most.

Companies that extend beyond borders of a country are called **multinational/transnational corporations**.
- Ex. McDonalds, or General Electric. Half of employees working in other countries.
- Some T&Cs have more weight than entire nations – influence economics/politics by donating money, and influence global trade laws.

2 major impacts on country – on economy and culture. Much of economic globalization results from global market competition for cheap labour, and locating factories in cheapest locations.
- Developing nations provide incentives like tax-free zones or cheap labour so T&Cs can bring jobs and industry to agricultural areas.
- **Negatives:** Workers abroad exploited, and **outsourcing** can hurt core country.
- **Positive:** Better allocation of resources, higher product output, more employment worldwide, cheaper prices. Cultural practices also passed and spread abroad – **diffusion**.

Social Movements

When a group of people come together with shared idea, can create lasting effects by shaping future of society.

- Need **organization, leadership**, and **resources** to make an impact.

Activist movements aim to change some aspect of society, while **regressive/reactionary movements** resist change.
Several theories of why they form:

- 1. **Mass Society Theory** – Scepticism about groups, said they only form for people seeking refuge from main society. Ex. Nazism.
- 2. **Relative Deprivation Theory** – actions of groups oppressed/deprived of rights that others in society enjoy. Ex. Civil Rights Movement, a response to oppression to people of color. *3 things needed for social movement*: **relative deprivation**, **deserving better**, and belief **conventional methods are useless** to help.
  - Criticisms: people who don't feel deprived join social movement even if they don't suffer themselves. And too risky for oppressed to join a movement due to lack of resources. And when all 3 present, no social movement created.
- 3. **Resource Mobilization Theory** – looks at social movements from different angle. Instead of looking at deprivation of people, focuses on factors that help/hinder a social movement like *access to resources*. Need money, materials, political influence, media, and strong organizational base to recruit members – charismatic figure needed.
  - Ex. Martin Luther King Jr. in Civil Rights Movement.
- 4. **Rational Choice Theory** – people compare pros and cons of different courses of actions and choose the one they think is best for themselves.
  - Have to assume all actions can be listed, and transient. Also assumes person has full knowledge of outcomes. Rarely all true.

Can cause widespread panics, crazes (fads, ex. the anti-vaccine movement).
Social movement begins with **incipient stage** (public takes notice). Will either succeed or have to adapt. In the end, become part of bureaucracy they try to change – become absorbed into institutions.

Culture

Culture and Society

- **Culture** is way of life shared by group of individuals – the beliefs and values that bind a society together. Very diverse, can include artwork, language, and literature.
- **Society** is the way people organize themselves – bunch of people who live together in a specific geographic area, and interact more with each other than outsiders. Share a common culture over time.
  - Culture = rules that guide way people live, and society = structure that provides organization for people.
- Society includes **institutions**, ex. family, education, politics, which all meet basic human needs. The hardware on a phone.
- Culture provides guidelines for living, ex. software or apps on a phone, constantly being updated. What makes society run.

Culture talks about rules and instructions within a society that teach them how to live.

- Refers to ideas and things passed from generation to the next – language, customs, etc. Varies as we travel around the globe.
  - Ex. Chinese and Spanish spoken all around the world; Many like meat and vegetables, while others eat tofu and grasshoppers; Ways of greeting differ

4 main points:

- 1. All people ***share culture*** with others in their society, provides rules and expectations for carrying out daily rituals and interactions.
- 2. Culture is ***adaptive*** – it evolves over time.
- 3. Culture ***builds on itself*** – creation of culture is ongoing and cumulative, and societies build on existing cultures to adapt to new challenges and opportunities.
- 4. Culture is ***transmitted*** – from one generation to the next. We teach a way of life to the next generation. Humans are only mammals with culture to adapt to environment.

Subculture vs. Counterculture

A subculture is culture of a meso-level sub-community that distinguishes itself from the larger dominant culture of society.

- Smaller than a nation but unlike a microculture, it is large enough to support people throughout their entire lifespan.
- **Meso-level** = before micro and macro level. Medium sized groups.
- Subcommunity = smaller community in larger one.
- It's different in some way, but still share some things with larger society.

A **microculture** can't support people throughout their lifespan, refers to groups/organizations only affecting limited period of one's life.

- Ex. Girl scouts, college sororities, boarding school.

Subcultures include ethnic groups like Mexicans or orthodox Jews, or groups like the elite upper class. Can cause tension with dominant group.

When laws of dominant society are violated, a **counterculture results**. Values differ greatly from larger society.

- Ex. Mormons believe in polygamy. **Polygamy =** more than one spouse, **polygyny** = more than one wife
- Ex. Amish reject mainstream ideas and have their own ideas, reject technology and consumerism.

Jim Goes to College Subculture

Within a nation many smaller groups – ethnic, regional, tribal subcultures made of people who identify closely with each other. So subculture is smaller community that distinguishes itself from larger society.

- Different cities states in US may have their own unique subcultures.
  - Ex. Jim, grew up in Florida his whole life, but got into university in Washington DC. Notices a lot of differences between the two. Ex. Has to parallel park, and has to pay for parking. Driving in DC not same as in Florida, much more traffic.

Culture Lag and Culture Shock

Culture lag is the fact culture takes time to catch up with technological innovations, resulting in social problems.

- Common in societies because material culture changes rapidly, while non-material culture resists change.
- **Material culture** refers to physical and technological aspects of our daily lives, like *food and houses*
- **Non-material culture** doesn't include physical objects, like *ideas/beliefs/values*, which resist change.
  - Examples: when cars first invented no laws to govern driving (no speed limits, lanes, etc). Very dangerous but laws soon written to fix problem. Or invention of computers and emails.

Culture Shock – feelings of disorientation, uncertainty, and even fear when they encounter unfamiliar culture practices. Ex. Moving countries or travels to another type of life (urban to rural).

- In foreign places, business conducted differently, and food completely different.
- As a result of culture shock may feel homesick, lonely, etc.
- Sometimes see things frowned upon in own culture

Diffusion

Diffusion is the spread of an invention or discovery from one place to another. Even technology and software have made a difference in how people connect with others across the globe. Can occur in many ways.

- Ex. Capitalism, democracy and religious beliefs
- Exploration, military conquest, missionary work, mass media, tourism, internet.
- Ex. Food in America seen all around the world – McDonalds in Asia. Spanish is one of fastest growing languages. Or the ALS ice bucket challenge.

Mass media = dissemination of information, and how it's transmitted within a culture. Includes print media and digital media. How it's consumed changes across cultures in each group. Can look at role it plays through society through different sociological perspectives.

- According to the **functionalist perspective**, its main role is to provide **entertainment**. Also says it can act as an **agent of socialization** (ex. **Collective experience** of watching Olympics on TV, and **community building** – entire internet communities) and act as an **enforcer of social norms**.
  - Also tells us what *society expects of us* through rewards and punishment, ex. Seeing criminals. But can also glorify behaviours that are wrong in society, like intense physical violence.
  - Also functions as a promoter of consumer culture. At the turn of century average US child saw 20000 commercials a year on TV. Only increased from there, and not clear what impact this may have on next generation.
- The **conflict perspective** focuses on how the media portrays and reflects and exacerbate **divisions** that exist in society, ex. Race/social class.
  - Uses term **gatekeeping** to describe the process by which a small number of people and corporations control what information is presented on the media, and how they move through a series of gates before they reach the public. In some countries this is decided by the government, in others decided by large media corporations.
  - Gatekeeping has more effect on some media than others, ex. Lots of control on big movies, but little overhead control on what's posted online.
  - Also describes how mass media reflects the dominant ideology. Often limits other views. People who make the choice – the gatekeepers are predominantly white, male, and wealthy.
  - Portrayal of minorities can be stereotyped. And attempts to fix this can wrongly result in **tokenism**.
    - Tokenism -

Feminist Theories is similar to *conflict theory*, in that mass media misrepresents society towards the ***dominant ideology***. Specifically, message about men and women are represented in the media. Depictions of men and women often stereotyped, emphasizing traditional sex roles.

Interactionist perspective looks at mass media on **micro-level** to see how it shapes day to day behavior.

- How mass media blurs line between solidary and group activities
  - Ex. watching a movie.
- And how we connect with others using media *changes over time* (email instead of phone, or online dating).

Evolution and Human Culture

Culture is the customs, knowledge, and behaviours learned and socially transmitted. Includes values and objects meaningful to a group of people. Culture also has a **biological** component.

- **Charles Darwin's Theory of Evolution** – both **physical traits** and **behaviours** can be selected for if they contribute to success of the species.
  - Ex. For behaviours, all cultures of ways of dealing with illness/medicine/healing. Or wedding/funeral ceremonies. Language. Indicates they were selected for as human species evolved.

Evolution can shape culture, but can also think of how culture can shape human evolution.

- Ex. Hunter-gatherer society vs. farming society, people moved less, and populations grew. Because of this people were more exposed to outbreaks of disease. Since only those that survived weren't killed off, these societies have shaped our immune systems.
- Or *lactose intolerance*, first year of life most humans get nutrition from milk, but switched after children are weaned. But Northern Europeans which reared cattle, don't have this effect – their lactase gene doesn't turn off. So those able to digest milk more likely to survive.

Social Inequality

Overview of **Social Inequality**

The **resources** in a society are unevenly distributed.

- Ex. Wealth in US, top 20% have 72% of the wealth of the country and bottom 20% only control 3%
- Upper, middle, and lower class. Based on incomes.
- As you go up the social ladder, have better access to education, healthcare, and housing.

Groups of population disproportionality affected – **ethnic/racial minorities** have greater degrees of inequality as manifested by lower incomes, lower education, and reduced access to healthcare.

- Those in poverty also face considerable barriers to obtaining the same healthcare, education, and other resources as others.
- Gender does too. Females experience differences in pay (**gender-pay gap**), and the **glass ceiling effect** (poorly represented in higher position in companies)

People may feel increasingly **socially excluded**, live in **segregated neighbourhoods**, and feel **politically disempowered**.

- Can lead to civil unrest, and tempt people into criminal activities.

Ways to help: **government schemes** (ex. Food stamps), improve **access to education/healthcare,** and figure out social interventions that allow **integration to society**.

Upward and Downward Mobility,

We have a number of ways to break down society into social layers, ex. Classes

- Lower class – manual work, labour, low-pay jobs.
- Middle class – professionals, better paying jobs
- Upper class – very wealthy businessmen and family wealth
  - Correlates to amount of income.

When we think of **social positions**, can there be movement? Yes. Various ways.

- Individual can move **horizontally** – move within the same class.
  - Ex. Accountant switches job to different accounting company.
- **Vertical movement** – move up or down the social hierarchy.
  - Ex. Manager at restaurant becomes CEO of fast food restaurant. But if he gets demoted to serving food, fall downwards.

Various types of social constructs that allow for social mobility.

- **Caste system** – very little social mobility, because your role is determined entirely by ***background*** you're born to and who you're married to. *A lot of social stability*.
  - Ex. The Hindu caste system.
- **Class system** – allows for degree of social mobility, ***combination of background and movement***, often by education. *Less stability*.
- **Meritocracy** – concept that people achieve social position solely based on ***ability and achievements***. Highly idealized. Birth/parental background doesn't matter. Extreme social mobility. *Equal opportunity*.

Intergenerational and Intragenerational mobility, Social Mobility

- If change in social class happens in a person's own lifetime – **intragenerational mobility**.
- **Intergenerational mobility** – change in social class between generations
  - Ex. Parent is working class and son is working class.

Absolute and Relative Poverty

2 different ways of thinking about poverty – does it *threaten survival* of person, or does it *exclude* them from society?

- **Absolute poverty** – An absolute level at which if you go below, survival is threatened. ***Minimum level*** of resources a human being needs to survive. This level no matter where you are.
  - Approx. $1-2 a day, talking about developing countries.
  - However, someone in Arctic needs a lot more than somewhere else. There's variability absolute poverty does not consider.
  - The median level of income in a society can gradually rise as country gets richer. When it does, we find less people live in absolute poverty – decrease in poverty.
- **Relative Poverty** – in developed countries, use a different marker – a % level below the median income of the country. Ex. In Us, instead of $1-2 a day, median income is above $80/day.
  - **<60%** of the median income.
  - If a country's income rises up, absolute poverty line won't change, median income level would.
  - Relative poverty is not about survival, its people whose incomes are so low in their own society they're being excluded from society.

Social Reproduction

Huge amount of social inequality between rich families and poor families. Large social inequality seems to replicate itself cross generations. Perpetuation of inequality through social institutions (such as education/economy), social mobility counters this.

- **Social reproduction** – transmission of social inequality from one generation to the next
  - Ex. People with rich parents end up wealthy themselves; poor families give birth to kids in poor neighborhoods, with less access to education and opportunities, and they grow up to be poor also
- They have **financial capital**, and can invest it to obtain **social capital** – building up reliable, useful social networks. (Connections)
- Can also expose you to **cultural capital** – knowledge, education, and skills transmitted across generations
  - Ex. If parents exposing you to trips abroad and learning foreign languages. Or cultural items of social inequalities from one generation to the next

Doesn't **educational system** allow poor people to gain capital too?

- Our educational system ***doesn't value cultures of low classes***. It doesn't value the culture and social networks of the poor population.
- Education system can reinforce this social stratification.

Social Exclusion

Being an integral member of society has lots of advantages – access to good social networks, housing, educational resources, and resources in community.

- But certain individuals can be **excluded** to the peripheries of society, and are prevented from participating in society.
- Reduced right and access to resources/opportunities

Some can *drag* people into the periphery of society

- The **poverty magnet** can drag people away from the core part of society, and experience a greater degree of social exclusion.
- The **ill-heath magnet** can also drag people away, can't participate in society.
- Certain groups may face discrimination, based on their race/gender/sexual orientation/etc – the **discrimination magnet.**
- **Education, housing, employment** all important factors. With lack of any of these they can be relegated to fringes.

People in periphery often have many of these magnets combined, have tremendous forces pushing them away.

- They may also have greater consequences like ill health and criminal activities.

Segregation is a way of separating out groups of people and giving them access to a separate set of resources within the same society

- Idea **"separate but equal"**, which is rarely true in practice.
- Segregated people often have **worse resources.**
- Segregation is maintained by law/public institutions, or more informal processes like "**hidden discrimination**".
- **Social isolation** – when community voluntarily isolates itself from mainstream, based on their own religious/cultural/other beliefs.

Environmental Justice

Where we live plays a huge role in environmental benefits and risks we're exposed to.

- Areas with ***high poverty*** and ***lots of racial minorities***, often have few environmental benefits (green spaces, parks, recreation).
  - They also get a lot of **environmental burden** compared to wealthier parts. Includes waste facilities, manufacturing/factories, energy production, airports.
  - At risk because they often have few alternatives, little awareness of risks they face, and other pressing issues.
  - More health problems like asthma, obesity, etc.

Wealthier population society has much higher benefits.

- More politically and economically powerful, and able to demand beneficial facilities are placed close to them and burdening facilities far way.
- Also better represented in environmental/lobbying groups.

Big concept is **environmental justice** – looks at the fair distribution of the environmental benefits and burdens within society across all groups.

Residential Segregation

Residential segregation – groups of people separate into different neighbourhoods.

- Can mean race or income.
- Where we live affects our life chances, because it affects our politics, healthcare, availability to education, etc.

Other forms of segregation:

1) **Concentration** – there's clustering of different groups
2) **Centralization** – segregation + clustering in a central area.

- **Index of dissimilarity** – 0 is total segregation, and 100 perfect distribution.

Why is residential segregation important?

- **Political isolation** - Communities ***segregated*** are politically weak because their political interests don't overlap with other communities – become political vulnerable, don't have the political influence to keep their own needs addressed.
- **Linguistic isolation** - Communities who are isolated may develop own language, even in same city. May limit jobs.
  - Lower access to quality education/heath
- **Spatial mismatch** – opportunities for low-income people in segregated communities may be present but farther away, and harder to access. Gap between where people live and where opportunities are.

Global Inequality

The world is extremely unequal.

- Life expectancy is Congo is 51 vs. France/Japan is 84. Tremendous range.
- Access to clean water – in Africa, very difficult. In US/Europe very easy.

Champagne glass can help explain inequalities in wealth we see. It represents the distribution of wealth.

- Top 1/5th have 82.7% of the global income.
- Poorest 1/5th have 1.4% of global income.
- Richest 85 people in world have more wealth than the poorest 3.5 billion people in the world.

Inequalities in individual countries as well, ex. very poor countries can have a few extremely rich people.

- **Maternal mortality rate** is a marker for healthcare systems.
  - In NA and Europe 10-20 people per 100 000 die of childbirth.
  - In SA 75/100 000
  - SE Asia, 170/100 000.
  - Central Africa 700+/100 000.

Heath and Healthcare Disparities in the US

A lot of disparities we see in US are result of poor economic and environmental conditions.

- ***Social-economic status*** is a pyramid.
  - As we go **up** social pyramid, access and quality of healthcare improves.
  - Opposite is true for those at **bottom** of pyramid – more disease, less high quality healthcare, substandard housing, poor diet, dangerous jobs, can't afford expensive treatments
- **Race** can play a role – ***Hispanics and African-Americans*** have higher morbidity and mortality rates, worse access to healthcare and lower quality healthcare.
  - Even though some can be attributed to SES reasons, doesn't explain everything. Minorities less likely to receive everyday healthcare and treatments for life-threatening conditions.
- **Gender** differences – men typically use fewer preventative services like vaccines/check-ups.
  - Women require reproductive services, and access is reduced due to local laws.
  - Studies for treatments for diabetes/heart disease don't always include women, and can suffer from lack of research.
- **LGBT** community – might face discrimination, which can limit clinics they feel comfortable seeking help from.
  - ***Transgender*** especially face discrimination, and have a hard time finding someone who has experience working with transgender individuals. Leads them to be reluctant to seek services when they really need them.

Intersectionality – discrimination based on **multiple factors**

Many types of discrimination, like sex/gender/culture/race, but what if someone experiences multiple forms at same time?

- Ex. ***Female*** who is ***African American*** and practices ***Buddhist*** teachings, causing her to be discriminated against in 3 different areas.
- Social Stratification – groups of people are given better preferences than others (group based) (intersectionality is at the ***individual/person level***)

Why is it important to consider intersection?

- Because multiple different categories of potential discrimination/oppression that compounds in one individual, and put her at disadvantage in society.

Theory of intersectionality asks us to consider all the different levels of discrimination.

- Originally coined in 1989 by Crenshaw as a feminist theory, but has since expanded out and use it to explain oppression in all parts of society.

Class Consciousness and False Consciousness

Means of production – way we produce goods, ex. Factories and farms. Owned by fairly wealthy individuals, which hire a large amount of workers which offer their labour, without owning any of the means of production.

- There's a class divide, a hierarchy of upper/lower class.

Theory by **Karl Marx** – workers in *working class* don't realize they're being exploited and oppressed by this capitalistic model of working.

- Workers can develop **class consciousness**, and realize they have solidarity with one another and struggle to overcome this oppression and exploitation.
  - Involves seizing and obtaining means and redistributing the means of production among the workers.
- **False consciousness** – unlike class consciousness, instead of seeing they have solidarity with one another, they're unable to see their oppression.
  - And owners can promote this false consciousness by controlling classes, making it more difficult for workers to see their oppression.

Statistics

Regression – all variables examined are continuous

- Linear regression – degree of dependence between one variable and another. Data is on scatter plot, one-way influence of one variable on another.

Correlation - all variables examined are continuous. Unlike regression makes no assumptions about which variable is influencing the other.

- If correlation coefficient is 1, perfect. If -1, opposite. 0, random.

Chi-square – when all variables are categorical, looks at if 2 distributions of categorical data differ from each other.

- Null hypothesis vs. alternative hypothesis.

T-test – compares mean values of a continuous variable (dependent) between 2 categories/groups, ex. comparing mean of a group to a specific value. Can also compare means of 2 groups.

- Two-tailed = possibility of relationship in both directions, one-tailed = one direction.

ANOVA – similar to t-test, compare distributions of continuous variable between groups of categorical variable, but can be used for 3+ groups.

If value doubles, 100% increase

Study Types

Cross-sectional study – look at a group of different people at one moment in time

Cohort study – following a subset of population over a lifetime. A cohort is a group of people who share a common characteristic (ex. people born and exposed to same pollutant/drug/etc.) in period of time.

Longitudinal study – data is gathered for the same subjects repeatedly over a period of time, can take years or decades.

Case-control study – observational study where 2 groups differing in outcome are identified and compared to find a causal factor. Ex. comparing people with the disease with those who don't but are otherwise similar.

Clinical trial - highly controlled interventional studies

Randomized Controlled Trial – people studied randomly given one of treatments under study, used to test efficacy/side effects of medical interventions like drugs. Gold standard for a clinical trial.

Validity

Internal Validity – extent to which a causal conclusion based on a study is warranted. Confounding factors often impact the internal validity of an experiment.

External validity – Whether results of the study can be generalized to other situations and other people. To protect external validity, sample must be completely random, and all situational variables must be tightly controlled.

Construct validity – whether a tool is measuring what it is intended to measure.

Regression to the mean – if first measurement is extreme, second measurement will be closer to the mean

Confounding variables – changes in dependent variable may be due to existence of or variations in a third variable

Temporal confounds – time related confounding variables

Types of Control

Vehicular control – what experimental group does without the directly desired impact

Positive control – treatment with known response

Negative control – group with no response expected