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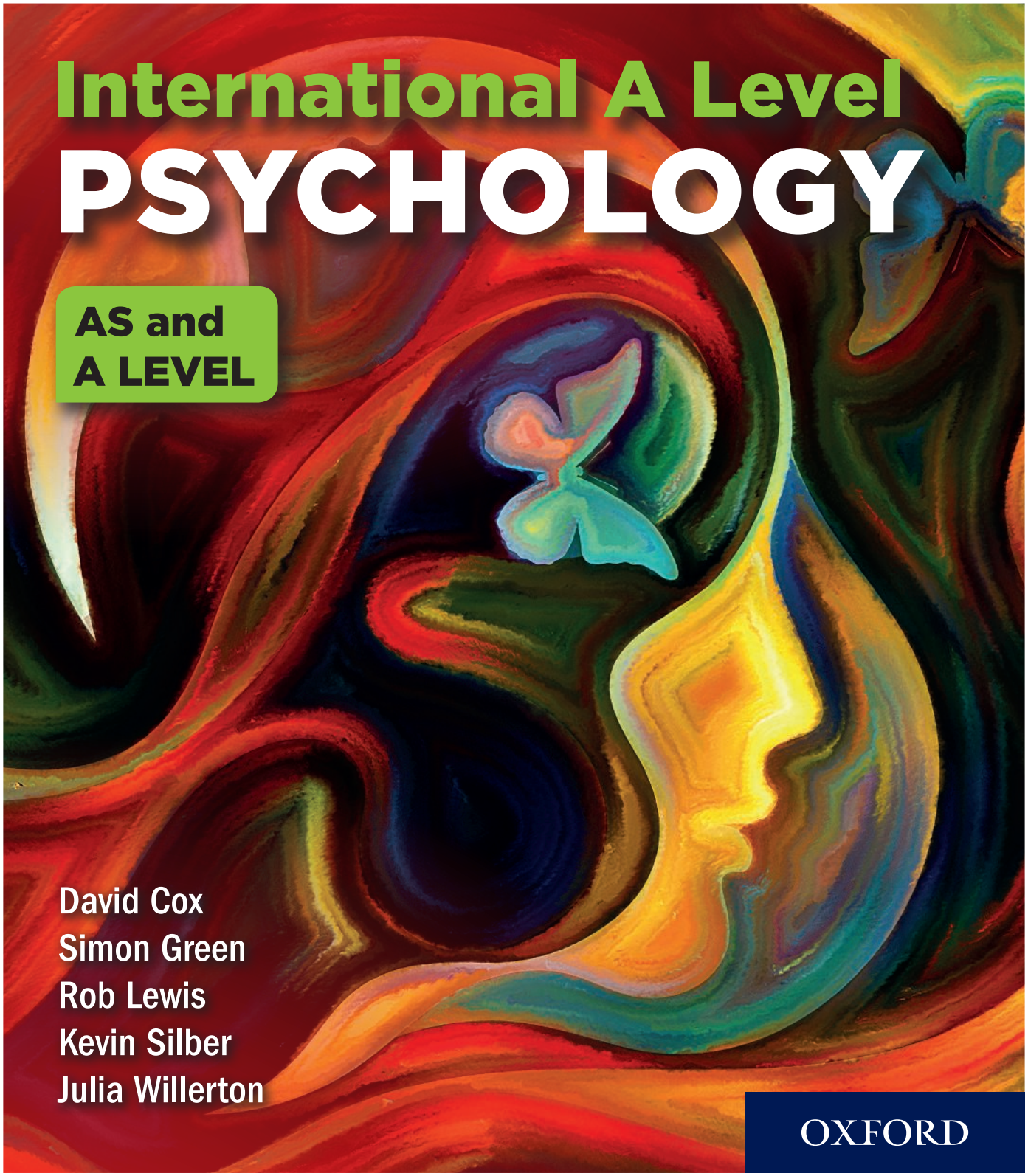

International A Level PSYCHOLOGY

AS and
A LEVEL

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OXFORD

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How to use this book

This book was specifically written for the Oxford AQA International AS & A Level Psychology syllabus. Students taking the AS level course will only be required to study Parts 1 and 2, while those taking the A Level course will need to cover the whole content of this book.

To help you get the most of your book, here is an overview of its key features:

KEY STUDY

Certain research studies are described in detail. All studies mentioned in the AQA specification are provided as 'key studies'.

THINKING SCIENTIFICALLY

'Thinking scientifically' features contain important information about how to evaluate key studies.

Link

Link boxes appear throughout the book and link to further information on topics.

Research methods link

Link boxes appear throughout the book and link back to the **Research methods** sections.

Key term

These are the terms given on the specification that you will need to be able to define and understand.

ACTIVITIES

Short activities for home or the classroom aim to develop your understanding of the subject.

PRACTICAL ACTIVITY

A suggestion for a practical investigation is included at the end of each chapter.

EXAMPLE EXAM QUESTION

Example exam questions are given throughout the book on the full range of topics.

Exam hint

Exam hints accompany example exam questions, giving you expert guidance on what to look out for.

Exam focus

At the end of every chapter there is an example exam question, model student answers, and examiner feedback.

Models of memory

Many of the things of interest to cognitive psychologists are not directly observable. For example, whilst we directly experience the results of our memory – we remember what we went to the supermarket for, we use the functions on our mobile phones effortlessly – we cannot see how our memory system is organised to enable such complex behaviours. What cognitive psychologists do in these circumstances is to develop models of how things might work.

Models provide a very useful way of viewing things that we actually cannot see. A basic model is constructed after careful consideration of existing evidence, and then further research is conducted to test the assumptions of this model. As a result of this testing the model is either supported, updated, or even discarded in favour of one that better fits the evidence. This can be seen in the development of our understanding of the structure of memory. The multi-store model of memory was a development from an earlier idea that there was a primary memory for temporary conscious thoughts and a secondary memory for more permanent storage of thoughts. As our understanding of the complexity of human memory increases, so our models of memory change to accommodate these complexities. For instance, over time, deficiencies in the multi-store model saw new models developed, including the working memory model, an alternative to the multi-store model's short-term memory store. We will look at two of the most influential models of memory next – the multi-store model and the working memory model.

The multi-store model of memory

The multi-store model of memory is the most well-known and influential model of memory, proposed by Atkinson and Shiffrin in 1968. They saw memory as a flow of information through a system divided into a series of interacting memory stores (see Fig. 1.1.1). Each store has a different purpose, and each varies in terms of its **coding**, **capacity**, and **duration**.

Key terms

Coding: changing the format of information for use in memory (also referred to as encoding).

Capacity: the amount of information that can be held in memory.

Duration: the length of time information remains in memory.

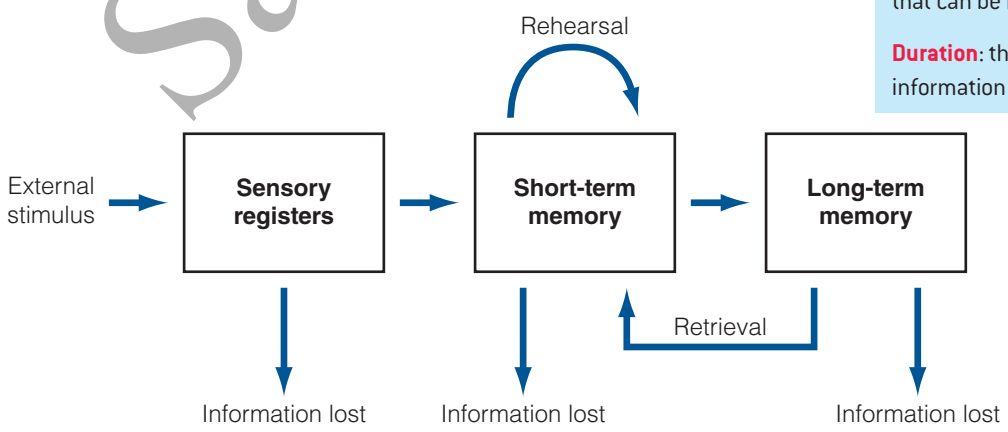

Fig. 1.1.1 The multi-store model of memory

Exam hint

It is a really good idea to learn the diagram for the multi-store model. You can draw this in your answer, and it is a great aid to memory. There are enough features in the diagram to get full marks for a description, but don't just focus on the structure – be sure to mention processes too, for example rehearsal.

EXAMPLE EXAM QUESTION

Outline the main features of the multi-store model of memory. (4 marks)

Key term

Sensory register: a store of sensory information that lasts no more than a few seconds.

Sensory registers

Information enters the system from the environment through our senses. Everything we hear, see, touch, taste, and smell enters sensory memory. There are actually several stores in sensory memory, called **sensory registers**. Each register deals with information from a particular sense, for example there is the iconic register (vision), the echoic register (sound), and the haptic register (touch). These are *passive* stores, in that we cannot control what enters sensory memory, nor can we consciously control their functioning. The sensory registers are constantly bombarded with information, far more than the later memory stages can handle, so it has a mechanism for selecting the relevant sensory information and discarding the rest. This is called *attention*. Whilst sensory registers have a relatively large capacity, information is stored only briefly and in a relatively unprocessed form (i.e. there is limited encoding). Research has shown that sensory information that does not receive attention has a duration of a few seconds at most. Information that is the focus of attention is transferred to the next memory store.

Iconic register

'Icon' is another word for image or picture. The iconic register therefore refers to our memory for visual information. It has received the most research interest not only because it is relatively straightforward to investigate, but also because it is through vision that we receive most of our sensory information about the world. It has been claimed that the purpose of the iconic store is to allow us to integrate and make sense of the mass of visual sensations we receive so that our perception is of a smooth and continuous visual experience. You can use an analogy of a cartoon film to understand this. Cartoons are constructed of a large number of slightly varying still images. The scene would make no sense by looking at each still in turn, but when presented in quick succession we perceive a continuous moving scene. We do not see a jerky sequence of movements nor the blank space that must occur between stills – at least not in good quality cartoons! Our iconic register works in a similar way, ensuring that our visual experience is not a jumbled set of disconnected images.

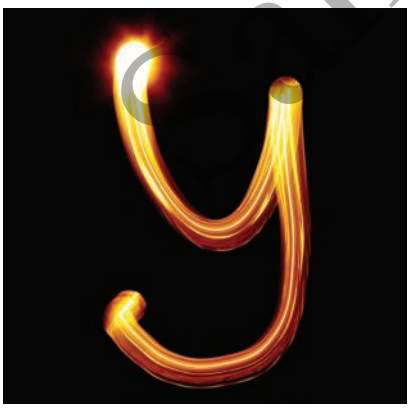

Fig. 1.1.2 This image is created by waving a torch in a dark room. You could create your own easily enough.

ACTIVITY 1.1.1

Take a torch into a very dark room. If you move your arm fast enough you can actually create visual images of letters. These letters are not physically out there. They are formed because sensory memory holds onto visual information, or an *icon*, for a brief period after the visual image has gone. The image (light) has moved in space so we are remembering all the previous locations of the light. You will notice that the letter you trace will disappear very quickly. In fact, you might have to concentrate quite hard to see it at all. This reflects the very limited duration of information in iconic memory.

KEY STUDY: SPERLING'S EXPERIMENTS INTO ICONIC MEMORY

Atkinson and Shiffrin based their assumptions about iconic memory on the findings of previous research, in particular that of Sperling (1960). In his experiment, Sperling very briefly displayed to his participants visual arrays containing three rows of letters (see Fig. 1.1.3). He found that participants could only recall four or five of the letters from the 50 millisecond (0.05 second) arrays, but reported being aware of more letters that they could not report. Sperling assumed that, because visual information was only available for a very short time, it faded in memory before participants could recall it. Sperling conducted a further experiment to investigate this, using what he called a partial report procedure. He trained participants to recognise three tones – a high tone related to letters on the top row of the display, a medium tone related to the middle row, and a low tone related to the bottom row. Once participants had learned this, Sperling once again presented them with a series of displays for 50 milliseconds each, this time along with a tone, cueing participants to a particular row. He found that participants recalled on average 75 per cent of the letters in the cued rows, a much better percentage than for the whole array.

M	N	J	C
N	X	K	V
F	L	B	P

Fig. 1.1.3 An example of the Sperling visual array

According to Sperling this improved performance because a row contained fewer items than the whole display, therefore there was less decay of information from memory before participants had to recall it. Recall was not 100 per cent however, even though participants only had to remember a small amount of information immediately after being shown it. Sperling saw this as evidence that not only does iconic memory have a very limited capacity, but that information decays and is lost very rapidly.

Research methods link

You can read more about the advantages and disadvantages of laboratory experiments on page 157–8.

THINKING SCIENTIFICALLY: THE COSTS OF HIGH CONTROL

Sperling's study is an example of a laboratory experiment. The advantage of a laboratory experiment like this is that there is a high level of control, allowing other researchers to *replicate* the findings (as indeed they have). Whilst this gives the results greater *reliability*, it comes at a cost. Such experiments use stimuli and environments that are quite artificial, in that they do not accurately reflect how we use memory in everyday circumstances. Some psychologists argue that this reduces the validity of the findings. This is an example of what frequently happens with tightly controlled psychological experiments – greater reliability comes at the cost of reduced *validity*.

Echoic memory

Echoic memory is the sensory register for auditory information. Research by Darwen et al. (1972) and others suggests that the length of time information is stored in echoic memory is about three seconds. This is much longer than the 0.5 seconds that information in iconic memory lasts. According to Cowan (1984), echoic memories last longer because of the important role language (and thus the sound of language) plays in communicating with others and understanding the world around us.

Darwen et al. (1972) conducted a study similar to Sperling's, but using auditory rather than visual stimuli. Participants were presented with spoken recordings of letter and number lists. The lists were presented over headphones so that it seemed to participants that one list came from the left, one from the right, and a third from behind. After hearing the lists participants were given a cue to recall one of the three lists. The length of time from the presentation to the cue varied between 0 and four seconds. The cue should have made the task easier as then participants only had to recall a list from a particular direction. Darwen et al. found that as the time between presentation and cue increased, the recall performance of participants decreased. After a three-second delay, participants performed no better than they would have without cues.

Further testing showed that performance did not significantly improve when participants were cued to recall either letter or digit lists. To do this task successfully, some analysis of the meaning of the auditory information would have been needed (that is, participants would need to distinguish a letter from a number). This finding suggests that auditory information in echoic memory is simply held there momentarily in an unprocessed 'raw' form before it is transferred for further processing.

Short-term memory

Key term

Short-term memory (STM): a temporary memory store that holds limited amount of information for a short period of time.

Information that is selected from sensory memory by the attention system is transferred to **short-term memory (STM)**. This is a temporary holding area, and can be thought of as a kind of immediate memory – the part of the memory system that holds all the information an individual is consciously thinking about at any one time. Atkinson and Shiffrin identified a number of important characteristics of STM, including its limited capacity, short duration, and acoustic encoding. Anyone who has used a telephone will be aware of these characteristics. When you look up a number you have to repeat (or rehearse) it until it is used, otherwise it 'disappears' (short duration). If the number is too long you end up remembering the latter numbers in the string but forgetting the earlier ones (limited capacity). You almost certainly verbalised the whole process too, repeating the numbers out loud or in your head (acoustic encoding).

ACTIVITY 1.1.2

Try working out these problems in your head – do not write anything down or use a calculator:

$4 + 9 =$
$6 + (17 \times 3) =$
$7 + 2 + (8 \times 46) =$

It is likely that you had no difficulty with the first problem; the second problem was a bit more challenging, but quite possible; the last problem almost certainly tested you beyond the limits of your STM.

This kind of activity demonstrates the limited capacity of STM and shows that we can only hold and manipulate a small number of items at any one time.

Capacity of STM

STM has limited storage space. This was an early discovery by Jacobs in 1887. He used a digit span technique, which involved presenting participants with sequences of letters or digits at half-second intervals that then had to be recalled in the correct order. He started by presenting three-item sequences, increasing the sequences by one item until participants were unable to recall the sequence correctly. He repeated this process over a number of trials until he established the average number of items that a participant could recall – this was their digit span. Jacobs found that the participants recalled on average between five and nine items.

However, the term 'item' is very vague. For example, Jacobs found that digits were recalled better than letters (9.3 items as opposed to 7.3 items). Miller (1956) suggested that while STM is indeed limited to 'seven plus or minus two', capacity is determined by the number of 'chunks' of information rather than the number of individual letters or numbers.

ACTIVITY 1.1.3

Read the following list of items quickly and once only, then cover them up and write them down in the same order as they appear.

1234 2016 1845 1963

How did you do? You may have found this difficult – the number of digits is beyond the normal short-term memory span of five to nine digits. Note that there are 16 individual digits (or items) in this list, but because they were grouped together to create more meaningful 'chunks' (they resemble dates), you were able to expand the capacity of STM.