



Behaviour

- Explain the advantages to organisms of innate behaviour.
- Describe *escape reflexes*, *taxes* and *kineses* as examples of genetically determined behaviours.
- Describe the meaning of the term: *learned behaviour*.
- Describe *habituation*, *imprinting*, *classical* and *operant conditioning*, *latent* and *insight learning* as examples of learned behaviours.
- Describe using one example the advantages of social behaviour in primates.
- Discuss how the links between a range of human behaviours and the dopamine receptor DRD4 may contribute to the understanding of human behaviour.



What is behaviour?

- The responses of an organism to its environment.
 - Often to increase it's chances of survival.
- Two types:
 - Innate behaviours
 - Learned behaviours



Innate or Learned

Genetically determined

Influenced by environment

Unintelligent – organism often unaware of the purpose

Passed on via teaching

Passed onto offspring via reproduction

Form the basis of intelligent/intellectual activity

Rigid & inflexible

Environment has no impact.

Behaviour patterns are similar in all members of the species

Altered by experience

Behaviour patterns vary among members of the species

Not passed onto offspring via reproduction



Innate Behaviour

- Occurs without the need for learning.
- Inherited
- Performed in the same way in response to the same stimulus.
- Examples:
 - Reflex
 - Kinesis (pl. Kineses)
 - Taxis (pl. Taxes)
 - Complex actions



Reflex

- Protect form harm.
- Promote survival.
- Involuntary
- Follow a specific response to a certain stimulus.

- Eg. Escape reflex in invertebrates

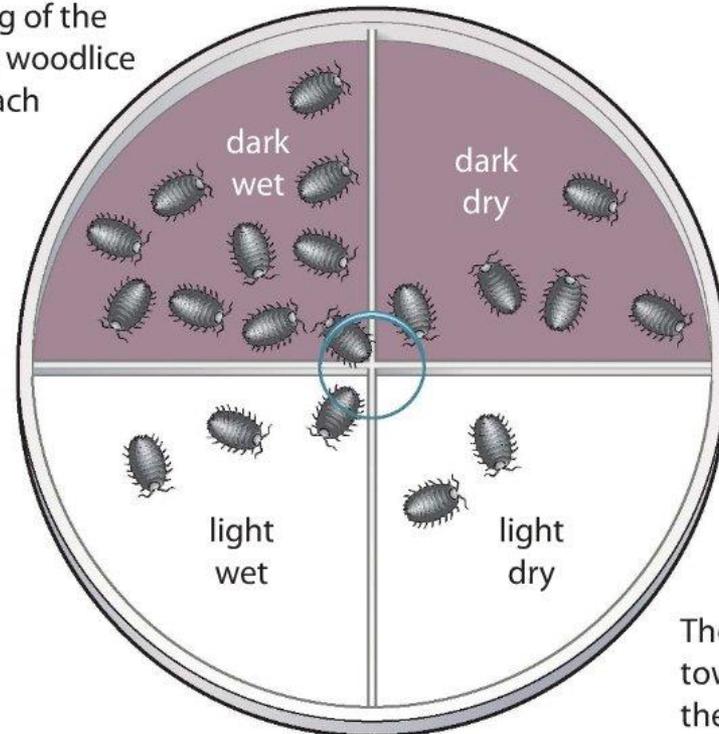


Kinesis

- Rate of movement increases when the organism is in unfavourable conditions.
- Non-directional.

- Eg. woodlice

At the beginning of the experiment five woodlice were put into each chamber.



The woodlice move towards the conditions they prefer.



Taxis

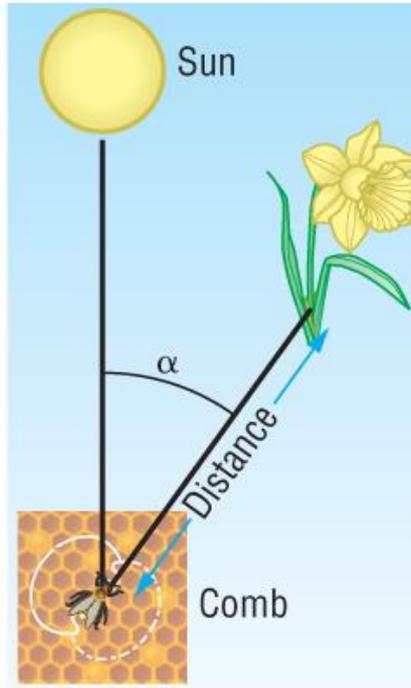
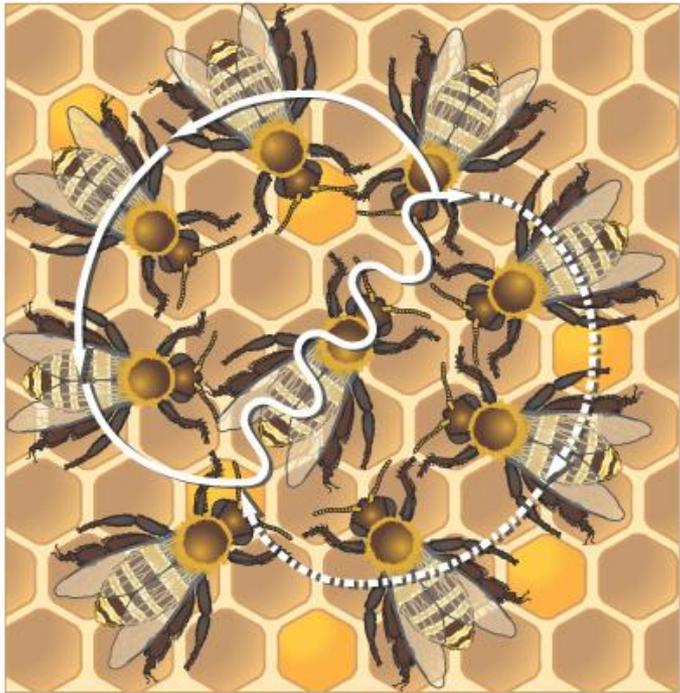
- Movement towards/away from a certain stimulus.
- Eg. Positive phototaxis = moving towards light.

Name	Meaning
Phototaxis	Response to light
Chemotaxis	Response to chemicals
Hydrotaxis	Response to water
Thigmotaxis	Response to physical contact
Thermotaxis	Response to heat



Complex Innate Behaviour

- Many invertebrates show complex behaviour patterns.
 - Consist of a number of innate behaviours linked together.
- Eg.
 - Honey bee's waggle dance.
 - Sand wasp's food burial.
 - Female stickleback's mating rituals.



The angle between the waggle part of the dance and the vertical represents the angle between the sun and hence the direction of the flower field horizontally.

The duration of the waggle part of the dance signifies the distance. Approximately one second of dance = 1 km distance.



Sand wasp's food burial.





Stickleback Courtship

A Fixed Action Pattern



Male – red
colouring



Learned Behaviour

- Animal responses that change/adapt with experience.
 - Eg.
 - Learning to respond in certain ways.
 - Learning to ignore certain stimuli.
 - The ability to consider a problem & create a solution.



Learned behaviours provide greatest benefits when...

- Animal has a long lifespan & has more time to learn more responses.
- Parents care for their young to enable learning from them.
- Animal socialises with others of their species to enable learning from them.



Types of Learned Behaviours:

- Habituation
- Imprinting
- Classical conditioning
- Operant conditioning
- Latent learning
- Insight learning



Habituation

- Ignoring stimuli that offer no punishment or reward.
 - Avoids energy waste.
 - Screens out the many non-important stimuli.
 - Eg.
 - Birds ignoring scarecrows.
 - Humans sleeping through nearby rail noise.



Imprinting

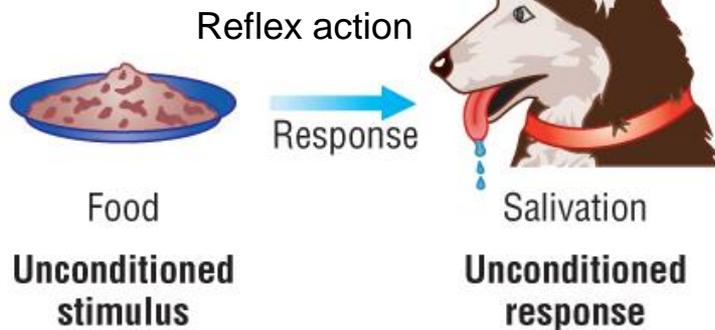
- Young animals imprint on their parents (or other moving objects) soon after hatching.
 - Occurs during the **receptive period**.
 - After this young goslings will only follow & learn from objects that look like this first object.
 - Helps young learn skills from their parents.
 - How to fly.



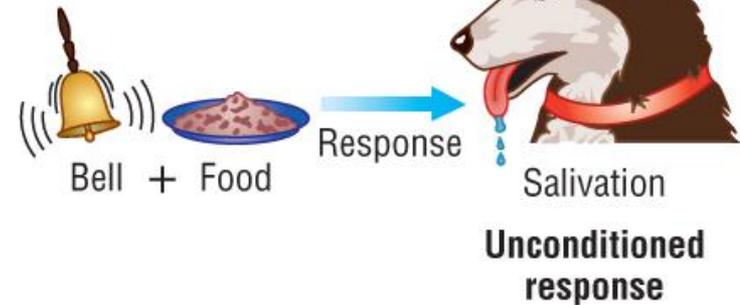
Classic Conditioning

- Animals learn to relate a pair of events, responding to the first in anticipation of the second.

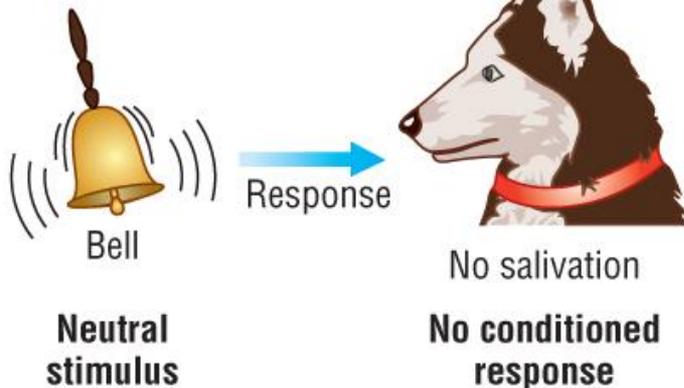
1 Before conditioning



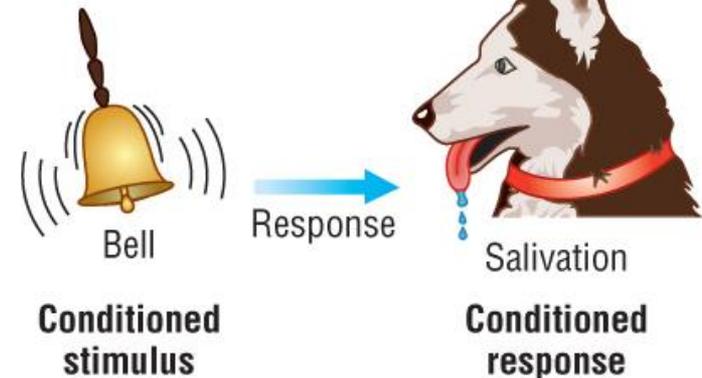
3 During conditioning



2 Before conditioning



4 After conditioning





Operant Conditioning

- Trial & error learning.
 - Behaviours reinforced by rewards or inhibited by punishment.
 - Animals associate an operation with reward/punishment (**reinforcers**).
 - Active & voluntary learning.
- Eg.
 - Skinner experimented with rats in a box.
 - Rats accidentally press a lever & get a reward – lever pressing frequency increases.



Latent (exploratory) Learning

- Animals explore new surroundings & retain information about it.
 - May not use the information immediately but can help them to survive if it can now escape from a predator later on.
 - Eg.
 - Rabbits explore burrows & learn the different pathways.



Insight Learning

- Highest form of learning.
- Involves thinking & reasoning to solve problems.
 - Responses are varied.
- Once solved, the solution to a problem is remembered.
- Eg.
 - Chimps learning to solve the problem of getting food from high up.



Exam tip

- Ensure you can identify each type of learning from their descriptions.
 - Exam questions will ask about animals you may have never heard of.



What's the learning type...

1. Birds quickly learn to avoid eating some bitter-tasting moth larvae. **oc**
2. Young ducks follow their mother everywhere. **Imp**
3. Cats perk up for lunch as soon as we get the can opener out of the drawer. **cc**
4. Villagers do not come to the shouting shepherd's aid as he cries "wolf". **Hab**
5. Students remember more of what they discover for themselves. **IL**



Primate Behaviour

- Primates:
 - Apes
 - Humans, Chimps, Bonobos, Gorillas, Orangutans.
 - Monkeys
 - Lemurs

 - Live in family groups until sexual maturity.
 - Have large brains with well developed cerebral cortex.
 - **Social behaviour** & cerebral cortex appear to have developed at the same time.
 - Thought to be linked.



Definitions

- **Social behaviour:**
 - Organisms living together in groups where each member of the group has a defined role.
- **Hierarchy:**
 - Individuals in a group are ranked in order of importance. Those higher up often receive more food or mate with more others.



Mountain Gorilla Society



Silverback male
(mature & dominant)

Offers protection to the group, leads the group's search for food & mates with the females.

Adult females

(mature)

Child males & females

(immature)



Adult females care for young.

Young dependent on mum for milk, then for learning social skills & finding food.

Maturing infants leave for another group, or to start their own.



Advantages of Social Behaviour in Primates

- Maternal care/group protection increase survival rate.
 - Birth rate can be low.
 - Allows extended childhood for development of large brain.
- Young learn through observation & play.
 - Develop their own social skills.
- Knowledge is shared.
 - Avoids having to re-learn.
- Protection of food is shared.
- Detection/deterrent of predators is easier with groups working together.



The Effects of Dopamine on Human Behaviour

- Dopamine:
 - A neurotransmitter
 - A hormone
 - A precursor molecule for adrenaline

 - Increases general arousal.
 - Decreases inhibitions.
 - Increases creativity.

 - Released when given an unexpected reward.
 - Depressed when an expected reward is omitted.
 - So provides feedback to the brain when learning new behaviours (helps set up conditioned responses).



Low Dopamine Levels...

- Are associated with Parkinson's disease.
 - Treatment:
 - Administration of L-Dopa (a dopamine precursor).
 - Raises dopamine levels.
 - Linked to development of mental health conditions:
 - Schizophrenia
 - Obsessive/compulsive disorders



Dopamine Receptors

- Five different types (DRD1 – DRD5).
- DRD4:
 - A neurotransmitter receptor.
 - Over 50 known alleles to this gene.
 - Some of these alleles are related to certain behavioural conditions.



DRD4 Alleles

- One DRD4 allele is more frequent in ADHD sufferers.
 - Ritalin increases the amount of dopamine in the brain.
- Other DRD4 alleles are implicated in increased chance of addictive or risk taking behaviours (smoking, gambling, etc).



Latest News

- Researchers are now starting to look into the effects of other genes on behaviour.
- Eg. In 2007, eight genes were found to be linked to Obsessive-Compulsive Disorder (OCD).



Caution!!!

- The association of genes with behaviours must be treated with care.
 - A simple “gene to behaviour” link is very unlikely.
 - Genes often interact with each other.
 - Behaviour is a product of genes and environment.



Exam Tip

- Examiners often set questions on up-to-date research.
- Ensure you can give some examples that link behaviour to genetic influence.
 - Eg. Using dopamine receptor targeted drugs to treat psychosis (mental health condition).



Write definitions for these...

Innate behaviour	Unconditioned stimulus	Conditional response
Habituation	Conditioned stimulus	Learned behaviour
Classical conditioning	Imprinting	Operant conditioning
Skinner box	Social behaviour	Kineses
Reinforcers	Latent learning	Trial and error learning
Insight learning	Psychosis	Escape reflexes
Longitudinal study	DRD4	Taxes