UNIT 1

Approaches in Psychology

▲ Approaches in psychology were once called 'schools of thought', they embody a shared set of assumptions about human behaviour and the methods appropriate to its study. Adherents of any approach hold assumptions about the causes of behaviour and use a common set of concepts when giving an explanation. They also tend to use a common set of research methods.

The specification for AS Unit 1

PY1 20% 1¼ hours Approaches in Psychology	
Exam: **Candidates answer five compulsory questions on psychology.**	Four major psychological approaches form the basis of Unit 1. Candidates must be able to: ▶ Outline the main assumptions of each approach. ▶ Describe one theory and one therapy linked with each approach. ▶ Evaluate the strengths and weaknesses of each approach. ▶ Explain and evaluate the methodology used by each approach. ▶ Compare and contrast in terms of similarities and differences with other approaches. **Biological approach**: Selye's general adaptation syndrome (GAS) and psychosurgery or chemotherapy. **Behaviourist**: Social learning theory of aggression, aversion therapy or systematic desensitisation. **Psychodynamic**: Freud's theory of personality development and dream analysis or free association. **Cognitive**: Attribution theory and cognitive behavioural therapy (CBT) or rational emotive therapy (RET).

Health warning

The exam information given on this spread is correct at the time of writing. However exams evolve and there are often changes. We have a website (www.folensblogs.com/psychcompanion/blog/) where you can find any updates, as well as the official WJEC site (www.wjec.co.uk).

COMMENTS ON THE SPECIFICATION AND ORGANISATION OF THIS CHAPTER

In this part of your AS Psychology course you are going to study different approaches that psychologists use to explain behaviour. To help you understand the approaches, you will look at specific examples of the named approaches. For example, in order to study the biological approach you are going to look at Selye's GAS model, which is used to explain stress.

The first four chapters of this book deal with each of the approaches named in the specification – the biological, behaviourist, psychodynamic and cognitive approaches.

For each approach the following topics are covered

Spread 1: Assumptions We start each chapter by describing three key assumptions of the approach. As you read the rest of the chapter, you will see these assumptions 'in action' in the theory and therapy that are covered.

Spread 2: Theory The specification identifies one theory for each approach. This is covered on one double-page spread. You do not need to be able to evaluate this theory.

Spread 3 and 4: Therapy Two therapies for each approach are covered but you need to study only one of these. Again, each therapy is covered on one double-page spread.

Spread 5: Strengths and weaknesses For each approach, you also need to understand the strengths and weaknesses of the approach. In the AS exam you will never be asked to evaluate the theory or therapy, you will only be asked to evaluate the general approach. However, you will be asked to compare and contrast the approaches, so we consider this on the spread that evaluates each approach.

Spread 6: Methodology Two methods that are typical of the approach are explained and evaluated.

In addition, in each chapter there are the following elements.

Can you? questions On each spread you will find 'Can you?' questions, prepared by a senior examiner to help you focus on the content of the page in a way that will help you answer exam questions.

Do it yourself activities These will help you gain a deeper understanding of the topic.

End of chapter review This includes a diagrammatic summary of the chapter, a page of revision activities and exercises, and student answers to typical exam questions plus an examiner's comments.

PY1 – Approaches in psychology

This is what a typical set of questions will look like in the AS Unit 1 exam. The questions always follow the same pattern, e.g. question 1(a) is about two assumptions of one approach. All that changes is the theory/therapy/approach.

1 hour 15 minutes (60 marks)

Answer all questions.

1. *(a)* **Outline** two assumptions of the behaviourist approach. [4]
   (b) **Describe** the social learning theory of aggression. [8]
2. **Describe** how the biological approach has been applied to either Psychosurgery or Chemotherapy. [12]
3. *(a)* **Evaluate** two strengths of the cognitive approach. [6]
   (b) **Evaluate** two weaknesses of the cognitive approach. [6]
4. **Compare and contrast** the biological and psychodynamic approaches in terms of similarities and differences. [12]
5. **Explain and evaluate** the methodology used by the psychodynamic approach. [12]

The **biological approach** aims to explain all behaviour and experience in terms of physical bodily processes. For example, when you feel stressed this usually involves a sensation of your heart pounding, your palms being sweaty and so on. These are physical symptoms created by activation of the nervous system. Your experience of stress is caused by biological processes. The nervous system is divided into the **central nervous system (CNS)** and the **autonomic nervous system (ANS)**, which is further subdivided into the **sympathetic** and **parasympathetic** branches. The CNS comprises the brain and spinal cord, containing about 12 billion nerve cells (neurons).

Assumption 1 Behaviour can be explained in terms of different areas of the brain

Many different areas of the human brain have been identified that are specialised for certain functions. The **cerebral cortex** covers the surface of the brain like a tea-cosy, and is much folded and grey in colour. This is the region of the brain responsible for higher cognitive functions. The cerebral cortex is divided into four lobes. The most important is the **frontal cortex** or **lobe** is responsible for fine motor movement and thinking. Other lobes include the occipital lobe, which is associated with vision.

Underneath the cortex there are various **subcortical** structures, such as the **hypothalamus**, which integrates the ANS (important in stress and emotion).

Assumption 2 Behaviour can be explained in terms of neurotransmitters

Neurons are electrically excitable cells that form the basis of the nervous system. The flexibility of the nervous system is enhanced by having many branches at the end of each neuron (called *dendrites*) so that each neuron connects with many others. One neuron communicates with another neuron at a **synapse**, where the message is relayed by chemical messengers (**neurotransmitters**). These neurotransmitters are released from **presynaptic vesicles** in one neuron, and will either stimulate or inhibit receptors in the other neuron. The **synaptic cleft** or **gap** is about 20nm (nanometres) wide. Some common neurotransmitters are: **dopamine** (associated with rewards and also schizophrenia), **serotonin** (sleep and arousal), **adrenaline** (arousal) and **GABA** (decreases anxiety).

Assumption 3 Behaviour can be explained in terms of hormones

Hormones are biochemical substances that are produced in one part of the body (endocrine glands such as the pituitary and adrenal glands) and circulate in the blood, having an effect on target organ(s). They are produced in large quantities but disappear very quickly. Their effects are slow in comparison with the nervous system, but very powerful. Examples of hormones include **testosterone** (a male hormone) and **oestrogen** (female hormone). Some hormones such as **adrenaline** are also neurotransmitters.

DO IT YOURSELF

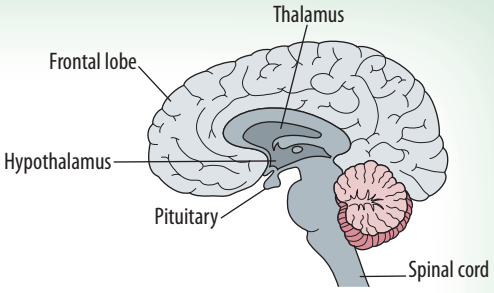
DIY No. 1.1

The brain is divided into two halves (or hemispheres), each of which has some special functions. If you perform two tasks that involve the same brain hemisphere, you should be slower at both tasks than if performing two tasks where one involves the right hemisphere and one the left. You can demonstrate this quite easily by doing the following experiment.

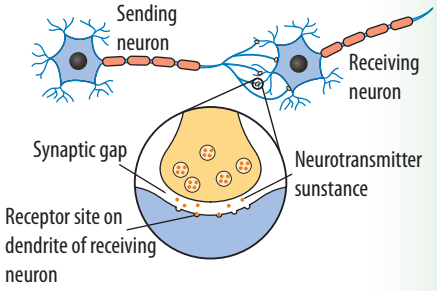
Tap your right finger while reading a page from a book (both involve the left hemisphere). And then repeat the finger-tapping with your right finger without doing any reading. On each occasion, count how many finger taps you manage in 30 seconds and compare these scores.

Genetic explanations

*The biological approach also includes genetic explanations, i.e. that certain behaviours are inherited from your parents (**nature**). Some characteristics are determined by one **gene** (e.g. eye colour), whereas for most characteristics (e.g. intelligence or mental illness), many genes are involved. Genes generally create a* predisposition *to behave in a certain way rather than* determining *behaviour, and interact with life experiences.*



▲ Some important regions in the brain.



▲ A diagram of a neuron.

CAN YOU...? No.1.1

1... Name **two** areas of the brain and provide some extra information about each.

2... Explain the function of neurotransmitters and give **two** examples of neurotransmitters.

3... Give **two** examples of hormones and their functions.

EXAM QUESTION

Outline two assumptions of the biological approach. [4]

Notes *In the exam, you will be asked to outline **two** assumptions of **one** of the four approaches. The question will be worth 4 marks. You should structure your answer in the following way.*

- *Identify one assumption.*
- *Explain/detail this assumption.*
- *Identify a second assumption.*
- *Explain/detail this assumption.*

Selye's GAS model

Stress is a good example of a behaviour that is explained using the **biological approach**. 'Stress' describes the way you feel when under pressure – when the perceived demands of a situation are greater than your perceived ability to cope, particularly when these demands are seen as endangering your well-being in some way. For example, a person who has built up an exam into something that is incredibly demanding and yet knows that he or she has done very little revision, will experience stress, *but only if* failing the exam will result in pretty unpleasant consequences for him or her.

The stress response is important to the survival of an animal because the bodily changes associated with stress are essential in conditions of fight or flight (i.e. attacking or running away). Without your stress response, you are in danger of being run over by a car or being attacked by an angry dog.

Much of our understanding of the nature of stress can be traced back to the pioneering work of Hans Selye, described on this page. He coined the use of the word 'stress' in this context, a practice extended to other languages where the same word is in use – *le stress* in French, *der Stress* in German, and so on.

▲ Modern humans face very different stressors to those faced by early humans, yet are equipped with the same stress response, which may not always be **adaptive**.

DO IT YOURSELF

DIY No. 1.2

What happens when you feel stressed?
You have probably had the experience yourself many times – a racing heart, sweaty palms and a dry mouth. These are all characteristic changes of the stress response. Did you know, for example, that one of the selective advantages of sweating when faced with danger is that it makes the body slippery and more difficult to catch hold of!

The biological explanation for this is that the perception of a threat (stressor) arouses a part of your nervous system – the **sympathetic nervous system** – that produces adrenaline so you are ready for fight or flight.

Test out your own stress responses. Arrange for volunteers to engage in mildly stressful tasks, such as giving a presentation to the class or doing the particularly frustrating *Stroop task* (see faculty.washington.edu/chudler/words.html).

Take physiological measurements before, during and after (called **repeated measures**), e.g. pulse rate, size of pupils (when aroused they are dilated), dryness of mouth, sweat (check underarms!) and perhaps even blood pressure if you have a blood pressure monitor. For example, calculate mean heart rate for your volunteers and represent it on a graph.

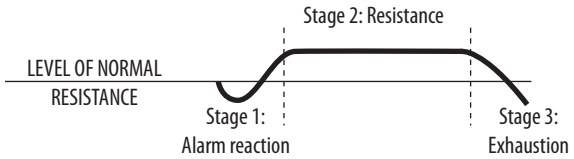
- Analyse your findings by producing some graphs.
- You could also ask participants to produce a subjective report of their sensations. Were there any changes over the three phases?
- Did people's subjective reports match their physiological data?
- Did you find individual differences in your volunteers? For example, were males more or less stressed than females?
- What did you learn about the stress response from this activity?

THE GAS MODEL

Selye's (1936, 1950) research, such as the study on the facing page, led him to conclude that when animals are exposed to unpleasant stimuli, they display a universal response to all stressors. He called this the **general adaptation syndrome** (**GAS**).

- It is 'general' because it is the same response to all agents.
- The term 'adaptation' is used because it is adaptive – the healthiest way for the body to cope with extreme stress.
- It is a 'syndrome' because there were several symptoms in the stress response.

Selye proposed three stages that lead up to illness, thus linking stress and illness – stress results in a depletion of physiological resources, which lowers the organism's resistance to infection.



Stage 1: Alarm reaction

The threat or stressor is recognised and a response is made to the alarm. The **hypothalamus** in the brain triggers the production of **adrenaline** from the **adrenal glands** (which lie on top of the kidneys). Adrenaline causes sensations that are often labelled an 'adrenaline rush' – increased heart rate, sweaty palms, fast breathing and so on. This leads to readiness for 'fight or flight'.

Stage 2: Resistance

If the stress continues, then it is necessary to find some means of coping. The body is adapting to the demands of the environment, but at the same time resources are gradually being depleted. The body appears to be coping whereas, in reality, physiologically speaking, things are deteriorating.

Stage 3: Exhaustion

Eventually the body's systems can no longer maintain normal functioning. At this point, the initial symptoms may reappear (sweating, raised heart rate, etc.). The adrenal glands may be damaged from previous over-activity, and the **immune system** may not be able to cope because production of necessary proteins (e.g. **cortisol**) has been slowed in favour of other needs. The result may be seen in stress-related illnesses such as ulcers, depression, cardiovascular problems and other mental and physical illnesses.

*The **adrenal glands** are where **adrenaline** is produced. They are located at the top of each kidney.*

*The **immune system** is designed to defend the body against the millions of antigens (i.e. bacteria, viruses, toxins and parasites) that would otherwise invade it. These things are usually prevented from entering your body in large numbers when your immune system is working, but the moment your immune system stops functioning properly, the door is wide open.*

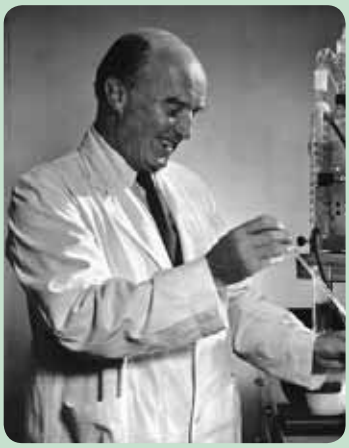
MEET THE RESEARCHER

Hans Selye (pronounced sell-yeh) was born in Hungary but spent most of his working life in Canada. He came from a family of physicians, and trained as a medical doctor in Prague. His work as a doctor led him to observe that people who were sick all shared certain signs and symptoms, the first step to his recognition of the concept of 'stress'.

In Canada he was in charge of a large research lab, with 40 assistants and 15000 lab animals. One of his colleagues recalled the energy and dedication he displayed – typically he would rise at 5.00am, take a dip in his pool at home, and then cycle some 10km to his lab, where he would then work for up to 14 hours. He rarely had days off, and went in to work at weekends and on holidays.

The end result was a formidable list of publications – more than 1700 research papers and 40 books. He was nominated several times for a Nobel prize for the enormous contribution he made to our understanding of stress.

▼ Hans Selye 1907–1982



HANS SELYE'S RESEARCH WITH RATS

Aims and context

Selye worked in a hospital and noted that all hospital patients shared a common set of symptoms (aches and pains, loss of appetite) no matter what was actually wrong with them. Later, when conducting research on the effects of hormones using rats, Selye (1936) again noticed this 'generalised' response. No matter what substance the rats were injected with, they always produced a similar response. He suggested that there was one internal mechanism for dealing with 'noxious agents' – which he called 'stressors'. The aim of this study was to test this hypothesis.

Procedures

Rats were exposed to various noxious agents: cold, surgical injury, production of spinal shock (cutting the spinal cord), excessive muscular exercise, or intoxications with sublethal doses of diverse drugs (adrenaline, morphine, formaldehyde, etc.).

Findings and conclusions

A typical syndrome was observed, the symptoms of which were independent of the nature of the damaging agent or the type of drug employed. This syndrome develops in three stages.

1. During the first stage (first 6–48 hours), all stimuli produced the same physiological triad:
   a) enlargement of the adrenal glands
   b) ulcers (open wounds) in the digestive system (stomach, intestines)
   c) shrinkage of the immune system.
2. If the treatment was continued, the appearance and function of the internal organs returned practically to normal.
3. With continued treatment, after one to three months (depending on the severity of the damaging agent) the animals lost their resistance and displayed the symptoms of the *physiological triad* seen in the first stage.

The results support the 'doctrine of non-specificity', that there is a non-specific response of the body to any demand made upon it. Selye suggested that the responses observed in rats to noxious agents might be similar to general defence reactions to illness.

CAN YOU...? No.1.2

1... Select **one** assumption of the biological approach from page 3 and explain how this relates to the GAS model.

2... Find out where your adrenal glands are located and draw a diagram to illustrate this.

3... Write a brief summary of Selye's classic study on stress including one sentence about each of the following:

a) aims and context

b) procedures

c) findings and conclusions.

4... Explain why the GAS model is adaptive.

5... Write **one** sentence to explain each stage of the GAS model.

6... Now write **two** further sentences for each stage so you have a full description of the model.

7... Select **two** other key points that you could mention related to the GAS model.

EXAM QUESTION

Describe Selye's GAS model. [8]

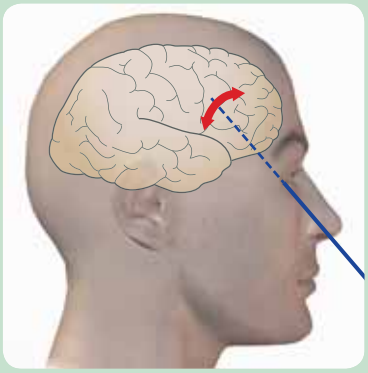
Notes *In the exam, you will be asked to describe **one** of the four theories you have studied (there is one theory for each of the four approaches). This question will be worth 8 marks. In order to gain the full 8 marks your answer should:*

- *Be accurate and well detailed.*
- *Show evidence of coherent elaboration, i.e. each point you make should be explained to demonstrate your understanding.*
- *Display a depth and range of knowledge, though not necessarily in equal measure. This means that you can either cover a few points in considerable detail (i.e. depth) or cover a number of points in less detail (range).*
- *Be well-structured and coherent.*
- *Have accurate grammar, punctuation and spelling.*
- *Be about 250–300 words in length.*

Therapy 1 Psychosurgery

On this spread and the next we look at two further examples of the **biological approach** in psychology. Both are examples of biological therapies that are used to treat mental disorders. On this spread, we look at **psychosurgery**, and on the next we will look at **chemotherapy**. You are required to study only one of these.

Views on psychosurgery tend to be extreme. There are those who are strongly in favour of this approach, and those who are vehemently against it, regarding it as nothing more than 'brain butchery'. However, it is important to remember that severe mental illness is also extremely disabling. Our society uses words like 'malignant' to describe cancer, but severe mental illness is possibly the most malignant disease you can have. Is it better to use methods that bring relief only sometimes and risk disastrous side effects, or to learn to tolerate mental problems?



▲ In the 1940s and 1950s, it was common to perform a lobotomy on patients with mental illness to control aggressive symptoms. One form of lobotomy – a transorbital lobotomy – was performed by inserting a sharp instrument into the brain through the eye socket. The prefrontal cortex, lying at the front, is thus damaged and this was thought to reduce aggressive behaviour.

HISTORY OF PSYCHOSURGERY

▲ Skull showing evidence of trepanning.

Psychosurgery goes back to the ancient practice of *trepanning* or *trephining*. Holes of about 4cm in diameter were cut in the skull of a living person using a sharp knife or special circular drill. The aim was to release evil spirits. The practice was common in Ancient Greece and Rome and into the Middle Ages in Europe, but it is much older than that – skulls dating back 40 000 years have been found showing signs of trepanning (Sabbatini, 1997).

In the 1940s and 1950s, a new form of psychosurgery was pioneered by Egas Moniz (see right). He heard about research where monkeys with aggressive tendencies were subdued after their **frontal lobes** were removed. He developed a similar operation for humans and was awarded the Nobel prize in 1949 for his work.

This method was popularised in the USA by Walter Freeman, who used the 'ice-pick technique', hammering an ice-pick into a patient's tear duct and wiggling it around to sever connections between the **prefrontal cortex** and the brain.

It is estimated that up to 50 000 lobotomies were performed, but ultimately the extreme side effects were recognised and the advent of **psychoactive drugs** for the treatment of mental disorders meant that the operation became unfashionable. Psychosurgery today is quite a different procedure.

PSYCHOSURGERY

Psychosurgery is a surgical procedure that is performed on the brain with the aim of treating mentally disordered behaviour. The term is not used in cases where there is a known organic cause of disturbed behaviour, such as when surgically removing a tumour or performing an operation to alleviate epilepsy. Psychosurgery may involve destroying sections of the brain, or, more commonly, severing fibres so that target areas of the brain are separated and 'functionally' removed.

Prefrontal lobotomy

The **prefrontal lobotomy** is a surgical procedure involving selective destruction of nerve fibres. It is performed on the frontal lobe of the brain, an area that is involved in impulse control and mood regulation. Its purpose is to alleviate some of the severe symptoms of mental illness. Initially, operations were performed on patients with *affective disorders* (i.e. various types of **depression**), other groups of patients included those with severe **obsessive-compulsive disorder** (**OCD**), and, less successfully, with **schizophrenia**. As a rule, the *severity* of the illness was a more important factor than the *type* of illness, along with consideration of how dangerous the patient was.

Moniz developed a surgical procedure called a **prefrontal leucotomy** in the 1930s. This involved drilling a hole on each side of the skull and inserting an instrument that resembled an ice-pick to destroy the nerve fibres underneath. Moniz later refined his technique by designing a 'leucotome', an instrument with a retractable wire loop that could cut into the white matter of the brain and sever nerve fibres. It was hoped that cutting into nerve pathways that carried thoughts from one part of the brain to the other, would relieve patients of their distressing thoughts and behaviours.

There is no doubt that the early practice of psychosurgery was both inappropriate and ineffective. Lobotomies had a fatality rate of up to 6%, and a range of severe physical side effects such as brain seizures and lack of emotional responsiveness (Comer, 2002). Modern psychosurgery is a different matter, although fundamentally the same objections could apply.

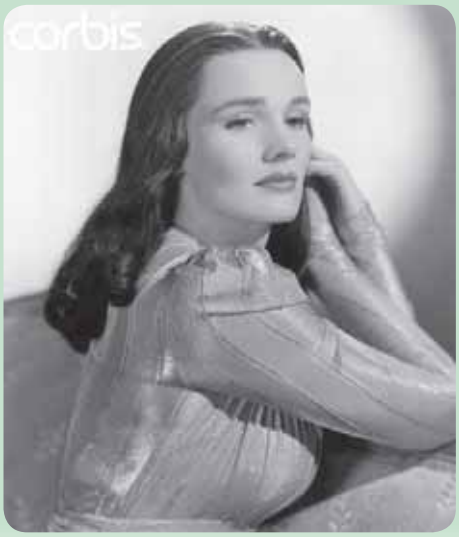
Two of the mental disorders that psychosurgery is used on are ***obsessive-compulsive disorder*** *(****OCD****) and* ***bipolar disorder****. OCD is anxiety disorder where an individual experiences recurrent obsessions – persistent ideas, thoughts, impulses and/or images that are seen as inappropriate or forbidden, and which cause intense anxiety. Compulsions develop as a means of controlling the obsessional thoughts. These compulsions are repetitive behaviours or thoughts such as repeated hand-washing. OCD can be severely debilitating.*

Bipolar disorder was previously referred to as manic-depression because sufferers oscillate between mania (being hyperactive, elated, making grandiose plans) and depression.

▶ The film *Frances* is about the Hollywood actress Frances Farmer. In the film, she is subject to a transorbital lobotomy. In real life, she did spend a number of years in a mental hospital but in fact never had a lobotomy. The film shows graphic detail of some of the horror of early lobotomies.

Recently Howard Dully (2007) produced a book called *My Lobotomy*, vividly describing his experiences as a lobotomy patient which gives disturbing insights into the whole process.

However, it is important to recognise that modern-day lobotomies are much less primitive, although the end result may be the same. For example, Mary Lou Zimmerman received psychosurgery (a cingulotomy and a capsulotomy) for untreatable OCD. Unfortunately, the operation resulted in crippling brain damage rather than a cure. Her family sued the US clinic that treated her, claiming they had not been informed of the dangerous and experimental nature of the surgery. A jury, after hearing expert witnesses, awarded her $7.5 million in damages.



Stereotactic psychosurgery

More recently, neurosurgeons have developed far more precise ways of surgically treating mental disorders such as OCD, bipolar disorder, depression and eating disorders that fail to respond to psychotherapy or other forms of treatment.

Instead of removing large sections of frontal lobe tissue, neurosurgeons nowadays use brain scanning, such as **MRI scans** to locate exact points within the brain and sever connections very precisely. The procedure is done using an anaesthetic.

In OCD, for example, a circuit linking the orbital **frontal lobe** to deeper structures in the brain, such as the **thalamus**, appears to be more active than normal. The bilateral **cingulotomy** is designed surgically to interrupt this circuit. Surgeons can either burn away tissue by heating the tip of the electrode, or use a non-invasive tool known as a *gamma knife* to focus beams of radiation at the target site.

In a **capsulotomy**, surgeons insert probes through the top of the skull and down into the capsule, a region of the brain near the **hypothalamus** that is part of the circuit connecting this area to the cortex. They then heat the tips of the probes, burning away tiny portions of tissue.

In a general review of research, Cosgrove and Rauch (2001) reported that cingulotomy was effective in 56% of OCD patients, and capsulotomy in 67%. In patients with major affective disorder, cingulotomy was effective in 65%, and capsulotomy in 55%. However, given that the authors claimed that only about 25 patients per year are currently treated in this way in the USA, the number of patients studied is very small. Also, Bridges *et al.* (1994) have pointed out that, as a treatment of last resort, no controlled trial against a comparable treatment is possible.

Deep brain stimulation

A possible alternative to psychosurgery is **deep brain stimulation** (**DBS**), where surgeons thread wires through the skull. No tissue is destroyed. The wires, which remain embedded in the brain, are connected to a battery pack implanted in the chest. The batteries produce an adjustable high-frequency current that interrupts the brain circuitry involved in, for example, OCD. If it doesn't work, it can always be turned off. Mayberg *et al.* (2005) found that four out of six patients with severe depression experienced a striking remission after treatment involving stimulation of a small area in the frontal cortex.

There are other similar techniques, including transcranial magnetic stimulation and vagus nerve stimulation.

DO IT YOURSELF

DIY No. 1.3

Divide your class into groups. Each group should take one form of psychosurgery and prepare:

- an engaging and informative talk about that technique
- a poster display
- a handout of notes
- a quick quiz about the topic, including the answers.

Examiner hint

In order to gain the full 12 marks, your answer must provide a link between the aims of psychosurgery and the main assumptions of the biological approach.

CAN YOU...? No. 1.3

1... Explain what psychosurgery is.

2... Outline the historical development of psychosurgery.

3... Briefly describe **three** different psychosurgery techniques.

4... Outline **two** findings from research studies and state what conclusion can be drawn from each of these studies.

EXAM QUESTION

Describe how the biological approach has been applied to either psychosurgery or chemotherapy. [12]

Notes *In the exam, you will be asked to describe **one** therapy. In total you will have studied four therapies (one for each of the four approaches). This question will be worth 12 marks. In order to gain the full 12 marks, your answer should satisfy the same criteria as those listed on page vii. You might include the following in an answer about psychosurgery.*

- *A brief outline of the aims of psychosurgery and how these link with the assumptions of the biological approach.*
- *The historical development of psychosurgery.*
- *Examples of how psychosurgery has been used.*
- *Research findings into psychosurgery.*
- *Your answer should be about 400–450 words in length.*

Therapy 2 Chemotherapy

Chemotherapy is the term used to describe the use of **psychoactive drugs** to treat mental disorders. 'Psychoactive' refers to drugs that affect psychological, as opposed to physical, conditions. In other words, drugs that treat, for example, **depression** rather than drugs that treat viral infections. A quarter of all the medication prescribed through the National Health Service (NHS) consists of psychoactive drugs – drugs that modify the working of the brain and affect mood and behaviour (SANE, 2009).

Such drugs were first developed in the 1950s, and revolutionised the treatment of mental disorder because they controlled many of the symptoms of serious disorders (such as hallucinations or crippling depression), enabling patients to conduct relatively normal lives. The use of these drugs is not restricted to adults. In 2003, it was estimated that more than 40 000 children and teenagers in the UK were taking drugs for the treatment of depression.

On the previous spread, we looked at **psychosurgery**, another technique used by the biological approach. The alternative is for you to study chemotherapy, discussed on this spread. You are required to study only one of these.

Schizophrenia

Schizophrenia is characterised by a profound disruption of thought and emotion, which affects a person's language, perception, affect, and even sense of self. The symptoms of schizophrenia are typically divided into positive and negative symptoms. Positive symptoms are those that appear to reflect an excess or distortion of normal functions, such as hearing voices or feeling controlled by aliens. Negative symptoms are those that appear to reflect a diminution or loss of normal functions, such as reduced emotional feelings and lack of goal-directed behaviour.

THE MECHANICS OF DRUG THERAPY

Before drugs can work, they have to enter the bloodstream and travel to the brain, which is protected from substances in the blood by the blood–brain barrier. When taken by mouth, drugs are absorbed by the gut and pass into the liver. This breaks down and destroys much of the active ingredients of the drug so that less is available to cross the blood–brain barrier. If the drug is injected, it enters directly into the bloodstream, bypassing the liver. This means that a given effect can be achieved with smaller doses when the drug is injected than when it is taken by mouth.

DO IT YOURSELF

DIY No. 1.4

Divide your class into groups. Each group should take one form of chemotherapy and prepare:

- an engaging and informative talk about that technique
- a poster display
- a handout of notes
- a quick quiz about the topic, including the answers.

CHEMOTHERAPY (DRUGS)

The three main types of psychoactive drugs are antipsychotics, antidepressants and antianxiety drugs.

Antipsychotic drugs

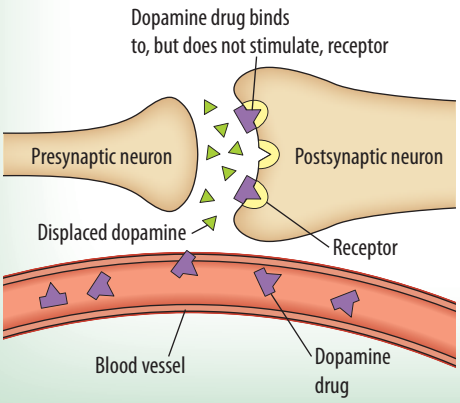
Antipsychotic drugs treat **psychotic** mental disorders such as **schizophrenia**. A patient with a psychotic mental disorder has lost touch with reality and has little insight into his or her condition. **Conventional antipsychotics** (such as *chlorpromazine*, given a brand name such as *Largactil*) are used primarily to combat the positive symptoms of schizophrenia. These drugs block the action of the neurotransmitter **dopamine** in the brain by binding to, but not stimulating, dopamine receptors (see diagram above).

The **atypical antipsychotic drugs** (such as *clozapine*, given a brand name such as *Clozaril*) act by only temporarily occupying dopamine receptors, and then rapidly dissociating to allow normal dopamine transmission. This may explain why such atypical antipsychotics have lower levels of side effects (such as *tardive dyskinesia* – involuntary movements of the mouth and tongue) compared with conventional antipsychotics.

Antidepressant drugs

Depression is thought to be due to insufficient amounts of neurotransmitters such as **serotonin** being produced in the nerve endings (**synapse**). In normal brains, neurotransmitters are constantly being released from the nerve endings, stimulating the neighbouring neurons. To terminate their action, neurotransmitters are reabsorbed into the nerve endings and are broken down by an enzyme. Antidepressants work either by reducing the rate of reabsorption, or by blocking the enzyme that breaks down the neurotransmitters. Both of these mechanisms increase the amount of neurotransmitter available to excite neighbouring cells.

The most commonly prescribed antidepressant drugs are **selective serotonin reuptake inhibitors** (**SSRIs**) such as *Prozac*. These work by blocking the transporter mechanism that reabsorbs serotonin into the presynaptic cell after it has fired. As a result, more of the serotonin is left in the synapse, prolonging its activity and making transmission of the next impulse easier.



◀ The diagram shows the synapse between two neurons. **Neurotransmitters** transmit information across the synapse. Drugs are delivered via blood vessels.

Conventional antipsychotics block the action of dopamine by binding to dopamine receptors. Other drugs, such as SSRIs (see below), also work by blocking the action of nervous transmission.

Antianxiety drugs

The group of drugs most commonly used to treat anxiety and **stress** are **benzodiazepines** (**BZs**). They are sold under various trade names such as *Librium*, *Valium*, *Halcion* and *Xanax*. BZs slow down the activity of the **central nervous system**. They do this by enhancing the activity of **GABA**, a biochemical substance (or neurotransmitter) that is the body's natural form of anxiety relief. About 40% of the **neurons** in the brain respond to GABA which, when released, has a general quietening effect on many of the neurons in the brain. It does this by reacting with special sites (called GABA receptors) on the outside of receiving neurons. When GABA locks into these receptors, it opens a channel that increases the flow of *chloride ions* into the neuron. Chloride ions make it harder for the neuron to be stimulated by other neurotransmitters, thus slowing down its activity and making the person feel more relaxed.

Beta-blockers (**BBs**) are also used to reduce anxiety. They reduce the activity of **adrenaline** and **noradrenaline**, which are part of the **sympathetic nervous system**'s response to stress. BBs bind to receptors on the cells of the heart and other parts of the body that are usually stimulated during sympathetic arousal. By blocking these receptors, it is harder to stimulate cells in this part of the body, so the heart beats slower and with less force, and blood vessels do not contract so easily. This results in a fall in blood pressure, and therefore less stress on the heart. The person feels calmer and less anxious. BBs are often used by sportsmen (e.g. snooker players) and musicians to reduce arousal because sympathetic arousal may have a negative effect on performance.

Effectiveness of chemotherapy

Drug therapies are popular with patients because they are easy to use, however they may have unpleasant or even dangerous side effects. For example, antipsychotic medications lead to *tardive dyskinesia* (uncontrollable movements) in 30% of those taking the drug (Hill, 1986) and research has found that patients taking SSRIs are twice as likely to commit suicide (Ferguson *et al.*, 2005).

Drugs are also popular because they reduce the symptoms of mental disorders. This is usually assessed by giving one group of patients the drug while another group is given a **placebo** – a substance that has no *pharmacological* effects (i.e. it has no effect on the body). Patients are given medication but do not know whether it is the real thing or the placebo. This enables us to determine whether the effectiveness of the drug is due its pharmacological properties or due to something psychological (e.g. simply believing that taking the drug will make you better).

There are thousands of studies looking at the effectiveness of drugs, and many of them indicate that drugs are superior to placebos. For example Kahn *et al.* (1986) followed nearly 250 patients over 8 weeks and found that BZs were significantly superior to a placebo. However, many other studies have found little or no benefits, suggesting that many of the benefits of drugs are due to the expectation that they will improve mental health rather than their pharmacological content.

Dopamine *and* ***serotonin*** *are both neurotransmitters that have been associated with a number of behaviours. Dopamine is linked to schizophrenia. Low levels of serotonin are related to depression, and high levels have been linked to anxiety.*

Examiner hint

In order to gain the full 12 marks, your answer must provide a link between the aims of chemotherapy and the main assumptions of the biological approach.

CAN YOU...?

No.**1.4**

1... Explain what chemotherapy is, including a definition of the term 'psychoactive'.

2... Describe **two** or **three** types of psychoactive drugs, explaining how they work and what disorders they are used to treat.

3... Describe at least **two** research findings related to the effectiveness of chemotherapy.

EXAM QUESTION

Describe how the biological approach has been applied to either psychosurgery or chemotherapy. [12]

Notes *In the exam, you will be asked to describe* ***one*** *therapy. In total you will have studied four therapies (one for each of the four approaches). This question will be worth 12 marks. In order to gain the full 12 marks, your answer should satisfy the same criteria as those listed on page vii. You might include the following in an answer about chemotherapy.*

- *A brief outline of the aims of chemotherapy and how these link with the assumptions of the biological approach.*
- *Examples of different kinds of chemotherapy.*
- *Examples of how chemotherapy has been used.*
- *Research findings into chemotherapy.*
- *Your answer should be about 400–450 words in length.*

Evaluating the biological approach

You have studied two examples of the **biological approach** – one theory (the **GAS model**) and one therapy (either **psychosurgery** or **chemotherapy**). It is now time to use your understanding of the biological approach to consider its strengths and weaknesses. To help you, we have provided some additional examples of the biological approach.

▶ The biological approach sees behaviour as the consequence of biological systems, such as activity in the brain, neurotransmitters and hormones.

Strengths of the biological approach

1. Scientific approach

At the beginning of this chapter we looked at the assumptions of the biological approach, which were that behaviour can be explained in terms of the brain, **neurotransmitters** and **hormones** (i.e. biological systems). This means that biological explanations have clear variables that can be measured, tracked and examined. This enables psychologists to conduct scientific research studying these variables.

For example, psychosurgery involves functionally removing parts of the brain. Such procedures are based on earlier research that has linked areas of the brain to certain behaviours such as aggression.

In the case of chemotherapy, research has investigated the links between psychoactive drugs and the production of certain neurotransmitters (such as **dopamine**), and linked this to behaviour.

Selye exposed rats to certain noxious agents (such as drugs or extreme cold) and then observed the effects these 'agents' had on the behaviour and physiological responses of the animals.

All of these examples of research are scientific insofar as they fulfil the aims of scientific research – to conduct objective, well controlled studies and, ideally, to demonstrate causal relationships. Thus a strength of the biological approach is that it lends itself to scientific research that can then be used to support biological explanations.

2. Determinist approach

As well as being scientific, the biological approach is also **determinist**. One strength of being determinist is that if we know what 'predetermines' our behaviour, we are more likely to be able to treat people with abnormal behaviour. Psychologists seek, for example, to understand the functioning of neurotransmitters so they can predict the effects of neurotransmitters on normal and abnormal behaviour.

For instance, the neurotransmitter dopamine has been linked with the mental disorder of **schizophrenia**. The evidence comes from a number of sources. For example, the drug *amphetamine* is known to increase levels of dopamine and the large doses of the drug can cause some of the symptoms associated with schizophrenia (e.g. hallucinations). A second line of evidence comes from the drugs that are used to treat schizophrenia (**antipsychotics**), which reduce some of the symptoms and are known to reduce dopamine levels. This suggests that high levels of dopamine are causing the symptoms.

Similar research has been conducted in relation to psychosurgery. For example, **brains scans** have shown that certain areas of the brain are more active than others in patients with **OCD**. The **cingulotomy** (a form of psychosurgery) is therefore designed functionally to sever these areas in order to reduce the symptoms of OCD. The research suggests that OCD is caused by activity in these areas of the brain – a determinist explanation.

The strength of causal understandings is that they enable us to control our world. If we understand that prolonged stress causes physical illness, then we can reduce the negative effects by treating stress in the short-term. If mental illness is caused by biological factors, then we can treat mental illness using biological methods. Thus one strength of the biological approach is that it is determinist and provides explanations about the causes of behaviour so that we can use such understanding to improve people's lives.

3. Successful applications

The biological approach has led to many successful applications. For example, Selye's research had a major impact on our understanding of the link between stress and illness. It led to a large amount of other research that has demonstrated that people recover less quickly from wounds if they are stressed. Such understanding is applied in a hospital setting to reduce anxiety and stress in patients so that they recover more quickly.

The biological approach has also led to many forms of treatment for mental disorder, such as psychosurgery and chemotherapy. For example, the effectiveness of **capsulotomy** (a form of psychosurgery) in the treatment of OCD is discussed on page 7. Cosgrove and Rauch (2001) reported recovery rates of 67%, which is reasonable high.

Chemotherapy produces rather mixed results because drugs affect people differently. However, it is a particularly popular form of treatment because it is easy and enables many people with mental disorders to live relatively normal lives outside mental hospitals. For example, **bipolar disorder** (manic depression) has been successfully treated with drugs – Viguera *et al*. (2000), for instance, report that more than 60% of bipolar patients improve when taking lithium.

Weaknesses of the biological approach

1. Reductionist approach

Biological explanations reduce complex behaviours to a set of simple explanations, for example reducing the experience of stress to the action of the hormone **adrenaline**.

Reductionism is a part of understanding how systems work, but the problem is that, in the process, we may lose a real understanding of the thing we are investigating. For example, the biological approach suggests that an illness such as schizophrenia is basically a complex physical–chemical system that has gone wrong. The psychiatrist R.D. Laing (1965) claimed that such an approach ignores the *experience* of distress that goes along with any mental illness, and is therefore at best an incomplete explanation.

Furthermore, a simplified explanation may prevent us reaching a true understanding of the target behaviour.

2. Nature rather than nurture

Mental illness has multiple causes, yet the biological approach focuses on just biology (**nature**), tending to ignore life experiences (**nurture**) and psychological factors such as how people think and feel.

For example, the biological approach to explaining schizophrenia is concerned with abnormal levels of certain neurotransmitters rather than with how patients feel about their illness. The biological approach to treatment is therefore concerned with adjusting the abnormal biological systems rather than with talking to patients about how they feel.

3. Individual differences

The biological approach is a **nomothetic** approach, looking to make generalisations about people and find similarities. It tends to ignore differences between individuals. For example, when stressed, some people produce higher levels of adrenaline than others, which, in turn, affects the long-term effects of stress.

Biological research studies a few individuals and assumes that everyone's biological systems behave in the same way. In fact, research on biological systems has tended to use male rather than female participants (animals and humans) because female hormone cycles may interfere with biological research. Such research bias could, however, produce an erroneous picture of behaviour: one with a male bias. For example, Taylor *et al.* (2000) suggest that men usually react to stress with a 'fight or flight' response, but women show a 'tend and befriend' response. This gender difference is seen in many species, with females responding to stressful conditions by protecting and nurturing their young (the 'tend' response), and by seeking social contact and support from other females (the 'befriend' response).

DO IT YOURSELF

DIY No. 1.5

Compare and contrast

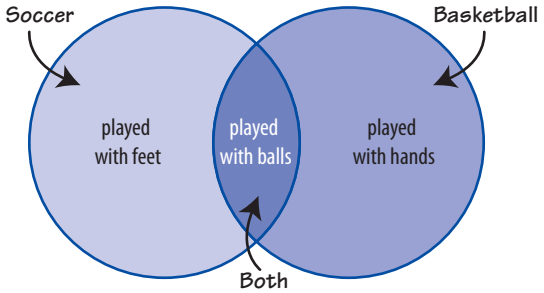
So far you have studied only one approach – the biological approach – and so you cannot compare and contrast it with the other approaches. However, you can lay the foundations for later chapters.

In the left-hand column below we have listed the issues and debates that were discussed in the introduction to this book. Some of these have been highlighted on this spread. Your task is to copy out this table and fill in the right-hand column in relation to the biological approach. We have filled in one entry for you as an example.

Issues and debates	The biological approach
Nomothetic/idiographic	
Nature–nurture	
Reductionism/holism	
Determinist/free will	Highly determinist. For example, suggests that neurotransmitters cause mental disorders such as depression and therefore chemotherapy can be used to alter or 'determine' neurotransmitter levels and reduce the symptoms of the mental disorder.
Scientific/non-scientific	
Methodology used	
Anything else	

The issues and debates listed in the table above are explained in the introduction to this book (see pages x–xi).

Compare and contrast



▲ The idea of compare and contrast is to analyse the similarities (compare) and differences (contrast) of two given ideas or things. Can you think of some other examples, such as comparing psychology and maths?

CAN YOU...?

No. 1.5

1... Identify **two** strengths of the biological approach.

2... Make **three** distinct points to explain each strength.

3... Identify **two** weaknesses of the biological approach.

4... Make **three** distinct points to explain each weakness.

EXAM QUESTIONS

Evaluate two strengths of the biological approach. [6]
Evaluate two weaknesses of the biological approach. [6]

Notes *In the exam, you are required to discuss **two** strengths and **two** weaknesses of **one** of the four approaches. For each strength and weakness, you should:*

- *Clearly identify the strength or weakness.*
- *Thoroughly explain why this is a strength or weakness in relation to the approach.*
- *Where appropriate, use examples drawn from theory/therapy to illustrate your answer.*
- *Think of each strength/weakness as being worth three marks (although, strictly speaking, this is not how they are marked).*
- *Write around 50–60 words on each strength/weakness.*

Methodology used by the biological approach

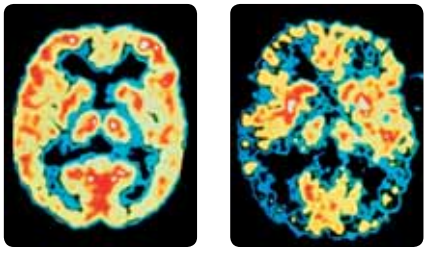
The final topic on the **biological approach** is a consideration of the methodology used by this approach. Obviously, researchers use all sorts of methods and techniques, but we have selected two that are particularly common in the biological approach – brain scanning and twin studies.

1. Brain scanning

The biological approach assumes that behaviour can be explained in terms of activity in the brain and nervous system. Therefore biological psychologists seek methods that allow them to view brain activity.

EEG – In the 1950s, the only method available for studying brain activity was the **electroencephalogram** (**EEG**). Electrodes are placed on the scalp, and electrical activity in different regions of the brain can be recorded. EEG was used in a classic study by Dement and Kleitman (1957) to detect different stages of sleep. As people go to sleep, their brain waves become slower. This can be detected by an EEG machine. During a night's sleep, this pattern occasionally changes to become very fast accompanied by the eyes darting about under closed lids. This is called **rapid eye movement** (**REM**) sleep. Dement and Kleitman woke participants up at various points during sleep and found that the participants were much more likely to report having a dream if they were awoken during REM sleep.

The development of brain scanning techiniques – In the past 30 years, much more precise methods of studying the brain have been developed.



▲ PET scans (see text) are usually shown as a coloured picture where the 'hot' colours, such as orange and red, are used to represent the areas where there is greatest activity, and the 'cold' colours, such as green and blue, represent the areas with least activity. PET scans tell us which bits of the brain are busy but not what they are doing. These PET scans show the difference between 'normal' brain activity (on the left) and that in a person with Alzheimer's disease (on the right). There is much less activity in the brain of the Alzheimer's patient.

CAT scans (Computed axial tomography) – These involve taking a series of x-rays and combining them to form a comprehensive two- or three-dimensional picture of the area being scanned. Usually, a dye is injected into the patient as a contrast material and then he or she is placed in the cylindrical CAT scan machine that takes the pictures.

Strengths: CAT scans are useful for revealing abnormal structures in the brain such as tumours, or structural damage. The quality of the images provided by the CAT scan is much higher than that of traditional x-rays.

Weakness: CAT scans require more radiation than traditional x-rays, and the more detailed and complex the CAT scan is, the more radiation exposure the patient receives. Pregnant women are unable to be scanned this way, and repeated exposure should be avoided.

MRI scans (magnetic resonance imaging) – These involve the use of a magnetic field that causes the atoms of the brain to change their alignment when the magnet is on and emit various radio signals when the magnet is turned off. A detector reads the signals and uses them to map the structure of the brain.

A classic study by Maguire *et al*. (2000) used MRI scans to demonstrate that taxi drivers had larger **hippocampi** than non-taxi drivers, supporting the view that this area of the brain is important in spatial memories.

Functional MRI (**fMRI**) provides both anatomical and functional information by taking repeated images of the brain in action.

Strengths: MRI gives a more detailed image of the soft tissue in the brain than do CAT scans, and involves passing an extremely strong magnetic field through the patient rather than using x-rays. MRI is best suited for cases when a patient is to undergo the examination several times successively in the short term, because, unlike CAT, it does not expose the patient to the hazards of radiation.

Weakness: MRI scans take a long time and can be uncomfortable for patients.

PET scans (positron emission tomography) – This sort of scan involves administering slightly radioactive glucose (sugar) to the patient. The most active areas of the brain use glucose, and radiation detectors can 'see' the radioactive areas, so building up a picture of activity in the brain. The scans take between 10 and 40 minutes to complete and are painless.

Raine *et al*. (1997) used PET scans to compare brain activity in murderers and normal individuals. They found differences in areas of the brain such as the prefrontal cortex and the amygdala, regions previously associated with aggressive behaviour. However, they pointed out that such brain differences do not demonstrate that violence is caused by biology alone.

Strengths: PET scans reveal chemical information that is not available with other imaging techniques. This means that it can distinguish between benign and malignant tumours, for example. PET scans can also show the brain in action which is useful for psychological research.

Weaknesses: This is an extremely costly technique and therefore not easily available for research. Also, as the patient has to be injected with a radioactive substance, the technique can be used only a few times. Finally, PET scans are less precise than MRI scans.

DO IT YOURSELF

DIY No. 1.6

Individually, or in groups, carry out research on a study that has made use of EEG, CAT, MRI, fMRI or PET scans.

- Note the aims of the research.
- Note the research findings.
- Evaluate the type of scanning device used.

You should prepare this information to present back to the group, and produce an overall handout on each type of scanning technique, along with its pros and cons.

2. Twin studies

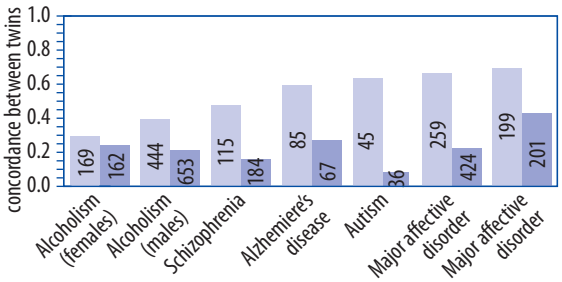
One of the assumptions of the biological approach is the influence of **genes** on behaviour. Genes are the units of by which we inherit characteristics from our parents. Psychologists use **twin studies** to compare the effects of genetics (**nature**) versus experience (**nurture**).

Intelligence and twin studies – Bouchard and McGue (1981) studied the inheritance of IQ. They measured the intelligence of twins and compared their IQs (the score produced by an intelligence test). The degree to which two people are similar is expressed as a **concordance rate**. If two people have exactly the same IQ, the concordance rate is 100%, whereas 0% means absolutely no similarity.

Bouchard and McGue looked at **monozygotic** (**MZ**) twins. Such twins share 100% of their genes and are therefore called 'identical'. A review of more than 30 studies found a mean concordance rate of 86%. Even though this is not a perfect correlation, it suggests that a large part of intelligence appears to be inherited.

Research has also looked at **dizygotic** (**DZ**) twins, who are non-identical, sharing around 50% of their genes, the same as any two siblings. Research has found a mean concordance rate of 60% for DZ twins.

Twins reared apart – One of the problems with twin research is that twins not only share the same genes, but they also grew up in the same environment, and therefore any similarities may be due to environment as well as genetics. To try to separate these two influences, psychologists have looked at data from twins reared apart. Bouchard and McGue found 72% concordance for MZ twins reared apart. This continues to show a significant genetic contribution to intelligence.



▲ Research has looked at the inheritance of a wide range of behaviours, including some of those shown in the graph. These studies have detected that some behaviours and disorders (e.g. schizophrenia) have a genetic link, but these concordance studies are based on correlational data, and this means that we can't really prove cause and effect as they neglect to consider the impact of the shared environment that twins have. They also overlook the fact that, although MZ twins do share 100% of their genes, they could be 'discordant' for a behaviour, not because they do not both have a gene that predisposes them to a behaviour or disorder, but because one of them may have been exposed to a 'trigger' that the other one has not.

▲ Identical (MZ) twins are never totally identical despite having identical genes. Chance events throughout our lives have small effects – in fact, if you started all over again, you would turn out differently!

Strengths

- As MZ twins share 100% of their genes, they make perfect participants for the study of genes on behaviour, and provide useful information for those that adopt the biological approach in psychology.
- Within the field of intelligence, for example, comparison between MZ twins reared together and apart has allowed psychologists to make sound assumptions about the relative importance of genes and environment on development (see research conducted by Bouchard and McGue, 1981).

Weaknesses

- Twins not only share between 50% (DZ) and 100% (MZ) of their genes, but are also often raised in exactly the same environment, and are treated in the same way in all areas of life (family, education, etc.). Concordance rates from psychological research should therefore be treated with caution, as it is difficult to untangle the relative effects of genetics versus environment.
- The study of twins reared apart is also problematic. Very often, twins separated at birth or at a young age will have been raised in very similar environments in terms of social class, education, family values, etc.

Once again, in terms of looking at the **nature–nurture debate**, it is difficult to decipher the exact influence of genes/environment.

***Genes** contain instructions about the physical and behavioural characteristics of living things, such as your eye colour or the colour of a butterfly's wings. Offspring inherit these genes from their parents. The actual number of genes varies from one species to another. Humans have thousands of them.*

Examiner hint

In order to ensure your answer to this question is thorough and relevant, you need to include examples of how the particular methodology is used within the approach. For example, when discussing the use of twin studies within the biological approach, you should bring in the work of Bouchard and McGue, or any other twin studies. This will help you explain the methodology thoroughly and coherently, and demonstrate to the examiner that you understand the methodology used within that particular approach. Answers where a candidate talks in a generic manner about certain research methods will not attract credit in the top two bands (see mark schemes on page vii).

CAN YOU...?

No.**1.6**

1... Identify **two** methods used by the biological approach, and for each describe an example of how this method was employed in a research study that used the biological approach.

2... For each method, outline and explain **two** strengths and **two** weaknesses of using this method in the study you described.

EXAM QUESTION

Explain and **evaluate** the methodology used by the biological approach. [12]

***Notes** In the exam, you are required to explain and evaluate the methods used by **one** of the four approaches. **It is vital that you clearly explain how the methods link with the assumptions of the approach, i.e. that they have clear relevance to the approach.** A general guide in terms of structuring your answer is as follows.*

- *Explain one method used by the approach (use examples that will highlight its relevance to the approach).*
- *Evaluate the strengths and weaknesses of this method.*
- *Explain a second method used by the approach (use examples that will again highlight its relevance).*
- *Evaluate the strengths and weaknesses of the second method.*

N.B. The top band of the mark scheme for this question requires: 'Methods are appropriate and clearly explained…and have clear relevance to the approach'.

Chapter 1 summary

Assumptions of the biological approach

Brain Different areas of the brain are linked to different functions, e.g. the frontal cortex is linked to thinking.

Neurotransmitters either stimulate or inhibit neurons in the brain, e.g. dopamine, adrenaline.

Hormones have an instant and short-lasting effect on target organs, e.g. testosterone, adrenaline.

Selye's GAS model

'General adaption syndrome' GAS
A general response to all stressors that is adaptive (helps the body cope); explains the link between stress and illness.

Three stages
1. Alarm: stressor perceived, adrenaline released for fight or flight.
2. Resistance: body adapts, apparently copes, but resources are depleted.
3. Exhaustion: initial symptoms reappear.

Research study
Selye (1936) Three stages of GAS occurred when he exposed rats to various noxious agents (e.g. cold, drugs); demonstrated the non-specific stress response.

Psychosurgery

Prefrontal lobotomy
Frontal lobe is functionally separated; involved in impulse control and mood. Early methods (e.g. Moniz) were primitive and ineffective.

Stereotactic psychosurgery
Precise location of target areas using MRI, e.g. capsulotomy where connections to region near thalamus are severed to relieve OCD; also cingulotomy.

Deep brain stimulation (DBS)
No tissue is destroyed; wires are placed through the brain tissue and high frequency current can be triggered to interrupt brain circuitry. Used successfully with depression.

Chemotherapy

Antipsychotic drugs
To treat psychotic disorders such as schizophrenia. Comprises conventional (e.g. chlorpromazine i.e. Largactil) and atypical (e.g. clozapine i.e. Clozaril) antipsychotics, which block the dopamine.

Antidepressant drugs
Raise levels of serotonin to reduce depression. SSRIs prevent the reuptake of serotonin at synapses. Other antidepressants block enzymes that break serotonin down.

Antianxiety drugs
Anxiety and stress are treated using benzodiazepines, which enhance GABA, or beta-blockers, which reduce adrenaline activity.

Strengths and weaknesses of the biological approach

Strengths
- A scientific approach – measurable variables enable well controlled, objective research.
- A determinist approach – causal relationships can be identified.
- Successful applications, e.g. Selye's research led to improved treatment for injured patients.

Weaknesses
- A reductionist approach – complex behaviour is reduced to actions of neurotransmitters and brain activity.
- Nature rather than nurture – ignores other factors such as life experiences and emotions.
- Tends to ignore individual differences, e.g. some people become more stressed than others.

Methodology of the biological approach

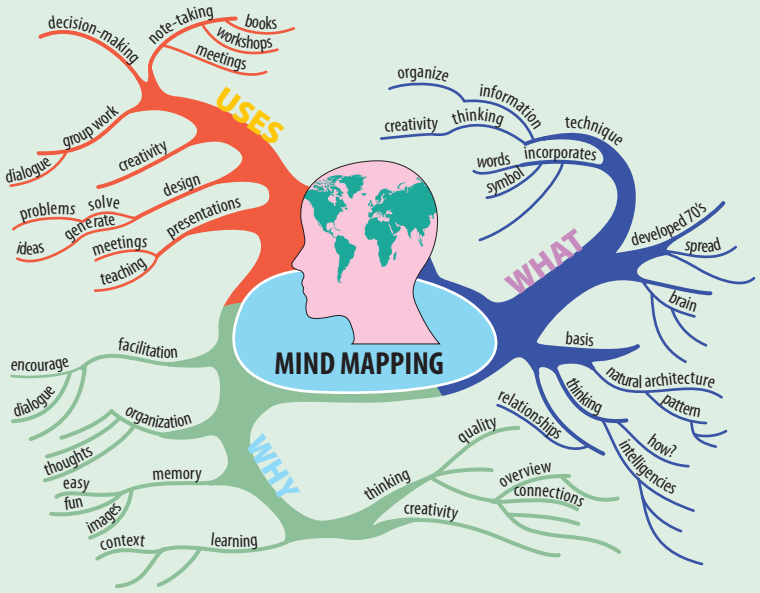
Brain scanning
Enables psychologists to measure brain activity.
- **CAT** scans take a series of x-rays showing brain structure.
- **MRI** scans detect brain structure using magnetic detectors, providing detailed information with no radiation.
- **fMRI** provides a picture of the brain in action.
- **PET** scans detect chemical and structural information and show the brain in action, but are very expensive and expose patients to radiation.

Twin studies
Enable psychologists to estimate the relative contribution of genetic (nature) and environmental (nurture) factors. High concordance rates for MZ twins demonstrate the importance of nature, especially when compared with DZ twins, and also with twins reared apart.
- **Strengths**: useful information, tells us about nature and nurture.
- **Weaknesses**: environments the same, twins reared apart share similar environments.

Review activities

Mind maps

A mind map is a visual representation of a topic, showing the links between the various elements. The links usually form a branching pattern, with the main topic in the centre and component elements/ideas radiating outwards. Small sketches/doodles can be added, as well as colours (highlighters, felt-tips). Each page of notes therefore has a unique, distinctive visual appearance (whereas pages of ordinary/linear notes all look very similar) (Buzan, 1993).



▲ A mind map about mind mapping.

The art of précis

Textbooks provide a large amount of text on the different topics you have to cover. Often there is more than you need for the exam. You need to select the 'golden nuggets' – the key pieces of information that must be remembered for the exam.

In this chapter, you have studied one theory (the GAS model) and one therapy. For each of these, list the golden nuggets of information that need to be remembered. You might select about 15–20 golden nuggets for each.

Now use these golden nuggets to construct:

- A 300-word account of the GAS model.
- A 400-word account of your therapy.

The assumptions of the biological approach

At the beginning of this chapter, we listed some assumptions of the biological approach. Draw a table like the one below and fill in examples from your studies.

	GAS model	Therapy (either psychosurgery or chemotherapy)
Assumption 1 Brain		
Assumption 2 Neurotransmitters		
Assumption 3 Hormones		

Key words

Go through the chapter and identify all the key terms in blue bold. Create a set of key cards for these words – write the key term on one card and write its definition on another card (you can find the definitions in the glossary/index).

One game you can play with these is called '*Concentration*', which works best with two or three players. Place all the cards face down, with the key terms on the left and the definitions on the right. Turn over two cards – one from the left and one from the right. Do they match? If not, turn them face down again and let the next player have a go. If they do match, then you keep the cards.

Spot the mistakes

The text below contains a description of Selye's GAS model. Copy this text and identify all the mistakes! When you have finished compare your work with someone else and put the mistakes right.

Bill Selye conducted research in the 1920s on animals such as rats. It led him to conclude that, when animals are exposed to unpleasant stimuli, they display a universal response to all stressors. He called this the general adaptation system or GAS.

Selye proposed that this model can explain the link between stress and illness because stress results in a depletion of psychological resources and this lowers the organism's resistance to infection.

Stage 1 Alarm reaction

The threat or stressor is recognised and a response is made to the alarm. The hypothalamus in the brain triggers the production of dopamine from the adrenal glands. The effect is increased heart rate, sweaty palms, fast breathing and so on. This leads to readiness for 'fight or fidget'.

Stage 2 Acceptance

If the stress continues, then it is necessary to find some means of coping. The body is adapting to the demands of the environment, but at the same time resources are gradually being depleted. The body appears to be coping whereas, in reality, physiologically speaking, things are deteriorating.

Stage 3 Exhaustion

Eventually, the body's systems can no longer maintain normal functioning. At this point, new symptoms start (sweating, raised heart rate, etc.). The adrenal gland may be damaged from previous overactivity, and the immune system may not be able to cope because production of necessary proteins (e.g. adrenaline) has been slowed in favour of other needs. The result may be seen in stress-related illnesses such as ulcers, depression, cardiovascular problems and other mental and physical illnesses.

Example exam questions with student answers

Examiner's comments on these answers can be found on page 174.

EXAMPLE OF QUESTION 2

Describe how the biological approach is applied to either psychosurgery or chemotherapy. [12]

Megan's answer

Chemotherapy can take many different forms. For example, antipsychotic drugs are used to treat things like schizophrenia. They do this by acting on the chemical called dopamine. Some antipsychotics have side effects though, such as involuntary movements of the mouth. Antidepressants are used to treat depression. One type of drug are the SSRIs which basically work by increasing the amount of serotonin in the bloodstream, these work for the patient as low levels of serotonin are thought to cause depression. Beta blockers are given to people with anxiety. These reduce levels of adrenaline and so help the person feel more calm and less stressed. Chemotherapy is therefore drug therapy.

Tomas's answer

You can read **Tomas's answer, which got full marks, on page 174.**

EXAMPLE OF QUESTION 5

Explain and evaluate the methodology used by the biological approach. [12]

Megan's answer

The biological approach uses lab experiments so that they can manipulate the IV and observe the effects on the DV. This is done under very controlled conditions. There are lots of advantages to lab experiments. Firstly, there is a high control of variables, not only the IV but many EVs too. This allows cause–effect relationships to be established. Also because lab experiments follow standardised procedures, replication is possible, therefore increasing the experimental validity. However, there can be a problem of demand characteristics, where the participants may try and guess the purpose of the study, and behave in ways they might not normally. This also links to ecological validity – another problem with lab experiments. People who take part are unlikely to act in ways they normally would. Sometimes experimenter bias is a problem too, the experimenter may interpret the behaviour in ways that match the hypothesis, or even lead the participant into behaving in certain ways, for example, by reading a list of words really slowly so that participants will remember them.

Tomas's answer

The biological approach would make use of non-invasive methods such as brain scans; these include EEG, CAT, MRI and PET scans. EEG measures brain activity by placing electrodes onto the scalp, and are useful for investigating things like hemisphere function and stages of sleep. However, they do not provide us with images of the brain as do CAT, and MRI scans. CAT scans can show us an x-ray of the brain, and are used to look at brain structure, for example exact damage in brain damaged patients. MRI scans do not involve injecting a radioactive dye into the patient as do CAT scans, and are therefore good if a person has to be scanned several times in a short period. The most recent scanning device is known as PET – positron emission tomography. This type of scan differs from the others as it shows the chemical composition (metabolism) of the brain rather than just its structure. Therefore this is a more sophisticated scanning device, which can reveal information that the others cannot (such as whether a tumour is benign or not). Raine et al. studied criminal behaviour using PET scans; these were used to establish whether there were brain abnormalities in a sample of murderers. Advantages of these methods are that they are non-invasive in general, they do not cause permanent damage to the patient, yet they allow us to investigate the concept of localisation of function – the idea that certain areas of the brain are responsible for certain behaviours. PET scans are effectively used to diagnose the early stages of neurological illnesses such as epilepsy, Alzheimer's disease, and other dementias. However, the radioactive exposure in PET imaging means that there is only a limited amount of times a patient can undergo this procedure. PET imaging is also extremely expensive, and for this reason is offered only in a limited number of medical centres in the world.

Twin studies are also of value to biopsychologists in investigating the assumption that behaviour is due to our genetic make-up. MZ twins share 100% of their genes, and so if behaviour is a product of our genes both twins should demonstrate the same behaviour. For example, Bouchard and McGue looked at both identical and non-identical twins when investigating whether intelligence could be due to nature. While twin studies provide useful information for the nature–nurture debate, and are able to help psychologists decipher whether certain disorders are genetic, they are not without criticism. Looking at concordance rates provides correlational data, and so cause–effect relationships cannot be established. For example, if twins have grown up in the same environment then they would have been exposed to the same social 'triggers', which could account for the similarities in their behaviour. This leads to another problem with comparing concordance rates in sets of twins, and that is that usually twins have grown up in exactly the same environment (or if not, very similar ones), and so the effects of biological versus environmental factors are difficult to untangle.