The Biological Perspective: Aggression and Free Will

You need to be able to:

- ❑ *Describe the main assumptions of the biological perspective*
- ❑ *Outline some of the biological factors that may be involved in aggressive behaviour*
- ❑ *Discuss the issue of free will in relation to biological perspectives on aggression*

Cases derived from 'Mind Machine: The Violent Mind' (BBC, 1988)

Is Aggression Part of Human Nature?

Aggression is certainly part of human life. Apart from everyday reports of violent crime we are a pretty warlike species. Since the end of World War II there have been about 30 days on which a war was not taking place somewhere on the planet. Many have argued that the machinery of aggression has been built into our brains by evolutionary processes. It is certainly the case that we are not alone in being an aggressive species. Other animals with which we share a common ancestry, such as chimpanzees, have also been observed to engage in intergroup aggression that looks a great deal like warfare.

So it could be argued that aggression and violent behaviour are an inevitable fact of life, over which we have no control. However, when we talk about ourselves and each other, this idea is rarely given houseroom. Rather, we talk about ourselves as if we had the capacity to choose our actions: free will. Often, when we view examples of aggression and violence we hold the person that carried them out morally responsible for the harm that arises from their actions.

Free Will, Moral Responsibility and Psychology

The ideas of free will and moral responsibility are built into our legal system. Generally, the law says that, on order for a crime to have been committed there must be *actus reus* – the guilty act – and *mens rea* – the guilty mind. In other words, in law, moral responsibility is generally predicated on *intent*.

At this point, Psychology and the law tend to part company. The law is predicated on the notion of free will. As we have seen over the past few weeks, Psychology frequently is not. Although for different reasons, most schools of psychological thought take the model of the physical sciences, where all effects have physical and mechanistic causes. Consequently, most psychological perspectives deny the existence of free will. For example, the behaviourists believe that our behaviour is determined by our conditioning and history of reinforcement. The Freudians believe that our behaviour is determined by unconscious processes.

The biological approach is deterministic in a similar way. When explaining human behaviour, biological psychologists use biological concepts. Their theories tend to emphasise:

- ❑ Genetics, and the possibility that certain behavioural tendencies are inherited.
- ❑ The nervous system, and the way that certain behaviours are linked to the functioning of particular parts of the brain.
- ❑ Chemical influences, and the way that substances such as neurotransmitters and hormones (and their analogues, drugs and toxins) can alter the functioning of the brain.

What these have in common is that they are governed by physical processes that follow the laws of physics. In other words, from the point of view of a biological psychologist, the brain, which causes all of our behaviour, is a machine. An incredibly complex machine, but a machine nonetheless. And machines do not have free will. Their behaviour unfolds in a predictable way according to knowable laws and principles. So, aggression and violence are behaviours produced by

the brain, and the brain operates in a mechanistic way. This type of **deterministic** and **reductionist** view precludes the idea of choice or agency and, consequently, makes the idea of moral responsibility irrelevant.

Nonetheless, we carry on (biological psychologists included) as if people do make choices about their actions and can be held responsible for the consequences. However, there are circumstances where we (and the law) accept that biological processes have overridden 'free will', and that a person should not be held liable for the consequences of their actions.

Case 1 – Dawn

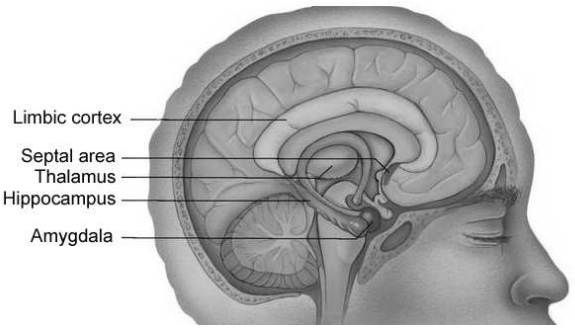
Dawn has episodes of erratic behaviour, and occasionally has violent fantasies. For example, she reports that on one occasion, whilst preparing dinner for her family, she started to experience great feelings of resentment against her husband. She was using a knife at the time and started to fantasise about stabbing him. On other occasions she has behaved in ways that, whilst not aggressive, are certainly bizarre. For example, she has been known to remove all her clothing and wander off into the garden in the middle of the night.

Discussion question: *what immediate assumptions might we make about Dawn's behaviour? If Dawn had stabbed her husband, would we hold her responsible?*

Dawn is diabetic. Under some circumstances, her blood-glucose level can drop dangerously low, and she becomes hypoglycaemic. This state is dangerous for the person, as it can lead to coma and ultimately, death. In Dawn's case it can also lead to abnormalities of psychological functioning. In her words, 'It feels as if I'm moving through a tunnel…everything disintegrates but at the same time becomes intensely vivid…it's lethal…your own body behaves on its own…your mind goes absent'.

As Dawn's blood-glucose level drops, her **cerebral cortex**, the part of the brain responsible for planning, reasoning and 'rational' behaviour starts to shut down. However, her **limbic system**, a more primitive part of the brain involved with responding to threats and aggressive behaviour, carries on functioning. Its aggressive impulses can no longer be controlled by the cerebral cortex.

Discussion question: *most people agree that, if Dawn did commit a violent act whilst hypoglycaemic, she should not be held morally responsible. However, consumption of a large amount of alcohol can have very similar effects on the brain to hypoglycaemia: impaired cortical functioning leading to uninhibited behaviour. Much violent crime is alcohol related. If Dawn attacked her husband whilst drunk would we draw the same conclusion? After all, the biological processes are very similar.*



http://www.colorado.edu/epob/epob1220lynch/image/limbic.jpg

Cases 2 and 3 – Arthur and Colin

Arthur has recurring dreams about being attacked. The dreams are accompanied by feelings of terror and great anger. Sometimes he has woken up from such dreams to find that he has assaulted his wife. He has hit and kicked her and once tried to strangle her, apparently whilst asleep. Colin also suffered from recurring violent dreams following a head injury he sustained in a car accident. He awoke one day to find he actually had killed his wife.

Discussion question: *if someone claims to have committed a criminal act, such as homicide, whilst asleep, is it our first instinct to believe them? How could we test their claim?*

Frontal cortex (thinking, planning, rational behaviour) is inhibited whilst the person sleeps.

At times, **sensory and motor cortex** (areas associated with movement and sensation) are highly stimulated, leading to the experience of dreaming.

The **limbic system** (emotion) is often activated whilst we dream.

The **pons** paralyses us to stop us from acting out our dreams.

Psychologists who examined both Arthur and Colin agreed that both were suffering from sleep disorders. In Arthur's case, he suffers from **night terrors**. In this disorder, people tend to have very strong negative emotions whilst asleep, on which they are inclined to act. They may lash out in their sleep and are sometimes violent, but often have no recollection of this when they wake up. In Colin's case, it was decided that he was suffering from **REM behaviour disorder**. This is rarer and often more dangerous than night terrors. If generally occurs when the pons is damaged. The pons paralyses us when we go into REM sleep, and this stops us from acting out our dreams. If the pons is damaged, then people can engage in complex – and occasionally violent – behaviour, whilst asleep. In Colin's case, he attacked and killed his wife.

REM behaviour disorder sufferers are not usually dangerous to anyone but themselves. There have been a number of cases where sufferers have injured themselves whilst acting out elements of their dreams. The following case description is fairly typical:

> A Patient came to a local sleep laboratory because he was keeping his family awake all night with shouting and acting out his dreams. His wife was forced to sleep in a different room not only so she could get some sleep, but also because she feared for her own safety. The patient managed to fall out of bed on a nightly basis, often injuring himself in the process. He was a war veteran and would often dream he was trying to avoid enemy attack. Thinking that it would help, he purchased a hospital bed with railings. Still he managed to climb out over top of the railings and fall to the floor. The patient then had to resort to sleeping on a mattress on the floor. When he was monitored in the sleep lab during overnight testing, and he entered REM sleep, muscle tone activity was detected when it should have been absent. Talking, laughing, shouting, flailing of the arms and kicking of the legs were all observed. He nearly fell head first out of the bed on several occasions. The patient has been prescribed a medication which will make his muscles relax during REM sleep so that he will no longer act out his dreams. To update, the patient is now doing fine and is sleeping in his own bed again. (Orr, 2003)

The court accepted Colin's defence that he was not acting of his own free will when he killed his wife, and he was acquitted.

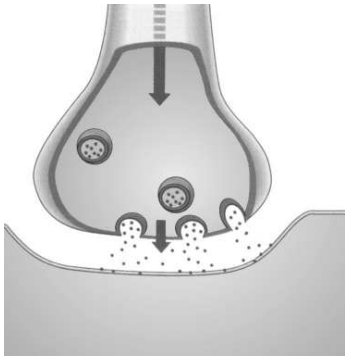
Case 4 - David

David was a gardener with a reputation for being a very passive and mild mannered person. Over a very short period of time his behaviour changed markedly. He became very bad tempered and lashed out at family members, something they describe as being completely out of character for him. Whilst working at a client's house he got into an argument with her and beat her to death. The prosecution argued that he had lost his temper and murdered her in a fit of rage. The jury believed the prosecution and he was sentenced to life in prison.

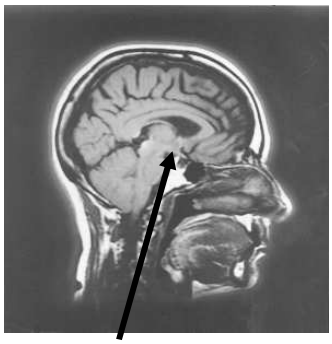
Discussion question: *how significant is it that David was reported to be acting 'out of character' in the days immediately prior to the murder?*

At his trial, David's defence argued that his behaviour had not been under his control. Shortly before his behaviour changed, David had accidentally been exposed to a high concentration of an organophosphate pesticide called **carbaryl**. Carbaryl is a substance that can have an effect on the nervous system. In fact, it behaves similarly to many nerve gasses (chemical weapons that exert their effect by impairing the functioning of the NS).

Carbaryl works by affecting the way that brain cells communicate with each other. This communication occurs at **synapses**, little gaps at the junctions of nerve cells. Neurones (nerve cells) release chemicals to send signals across the gap. These chemicals are called **neurotransmitters**. After it has been released, the neurotransmitter is broken down to prevent it from stimulating the post-synaptic neurone for any longer than necessary.



Carbaryl prevents the breakdown of a neurotransmitter called **acetylcholine (ACh).** Exposure to high doses of carbaryl causes ACh to build up in the brain and other parts of the nervous system.



Hypothalamus

One of the many parts of the brain that uses ACh is a structure called the hypothalamus. This structure is important in a huge range of behaviours including eating, drinking, sex and aggression. Electrical stimulation of specific parts of the hypothalamus can cause a rat to show signs of rage and attack behaviour.

David's Defence argued that the carbaryl to which he had been exposed had affected the functioning of his hypothalamus. A small provocation would have started the parts of the hypothalamus associated with attack behaviours to start firing. However, because of the carbaryl, they would not have been able to stop, leading to uncontrolled rage and aggression.

Case 5 - Sandie

Sandie came from a very stable background and seemed quite normal whilst growing up. However, around the age of 15 years her behaviour started to become erratic and violent. Her aggressive acts were quite unusual. For example, she once threw a bottle through a police station window, then waited around outside for the police to come and arrest her. Her extremely violent behaviour brought her to the attention of psychiatrists, who declared that she was untreatable. Eventually, Sandie found herself accused of stabbing a co-worker seventeen times. She had no recollection whatsoever of doing this.

Discussion question: *do we view violent women differently to violent men?*

Whilst examining her history when preparing her defence, her defence team noticed that her violent outbursts seemed to occur at regular monthly intervals. Further examination revealed that her aggressive acts almost invariably coincided with her menstruation.

One possible explanation for this concerns the effect of progesterone on the limbic system. Progesterone is a hormone that is released during pregnancy and also just prior to menstruation. As we have already seen, the limbic system plays a role in threat and attack behaviour. Progesterone seems to have a calming effect on the limbic system. It is possible that Sandie's aggressive behaviour stemmed form the fact that she released too little progesterone during the relevant phase of her menstrual cycle. What is certain is that when she was treated with drugs to increase her progesterone levels, Sandie became markedly less aggressive. Rather than being imprisoned, she was given a probation order conditional on continued treatment.

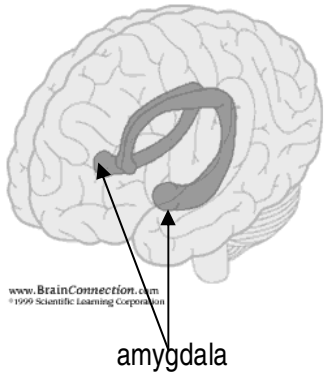
Discussion question: *psychologists are divided on the question of whether pre-menstrual syndrome is a useful construct. Apart from the ambiguous nature of some of the evidence, some have argued that it paints a picture of women as 'inherently pathological entities' who are slaves to their biology. What do you think of this view?*

Case 6 – Julie

Julie had a normal childhood, but in adolescence started to experience absence seizures, a form of epileptic fit. These got worse as she got older and she started to have full-blown seizures. Often, these were accompanied by intense feelings of panic and dread. Sometimes, Julie would start running, as if to escape from something or someone. In her teens she started to carry a knife, just in case she found herself in a dangerous part of town after one of her 'running attacks'.

On one occasion she went to see a film with her father, and had a panic seizure during the film. She ran off to the toilet to hide, and whilst in there started to have a hallucinatory episode in which her body became distorted. Unfortunately, in the middle of this attack another woman came into the toilet and accidentally brushed against her. In the grip of a terrible panic, Julie stabbed her in the heart and ran off (the woman survived, thanks to first aid administered by Julie's father).

Julie was hospitalised rather than arrested, and the medical team treating her thought that her aggressive outburst and her epilepsy might be related. They implanted electrodes in different parts of her brain to try and find out more about her seizures. They discovered that she had an epileptic focus very close to her amygdale, part of the limbic system. Experimentally, they stimulated the area electrically. Julie suddenly entered into an absence seizure. Following on from this her face started to twitch as if she was very angry, and she suddenly flew into a frenzy of attack behaviour.



A surgeon operated on her brain to remove the focus from her amygdale. Since then she has experienced no further aggressive outbursts or attacks of rage.

Discussion question: *what are the issues raised by treating aggressive behaviour by operating on people brains? What might be the pros and cons of such an approach?*