

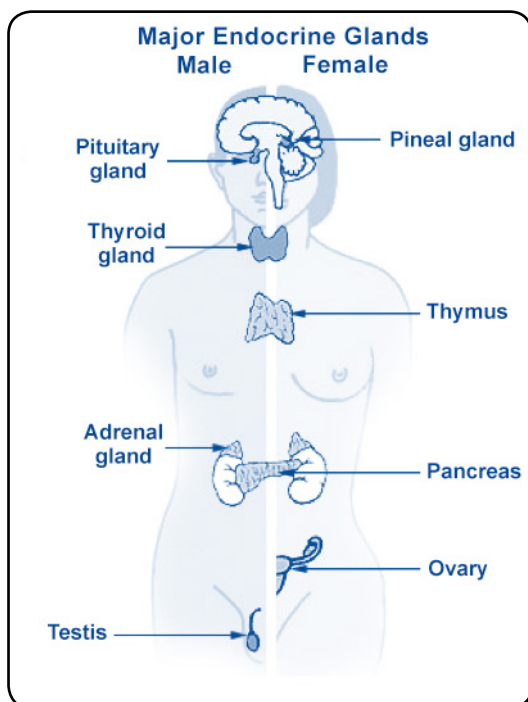


Hormones

This Factsheet is about **hormones** and the influence they have on human emotion and behaviour. The Factsheet includes exam hints and examiner comments, while the worksheet gives you the opportunity to apply what you have learned to exam style questions. Words in bold are explained in the glossary.

The examiner will expect you to be able to:

- Understand the function of hormones.
- Explain the influence of specific hormones on human behaviour.
- Explain the influence of hormones on human emotion.
- Draw on research evidence to support your understanding of how hormones influence behaviour.



Introduction

The human body comprises of a number of physiological **systems** that maintain healthy functioning. These systems include the circulatory system – consisting of the heart and blood vessels, the nervous system – consisting of nerves, and the **endocrine** system – which is comprised of endocrine glands that make and secrete hormones. The endocrine system controls many of the body's functions including the sleep/wake cycle, the fight/flight response, puberty, menstruation and reproduction. Each different endocrine gland makes and secretes a specific hormone, and these hormones act like chemical messengers, travelling around the body in the bloodstream to specific areas where they bring about a specific effect. The diagram above illustrates the position of the major endocrine glands that include **adrenal**, **thyroid**

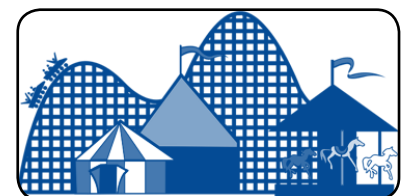
and **pituitary**. The **gonads**, or sex glands, also have an endocrine function – the female gonads are **ovaries** and male gonads are **testes**. The table below summarises the main hormones produced by the major endocrine glands and their actions:

Endocrine Gland	Hormone	Action
Pineal	Melatonin	Regulates sleep/wake cycle
Pituitary	Oxytocin	Promotes prosocial behaviour and attachment
Thyroid	Thyroxine	Controls appetite and metabolism
Adrenal	Adrenaline, Cortisol	Fight or flight response Stress response
Pancreas	Insulin	Regulates blood sugar levels
Ovaries	Oestrogen, Progesterone	Development/regulation of female reproduction system Regulates menstruation and pregnancy
Testes	Testosterone	Development/regulation of male reproduction system, role in aggression

Examiner Comment: Top-band candidates demonstrate a basic knowledge of the structure and function of the endocrine system as a whole, and a good understanding of the function of hormones specifically.

Adrenaline

Are you an **adrenaline** junkie – a thrill-seeker who loves adventure, extreme sports or riding the highest, fastest roller coasters? In simple terms, adrenaline junkie describes someone who appears to be addicted



to the feeling they get when they experience a rush of adrenaline. Adrenaline is known as the fight or flight hormone because its function is to prepare the body to deal with a threat, either by attacking or running away from danger. The hormone is secreted by the adrenal medulla, the middle section of the adrenal glands, which are located above the kidneys. When the body is under threat, or perceived threat, it needs to act quickly. The function of adrenaline, therefore, is to increase circulatory and respiratory activity, which increases the flow of blood and oxygen to the brain and organs.

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Effects of this are experienced as rapid heartbeat, quickened breathing, sweating and redness. You might sense these physiological effects when you are excited or afraid. Because the body needs to take action to deal with impending danger, it is less important to use up energy for other functions such as digestion. Another effect of adrenaline, therefore, is to slow down the function of the digestive system in order to preserve energy for where it is required. Adrenaline creates a state of physical arousal and psychological alertness – feelings that accompany states of fear, threat, euphoria and sexual excitement.

Research Evidence

Schacter and Singer (1962) conducted an investigation into the emotional effect of adrenaline. The aim was to test the **two-factor theory** of emotion. A participant sample of 184 male college students was divided into 4 groups. They were told they would receive an injection of Suproxin to test its effect on vision. However, the participants were deceived – three groups were given an injection of adrenaline while the **control group** was given a **placebo**. The men were either told the true effects of adrenaline or false information. The control group were given no information at all. The study had two conditions. In condition 1, participants were encouraged to play games as they waited for the study to commence. Researchers called this the euphoria condition. In condition 2, participants observed a **confederate** completing a questionnaire and growing increasingly angry. This was the anger condition. Participants were observed for changes in emotion during the two conditions and were then asked to fill out a questionnaire to report their emotional state.

The researchers found that participants who were accurately informed about the effects of adrenaline displayed minimal changes in emotion, while those who had been misinformed displayed much higher changes in emotion. **Self-report** questionnaires confirmed these observations. Participants who received a placebo experienced no state of arousal. This study supports the two-factor theory of emotion. It was concluded that individuals use a combination of physiological cues and cognitive labelling to construct their subjective experience of emotion.

Examiner Comment: Candidates should be selective in their use of research studies, drawing on relevant aspects to demonstrate the influence of adrenaline on emotion and behaviour.

Exam Hint: Candidates can gain evaluative marks by criticising the research method employed. For example, deception has ethical implications while self-report methods are prone to bias and demand characteristics.

Oxytocin

If adrenaline is known as the ‘fight or flight’ hormone, oxytocin is sometimes referred to as ‘tend and befriend’ or the ‘cuddle hormone’. It is secreted by the posterior lobe of the **pituitary** gland, which is located at the base of the brain. Oxytocin is released when people bond and form **attachments**, either physically – as in hugging, or psychologically – when they fall in love. The release of oxytocin



is not limited to romantic love. It is also secreted when a mother cuddles her baby or when a boy strokes his dog. Oxytocin can also have an opposite effect. Its release can cause suspicion of people who are unknown to us and make us less accepting of strangers. This suggests that the physiological effects of oxytocin are influenced by environmental clues.



Oxytocin has a particularly important function in female reproduction. It is the hormone that stimulates contractions when the baby is due to be born and which helps shrink the uterus after delivery. Oxytocin production is stimulated by the baby’s suckling action, which in turn stimulates the production of a mother’s milk for breast-feeding. It is also believed to play an important role in mother/baby attachment. Oxytocin has a similar effect on a father’s capacity to bond with his infant, as research has demonstrated.

Research Evidence

- Studies have illustrated the influence of oxytocin by using nasal sprays to simulate its effects. New fathers who were given oxytocin via nasal spray in a 2012 study were observed to demonstrate more nurturing behaviour towards their babies than fathers who were not exposed to oxytocin.
- Another study found that men in relationships were less likely to approach an attractive woman if they were given oxytocin than men who were not exposed to the hormone. The hormone did not affect single men who were not in a relationship. This suggests that oxytocin may promote fidelity in men who are attached and act as a deterrent against infidelity.
- In a 2010 study, men were given a dose of oxytocin and asked to write about their mothers. Those with secure relationships described their mothers as more caring while those with troubled relationships described them as less caring. This suggests that oxytocin may help to strengthen previous associations, whether positive or negative.
- A 2011 study found that Dutch students given oxytocin via nasal spray were more positive about fictional Dutch characters, but were more negative about characters with Arab or German names. This supports the notion that the social bonding effects of oxytocin are influenced by social cues.

Exam Hint: The point of including research in exam questions about the effects of hormones is to illustrate the theory. Names, dates and details about research methods are less important than findings and conclusions, as illustrated above.

Oestrogen

Oestrogen is the female sex hormone secreted by the ovaries in females. Its functions include the development of primary and secondary female sexual characteristics. During puberty, oestrogen is responsible for breast development, fat distribution and widening of the hips synonymous with a female ‘hourglass’ silhouette. Oestrogen is also responsible for the development of the vagina and uterus and the function of the ovaries. Although primarily considered a female hormone, it is secreted in small amounts in males. In both genders

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oestrogen is responsible for sex-drive (**libido**). Oestrogen has been found to increase the effects of oxytocin, which supports the function of parental bonding and attachment. Studies have found that men who are fathers had higher levels of oestrogen and lower levels of cortisol and testosterone than non-fathers.

Research Evidence

- Research supports the role of oestrogen in physical, psychological and emotional behaviour.
- Oestrogen levels rise and fall during a women's **menstrual cycle**. They are lowest just before and during menstruation and peak midway through the cycle, when the woman is most fertile. Lower levels of oestrogen at certain times of the month have been associated with fluctuations in mood and premenstrual tension (PMT).
- There is also a link between oestrogen levels and eating. Research has found that lower levels of oestrogen are associated with binge eating, particularly in women with eating disorders.
- Further research suggests an interaction between both oestrogen and progesterone and emotional eating at certain times during the menstrual cycle. It is argued that higher levels of these hormones leads to increased emotional eating.
- Oestrogen replacement therapy has been effective in suppressing binge eating in female mice. Hormone replacement therapy using oestrogen may therefore be a possible treatment for binge eating behaviour in women.
- Further animal studies have found oestrogen replacement therapy to be an effective treatment for obsessive compulsive behaviours in mice. This suggests that low oestrogen levels may be linked to obsessions and compulsions and that oestrogen replacement therapy could be an effective treatment for OCD.
- Low or fluctuating levels of oestrogen occur in the period before and after menopause and oestrogen levels drop after giving birth (**postpartum**). This has a significant effect on mood and can result in mood disorders such as depression – specifically postnatal depression and postmenopausal depression.

Examiner Comment: Higher band candidates are able to draw on a range of research to demonstrate a link between hormones, behaviour and emotion.

Testosterone

Testosterone is the male sex hormone and is secreted by the testes in males. Its functions include the development of primary and secondary sexual characteristics in males. During puberty, testosterone influences physiological changes such as deepening of the voice, facial hair growth, increased body mass and growth of the penis and testes. Throughout the lifespan, testosterone is responsible for maintaining sex drive and influences associated male traits such as aggression. Testosterone is also secreted in small amounts from the ovaries in females and can influence sex drive and aggression in both genders. Testosterone also has a role in stimulating the production of red blood cells and in the manufacture of protein in the muscles, liver and kidneys.



Research Evidence

- Researchers have been interested in the relationship between testosterone, sex and aggression.
- One study examined the records of 692 male prison inmates and found that men who had committed sexual or violent crimes had significantly higher levels of testosterone than those who had committed non-violent and/or non-sexual crimes. This and previous studies into the relationship between testosterone, sex and aggression are limited by small sample sizes as well as social and cultural bias.
- Dabs and Morris (1990) investigated the relationship between testosterone, sex and aggression using a much larger sample of 4462 American army personnel. The men were enlisted into the army in 1985 from a range of social, cultural, educational and occupational backgrounds. The participants' testosterone levels were measured when they were first enlisted and again at discharge. Researchers also gathered information about sexual behaviour, aggression and criminal behaviour.
- It was found that men with high testosterone levels were significantly more likely to have been involved in childhood delinquency, adult crime, drug and alcohol use. They were also found to have had more sexual partners than men with lower levels of testosterone. A further finding related to socio-economic status. Men with higher levels of education and income were less likely to display antisocial behaviour than men with low income and less education. They were also found to have lower levels of testosterone. It was therefore concluded that socio-economic status moderates the effects of testosterone. This study demonstrates that merely stating a cause and effect relationship between testosterone and aggression is too simplistic. Testosterone has been found to affect aggressive and sexual behaviour, but socio-cultural factors also affect testosterone levels.

Exam Hint: Make sure you demonstrate the relationship between hormones and behaviour and resist referring to this as cause and effect.

Conclusion

Hormones are chemical messengers that have a specific physiological effect in the body. Research suggests that hormones also have considerable influence on behaviour and emotion in both human and non-human animals. This supports the notion that behaviour and emotion have physiological origins. It is not appropriate, however, to say that hormones *cause* behaviour but that hormones influence behaviour. Research highlights the interaction between physiological factors and environmental stimuli, supporting a correlational effect.

Examiner Comment: Higher band candidates write essays with clarity, that are focused and well structured.

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Glossary

Adrenal:	Endocrine gland located on top of each kidney and comprising of the adrenal medulla that secretes adrenaline, and the adrenal cortex that secretes cortisol.
Adrenaline:	Fight or flight hormone secreted by the adrenal medulla (adrenal gland).
Attachment:	Close emotional bonds.
Confederate:	Fake participant who knows the true nature of the study and whose behaviour influences the participant sample.
Control group:	A group of regular participants used for comparison with the experimental group.
Demand characteristics:	Aspects of research which encourage participants to act in a particular way – the way they think the researcher expects them to.
Endocrine:	System of glands that secrete hormones.
Gonads:	Sex glands including ovaries (female) and testes (male).
Hormone:	Chemical messenger.
Libido:	Drive or desire for sexual activity.
Menstrual cycle:	Female cycle of approximately 28 days.
Oestrogen:	Female sex hormone secreted by the ovaries.
Ovaries:	Plural of ovary, the female gonads that secrete oestrogen.
Oxytocin:	Tend and befriend hormone secreted by the pituitary gland.
Pituitary:	Endocrine gland located at the base of the brain that secretes oxytocin.
Postpartum / Postnatal:	Period following giving birth when mothers may be prone to depression.
Placebo:	A dummy drug such as a sugar capsule or sugar solution that has no effect.
Self-report:	Method used by participants to report their own experiences.
System:	Physiological structures (e.g. endocrine, circulatory, digestive).
Testes:	Plural of testis, the male gonads that secrete testosterone.
Testosterone:	Male sex hormone secreted by the testes.
Thyroid:	Endocrine gland located in the neck that secretes thyroxine.
Two factor theory:	Theory that emotion arises from a combination of cognition and arousal.

Worksheet: Hormones

Name: _____

1. Outline the structure and function of the endocrine system.

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2. Evaluate the significance of psychological studies into the effects of hormones on human behaviour and emotion.

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3. Adrenaline is known as the ‘fight or flight’ hormone – evaluate the usefulness of this in terms of our understanding of its influence on human behaviour.

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4. Oxytocin is sometimes known as the cuddle hormone – evaluate the usefulness of this in terms of our understanding of its influence on human behaviour.

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5. What is the influence of sex hormones (e.g. oestrogen and testosterone) on human behaviour?

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