

# THE **BRAIN** AND **BEHAVIOUR**



BY STAFF OF ACS DISTANCE EDUCATION

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**Published by**

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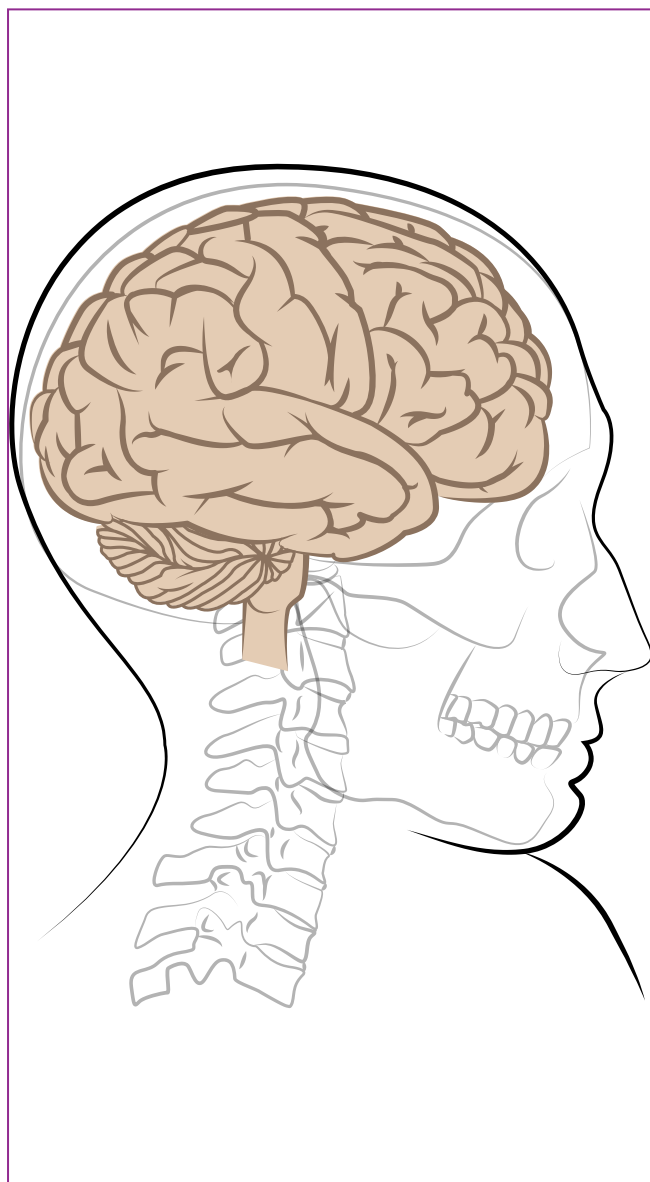
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**ISBN: 978-0-9942948-0-7**

# CHAPTER 1 UNDERSTANDING THE HUMAN BRAIN

The human brain is an amazing piece of architecture. Weighing in at an average of just 3 pounds, or 1.3kg, our brains have evolved to be the most complex organs on the planet, and they are more organised than the entire cosmos. It is estimated that they contain 100 billion neurons and there are some 100 trillion connections between them. It is perhaps not surprising that studying the brain has been the life's work of so many eminent scientists. Some would argue that given their intricacy, our brains are not even capable of understanding themselves.



## THE BIOLOGY OF THE BRAIN

Although psychologists are primarily concerned with behaviour, an understanding of the biology of the brain and central nervous system can help to unravel why people behave the way they do in given instances. In fact, biological psychology holds that all our behaviours, thoughts and experiences are a direct consequence of activity taking place in our brain. For example, if someone experiences pain because they pick up something hot, they will drop the hot object. This is a simple stimulus and response (or cause and effect) relationship. When this happens nerve pathways in the body pass information to the brain and we act accordingly. Another example is when events inside our bodies cause us to behave in a particular way. For instance, we feel hungry when stores of nutrients are depleted. When this happens, the hypothalamus region of the brain detects

changes in hormone levels in the digestive tract and promotes a hunger response. As you can see, much of our behaviour is influenced by our biology and its interactions with the environment.

However, not all causes of behaviour are quite so easy to explain. There are other underlying determinants of behaviour - genetics being one. In fact, we have long known that genetics is a key determinant of how we behave and this can most obviously be seen through studying our nervous systems. Closely linked to genetics is human development. Development is governed by our genes and their interactions with the environment.

As well as linking behaviour to the brain and central nervous system, biological psychology is also concerned with evolution. It suggests that we behave the way we do because of how we have evolved over many thousands of years. Behaviours which were successful can be seen as helping survival and reproduction. Our ancestors developed these types of behaviours whereas others did not and eventually became extinct.

## HOW CAN STUDYING ANIMALS HELP?

Although we consider ourselves to be quite different from other animals there are many similarities. From an evolutionary perspective we have evolved from a simpler life form. We cannot ever be entirely sure how humans evolved but we can use comparisons with animals to try and understand some of our behaviours. For

instance, both humans and animals have some behavioural responses which are regarded as being inbuilt or instinctive. Other animals also display behaviour which can be regarded as intelligent. As such, we can learn a great deal about our own behaviour through comparative studies of animals.

## WHO IS INTERESTED IN THE BRAIN?

As well as biopsychologists, others who are interested in the brain include neuropsychologists, neurologists, neuroscientists, geneticists, psychopharmacologists - in fact many other people in a variety of roles seek to obtain some understanding of the brain, its functioning and its role in behaviour. We'll briefly review some of those now.

### Biopsychology

This is the branch of psychology which is focussed on the relationship between biology and psychology. It is primarily concerned with a) How our thoughts, experiences and behaviour can be linked to brain activity and events in the nervous system, and b) How evolution has impacted on the way we process information. Biopsychology can be broken down into many areas.

### Neuropsychology

This field is concerned with the psychological outcomes of brain damage. Much of the data collected to advance the understanding of this area comes from case studies