

ECAP4010 – Introduction to Cognitive and Biological Psychology (Bio Section)

Dr Stuart Jones.



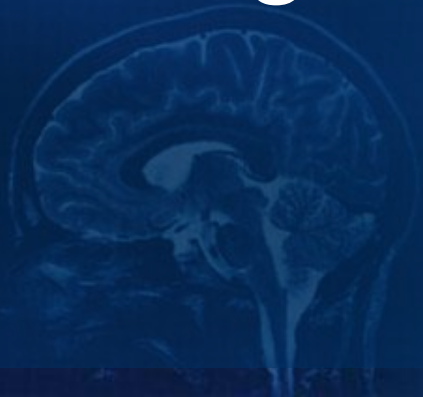
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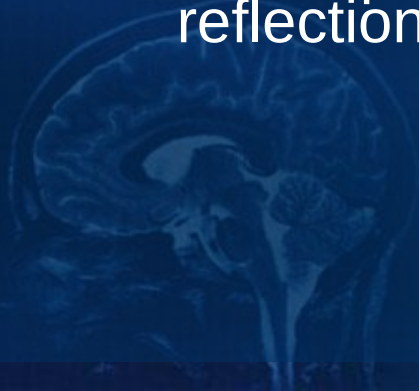
Aims

- To introduce students to the theories and applications of the biological basis of behaviour and human cognition.



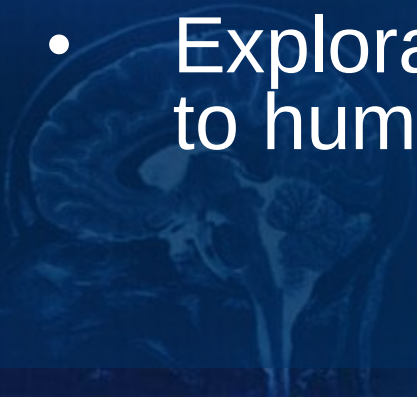
Learning Outcomes.

- demonstrate an understanding of theory and research relating to memory, attention and perception;
- demonstrate an understanding of the parts and function of the brain and nervous systems;
- demonstrate an awareness of the biological basis of behaviour and cognition, exploring neurological disorders related to behaviour and cognition;
- take responsibility for their own learning and skill development; including effective personal planning, self-reflection and project management skills.



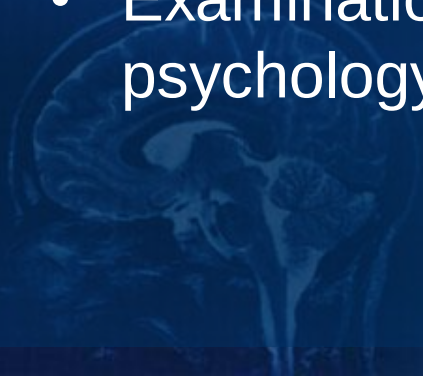
Content.

- An examination of the historical development of cognitive psychology and biological psychology.
- Consideration of a range of theories and research relating to perception and attention.
- Exploration of ideas and research relating to human memory and problemsolving.



Content

- Exploration of the parts and functions of the brain, nervous system and endocrine system and the relationship between behaviour and cognition.
- Consideration of the research methods used in biological psychology and their ethics and relevance to human psychology.
- Examination of the theories drawn from biological psychology experiments



Assessment.

- **ASSESSMENT**
- **Examination MCQ Assessment(1 hour) 50%**
- **Coursework (Essay) (2000 words) 50%**



REMEMBER

- The examination will be based on Biological Psychology.



Module Outline.

- See Module Outline Document on Moodle.



Recommended Reading.

- See online resources on Moodle.



Introduction to Biological Psychology.



Text Book definition.

- Biological Psychology is the field that relates behaviour to bodily processes, especially the workings of the brain.
(Rosenzweig, Breedlove and Watson, 2005).



Common Terms associated with Biological Psychology.

- Behavioural Neuroscience.
- Neurobiology.
- Biopsychology.
- Psychobiology
- Neuropsychology

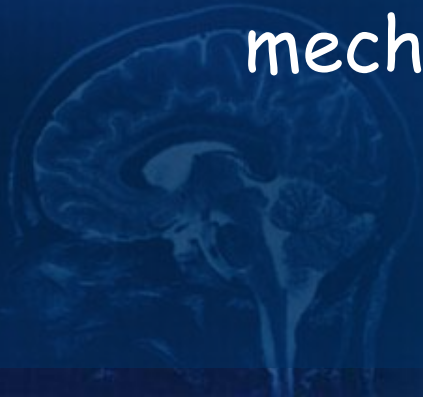


What is biological psychology?

The study of:

Physiological
Evolutionary
Developmental

mechanisms of behaviour and experience



How do Biological Psychologists do this?



How do Biological Psychologists do this?

- Study of brain functions.
- Specific areas of the brain has a specific function.
- Each area has a recognisable sub-area and each sub area has its own sub area.
- Microscopic levels.





Why?



Biological Explanations of Behaviour

- Physiological
- Ontogenetic
- Evolutionary
- Functional

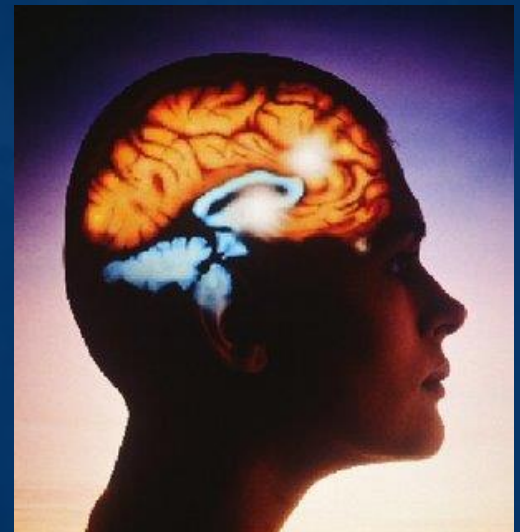


Physiological explanation

- Relates behaviour to the activity of the brain and other organs
- Machinery of the body - what is physically happening within our bodies

e.g.

- chemical reactions
- how brain activity controls the contractions of muscles



Ontogenetic explanation

- Development of a structure or a behaviour
- Effects of genetics, nutrition, experiences etc.



- How these interact to produce behavioural tendencies

Evolutionary explanation

- Considers a structure or a behaviour in terms of evolutionary history



Functional explanation

- Why a structure or behaviour evolved as it did
- In an isolated community a gene can spread by accident - genetic drift
 - Luckier individuals not necessarily healthier or better
 - Entirely Random

Dominant male has a lot of offspring so his genes spread



In larger populations, genetic drift isn't so powerful - genes must have some benefit



Birdsong (Kalat, 2001)



- Physiological
A particular area of songbird brain grows under the influence of testosterone, so this area of the brain grows larger in mature males
- Ontogenetic
A young male learns the song by listening to adult males.
 - must possess the genes that prepare him to learn the song
 - have the opportunity to hear the right song during a sensitive period during his early life

- Evolutionary

Birds with similar sounding songs - suggests that the species evolved from a single ancestor

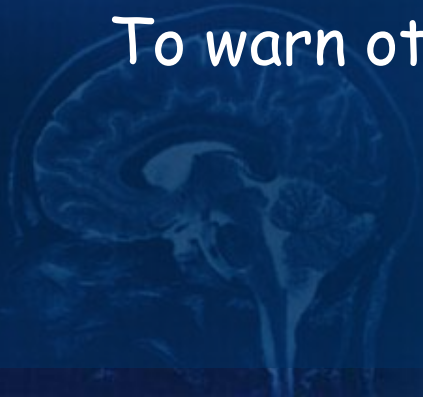
The *mechanism* responsible for the song they sing has remained active

- Functional

Usually - the male sings only these songs during the mating season and only in his own territory

To attract females

To warn other males that he is defending his territory



Integration of these different types of explanation:

- Which mechanisms are involved in the production of the behaviour?
- How it has developed within the person
- How it evolved
- What function it serves
- Is it an adaptive behaviour or a maladaptive behaviour?

Summary check

What is an:

Evolutionary explanation?

Physiological explanation?

Functional explanation?

Ontogenetic explanation?

The Brain and Conscious Experience

- Biological explanations of behaviour raise the mind – body or mind-brain problem.
- What is the relationship between the mind and body.
- For example.
 - “I became frightened because I saw a man with a gun”
 - Neuroscientists may say “You became frightened because of increased electrochemical activity in Amygdala”.

The Brain and Conscious Experience

- Dualism

The belief that mind and body are:

- different kinds of substance (non-physical and physical)
- they exist independently but somehow interact

Descartes:

Mind influences physical brain because both mind and brain interact at a single point.

- suggested pineal gland



Rene Descartes



"I THINK,
THEREFORE
I AM"
RENE DESCARTES

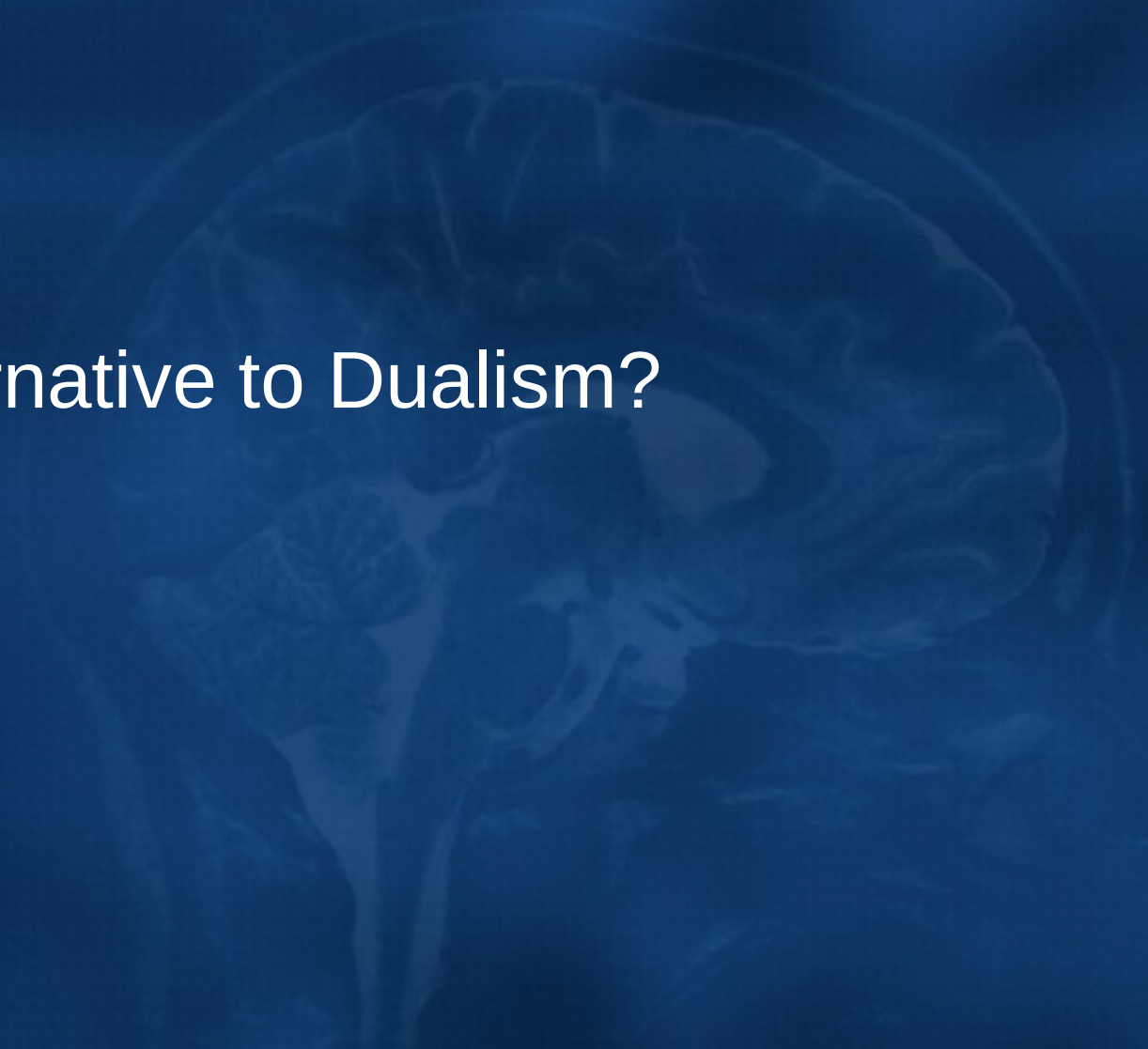
Student's version



Critique of Dualism

- Major objection is that dualism conflicts with law of conservation of matter and energy.
- Matter can transform into energy.
- Energy into Matter
- BUT, neither appears out of nothing.
 - Matter alters when other matter or energy acts upon it
 - A mind not composed of energy or matter could not make anything happen.
 - Muscle Movements.

Alternative to Dualism?



- Monism

The belief that the universe consists of only one kind of existence or one kind of substance

Three forms of monism:

Materialism

- everything exists in the material, or physical
- Mental events don't exist at all.

Mentalism

- only the mind really exists

Identity Position

- mental processes same thing as certain kinds of brain processes, but just described in different terms

Mind is Brain Activity

Mental Activity is what happens to the Brain.

What is Consciousness?



Questions

- Why any kind of brain activity is associated with consciousness



- How this can be associated with consciousness

Suggestions

Chalmers (1995) - consciousness is a fundamental property of matter - precisely because we can't explain it - it just is

Dennett (1996) - an enormous number of small problems - once we've solved these, there is no 'hard problem'

Churchland (1996) - might still be a conventional overall physical explanation for consciousness

Researching consciousness - a problem

Mass and charge (energy) can be observed, but not explained

Consciousness is neither observable nor measurable - so cannot (yet) be explained

We can only infer the consciousness of each other
- the problem of other minds

'I alone am conscious' - solipsism

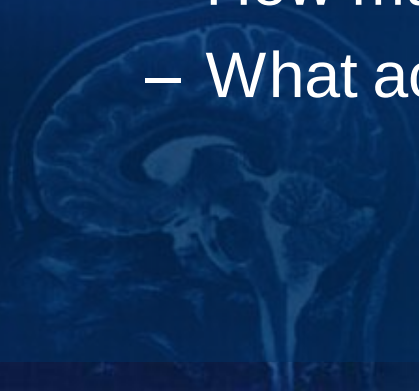


This aspect of the module

- The structure of the brain
 - what it is made up of
 - how it is made up
- Which of the areas and structures of the brain are implicated in particular behaviours and experiences

Task.

- In Groups, research and find 10 facts about the Brain.
- Present your findings about rest of the class.
- Things you might want to consider.
 - Size of the Brain.
 - What are Neurons.
 - How many Neurons.
 - What activities does the Brain control.



BRAIN FACTS

- Brain weighs approximately 3 lbs (1500 grms)
- Brain has approximately 100 billion neurons and 1 trillion supporting cells
- Neurons grow and organize themselves into efficient systems that operate a lifetime
- Brain controls ALL activities
- Emotion and cognition are intertwined
- Neurons can re-route circuits
- Brain and environment involved in delicate duet
- Brain never stops adapting and changing

