

# **Biological Psychology**

**An Illustrated  
Survival Guide**

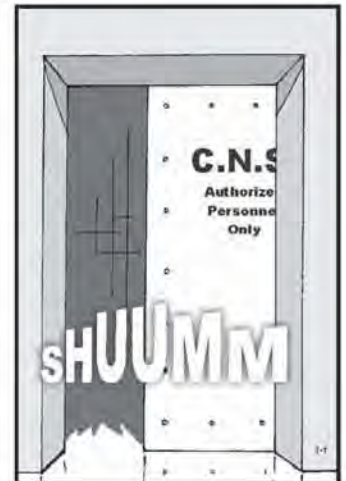
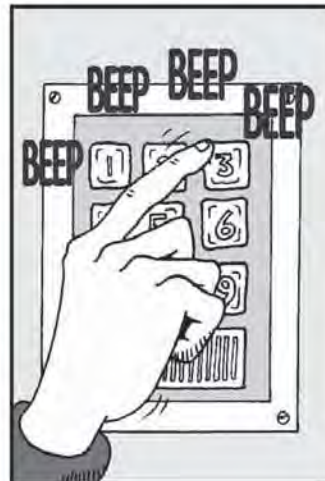
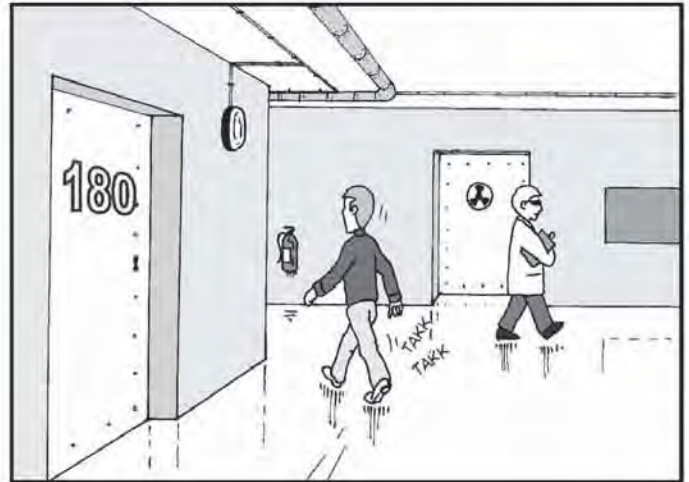
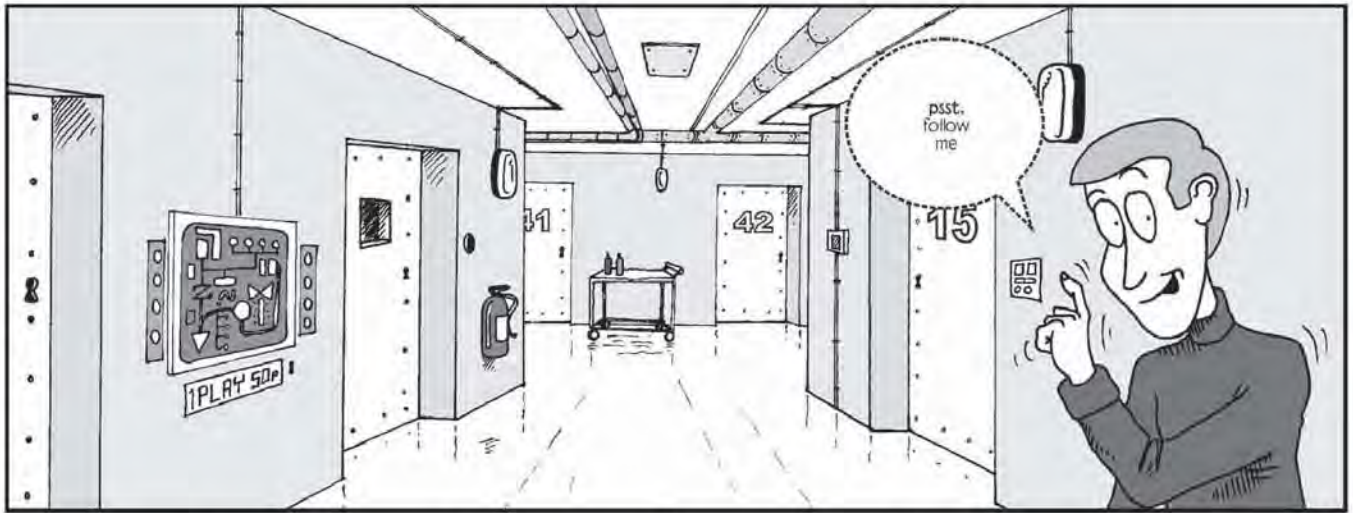
**Paul Aleixo  
and  
Murray Baillon**

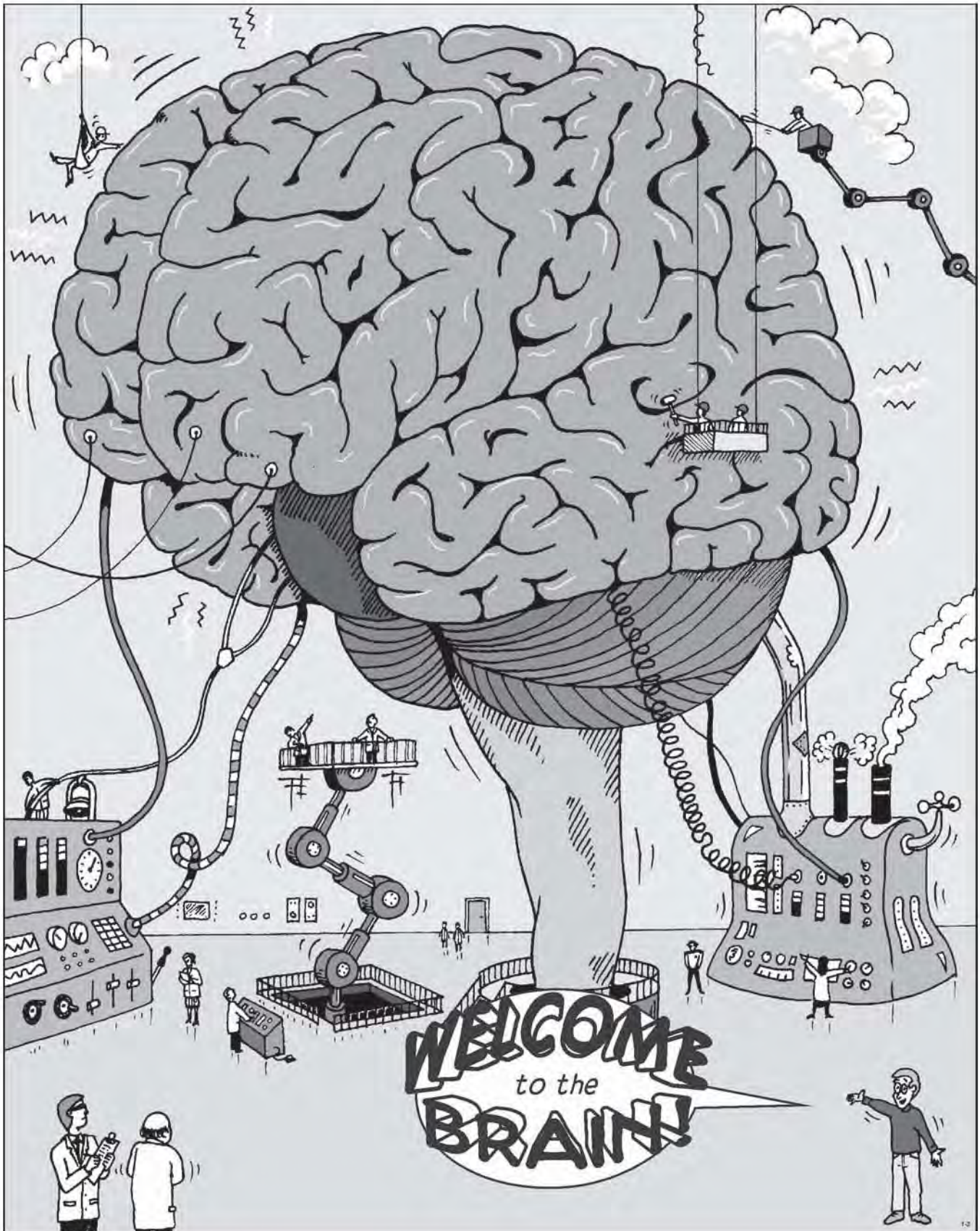


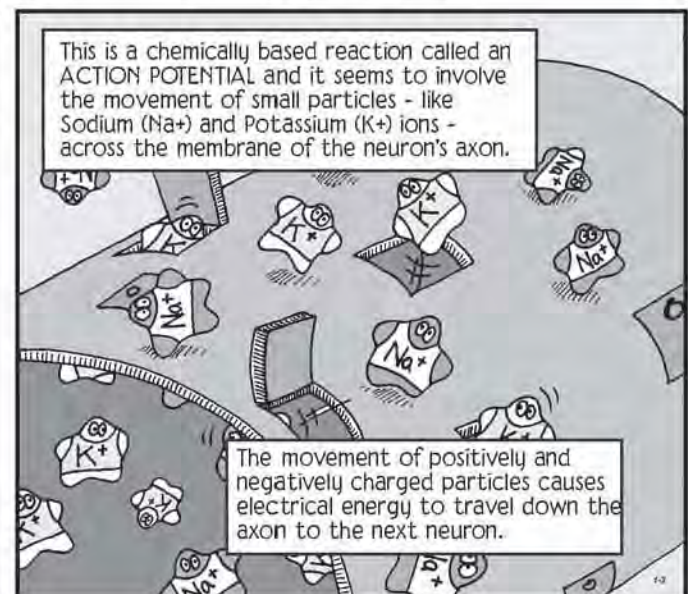
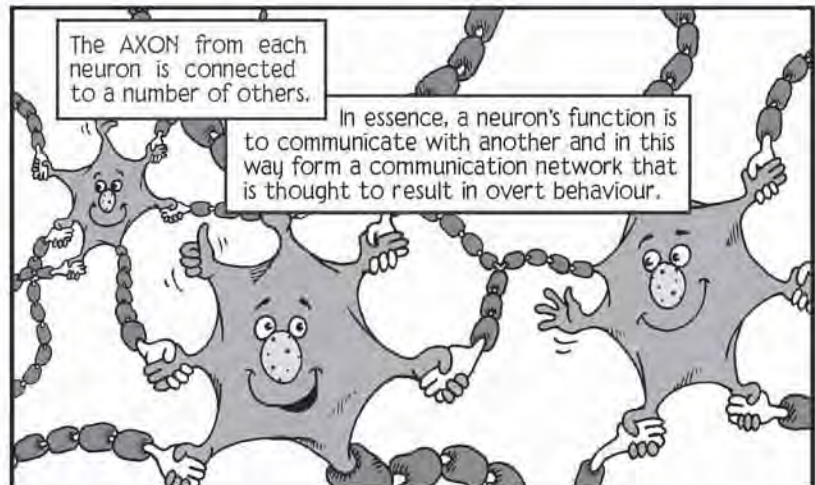
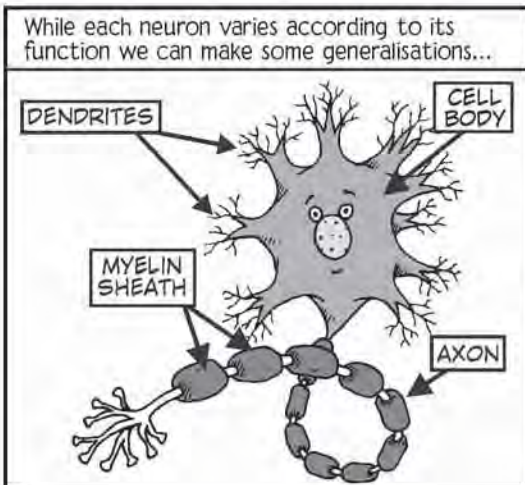
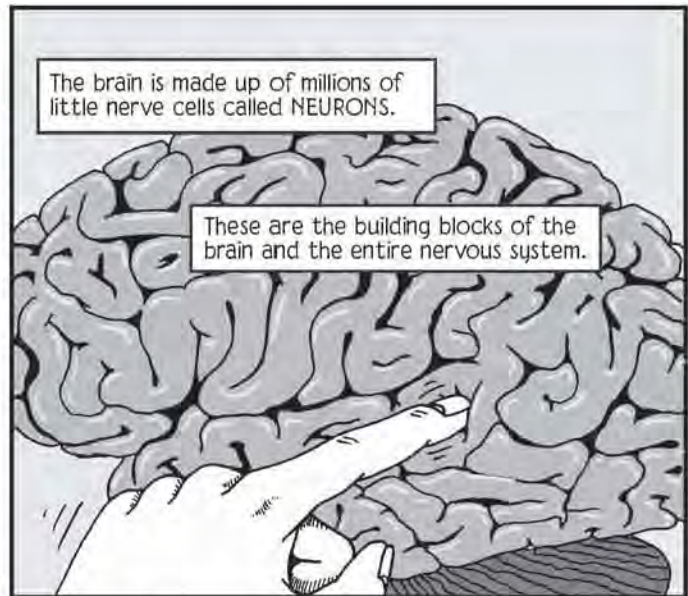
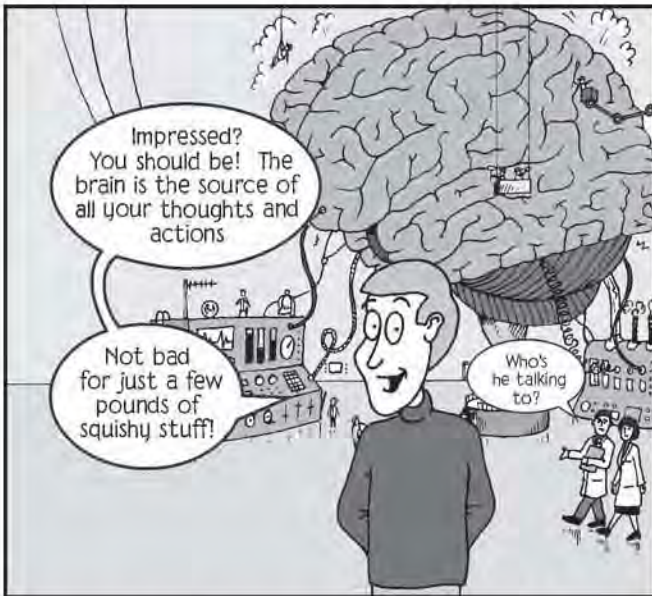
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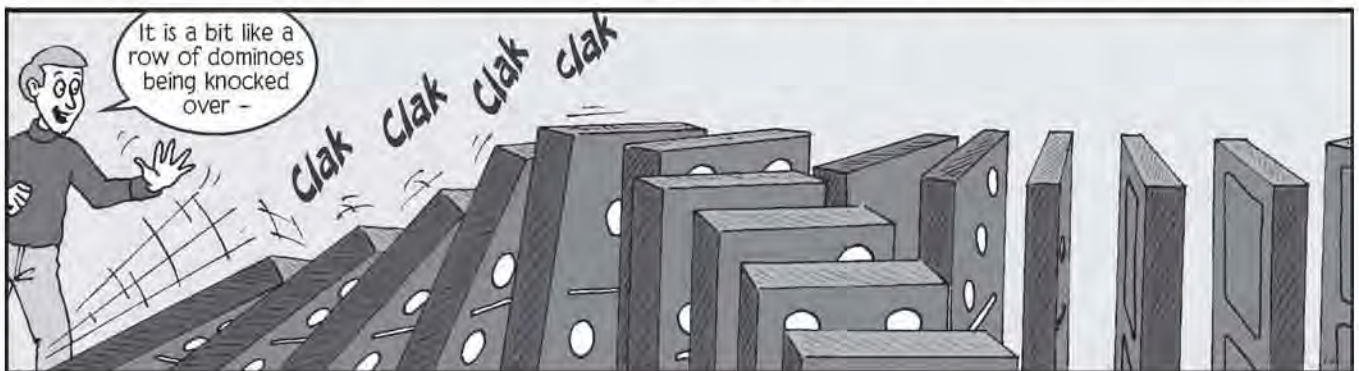
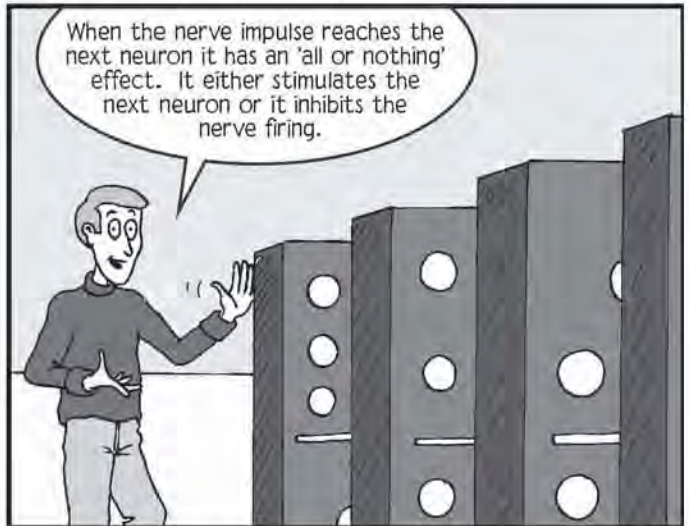
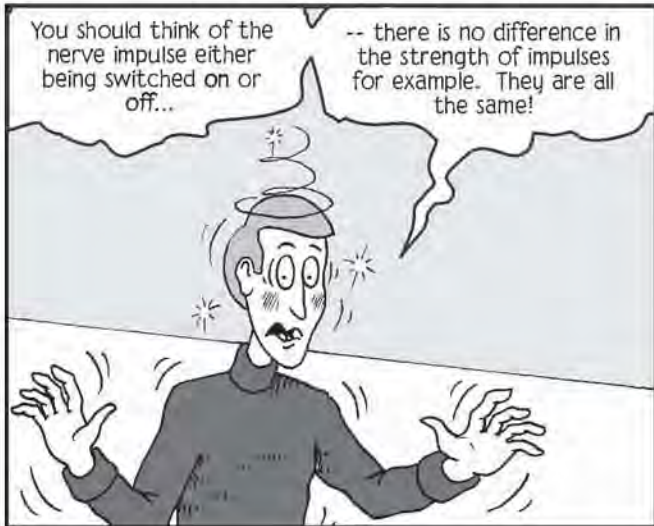
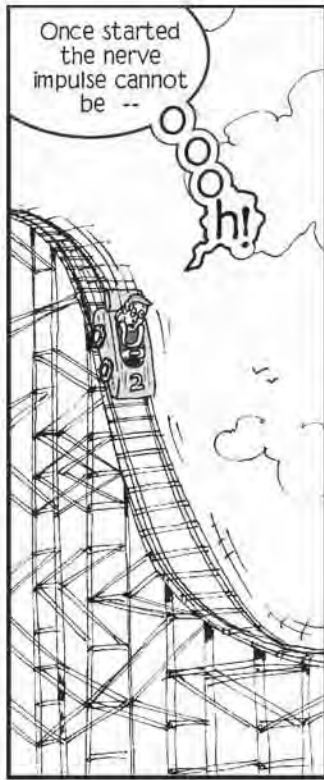
# CHAPTER 1

## THE BRAIN AND THE NERVOUS SYSTEM









This network of neurons, all firing impulses, affect other neurons and an overall pattern of nerve impulses is formed that results in behaviour!

So, it's all very simple. Each axon is connected to the dendrites of another neuron that sends the signal on to another neuron it is connected to and so on....

...or is it?

Actually, the majority of neurons do not touch any other neuron!

VERY TINY GAP

...so how is the nerve impulse carried across this gap?

When the nerve impulse reaches the end of the axon, this causes the release of chemicals known as neurotransmitters.

This gap is called a **SYNAPSE**.

NEUROTRANSMITTER MOLECULES

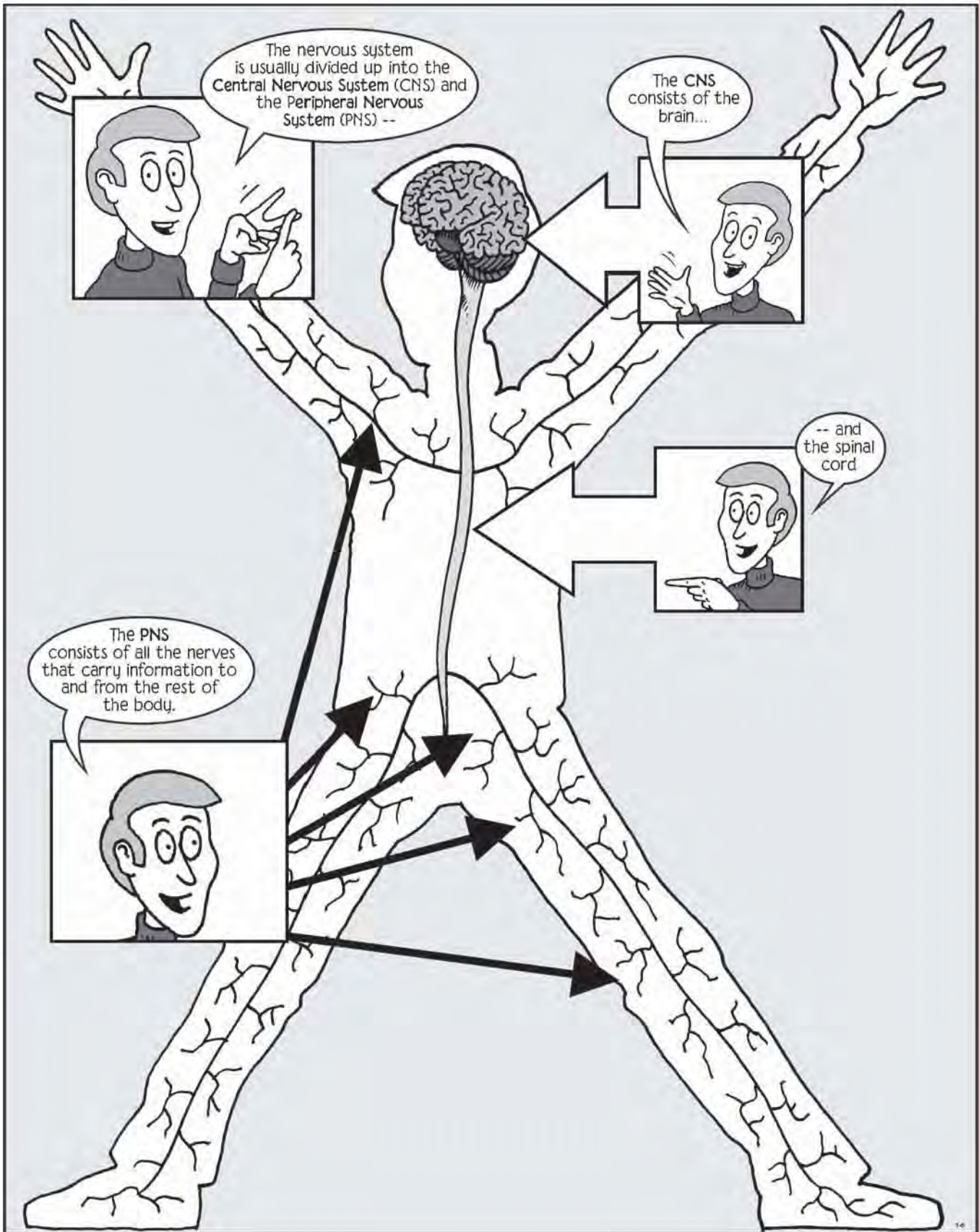
RECEPTOR SITES

SYNAPTIC GAP

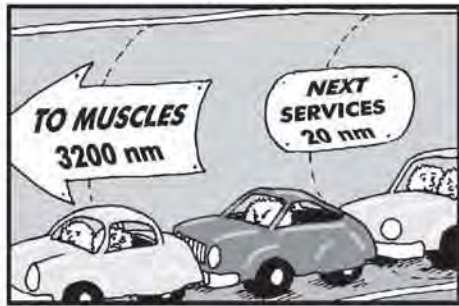
When the neurotransmitters reach receptor sites in the receiving neuron this causes a chemical reaction.

This sets up the action potential and sends the nerve impulse on, down that neuron's axon.

Since each neuron can be connected to many others and each impulse can either inhibit or stimulate a neuron next in line, this creates a very complex - and fast - system of neuronal circuitry.



### MOTOR NERVES



### SENSORY NERVES



Peripheral nerves are made up of motor nerves, which carry information to the body from the CNS --

-- and sensory nerves that convey information to the CNS

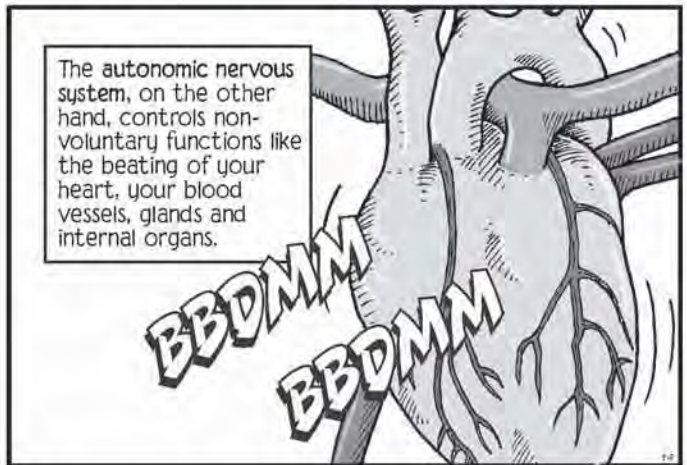
The PNS is further divided into the somatic nervous system and the autonomic nervous system...



The somatic nervous system is involved in the control of voluntary actions such as running...



The autonomic nervous system, on the other hand, controls non-voluntary functions like the beating of your heart, your blood vessels, glands and internal organs.





The ANS has two functions commonly called the sympathetic and the parasympathetic nervous system.



Imagine that you are running for a bus...

VROOOOM!

FOR BUS

Eat FOOD!!!


EWAN MEE

Hey.... Stop....That's my bus!!



When you're... pant... running... the sympathetic nervous system is responsible... huff...pant....for getting your... hfff... body...ready for action....

huff... pant... puff... it raises... augh... your heart rate, breathing rate... huff... and so... on.



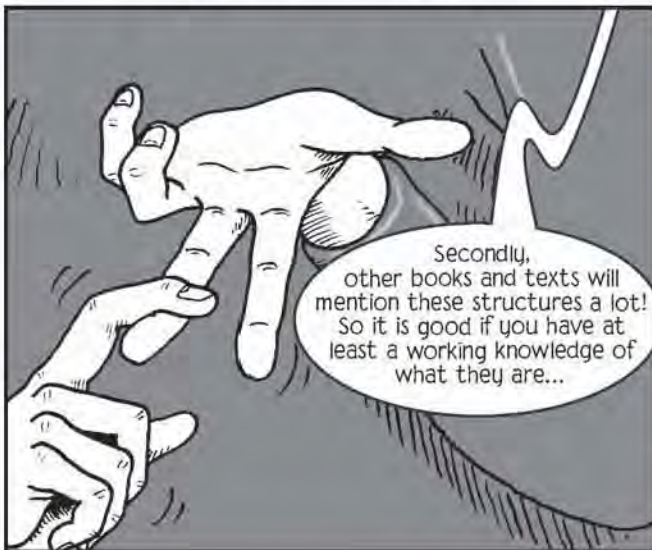
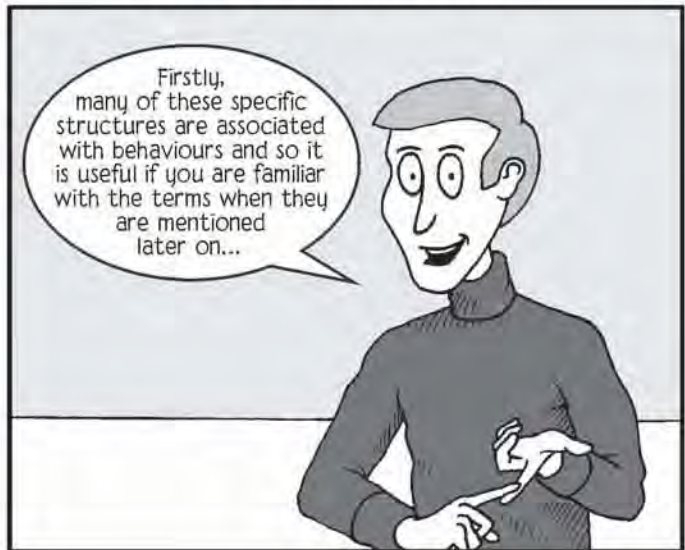
When you stop the activity... ahuu... it is the parasympathetic nervous system that slows the physiological processes of the body down again... huff...

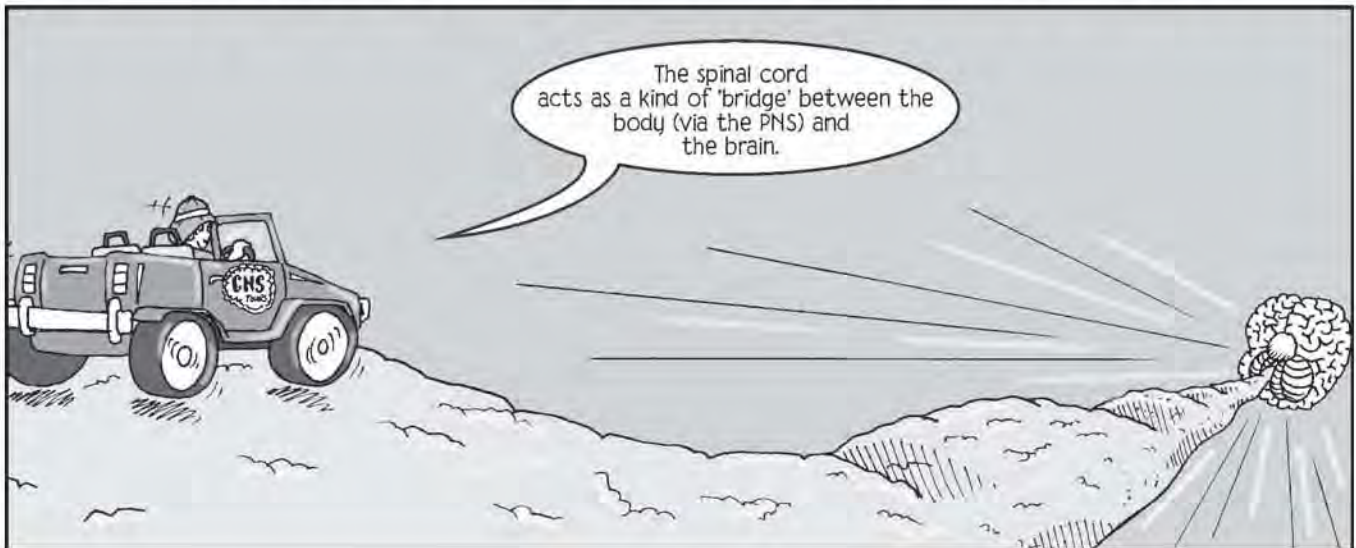


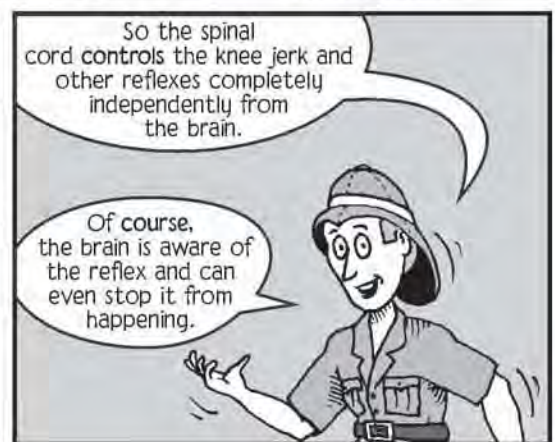
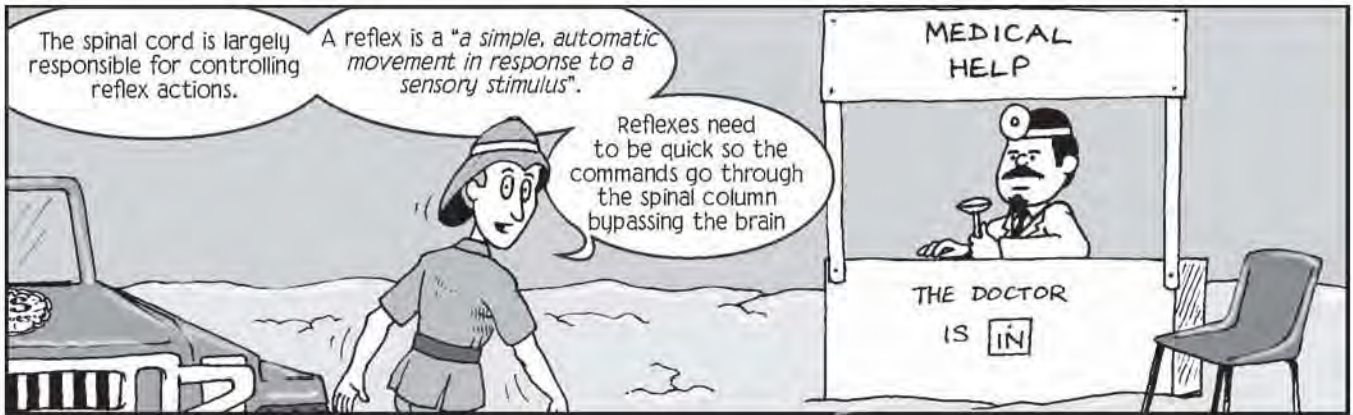
So the sympathetic and parasympathetic nervous systems work in opposing ways depending on what the body needs.

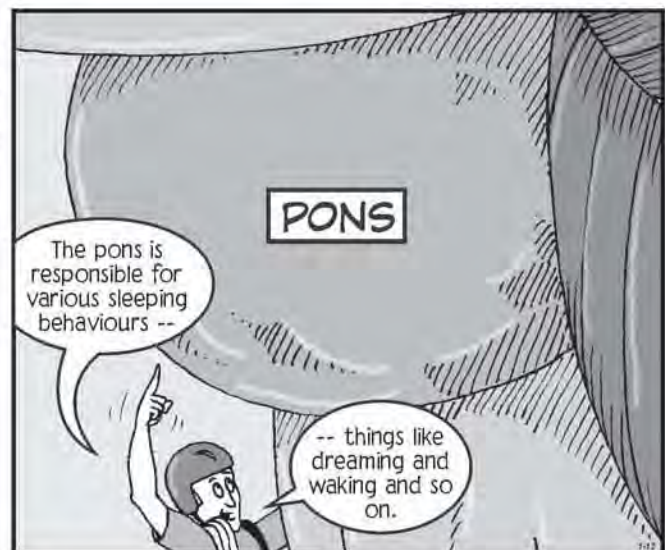
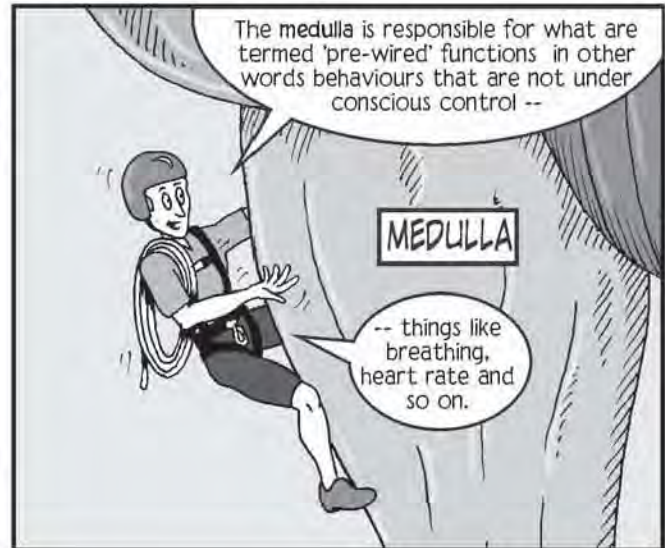
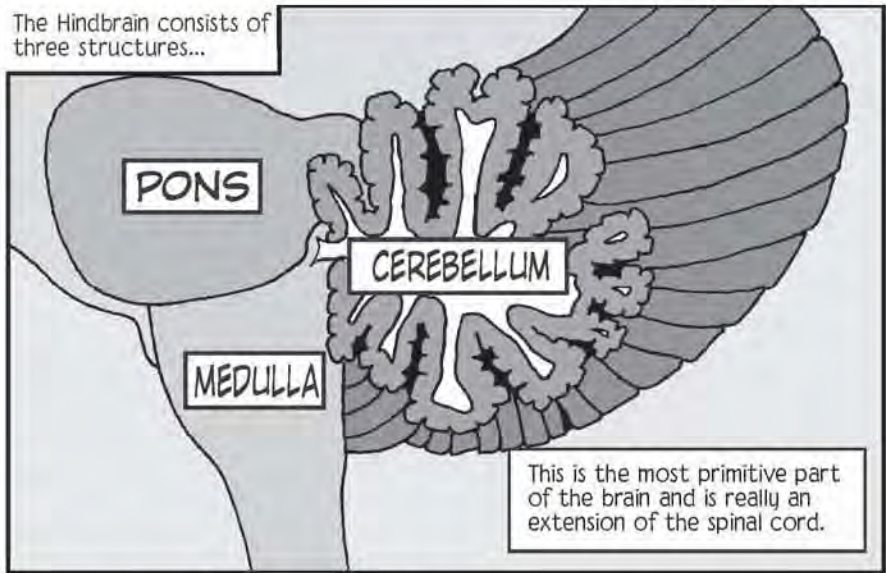
Don't worry love, there's another no. 42 along in 10 minutes!

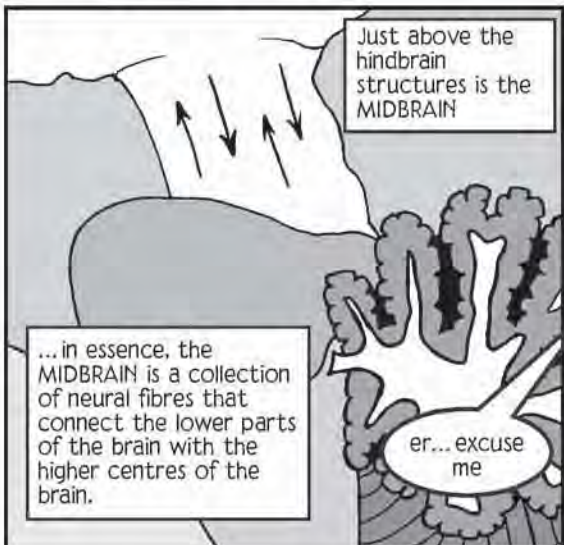
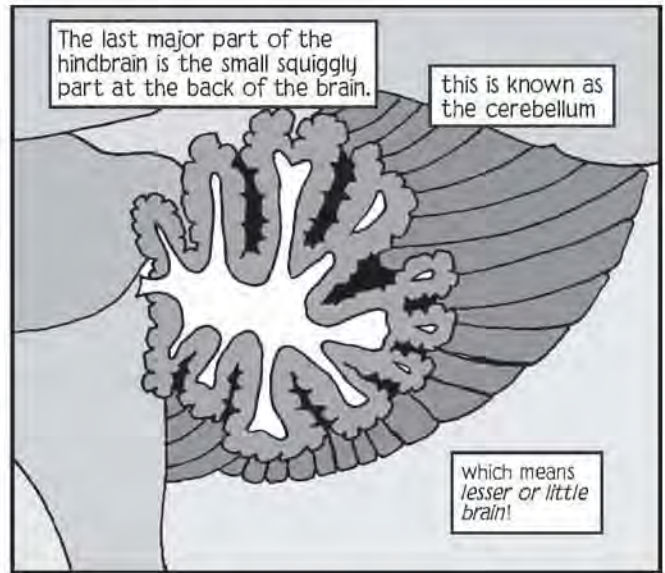
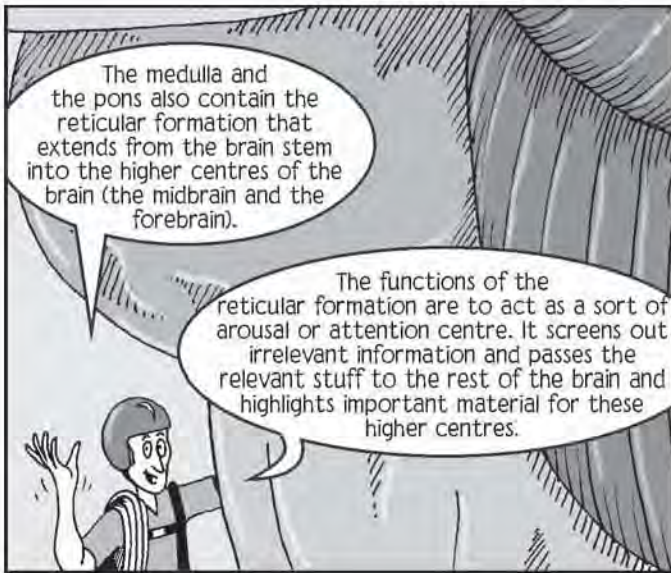


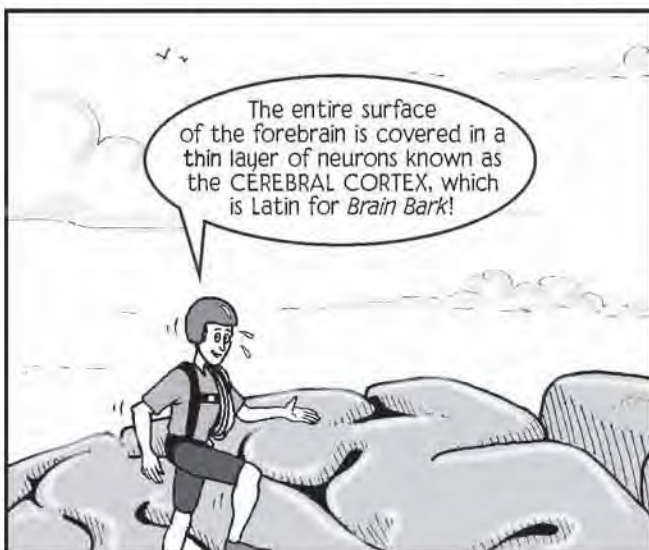
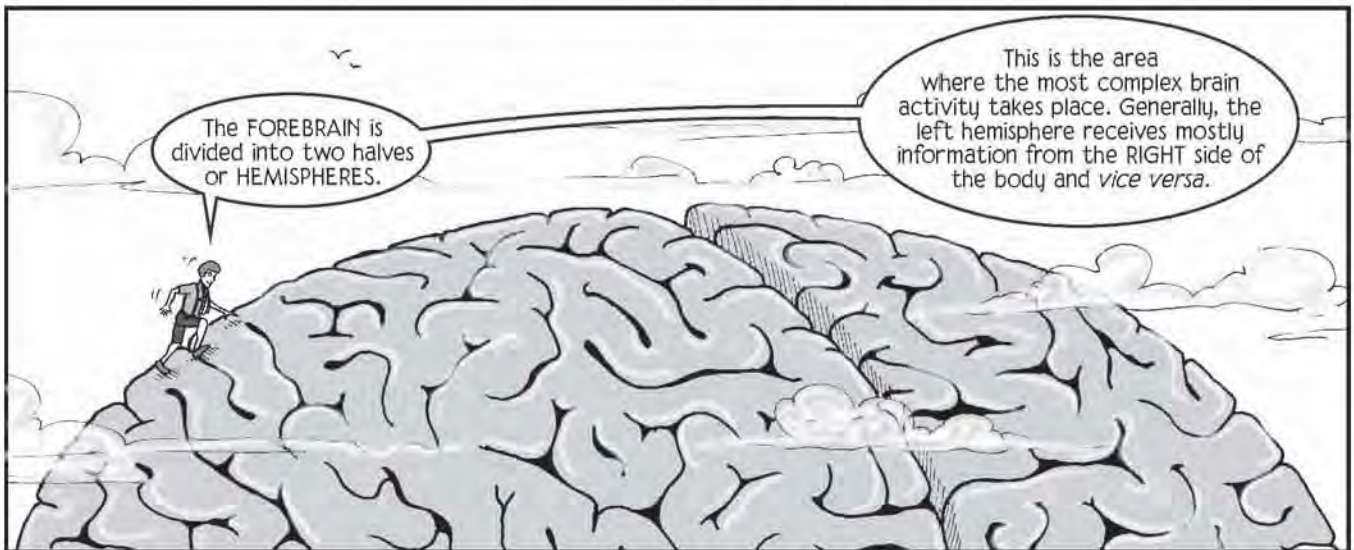
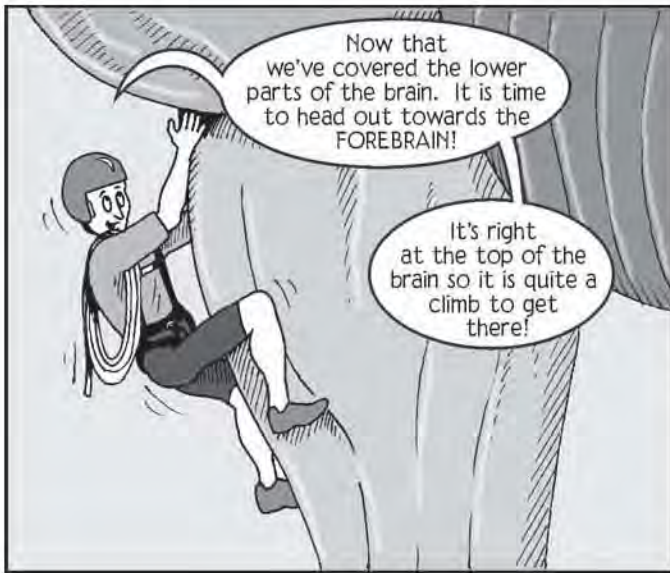


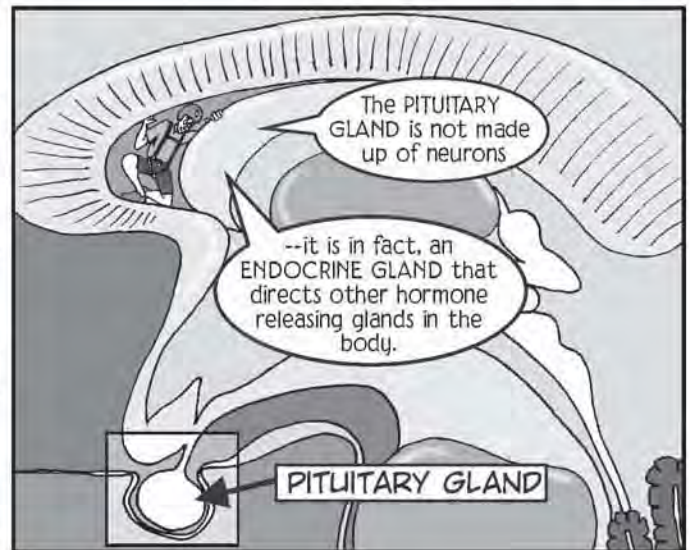
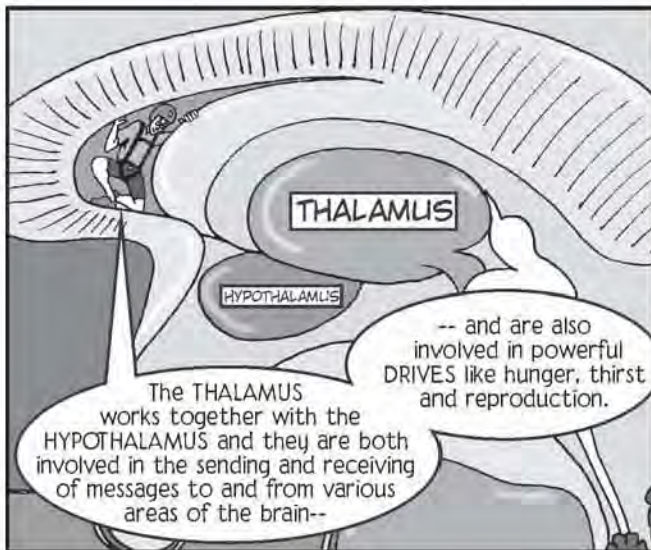
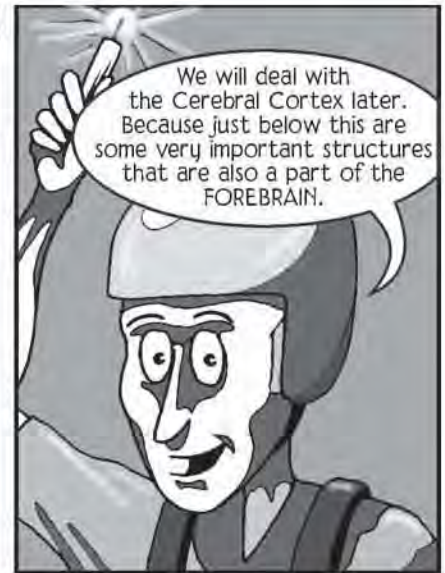
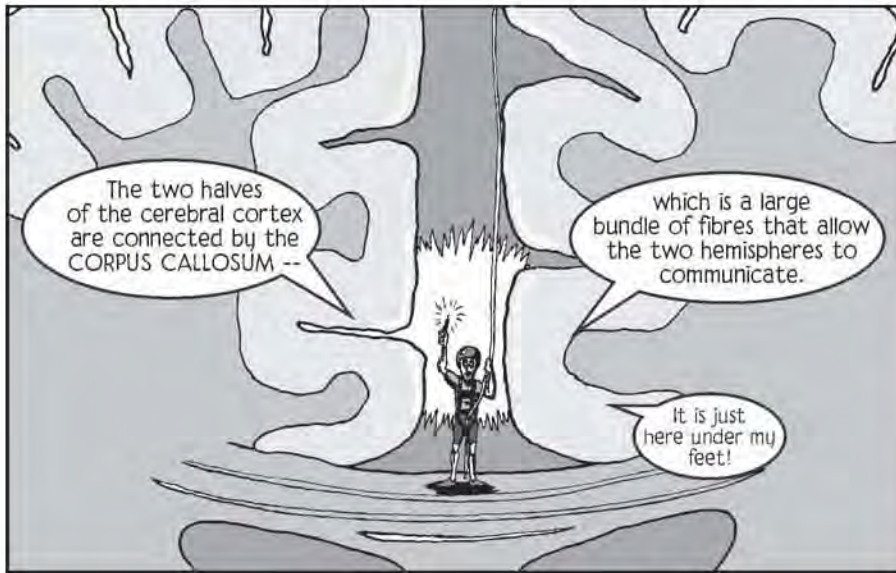








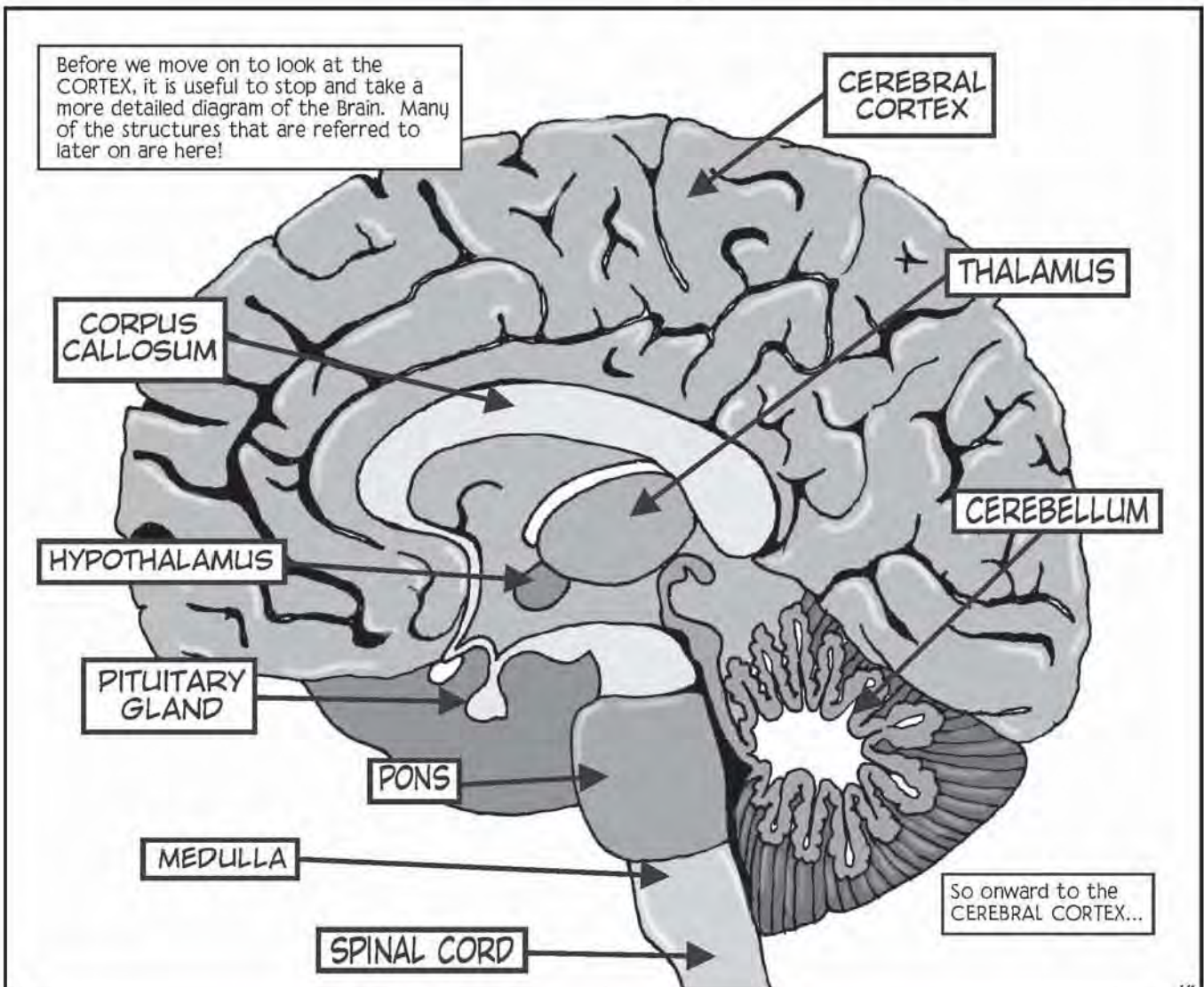
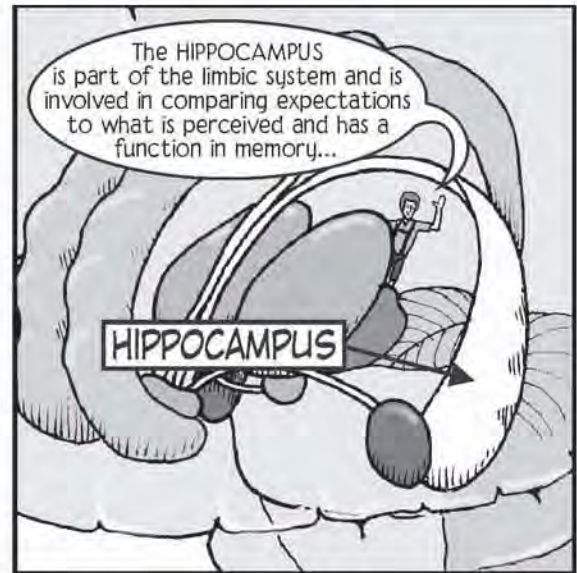
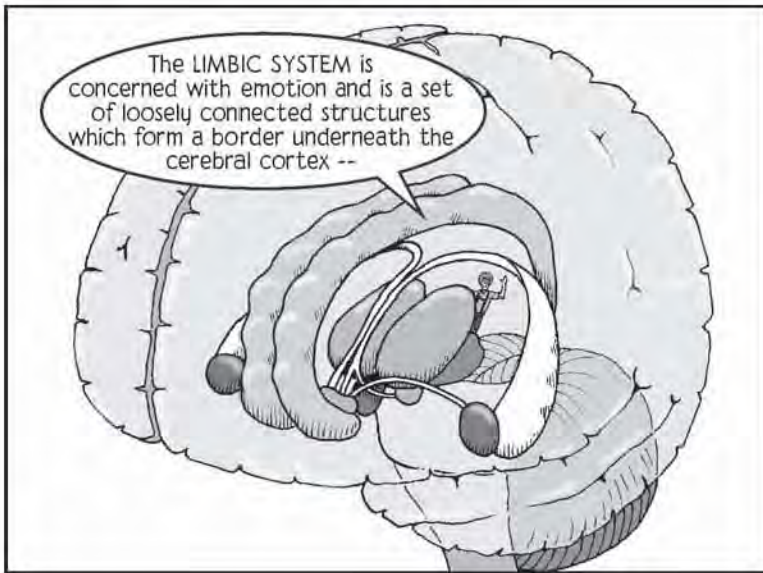


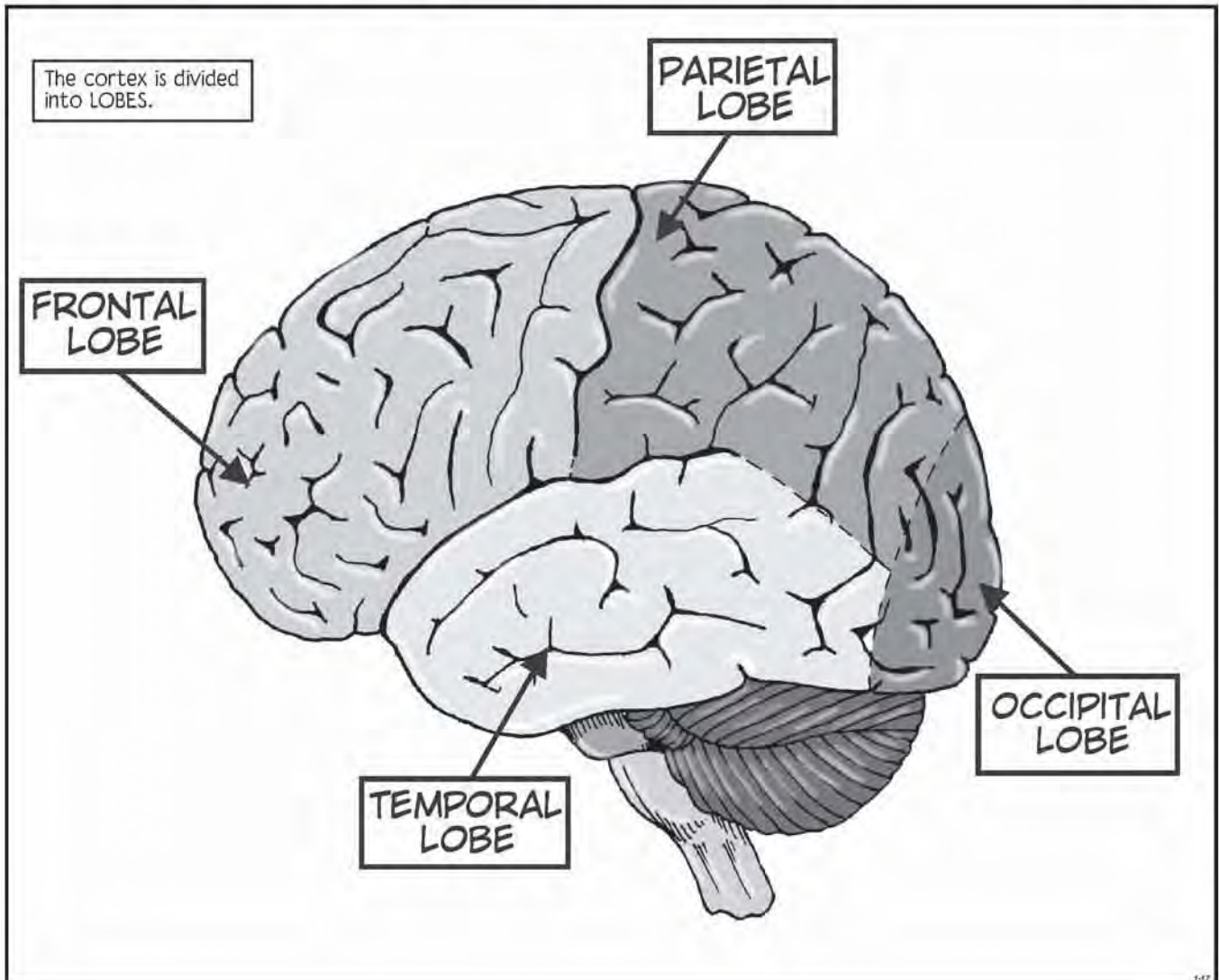
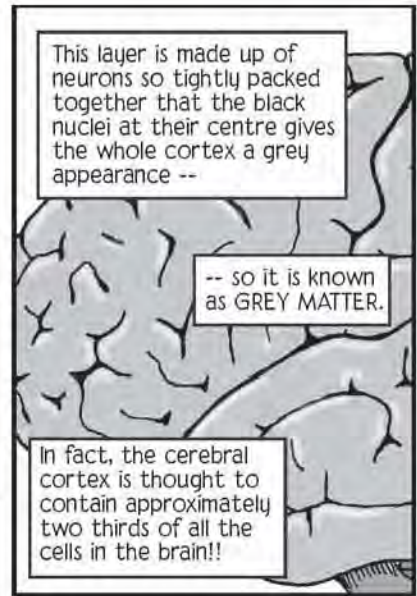


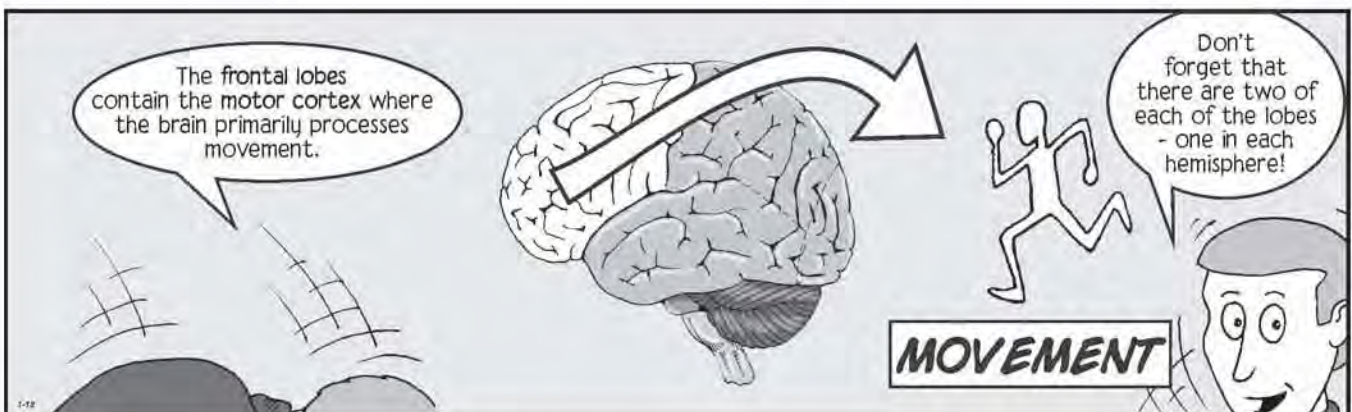
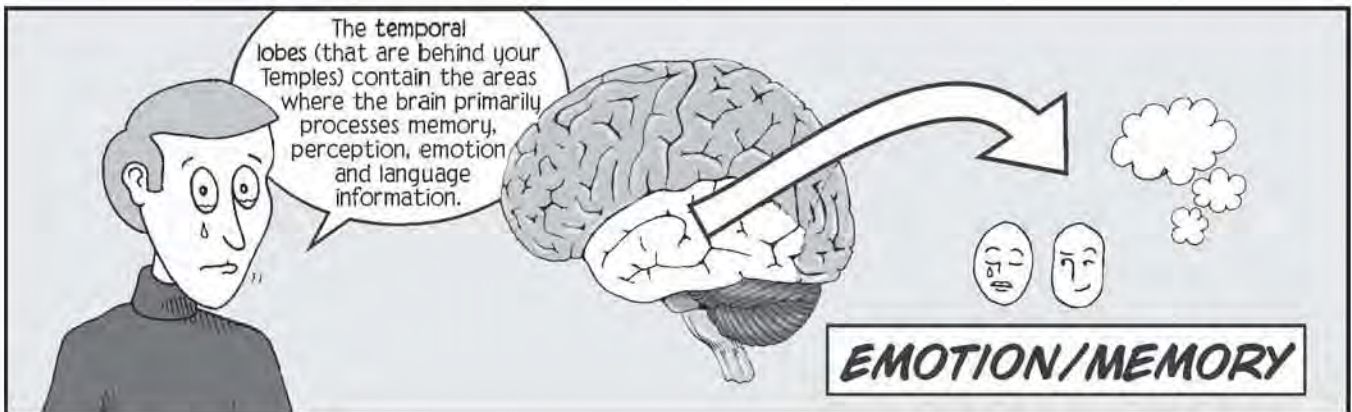
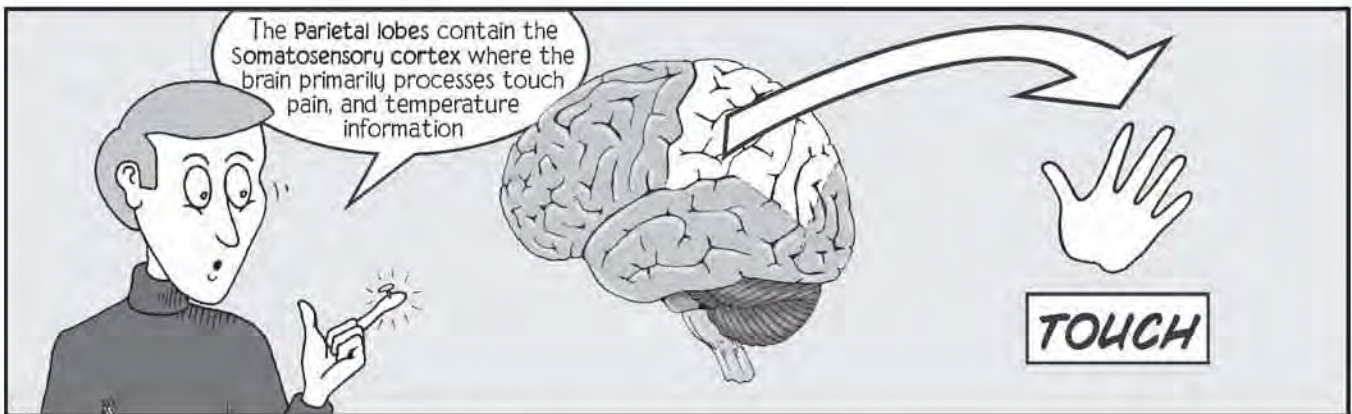
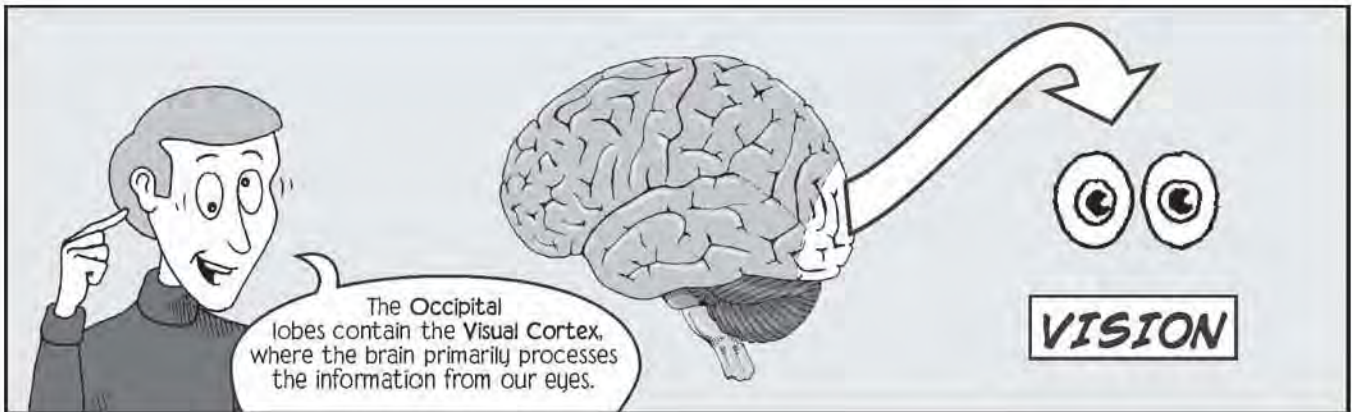
The hypothalamus sends messages to the pituitary gland to secrete hormones which in turn affect other hormone secreting glands like the adrenal glands, the gonads and the liver.

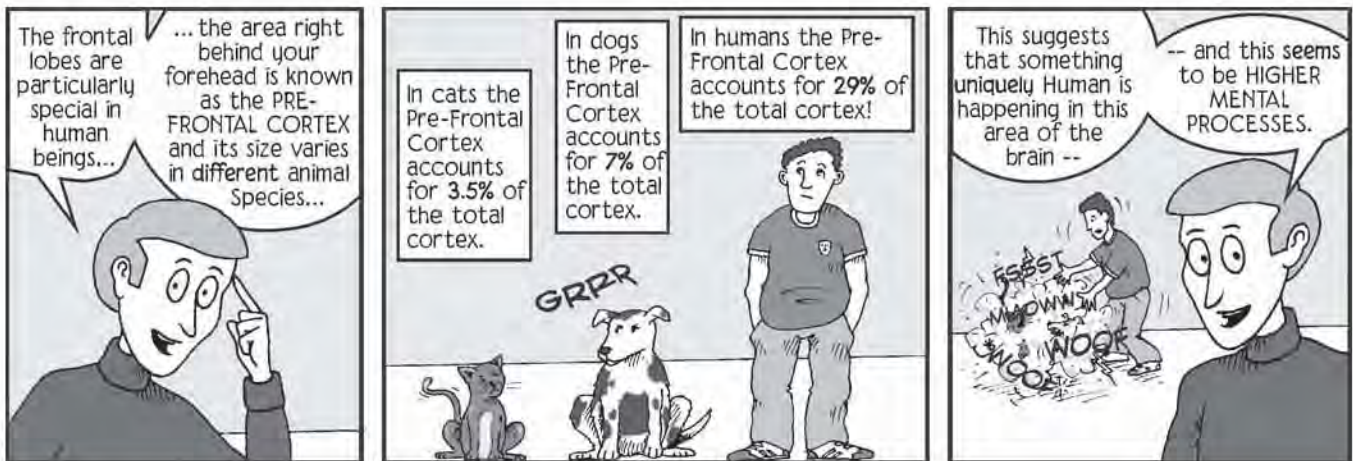




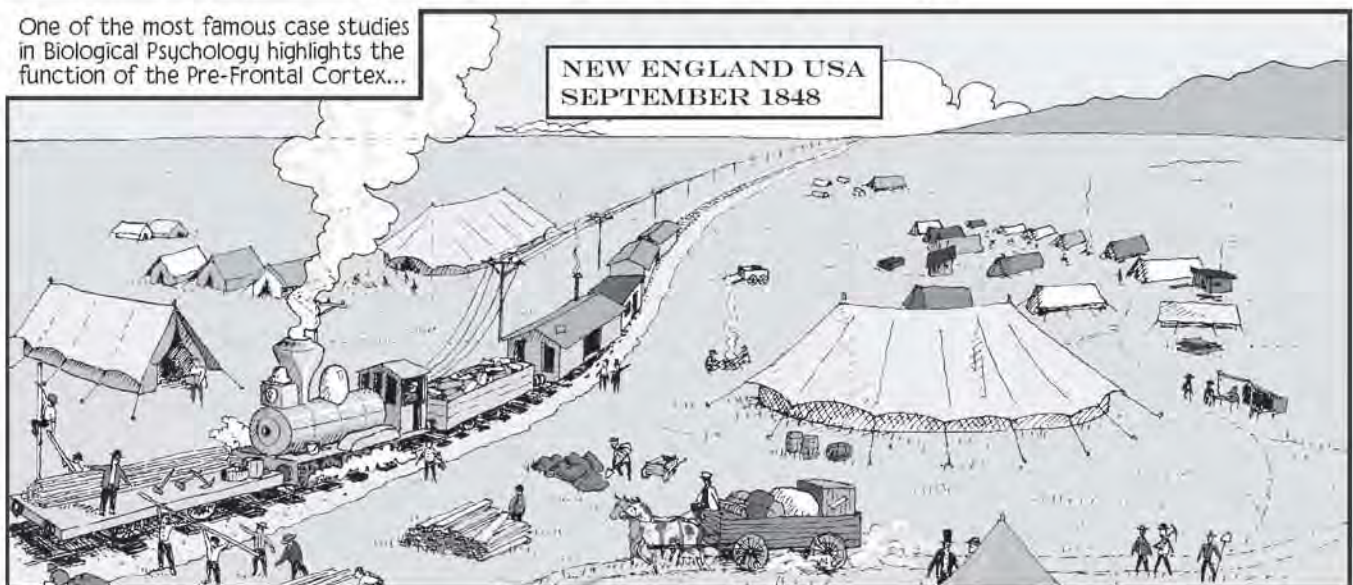






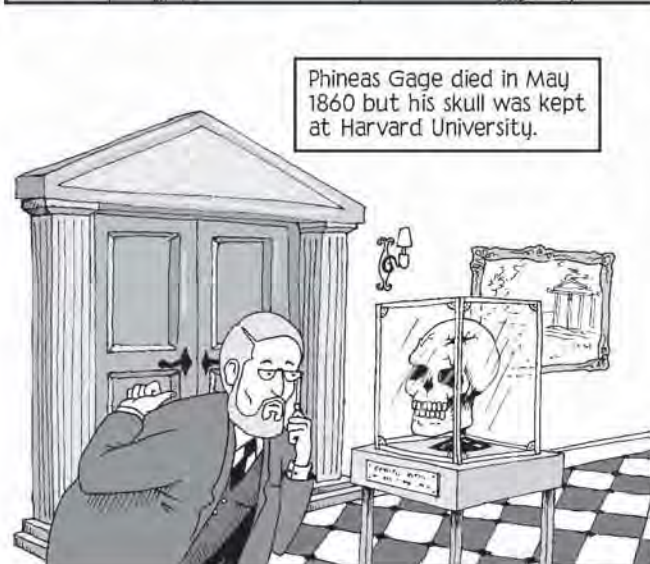
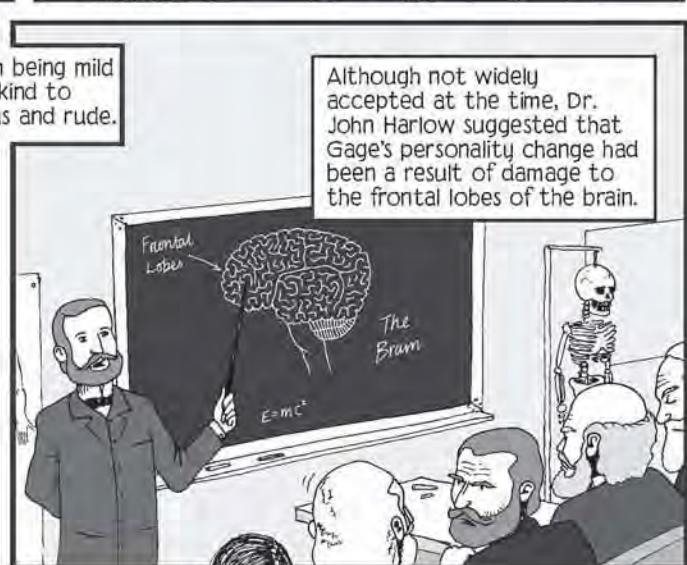


One of the most famous case studies in Biological Psychology highlights the function of the Pre-Frontal Cortex...



Unfortunately, on this occasion, the explosives went off prematurely.





The case study of Phineas Gage was the first clue that suggested that the pre-frontal lobes of the brain are responsible for higher mental processes like personality, the ability to plan behaviours, set goals and intention behaviour.

The case of Phineas Gage also highlights the early thinking on what is known as the *Localisation of Function* in the brain.

In other words it shows that some behaviours can be *localised* to specific parts of the brain.

PAUL BROCA was an early pioneer of localisation of function. He discovered that damage to a small area on the left side of the brain had caused his patient to lose the ability to speak.

This area is now known as BROCA'S AREA and is an area of the brain important for language production.

By the 1880s most researchers in the area were convinced of the concept of localisation of function in the brain...

...although, it was later discovered that the extent of the localisation is not as great as was once thought!

These and other case studies led early researchers to see the brain as *explainable*.

This meant that studying the brain could provide answers for what had, up to that point, been seen as the domain of a separate concept - 'the mind.'

The rest of this book will discuss the various functions of the brain in more detail and at times we will refer to specific parts of the brain to understand how things 'work'.

For now, I just want you to take a few moments to think about the brain in all its glory and the amazing things you are capable of simply because you have one of your very own!

Er... you do own one, don't you?