PSYC1002

Psychology 1002

S2 2018

Table of Contents

Table of Contents Cont.

➢ Understand and be able to describe the limitations of behaviourism which led to the Cognitive revolution using specific examples such as language, the need for internal mental representations and concepts like attentional overload and attentional limits

- Behaviourism rejected internal mental structures – now behaviours are complex S-R (stimulus response) associations

- Behaviourism treated people as robots and computers – input and output. They found the idea of cognition to be a pain and making things harder to understand (they could not really comprehend the logic of cognition as it was not something you could see or touch, it was more to do with analysis)

- With behaviourism they did not take into account the analysis of the mind and merely looked at psychology from a fundamental, physical point of view; which is very limiting

➢ Understand Tolman's perspective on internal mental representations and be able to describe the evidence he found in rat maze navigation which supported this viewpoint

- Tolman (1948)
  - Animal psychologists believe maze behaviour is S-R connections → learning consists of strengthening of some connections and weakening of others (e.g. external stimuli like sounds, smells, etc have big response)
  - Stimuli are not connected by just simple one-to-one switches to outgoing, but more so treated as a cognitive map that is worked over (indicating routes, paths, relationships, etc.)
  - Experiment:

    Group 1 (control) – run in maze once per day and found food in the goal box

    Group 2 (experimental) – not fed at all while in the maze for 7 days, then rewarded in maze from then on

    Group 3 (experimental) – not fed at all while in the maze for 3 days, then rewarded in maze from then on

- Group 2 has a dramatic drop in the time it takes to complete the maze. This does not show that the reward was a motivation. It shows that the rats, before the 7 days were complete, found their way out the maze eventually. They learnt the whereabouts of the maze and its route and were able to find the exit with ease because they were familiar with it, not because

the reward was there per say, indicating thought processes and intuition
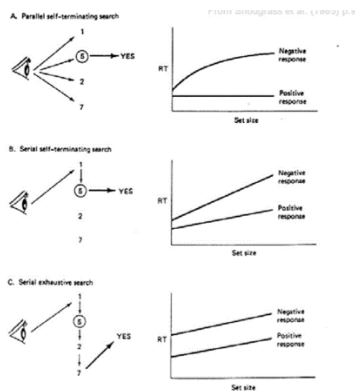
- ➢ Understand the additive factors method which allows cognitive psychologists to draw inferences about internal mental processes (as described by Snodgrass and in the lecture). Be able to apply this method to the memory scanning task

  - Role of technology → attentional overload
  - o Discovering human limitations in mental processing
  - o The need for better training
  - o The need for better design
  - o Computers take in and manipulate information:

    - We can investigate mental processes scientifically

    - We can use computers as a "model" for human information-processing systems

    - We can construct a model of cognitive processes and test the model by measuring human behaviour

  - Cognitive models: boxes and arrows refer to the processing and transfer of information
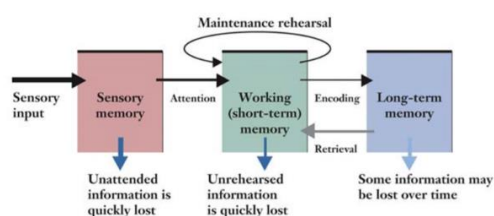
  - Mental chronometry
  - o Methods of measuring the speed and organisation of mental processes
  - o Compare behaviour in two tasks that differ in only one mental process (e.g. Simple vs. Choice Reaction time)
  - o Simple Reaction Time: press button to any light
  - o Choice Reaction Time: press one button to red light and another button to green light
  - o Choice RT – Simple RT = Estimate of stimulus evaluation time
  - o Mental chronometry can also be used to infer the nature of processes

- o In the memory scanning or 'Sternberg' paradigm subjects memorise a short list of items (the number of them is called 'set-size') and they are then asked later if a number (the probe) is one of them
- o The pattern results allow us to infer how people search through their memory

➢ Understand the difference between a parallel and serial search in memory and the manner in which this is inferred from reaction time data plotted against set size
- Two dimensions:
  1. People may search for items in parallel (at the same time) or serially (one by one)
  2. People may stop searching once the item is found (self-terminating), or keep searching through the whole set regardless
- When searching parallel, it does not matter the set size, as you are looking at them all at once. Whereas serially, it does and there is a limitation to the human mind!
- People will keep searching through the whole set regardless of whether they have already found the answer! It's in our nature
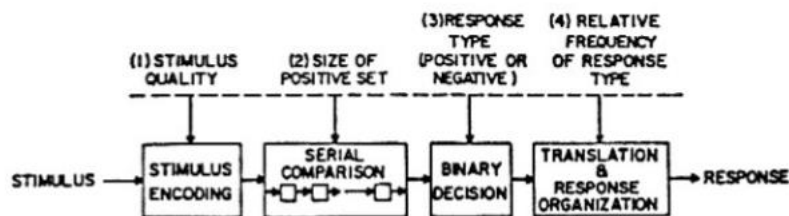
➢ Understand and be able to give examples as to why Cognitive Psychologists do not rely on introspection as a methodology and seek objective measures. Examples any include reasoning errors such as the certainty and pseudo-certainty effects demonstrated in the lecture
- Introspective data do no provide valid insight into the determinants of cognition
- Some cognitive processes occur without any conscious awareness or control and therefore are not available for introspection
- Even our consciously controlled cognitive processes are subject to a variety of "cognitive biases" and reasoning errors that influence our interpretation of events without our awareness
- Reasoning error e.g. certainty and pseudo-certainty effects: cognitive biases
  1. Hindsight bias: "I knew it all along"

2. Conformation bias: seek information that confirms our beliefs and ignore information that does not

3. We seek order in randomness and ignore "chance"

4. We ignore "base rates"/sample size

- Many errors actually make us more efficient at processing information – but it does mean we cannot accurately report on our own Cognitive Processes

➢ Understand and be able to give examples of situations where focused visual or auditory attention leads to limited processing of other stimuli

- <u>Paper by Leah L Thompson et al</u>. explores technological and social distraction on cautionary behaviours and crossing times in pedestrians
  - o Texting pedestrians were 3.9 times more likely than undistracted pedestrians to display at least 1 unsafe crossing behaviour (disobeying the lights, crossing mid-intersection, or failing to look both ways)
  - o Pedestrians listening to music walked more than half a second (0.54) faster across the average intersection than undistracted pedestrians
  - o Leah et al. concludes that technological and social (visual and auditory) distractions increase crossing times, with text messaging associated with the highest risk – therefore pedestrians were not processing other stimuli (e.g. traffic) around them

➢ Be able to define, distinguish and give examples of focused attention, divided attention, diffused attention, inattentional blindness, and change blindness

- As humans we have limited "attentional resources" – we can either focus these on one image/task/stream (and not process anything else) OR spread our attentional resources across many images/tasks/streams (and perform each less well)
- **Focused attention**: focused completely on one stimuli (e.g. studying)
- **Divided attention**: reduces the amount of information processed (e.g. multitasking)
- **Inattentional blindness**: when you are not paying attention to something at all (e.g. not seeing a crime because you were focused on walking your dog)
- **Diffused attention**: a relaxed state of concentration where the brain settles into resting (e.g. being tired whilst attending a lecture)
- **Change blindness**: sometimes, even when we are looking for something strange, it takes longer than expected to find it, when we make jumping eye movement the input washes out motion sensors (e.g. simulated by inserting 'blanks' or flashes in between pictures)
- Change blindness implies that our sense of 'completeness' (of experiencing a whole scene in one go) is an illusion and that we do not encode much information at all about what we are seeing

➢ Understand and be able to describe the difference between an early, late or flexible locus of selection

- A question first addressed with 'dichotic listening tasks' was "at what point is information selected for further processing?"

- **Early locus of selection**: information is selected or rejected based on its physical characteristics; unattended stimuli will only be processed <u>crudely</u>
- **Late locus of selection**: information is selected or rejected based on more complex characteristics like its meaning; unattended stimuli do have their <u>meaning processed</u>
- **Flexible locus of selection**: your locus of selection changing depending on how you are feeling

➢ Be able to both give and interpret examples which demonstrate an early, late or flexible locus of selection
- *Early locus of selection*
  e.g. Broadbent's filter model (1958) – a selective filter is needed to cope with the overwhelming amount of information entering the channels, such that certain messages must be inhibited or filtered out from the messages that were filtered for further processing
  e.g. nothing recalled in unattended channel except noise vs. speech, gender of speaker
- *Late locus of selection*
  e.g. Treisman's (1960) attenuation model – two messages "switch ears" at the point of the slash mark – you are paying attention to instructions without really realising it, you've just been told that that is what you are going to do
  e.g. we notice our name spoken in a conversation we are not attending to ("cocktail party" phenomena, Cherry, 1972 – 35% of participants reported hearing their own name in this situation (confirmation bias))
- *Flexible locus of selection*
  e.g. if you are feeling distracted already you are less likely to have meanings processed whereas if you are in a studious mood you are more likely to you will process stimuli with ease

➢ Be able to define and distinguish between endogenous and exogenous attention
- **Exogenous** (involuntary, stimulus-driven): when an object or feature 'pops out' or captures our attention – makes it an easy and 'parallel' search
- **Endogenous** (voluntary, goal-directed): when we try to find an object or feature – makes it an effortful and 'serial' search

➢ Understand the role of attention according to Treisman's FIT (Feature Integration Theory) and the visual search evidence (for both feature and conjunction targets) which supports it
- He proposes that we process features independently in a pre-attentive manner (doing this very quickly and in parallel)

- He proposes that the role of attention (the 'attention spotlight') was to bind these features together into objects (a slow and serial process)