

# Introduction to Biological and Developmental Biopsychology

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The primary motor cortex is responsible for motor movements and coordination. Damage is associated with speech impairments, body image distortions, and difficulty in learning motor skills.

The somatosensory cortex receives and integrates sensory information. Damage is associated with: affected perception of touch, phantom limb, and difficulty recognising one's own body.

The subiculum has roles in: learning, memory, spatial navigation, mnemonic processing, and regulation of stress. Damage is associated with memory impairment, disorientation, and stress.

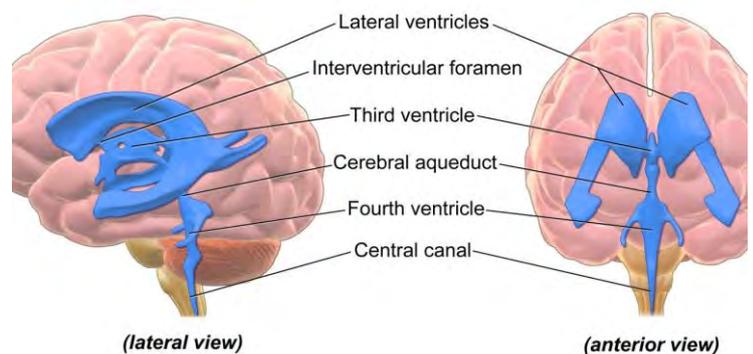
The superior temporal gyrus is the primary auditory cortex, with roles in: sound processing, speech comprehension, and auditory memory. Damage is associated with difficulty processing and recognising sound, and problems comprehending speech.

Wernicke's area is localised to the left hemisphere and focuses on language comprehension. Damage is associated with incorrect words and the inability to comprehend language.

## Ventricles

There is a system of ventricles which contain cerebrospinal fluid. The CSF supports surrounding structures and provides and removes chemical substances from the brain.

There are four ventricles. Two lateral ventricles follow a C-shaped course through all the lobes. The third ventricle occupies most of the midline region of the diencephalon and is connected to the fourth ventricle via the cerebral aqueduct. The fourth ventricle is located between the cerebellum and the pons and connects to the central canal of the spinal cord.



Enlarged ventricles are often associated with dementia.

## Development of Perception

Sensation refers to the processing of basic information from the external world produced by the sensory receptors.

Perception is the process of organising and interpreting this sensory information.

### Visual Acuity

Neonates see blurred images which do not sharpen across distances. Eye movements are slow and imprecise, but they begin tracking and scanning the environment almost immediately.

After 1 month, infants can track slow moving objects and can adjust their eyes to focus on near and distant objects.

By the age of 8 months, full visual acuity is approaching.

Young infants prefer to look at patterns of high visual contrast as they have poor contrast sensitivity (the ability to detect differences in light and dark areas). This is because the cones differ in shape, size, and spacing. They only process 2% of light hitting the retina. Young infants also have limited colour vision.

remain available. These interfere with the metabolism of amines and require patients to avoid certain foods.

> Selective Serotonin Reuptake Inhibitors: once a neurotransmitter has transmitted its impulse, it is generally reabsorbed. SSRIs inhibit the re-absorption of serotonin and increases levels of serotonin. Generally have fewer side effects than most types of antidepressants.

> Serotonin Noradrenaline Reuptake Inhibitors: block both the reuptake of serotonin and noradrenaline in the brain.

Reserpine is a drug used to control high blood pressure and the relief of psychotic symptoms. It was found to rid the body of monoamines, resulting in long-lasting serotonin depletion and depressive symptoms.

Chronic MDMA use results in long-term downregulation of the sensitivity of serotonin receptors and lowered plasma concentration of serotonin. May trigger depressive and anxiety symptoms when use is discontinued.

### Dietary Tryptophan

Brain serotonin levels depend on dietary intake of tryptophan. Tryptophan is an essential amino acid which the body cannot produce, it must be sourced from protein-rich foods.

Antidepressants may trigger mania in bipolar patients. This led to the development of mood stabilisers.

Lithium was the first mood stabiliser but is potentially toxic so dosages must be carefully managed.

Usually takes around 2-3 weeks before antidepressants begin to show improvements.

Receptor sensitivity theory: changes in receptor sensitivity occur in response to medication.

Neuroplasticity theory: antidepressants may trigger downstream increases in neuroplasticity.

Depression is associated with heightened levels of cortisol.

## *Conceptualisations of Self and Identity*

The self is a conceptual system made up of one's thoughts and attitudes about oneself.

Self-concept is a multidimensional construct that refers to an individual's perception of self in relation to any number of characteristics.

Self-awareness refers to an individual's awareness of their self.

Self-esteem refers to the evaluative element of self-concept.

### The Rouge Test

A self-recognition test that identifies a child's ability to recognise themselves in a mirror. Using makeup, an experimenter places a dot on the nose of the child. The child who touches their own nose upon looking into a mirror demonstrates self-concept.

6-12 months: the child sees a sociable playmate in the mirror.

12 months: self-admiring and embarrassment begin.

14-20 months: most children demonstrate avoidance behaviours.

18 months: half of children recognise the reflection in the mirror as their own.

20-24 months: self-recognition climbs to 65%.

30 months: almost all children recognise their own photograph.

- > Clear-cut attachment (8 months-2 years): the infant actively seeks contact with their caregiver and shows separation protest or distress on departure.
  - > Reciprocal relationships (2+ years): the infant takes on an active role in developing relationships with their caregiver.
- Bowlby also suggests monotropy: the ability of an infant to only form one attachment, to their mother.

## Strange Situation

An assessment of infants' attachment to their primary caregiver.

- > Secure Attachment: a pattern of attachment where an infant has a high-quality, unambivalent relationship with their attachment figure. A securely attached infant may be upset when the caregiver leaves, but happy on return. These infants can use their caregiver as a secure base for exploration. Ainsworth argued that secure attachments are formed by sensitive mothering; these mothers are more sensitive to their child's needs.
- > Insecure-resistant Attachment: a pattern of attachment where an infant is clingy and stays close to their caregiver rather than exploring the environment. Insecure resistant infants tend to become very upset when their caregiver leaves the room; they are unable to be comforted by strangers. When the caregiver returns, they are not easily comforted. They both seek and resist comfort. Mothers of insecure-resistant children show inconsistent patterns of mothering.
- > Insecure-avoidant Attachment: a pattern of attachment where an infant seems indifferent to, and may even avoid, their caregiver. These infants are easily comforted by a stranger. Mothers of insecure-avoidant children tend to consistently reject their infant in the first year of life.
- > Disorganised/disoriented Attachment: these infants have no consistent way of dealing with stress. Their behaviour is often confused or contradictory.

In the US, 65% of middle-class children are securely attached, 15% are insecure-resistant, 20% are insecure avoidant, and 5% are disorganised.

All insecurely attached Japanese children are classified as insecure-resistant.

Children who are securely attached have closer relationships with their peers than insecurely attached children. Secure attachment in childhood also indicates an increased likelihood of positive peer and romantic relationships and emotional health in adolescence.

## Genetics

The theory of evolution depends on three principles:

- > Variation: there are differences between individuals.
- > Transmission: parents pass characteristics onto their offspring.
- > Natural Selection or Competition: some characteristics make it more likely that an individual will reproduce successfully.

Monozygotic twins are identical and share all their DNA; dizygotic twins are no more alike genetically than other siblings.

Heritability is expressed as the proportion of individual variation which can be explained by genetic factors.