

**LECTURE 15**  
**March 7th**  
**PSYC 200**

**Cognition Continued**

**Reasoning**

- Practical reasoning
  - We consider what to do or how to act
- Theoretical reasoning (aka Discursive reasoning)
  - deciding on what to believe
- Syllogism
  - A person decides whether a conclusion logically follows from 2 or more statements that the person assumes to be true, you start with facts and with them you will arrive at a conclusion
  - example: all birds have wings (fact), a bluejay has wings (fact), therefore the bluejay is a bird (conclusion)
  - example that doesn't work: all dogs have 4 legs (fact), all cats have four legs (fact), therefore all cats are dogs (conclusion), this isn't true
- Deductive reasoning (a type of syllogistic thinking)
  - A top-down method of arriving at a specific conclusion based on broader premises
  - start at generalizations and end in specifics **(TEST QUESTION)**
  - example: all bodybuilders use steroids, john is a bodybuilder, therefore john uses steroids
- Inductive reasoning (also a type of syllogistic thinking)
  - using specific examples to arrive at a general conclusion
  - start at specifics and move to generalization, opposite of deductive reasoning **(TEST QUESTION)**
  - example: john uses steroids, john is a bodybuilder, all bodybuilders use steroids

**Errors in reasoning**

- overconfidence
  - simply refers to thinking you know more than you actually do
  - example: thinking you know which way the stock market will go
  - hindsight bias: "i knew it all along" phenomenon, overestimating knowledge of a previous situation
- Belief bias
  - sometimes when we engage in this type of reasoning, the conclusion we arrive at is at odds with our beliefs and belief bias happens when your beliefs distort your logical thinking
  - religion can influence your decisions also
  - example: if you are a researcher and you do a study and conclude that prayer doesn't help patients heal but if you are a religious individual your results will be biased and you will advocate for prayers and their healing
  - belief perseverance: your beliefs will never change regardless of all the facts you have in front of you contradicting you
- Heuristics
  - they are informal rules that we use to speed up a decision-making process, a mental shortcut
  - example: what is the most probable cause of death, a plane crash or a car crash? obviously a car crash

- witnessing a car crash will influence this decision as in your mind, it is easier to access and you believe it is much more common
- Availability heuristics
- example: the more available that info is, the more common we believe it to be
- confirmation bias: a tendency to search for or interpret info in a way that confirms one's preconceptions, leading to statistical errors
- The conjunction fallacy: most believe that more info you add to a statement, the more likely it is true
  - more is not better

## Decision Making

- Judgement
  - a skill that allows us to form opinions, reach conclusions and evaluate situations objectively and critically
  - it will inform your decision making skills
  - when you make a decision, you simply select and reject available options
- Framing
  - decision making is influenced by how the information is presented
  - example: you want to buy ground beef presented with company A and B, you read the ingredient list and you read that it says "75% lean" for company A, and "25% fat" for company B, you will more likely choose A because the info is presented in a more favourable-sounding way
- Decision aversion: when you're presented with more than just 2 options, you decide to say fuck it and walk away
- theories of decision making
  - rational choice theory: people make decisions by determining how likely each outcome of that decision is, as well as the positive or negative value associated with each outcome, evaluating the pros and cons
  - prospect theory: people will more likely avoid risk in situations where they stand to gain, but will seek risk in situations where they stand to lose something
    - basing decisions on perceived gains rather than perceived losses

## Neural contributions to decision making

chemicals associated with decision making

- dopamine: most important neurotransmitter in your head, studies have found that the presence of this chemical in your brain will allow you to make decisions that will lead to good outcomes and avoid bad outcomes
  - basal ganglia
    - group of structures found in midbrain, role in voluntary motor control and decision making processes, large amount of dopamine receptors located inside of basal ganglia and if you have a lot of these that means that there is a lot of dopamine in the

basal ganglia, when you're faced with a decision neural activity and dopamine level in basal ganglia goes up

- all this allows us to make more favourable decisions
- I'm going to make a decision that makes you feel good but isn't the best choice for you
- example: you want to lose some weight but you see salad and ice cream, you will choose ice cream over keeping your diet because it makes you feel better
- Executive control system: allows us to inhibit pleasurable responses so we can avoid making decisions that may feel good but are bad for us
  - found in ventromedial prefrontal cortex, this is a part of your brain that plays a role in allowing you to obey the rules of society, plays a role in linking your behaviour to its consequences
  - dorsolateral prefrontal cortex: role in initiating or inhibit behaviour based on the decisions you make
- anterior cingulate cortex: role in controlling your motor responses, don't know a lot about it
- parietal cortex (lobe): role in directing your attention during your decision making process

### **Attention**

can be defined as applying the mind selectively to a sense or a thought, conscious attention is selective, we can only process one perception at a time

- Corbetta and Schulman (2002)
  - Goal-directed selection (endogenous attention): you will make an explicit choice to pay attention to something, you say "i am going to pay attention to this"
  - Stimulus-driven capture (exogenous attention): an external factor is causing you to pay attention to something in particular
- how do we decide how much attention to devote to a particular task?
  - this depends on the complexity of the stimulus
  - perceptual load: determines how much attention we will give to a stimulus, having a large perceptual load means stimulus is complex and requires more attention
- the amount of attention that you can use is limited

### **Unattended Stimuli**

- Filter theory
  - a person selects stimuli early in the perception process, even before they assess the meaning of the input
- Sensory buffer
  - a part of the perceptual system that holds information for a short period of time before it is accepted or rejected by the filter
- example: the information which is processed at a deeper level (the stuff we pay attention to) has to take itself through a filter which selects information based on its physical description

### **Unattentional blindness**

sometimes however even if you are paying attention, you still fail to process the information

- Attentional blink: phenomenon that the second of two targets cannot be detected or identified

when it appears in a short delay from the first

- psychological refractory period: the period where you can't process any other information because you are so busy paying attention to the initial information
- Feature Integration theory (Treisman 1987)
  - we use attention to help us organize incoming information so that it makes sense to us

### **Language and Verbal Cognition**

- what is language?
  - it allows you to communicate how you feel to the people around you
  - it is a system of symbols
- multiple languages
  - most people who learn a second language do so at a young age (before the age of 7), learned at near fluency
    - fluency goes down decreases as we age
  - left parietal area: it seems that when we are younger, this area is much more active during language acquisition than it is when we are adults
    - what is found here is the wernicke's area, plays a role in understanding/ comprehending language
    - after studying brains of polylingual individuals who learned their languages at a young age, they found that they had a higher cortical density (more synaptic connections) in the left parietal area

### **Language Production**

- what actually goes through our minds the moment before we say something?
  - audience design: you will adapt what you are going to say/how you are going to say it depending to who you are speaking to
  - style-shifting: more at the individual level as opposed to a group level (as is in audience design)
    - example: how you speak to your parent will not be the same as how you speak to your friend
- In order to communicate effectively we need to follow certain semantic and syntactic rules
  - cooperative principle: instructs the speaker that the words they use should be 4 things: truthful, informative, relevant and clear
    - when you are speaking to someone, it is important to have an idea of the level of knowledge of your listener in order to successfully get your message across
- from time to time we all make errors in speech production
  - spoonerism: execution error, you will exchange the initial sounds of two or more sounds in a phrase
    - example: "cast far" instead of "fast car"
  - opportunism: refers to having to make a very rapid speech and then getting whatever it is you're trying to say wrong, usually happens when we are caught off-guard, chances are you're going to come up with a very poorly worded response

## language comprehension

- lexical ambiguity (homonymy): context, experience and word frequency is how we are able to determine the right meaning of a phrase
  - Marijuana: Issue Sent to Joint Committee (*Toronto Star*)
  - Child's Stool great for Use in Garden
  - She is looking for a match
  - Savings bank vs. River bank
- Structural ambiguity: the syntax causes sentences to have more than one meaning
  - The priest married my sister
  - Stolen painting found by tree

## Does culture influence the way we think? yes it does

- example: group of american and japanese kids we asked to describe a cartoon of a fish, the japanese kids were more interested in describing the background (the little fish and the aquarium), they responded like this because they come from a collectivist culture in which the good of the group is emphasized over the good of the individual. the americans described the big fish and nothing else, they responded like this because they come from an individualistic culture in which the individual is emphasized over the good of the group

## Language and Thought

- Does language affect the way we think? yes it does
  - linguistic relativity hypothesis
    - european and english languages have an egocentric frame of reference which means the space is represented with the individual at the centre
      - example: if someone asked you where the grocery store was, you will say that it is "two minutes away from my house"
    - asian languages have an absolute frame of references which means that you will be told exactly where the store is
    - the language we speak influences our reality: true
  - linguistic determinism
    - different languages impose different conceptions of reality: not always true
    - hopi indian tribe: they have no words in the past, present or future. Does this mean that they have no sense of time continuum? no, they do have a sense of time continuum