Week 2: Introducing Cognitive Psychology

Learning outcomes

- Explain what cognitive psychology is and illustrate this with everyday examples
- Identify the cognitive processes that will be studied in this unit
- Recognise developments in the history of psychology that led to the emergence of cognitive psychology
- Differentiate and evaluate research methods in cognitive psychology

Scientific study of knowledge

- When cognitive psychology was first launched, it was understood as the scientific study of knowledge leading to a number of questions:
    - How is knowledge acquired?
    - How is knowledge remembered?
    - How is knowledge used?
- Much of our behaviour, feelings, thoughts, choices depend on knowledge
    - Ie memory requires knowledge
    - Language relies on inference
- We use current knowledge and build on knowledge:
    - We get knowledge through prior experience and continue to build on it
    - **Top down processing**- previous experience with knowledge creates expectations > affects processing of information
        - Is influenced by our expectation and knowledge, rather than the stimulus itself

Defining Cognitive Psychology

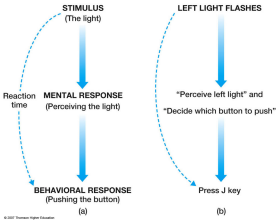
- Branch of psychology concerned with the scientific study of the mind
- Aims to understand human cognition by the study of behaviour of people by performing various cognitive tasks
- Argues that we need to study the brain as well as behaviour while people engage in cognitive tasks
- Concerned with all forms of cognition (memory, attention, learning, language, perception, problem solving, decision making) - not just intellectual functioning

The emergence of cognitive psychology

- 50-60 years old
- First book published in 1967 by Ulrich Neisser which had a big impact on psychology

Context in which the field of psychology has evolved

- **Wilhelm Wundt (1832-1920) – Voluntarism**
    - In the 19th century Wilhelm defined psychology separately from biology and philosophy.
    - First laboratory of scientific psychology
    - Introduced/championed experimental method
    - Reaction time experiments allowed cognitive processes to be inferred
    - Used behavioural and physiological studies



- **Wundt & his student Titchener (1867-1927)**
  - Used analytic introspection: Participants trained to describe their experiences and thought processes when elicited by stimuli presented under controlled conditions
  - Titchener, from the Structuralist school of thought, believed that the problem with introspection is that it is hard to test its claims as the 'mind is what it does' - Objective observation needed
- **William James (1842-1910)**
  - Theorized about primary and secondary memory
  - Looked at attention and memory
  - Started the first psychology lab in America
  - From functionalism school: description of mental processes in terms of their function or adaptive significance
- **John Watson (1878-1958)**
  - Founded the school of Behaviourism as a reaction to introspection and 'invisible' mental processes - Argued that introspection was unscientific
  - Concerned with the prediction and goal of behaviour
  - Behaviour explained as a product of learning and classical conditioning
  - Reductionist view: Behaviourists excluded everything except behaviour from psychology
- **B.F. Skinner (1930's &1940's)**
  - Initiated the study of operant conditioning
  - Learning processes through which a response increases as a result of reward of reinforcement or when reinforcement is contingent on a response being emitted
  - Stimulus-response elements
  - Viewed anything as a reinforcer if it changed the probability of a response
  - Walden two: a cult that is built based on an environment built on positive contingencies.

Cognitive revolution

- Contributed to partial decline in the influence of Behaviourism
- A number of factors contributed
  - Noam Chomsky's famous critique of Skinner's book and theory of language
  - George Miller discussed the magic number 7 + or – 2, in short term memory
  - Broadbent's model of attention which was an information processing model
  - Study of Human Performance
  - Mind and brain are not a black box

Scientific method

- All cognitive techniques follow the SM
- Seeking cause and effect relationships by following a series of steps to systematically investigate the effect of one specific variable on another specific variable
- Aim is to ensure that the results are caused by the variable being manipulated and not another (extraneous/intervening) variable
- **SM steps**
  1. Make an observation and take notes
  2. Ask a question
  3. Form a hypothesis
  4. Make a prediction
  5. Do a test
  6. Analyse data and draw a conclusion

Ecological validity

- The degree to which particular findings in the lab are applicable/relevant to the real world'
  - Extrapolating from the lab to the real-world
  - Extrapolating from one situation to the next

Research methods in cognitive psychology

1. Experimental Cognitive Psychology
2. Cognitive Neuroscience
3. Cognitive Neuropsychology
4. Computational Cognitive Neuropsychology

1. **Experimental cognitive psychology**
   - **What is it?**
     - Trying to understand human cognition by using behavioural evidence - Lab research
     - Reaction time and accuracy
     - Theories proposed in verbal terms
     - Relies on information processing model:
       - Stimulus is presented which causes certain cognitive processes to occur producing a desired response
       - **Emphasises:**
         - **Bottom up processing**
         - **Serial processing:** assumed that only one process occurs at any moment in time
       - **Ignores**
         - Top down processing
         - **Parallel processing:** many processes occur at once known as (used more for highly practiced tasks)
   - **Limitations**
     - **Ecological validity:** environment too controlled
     - **Indirect measures:** because we are **inferring** cognitive processes from behavioural responses
     - **Vague**

        - **Paradigm specificity**: Specific findings are specific to the exact task that is being used and that may change to the task, leading to different findings
        - **Impurity problem:** Tasks often involve the use of a complex mixture of different processes making it harder to interpret the findings
2. **Cognitive neuroscience**
    - **What is it?**
        - Involves using evidence from the brain to understand human cognition
        - Where do brain-specific processes occur and how long the brain takes to respond
    - **Terms used to describe areas of the brain activated during the performance of a task:**
        - **Dorsal:** superior or towards the top
        - **Ventral:** inferior or towards the bottom
        - **Anterior:** towards the front
        - **Posterior:** towards the back
        - **Lateral**: situated at the side
        - **Medial:** situated in the middle