

### CHAPTER 6: Memory model

#### Practice questions at - text book pages 112 to 113

- 1) Which of the following sequences reflects the order in which the human brain processes inputs from the surroundings?
- sensory memory, short-term sensory store, long-term memory.
  - sensory memory, long-term memory, short-term memory.
  - sensory memory, short-term memory, long-term memory.
  - long-term memory, short-term memory, sensory memory.

**Answer:** a.

- 2) Selective attention is best described as:
- many bits of information are received.
  - focusing on at least five bits of information.
  - disregarding undesirable bits of information.
  - focus on the relevant bits of information from the many which are received.

**Answer:** c.

- 3) Which one of the following does not help in retaining memories?
- chunking.
  - chaining.
  - practice.
  - overload.

**Answer:** d.

- 4) Which of the following is not a description of elements of the Atkinson and Shiffrin multi-store memory model?
- information enters the memory system via the senses.
  - the long-term memory quickly forgets memories after a short period.
  - the short-term memory is intermediate between the sensory memory and the long-term memory.
  - the sensory memory forgets most of its input except for those memories to which it has attention.

**Answer:** b.

- 5) Which of the following is the correct order of depth within Craik and Lockhart's levels of processing memory model?
- phonetic level, semantic level, structural level, long-term memory.
  - semantic level, phonetic level, structural level, long-term memory.
  - long-term memory, phonetic level, semantic level, structural level.
  - structural level, phonetic level, semantic level, long-term memory.

**Answer:** d.

- 6) Identify the three main receptor systems used by a performer in sport.

3 marks

**Answer:**

- **Visual** - sight.
- **Auditory** - hearing.
- **Proprioceptors** - touch or feeling about body position.

- 7) Identify and describe the three elements of perception.

3 marks

**Answer:**

- **Detection:** recording the stimulus.
- **Comparison:** comparing present information with past information stored in the memory.
- **Recognition:** locating a familiar cues or signals within the memory system.

8) How can information be retained in the long-term memory?

4 marks

**Answer:**

4 marks for four of:

- Through **repetition** of the stimulus, **practice** or **overlearning**.
- Through having **meaning** or **relevance** to the performer.
- **Information is novel, unusual or unique.**
- Stored here if **associated** with another piece of stored information - known as **chunking** in which **information is organised in groups**.
- Link **information** to **past experiences**.
- If **stimuli** are **emotionally intense, exciting, enjoyable or interesting**.
- If **information** is perceived to be **important**.
- **Reward** or **reinforce** success.

9) a) Using the example of a table tennis player receiving a serve, what information would be held in the short-term sensory store and for how long?

4 marks

**Answer:**

- **Information held would be local and temporary.**
- Pertaining to the **immediate surroundings** of the player and his or her opponent.
- This would be retained for up to **one to four seconds** or sooner if the display changes.
- And **new more relevant** information replaces it.
- Examples would be from: **position of the ball, placement of opponents hands or bat, placement of opponent relative to table.**

b) Name and describe the purpose of the process by which information is transferred from the short-term sensory store to the short-term memory.

4 marks

**Answer:**

- The process is called **selective attention**.
- And is caused by the individual selecting from the many (thousands) of bits of information which flow through the short-term sensory store each second.
- Those items which are **relevant**.
- And **avoiding items** which would **distract** the player (such as the crowd, other movements behind the ball).
- An example could be the retaining of the ready position of the opponent once the serve has begun.

c) What factors could affect response time in any game or sport?

4 marks

**Answer:**

4 marks for four of:

- **Number of choices** to be made during the response process.
- Whether the skill is open, complex or externally paced.
- Whether there are a number of sequential (one after the other) stimuli (the psychological refractory period).
- **Distractions** or ability to selectively attend or focus on the stimulus.
- Spectator distractions, social inhibition or presence of significant others.
- Age or gender.
- Level of personal fitness, health or body type or shape (somatype), length of neural pathways (whether the athlete is tall or short for example).
- **Past experience**, presence of motor programmes, the level of skill, the level of ability.
- **Environmental factors** such as weather, state of playing surface or court or the state of personal kit or shoes.

## QUESTIONS AND ANSWERS

10) a) Define and explain with examples the process of selective attention. 3 marks

**Answer:**

- This is the process of sorting out **relevant** bits of information **from the many** which are received.
- For example, a soccer player receiving a pass **will be aware of** the size of the pitch, the position of the opposing goal, the number of spectators, and other items from the environment which have **no relevance** to the pass about to be made, and will be **disregarded** by the process.
- The position of the ball, the position of many of his own team, the positions of defenders (the opposition), the spinning of the ball, are all **relevant** to the pass to be made, and will be **selected for attention** during the pass.

b) Explain, using a sporting example, how the use of selective attention depends on an athletes' level of ability. 3 marks

**Answer:**

2 marks for two of how the use of selective attention depends on an athletes' level of ability.

- An experienced performer can **focus totally** on an important aspect of his or her skill.
- Which excludes **irrelevant** stimuli.
- Parts of the skill are performed **automatically**.
- Which gives the good performer spare **additional capacity**.
- To enable the performer to attend to **new elements** of a skill.
- In contrast, a **novice** performer will need to be **guided** and coached to **ignore irrelevant cues**.
- And **directed** to **relevant cues** that are important to the information being received.

1 mark for example:

- For example, a novice performer may not be able to predict a dummy move as a player sidesteps left and right in rugby.
- Whereas an experienced performer has the playing experience to predict future events from early signals or past events.

c) How can a coach improve an athlete's selective attention. 3 marks

**Answer:**

3 marks for three of:

- Athlete told to **ignore** any irrelevant cues.
- Focus on improving **cue recognition**.
- Raise motivation and **arousal** levels.
- Use of **mental rehearsal** to improve selective attention.
- Increasing **intensity** of the stimulus.
- Use of **language** to attend to relevant cues.
- Use of **past experiences** from long-term memory store.

- 11) During sporting situations it may be necessary to process information using memory systems. 10 marks

What are the features and functions of the working memory?

**Answer:**

*5 marks for five of:*

- The **working memory** is part of **short-term memory** which is concerned with immediate conscious **perceptual** and **linguistic** processing.
  - **Selective attention** is used to sort out **relevant** bits of information that enter short-term memory.
  - Short-term memory has a very **large capacity**, but **minimal** storage time (**duration**).
  - So short-term memory **filters** out irrelevant information.
  - Any **irrelevant** stimuli is ignored and **lost**.
  - Enabling performer to switch attention.
  - **Relevant** bits of information are processed enabling task to be accomplished.
  - Or it can be stored in the **long-term memory** for future use.

What strategies could the player use to improve his memory system?

### **Answer:**

*5 marks for five of:*

- **Educate** the performer about the details of the skill.
  - **Explain** what to do and how to do it.
  - The more **practice** that can be done to a correct technical model, the better the recall schema will be formed and the better the immediate performance.
  - Ensure that **input** is clear and uncluttered.
  - **KISS** – keep it simple stupid.
  - Carefully **separate similar skills** to enable performer to distinguish between them.
  - **Organise** the process of skill learning to ensure that information is meaningful.
  - Be **brief** and not overload the short-term memory which can only hold small amounts of data.

- 12) Outline the main features of Craik and Lockhart's levels of processing memory model.

8 marks

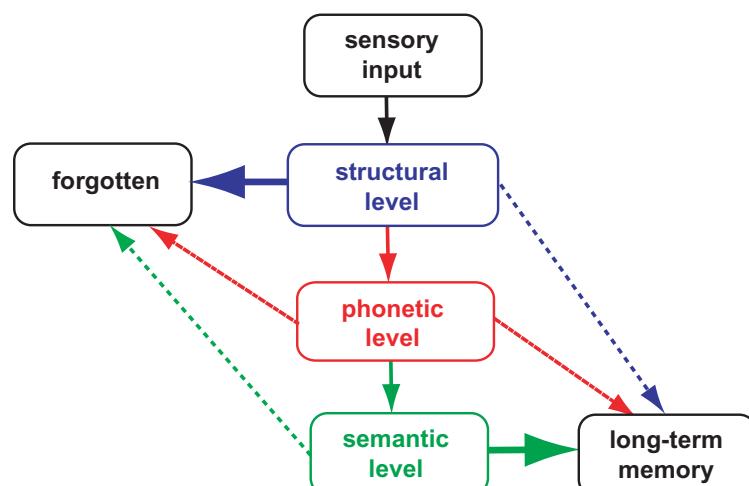
**Answer:**

- Figure Q6.1 sketches out this model developed by the authors.
  - The **levels of processing model** (Craik and Lockhart, 1972) focuses on the depth of processing involved in memory, and predicts the deeper information is processed, the longer a memory trace will last.
  - In this model the depth of processing **falls** within a shallow to deep continuum.
  - At the **structural level**, shown in the diagram, a person encodes only the physical qualities of something. For example, what the word looks like.
  - At the **phonetic level**, shown in the diagram, a person encodes its sound.
  - At the **semantic level**, shown in the diagram, a person which considers the actual meaning of a word.
  - This is the **deepest level of processing** and which is most likely to be remembered and acted upon.
  - **Shallow processing** at the structural and phonetic levels.
  - **Deep (semantic) processing** based on the meaning of the word therefore is more likely to be **remembered**.

**figure 3.26 – soccer player's attack**



### **figure Q6.1 – Craik and Lockhart's model**



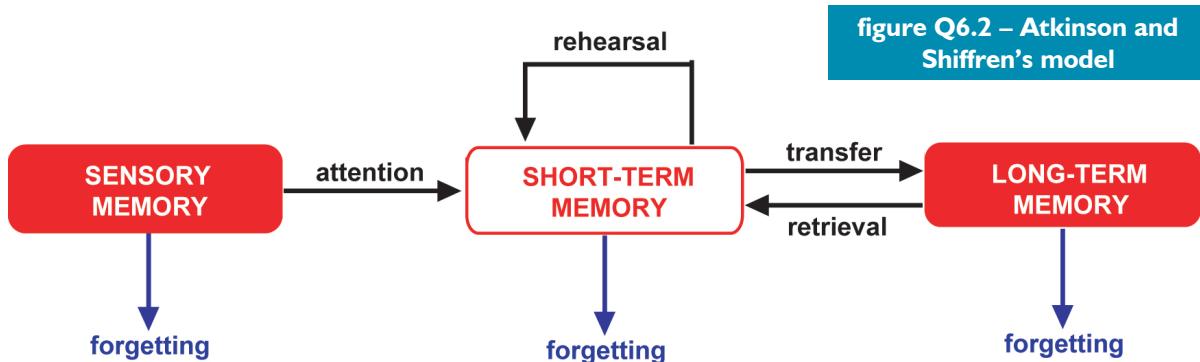
13) Outline the main features of Atkinson and Shiffran's multi-store memory model.

Use sporting examples to illustrate your answer.

10 marks

**Answer:**

- Figure Q6.2 outlines the basic structure of the **Atkinson and Shiffran's** multi-store memory model.



- This model asserts that human memory has **three separate components**:
  - The **sensory memory** in which information enters the memory via the **senses** for about one third of a second.
  - After the information has been encoded it enters the **short-term memory** store (also called working memory) or short-term memory, in which **rehearsal** will enable the memory to decide whether to transfer to long-term memory and be retained.
    - It may be **lost due to displacement** here.
    - Or transferred to the **long-term memory** store where **rehearsed** information is stored indefinitely, or **lost** due to decay.
- Information is then **retrieved** from the long-term memory into the **short term memory** when needed, where it will be acted upon.
- For example, a coach shouts 'accelerate' onto a take-off board, following a jump where the athlete took off from the runway. This instruction is received by the auditory sense, is converted into a code form, enters the working memory and is acted upon.
- On the next jump, the athlete retrieves this instruction (from the long-term memory store) and accelerates onto the take-off board.
- Another scenario could be that this information has not been **repeated or rehearsed sufficiently** to reach the long-term memory store and so is forgotten.

- 14) Compare the advantages and disadvantages of the usage of the Atkinson Shiffrin and Craik Lockhart memory models, paying attention to the sporting applications.

10 marks

**Answer:**

*Atkinson and Shiffrin's memory model:*

**Advantages:**

- Research into memory has helped doctors diagnose problems and disorders to patients for many years.
- This is a **simple** and straightforward model which helps understanding.
- It explains that people with brain damage do have **separate regions of the brain** corresponding to the model.
- Those with amnesia appear to **distinguish** between short-term and long-term memory.

**Disadvantages:**

- This model was developed in a very **artificial** (laboratory) environment and so may not suitable as a memory model for sports.
- This model is **too simple** as it does not explain why we remember different types of information.
- It does not explain why an athlete **remembers some activities**, but **not others** depending on the context.
- For example, an athlete remembers a good demonstration as opposed to the verbal description given by the coach.
- This model does not effectively explain the **difference** or interaction between short-term and long-term memory.

*The Craik and Lockhart's memory model:*

**Advantages:**

- This model has a **non-structured** approach.
- The basic idea is that memory is really **just what happens** as a result of processing information.
- This model explains why we might remember **meaningful information** rather than random information.
- There is **no clear distinction** between short-term and long-term memory.
- And so that **complex information** is the key to memory.
- Its strength lies in the **processes** involved in memory.
- For example, an experienced coach knows how to drill in good practice because they have a clear understanding of the development and delivery of relevant coaching points.
- This model explains why the longer we consider information, the more likely it will be remembered, as **memory recall of stimuli** is a function of mental processing which ranges from shallow to deep.
- The deep (**semantic**) level results in a more **durable** memory trace.
- For example, the more a hurdles athlete rehearses the lead and trail leg drills, the more likely the drills will be remembered.

**Disadvantages:**

- The **longer the time** taken to process information does **not** necessarily produce a stronger memory.
- It is **difficult to explain** what is meant by **depth** of processing.
- It does not take into account **individual differences**, since some performers might forget a basic skill in spite of strenuous efforts to remember it.
- Or people who have **not deeply processed a skill** are sometimes able to **repeat complicated tasks** without prompting.
- Participants typically spend a **longer time** processing the **deeper** or more difficult tasks.
- Both models attempt to explain how memory works, but they don't describe the **reality** of the brain's structure.
- Which is a very complicated mixture of cells with a variety of functions, which can again **change** according to needs and demands.
- In sporting terms, neither model will explain how a sportsperson like Andy Murray can interpret and act upon items in the court and anticipate his next stroke with the speed he can summon.
- Or how Gareth Bale can read the play of an opposing team and place himself on-side and in a position to score from a pass made by a member of his own team.