



Overview

(/study/app/study/app)

new/sid-

540-

cid-

763690/k

3. Human development / 3.1 Models of development

The big picture

Section

Student... (0/0)



Print (/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49671/print/)

Assign ▾



Table of contents



Notebook



Glossary



Reading assistance

? Subtopic question(s)

During this subtopic, you will be working towards answering the following subtopic question:

- To what extent is human development universal?

The guiding questions in each section help to guide you towards answering the subtopic question(s) at the end of the subtopic. The subtopic questions require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

Developmental psychology is the study of the ways in which humans develop over time. This area of psychology tends to focus on the study of children and adolescents, as this is the period of the most dramatic and measurable development in a human lifetime.

There is debate about the degree to which development is a universal process. If it were, you would expect all humans to develop at approximately the same pace. There are many complex factors that interact to influence development. These range from genetics, to the environment you are raised in, to the languages you speak and the extracurricular opportunities you are presented with. However, as vastly different as our childhoods may be, psychologists have proposed models to illustrate that there are similar stages of development that humans experience.



Figure 1. Are all these children at the same stage of development?

Credit: FatCamera, Getty Images



Student view

The period from birth to age three is one of the most critical for development. Human development does not progress at such a rate at any other time in a person's lifespan. The children in **Figure 1** are approximately the same age, but do you think they are all likely to be at the same developmental stage?

Milestones in Brain Development and Cognitive Growth: Cu...

**Video 1.** Milestones in brain development and cognitive growth.

As you watch **Video 1**, think about the children in **Figure 1** and what you think they can and cannot yet do in relation to each type of development.

As the children grow older, what factors may influence their development?

🔗 Making connections

2.1 Mental health disorders

You considered brain imaging techniques in relation to mental health in [section 2.1.1 \(/study/app/psychology-new/sid-540-cid-763690/book/final-section-heading-to-follow-id-49426/\)](#) and [section 2.1.5 \(/study/app/psychology-new/sid-540-cid-763690/book/the-neurobiology-of-mental-health-id-49430/\)](#). In this topic, you will consider the value of brain imaging techniques. Neurons and the process of neurotransmission were explained in [section 2.1.5 \(/study/app/psychology-new/sid-540-cid-763690/book/the-neurobiology-of-mental-health-id-49430/\)](#) and are developed further here.

HL Extension

4.1 Group behaviour

In [subtopic 4.1 \(/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49126/\)](#), the concept of cultural dimensions is explained. In this topic, their role in aiding our understanding of development is identified.

1.1 Psychology as a science

In [section 1.1.10 \(/study/app/psychology-new/sid-540-cid-763690/book/what-is-the-role-of-animal-research-in-understanding-human-behaviour-id-49360/\)](#), the role of animal research was considered. In this topic, you will consider how animal research has helped us understand human development.

4.2 Interpersonal relationships

Schema theory is explained in more detail in [section 4.2.1 \(/study/app/psychology-new/sid-540-cid-763690/book/how-can-understanding-human-cognition-decrease-conflict-id-49137/\)](#). In this topic, schemas will be explored in relation to their role in cognitive development.

4 section questions ▾

 [Previous section \(/study/app/psychology-new/sid-540-cid-763690/book/collected-research-studies-id-49476/review/\)](#)[Next section \(/study/app/p](#)

What is the role of biology in human development?

B-2-1-la: Explain the role of brain maturation, critical periods and neuroplasticity in human development.

B-2-1-lb: Evaluate the extent to which critical periods explain human development.



Teacher instructions

Learning outcomes

- Explain the role of brain maturation, critical periods and neuroplasticity in human development.
- Evaluate the extent to which critical periods explain human development.

Facilitation guidance

This section focuses on the role of biology in relation to changes in development. In particular, students will explore how the process of brain maturation and neuroplasticity can affect development and behaviour. Students will also consider the concept of critical periods and the extent to which they can explain human development.

Note: To illustrate the impact of the environment on neuroplasticity, examples of child neglect experienced by children raised in institutions will be considered, which may cause some distress.

? Guiding question(s)

In this subtopic, you will think about the question, '**To what extent is human development universal?**' This section will help you make an informed response by working through the following guiding question:

- What is the role of biology in development?

This section focuses on the role of biology in relation to changes in development. You will explore how the processes of brain maturation and neuroplasticity can affect development and behaviour. You will also consider the concept of critical periods and the extent to which they can explain human development.

Keep the guiding question in mind as you progress through this section. The guiding questions build into the subtopic question(s). You will return to the subtopic question(s) at the end of each subtopic. The subtopic questions require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

Maturation of the brain

Brain development starts during embryonic development. The brain changes rapidly in the first few years of life, reaching about 90% of its adult size by age 6. However, just because your brain is small does not mean it lacks neurons. In fact, you had more neurons in your brain at birth than you do now.

Concept

Change

The development of the human brain is a long, complicated process and, although it starts before birth, it will not be fully completed until mid to late 20s. In fact, the brain continues changing as neural connections are formed via synaptic genesis and removed via synaptic pruning.

Reflection questions

1. To what extent do you think your brain is fully developed?
2. What environmental factors do you think may impact the development of your brain?

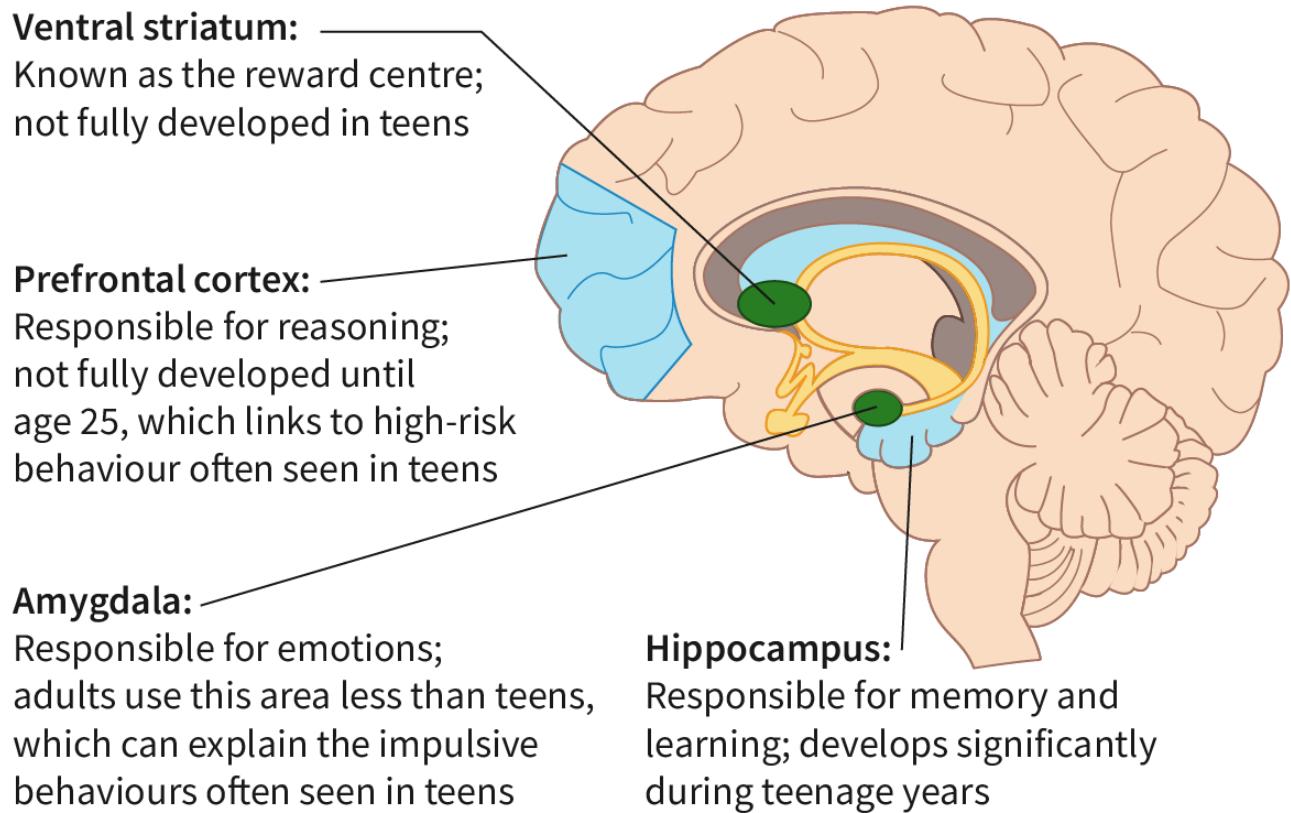


Figure 1. The development of different areas of the brain during the teenage years.

More information for figure 1

The prefrontal cortex is an area at the front of the brain. The text states that the prefrontal cortex is responsible for reasoning and is not fully developed until age 25, which links to high-risk behaviour often seen in teens. The ventral striatum is further back. The text states that the ventral striatum is known as the reward centre and is not fully developed in teens. The amygdala is further back, towards the centre of the brain, and is lower down. The text states that the amygdala is responsible for emotions and that adults use this area less than teens, which can explain the impulsive behaviours often seen in teens. The hippocampus is under the amygdala. The text states that the hippocampus is responsible for memory and learning, and develops significantly during teenage years.

Perspective lens

Biological approach

While the influence of environmental factors on development should not be ignored, understanding how the brain grows and develops has allowed a greater appreciation about the role of biological factors on development.

Changes in the brain can significantly impact the development a human goes through. This can be particularly observed during infancy, when the brain experiences many developmental changes.

However, as an individual ages, both the physical structure of the brain and the functional capabilities can decline. For example, patients with Alzheimer's disease suffer impaired cognitive functioning, particularly with regard to a decline in episodic memory. Research has now found that this developmental decline is due to the degeneration of neurons in the brain. You can read about the biological changes that occur in the brain of patients with Alzheimer's disease in more detail in this article here ↗ (<https://www.healthline.com/health/alzheimers-and-brain#location-of-brain-changes>).

Reflection question

- How can the knowledge of the neurological mechanisms behind Alzheimer's disease help improve early diagnosis and support for those affected?

There is a significant amount of development in the first years of a baby's life; this development can be associated with changes in specific areas of the brain (see **Figure 2** and **Table 1**).

Table 1. The timing of development of specific areas of the brain from birth.

Areas of the brain associated with significant early development	Function	Time at which development starts
Brain stem and the thalamus	Inborn reflexes such as grasping	Birth
Visual cortex	Vision	Birth to 6 months
Cerebellum and motor cortex	Motor skills	Pre-birth to 6 months
Amygdala and hippocampus	Emotional control	Birth to 3 years
Broca's area and Wernicke's area	Language development	Birth to 3 years
Prefrontal cortex	Logic/decision-making/problem-solving	1–4 years

The theory of brain development states that brain activity grows outwards from the brainstem to the cortex as the child develops. These 'lower' levels of the brain are associated with automatic functions, whereas 'upper' levels of the brain are responsible for more complex functions and associated with many of the behaviours that make us human. This is evident in the cognitive development of children. In early childhood, complex cognitive functions are limited but as 'upper levels' of the brain develop, such as the prefrontal cortex, children begin to think more logically and solve problems they were previously unable to. Research into cognitive development illustrates how a child's age influences their cognitive abilities (see [section 3.1.2 \(/study/app/psychology-new/sid-540-cid-763690/book/what-are-strengths-and-limitations-of-a-stage-theory-approach-to-human-development-id-50515/\)\)](#).

Research by Chugani (1999) ↗ (<https://doi.org/10.1177/107385849900500105>) also supports the theory of brain development. Through the use of PET scans, it was found that in infants the brain areas associated with basic functions, such as the brainstem and cerebellum, were more active than areas responsible for higher cognitive functions, such as the cerebral cortex. This changes as children grow and develop, with a significant increase in activity found in the cerebral cortex, particularly in the frontal and temporal lobes. These lobes are crucial for higher order skills, such as cognitive processing, executive function and language.

🔗 Concept

Measurement

Brain scan technology, such as the PET scan technology used in Chugani (1999), has revolutionised neuroscience and psychology. Without this technology, the ability of researchers to take a reductionist approach to human behaviour would be massively reduced. As a result, our total understanding of the neurobiological mechanisms underlying human behaviour would also be reduced. While this technology has led to a major leap in understanding, it is not without some limitations.

For example a [2024 study](https://www.nature.com/articles/s41467-024-53743-y) (<https://www.nature.com/articles/s41467-024-53743-y>) published in *Nature* found that when the same fMRI data was given to 70 different teams of researchers, no two teams used the same analysis methods and, as a result, their conclusions about the data differed.

Reflection questions

1. Given these findings, what are the possible limitations of using brain scan technology to investigate human behaviour?
2. What role could AI play in refining and improving the use of brain scan technology?

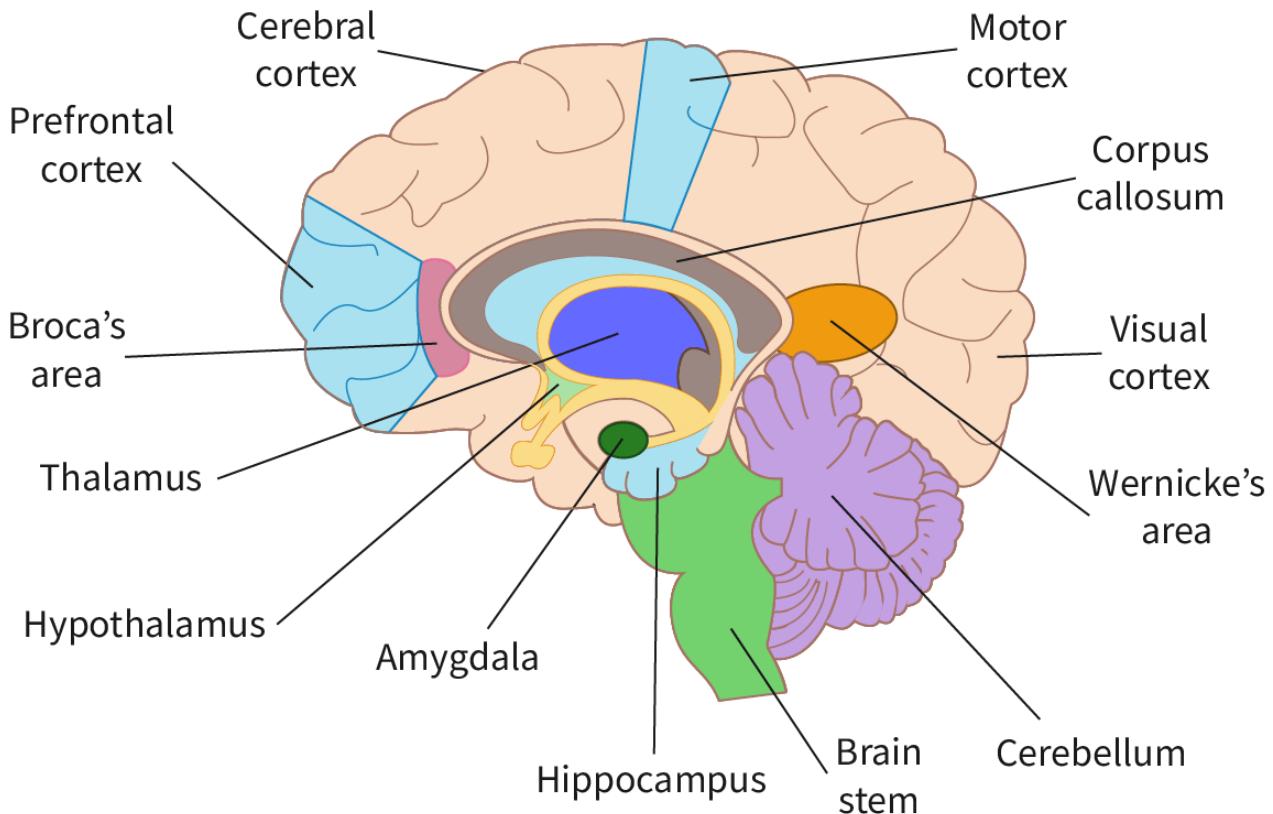


Figure 2. Brain structure.

[More information for figure 2](#)

Cross-section of the brain. The cerebral cortex, the outermost layer, covers the entire brain. The prefrontal cortex is located at the front of the brain, and Broca's area can be found at the back of this area. The motor cortex is found midway on the top of the brain. The corpus callosum lies centrally, connecting the two hemispheres. The hippocampus is positioned deep within the temporal lobes. The amygdala is adjacent to the hippocampus. The hypothalamus is a small region below the thalamus, which is a large area nestled centrally within the brain. Wernicke's area is in the temporal lobe, near the visual cortex, which is located at the rear of the brain. The cerebellum is located at the bottom rear of the brain, and the brainstem extends downwards from the cerebellum, connecting to the spinal cord.

Neuroplasticity

Your brain has millions of specialised cells, called neurons, which are designed to send and receive signals from your brain.

Home
Overview (/study/app/psychology-new/sid-540-cid-763690/book/what-is-the-role-of-biology-in-human-development-id-50514/review/)
new/sid-540-cid-763690/k

Each neuron is covered with white matter known as myelin; myelination occurs when the brain grows larger or when complex processes are triggered. This happens particularly quickly after birth when the baby is confronted with a range of stimuli not encountered while in the womb. This myelin sheath allows electrical impulses to transmit quickly and efficiently along the nerve cells. The process of how messages travel through the neural network via neurotransmission was explained in [section 2.1.5](#) (/study/app/psychology-new/sid-540-cid-763690/book/the-neurobiology-of-mental-health-id-49430/).

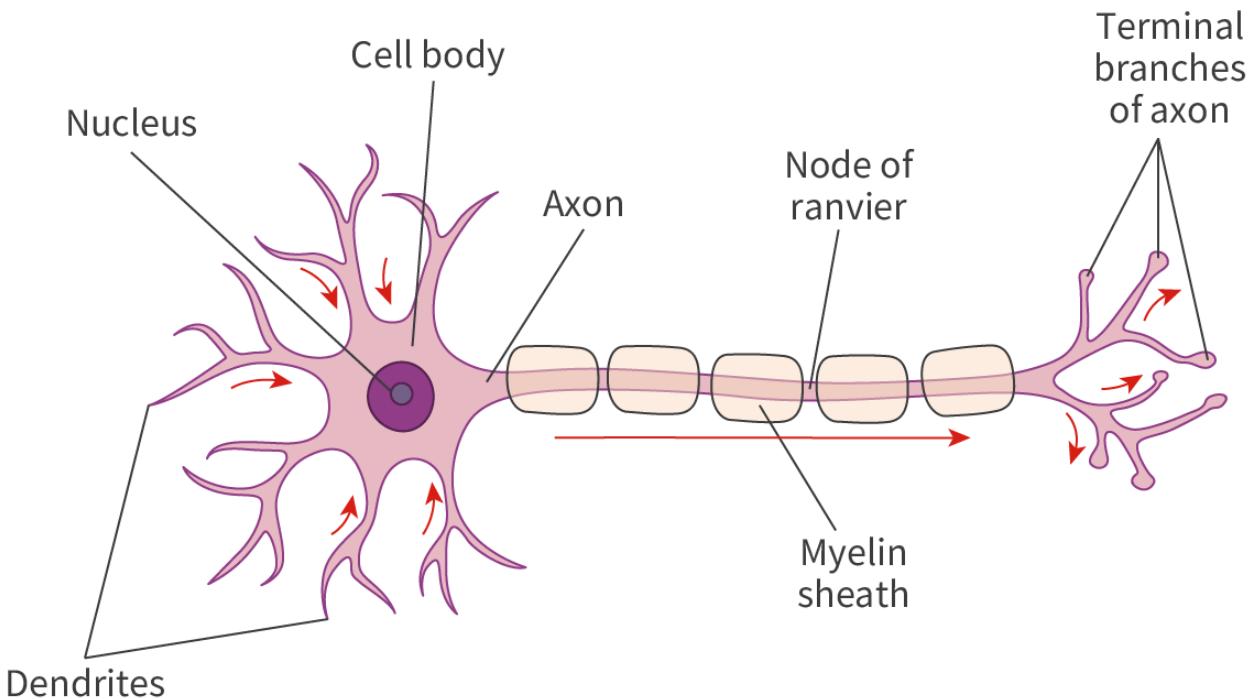


Figure 3. Neuron structure.

More information for figure 3

The neuron has a cell body, which contains the nucleus. Dendrites are structures that branch out from the cell body. The cell body is attached to a long, thin structure called the axon. The axon is encased in a myelin sheath. The gaps between segments of the myelin sheath are called nodes of ranvier. The terminal branches of the axon branch out from the end of the axon furthest from the cell body. Arrows along the dendrites point inwards towards the cell body. Arrows also point away from the cell body along the axon and along the axon's terminal branches.

Neurogenesis is the process by which new neurons are formed in the brain. Neurogenesis is crucial when an embryo is developing, and occurs primarily during the first trimester (three months) of pregnancy. Environmental factors, such as stress, nutrition, alcohol exposure and sensory input, can influence the rate and direction of these processes. [Lemaire et al \(2000\)](#) (<https://doi.org/10.1073/pnas.97.20.11032>) found that exposing a developing fetus to stress hormones can alter the timing of neurogenesis and the migration of new neurons, leading to changes in brain structure and function. The impact this may have on later development is unknown. Neurogenesis also continues in certain brain regions after birth and throughout your lifespan. You can read more about adult neurogenesis in [this article](#) (<https://qbi.uq.edu.au/brain-basics/brain-physiology/adult-neurogenesis>).

The brain continues to develop by forming a series of connections between neurons; this is known as neuroplasticity. This is most prevalent during childhood and adolescence, and can play a significant role in development and behaviour. The creation of neural connections in regions like the hippocampus plays a key role in memory formation. As children

Home
Overview
(/study/ap/
new/sid-
540-
cid-
763690/k)

and adolescents learn new information, synapses are formed between neurons to help store and consolidate what has been learned. The ability to create new connections allows for more complex and flexible learning, which is particularly essential during developmental periods, when children and adolescents are acquiring new knowledge and skills.

Neuroplasticity can also involve the elimination (synaptic pruning) of existing neural connections. This can happen as a result of environmental effects (for example, experience or learning) or because of natural causes (for example, ageing or illness). Synaptic pruning can play a role in the development of children by removing the neural networks which are unnecessary, as they are no longer being used, and thus helping the brain become more efficient. One area this can be seen in is the prefrontal cortex. Pruning of the prefrontal cortex helps adolescents learn to make more thoughtful and controlled decisions. The more efficient and connected the pathways are in the prefrontal cortex, the better an adolescent will be at regulating emotions, planning and acting responsibly.

Teacher instructions

Goal

- To consider the changes that occur in the brain due to neuroplasticity and the environmental factors that can influence this process.

Facilitation guidance

Give each student a piece of paper and ask them to draw a circle on the left-hand side of the piece of paper and simultaneously draw a square on the right-hand side. Ask them to repeat this five times and then answer the questions. Responses can be discussed as a class.

Activity

IB learner profile attribute: Thinker/Knowledgeable

Approaches to learning: Thinking skills

Time required to complete activity: 10 minutes

Activity type: Individual

Practice and its effect on changes in the brain

Concept application: Change

Draw a circle on the left side of a piece of paper and simultaneously draw a square on the right side of the paper.

Repeat this five times and then answer the questions.

- Did you see any improvement in your work as the trials progressed?
- With reference to neuroplasticity, explain what changes are happening within the brain when you try to master new skills.

Reflection questions

- What changes would happen to the neural connections in your brain if you continued to repeat this task daily?
- What changes would happen to the neural connections in your brain if you never repeated this task again?
- What other environmental factors do you think may significantly change the neurobiological structure of your brain in the future?

 Student view



Role of environment on neuroplasticity

Overview
(/study/app/new/sid-540-cid-763690/k)

From the first day of life, the surrounding environment and social world have a major influence on how an infant's brain develops, and this means that what happens in early childhood can matter to an individual's behaviour throughout their lifespan. This is particularly evident when a child is exposed to adverse experiences, such as stress, adversity or neglect, during the early stages of development.

Before brain imaging techniques allowed researchers to investigate neuroplasticity in humans, animal research allowed us to gain insight into the impact the environment can have on our brain and our development.

🔗 Making connections

Animal research in psychology

The value of animal research in psychology was considered in [section 1.1.10 \(/study/app/psychology-new/sid-540-cid-763690/book/what-is-the-role-of-animal-research-in-understanding-human-behaviour-id-49360/\)](#). This included specific research investigating the neurological origin of memory in sea slugs, and the use of mice in helping to map the entire brain. After reviewing [section 1.1.10](#) and reading [this article ↗ \(https://escholarship.org/uc/item/2nf200ps\)](#) by Rosenzweig, Bennett and Diamond (1972), consider how effective animal research is in helping us gain an understanding of how the human brain influences human development.

[Rosenzweig, Bennett and Diamond \(1972\) ↗ \(https://escholarship.org/uc/item/2nf200ps\)](#) conducted a landmark study on rats to investigate the effects of environmental enrichment versus deprivation on brain development. They found that rats raised in enriched environments had significantly thicker cerebral cortices and more synaptic connections than those in impoverished environments, demonstrating that the environment can impact brain structure. Similar effects of deprived environments have been found in children, which helps increase the reliability of the findings. [Perry \(2002\) ↗ \(https://doi.org/10.1023/A:1016557824657\)](#) compared MRI scans of children, aged 3, who had been extremely neglected and those who had not. The scans revealed that the neglected children had smaller brains than those who had not been neglected, suggesting that the lack of stimulation in the deprived environment resulted in less synaptic connections being formed (**Figure 4**).

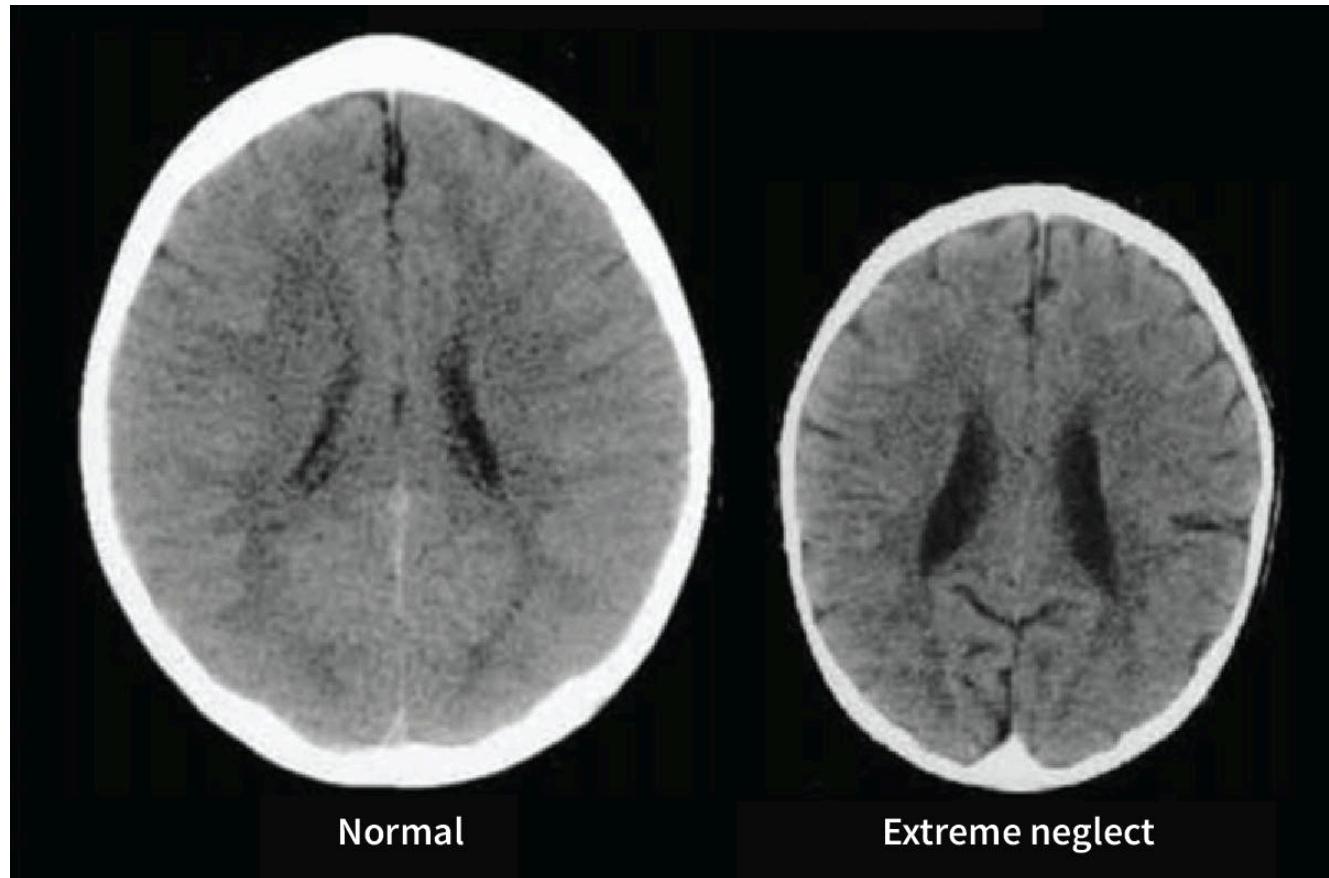


Figure 4. The differences between the brains of two 3 year-old children, one extremely neglected and one not.

Source: Snoek & Horstötter, 2021 ↗ (<https://doi.org/10.1007/s12152-021-09474-8>)

🌐 International mindedness

Governments and poverty

Considering the role the environment may have on changes in brain development allows us to take a more holistic approach to investigating human development. However, research findings can imply that children raised in areas that have poverty or low socioeconomic status will be impacted negatively in terms of their development. This is a very deterministic view and caution should be taken to avoid oversimplifying the effects and causes of poverty in different cultures. This article ↗ (<https://doi.org/10.1177/0261018315574020>) by Edwards, Gillies and Horsley (2015) highlights the need for caution when attributing developmental impairments to poverty, as this may justify social inequalities.

Concept application: Responsibility

1. Do your governments have a responsibility to act on findings that show that children's development can be hindered if they are raised in areas of poverty or low socioeconomic status?

Childhood trauma has been found to influence the brain and later development. Ireton, Hughes and Klabunde (2024) ↗ (<https://www.sciencedaily.com/releases/2024/02/240205165831.htm>) wrote meta-analysis of research into the effect of childhood trauma and brain development. This has shown how childhood trauma rewires vital neural pathways and affects development.

On a positive note, research has shown that, due to ongoing neuroplasticity, the negative impact a deprived environment or traumatic experience can have on brain development may not be permanent. The Romanian Adoption Study ↗ (<https://doi.org/10.1007/s40894-016-0032-1>) (*Romania's Abandoned Children: Deprivation, Brain Development, and the Struggle for Recovery*, Nelson et al., 2016) studied a group of children who were adopted from Romanian orphanages.

The longitudinal study showed improved neural activity and developmental progress in the children after they were adopted by families in the UK. However, as suggested by research by [Bick et al. \(2022\)](#) (<https://doi.org/10.1002/dev.22249>), when it comes to reversing any negative impacts, timing seems to be key.

Creativity, activity, service

Strand

Creativity and service

How can you exercise your brain?

Learning outcome

- Demonstrate engagement with issues of global significance.

Just like physical exercise helps us maintain a healthy body, brain exercises can help keep our brain healthy. Use your knowledge of neuroplasticity to create a video or infographic to encourage people of different ages to 'exercise their brain.'

Critical periods

The term critical period refers to a fixed and crucial time during development when the opportunity exists for an organism to learn things. In psychology, this term is used to define a period, usually during childhood, when it is the optimum time to learn a new skill or behaviour. If a child is not exposed to the appropriate environment during a critical period, it may be difficult or even impossible for them to develop the related behaviour later in life.

The biological explanation for critical periods is that it is due to the nervous system being especially sensitive to certain environmental stimuli. This is normally early in life when the brain is more malleable. As we grow older, and our neural connections become more fixed, we get better at retaining new and complex processes as our neural connections strengthen; but our ability to learn new skills and make new neural connections decreases.

Perspective lens

Biological approach

From an evolutionary perspective, critical periods make a lot of sense because they represent periods of time when specific developmental processes are especially sensitive to environmental influences. Many of these processes are vital for survival, reproduction and adaptation. Essentially, the idea is that critical periods help organisms adapt to their environments and increase their chances of survival and reproduction.

For instance, the high degree of brain plasticity during early development allows infants to learn language and develop attachments to caregivers. From an evolutionary perspective, learning language allows infants to successfully communicate, and forming attachments encourages the caregiver to meet the infant's basic needs. Thus, having critical periods for both, in early childhood, maximises the chance that humans can thrive and survive.

Reflection questions

- What limitations might there be of understanding critical periods from an evolutionary perspective?
- Why might humans have evolved to have such a long period of brain development compared to other species?

The concept of a critical period has been applied to first and second language development. In the 1960s, the linguist Eric Lenneberg proposed that the critical period for first language acquisition was between ages 2 and 14. Other cut-off ages and critical periods have been suggested for specific aspects of language development, as shown in **Table 2**.

**Table 2.** Suggested critical periods for aspects related to language.

Aspect of language	Description	Critical period
Phonology	The ability to differentiate between sounds (also known as ‘phonemes’) and the understanding that different sounds carry different meanings.	2–3 years
Grammar and syntax	The understanding that there is a system of language that is governed by rules.	5–7 years
Vocabulary	The acquisition of specific words within a language to increase expressive ability.	No critical period

⌚ Making connections

Attachment relationships

In section 3.2.2 ([/study/app/psychology-new/sid-540-cid-763690/book/how-do-early-childhood-influences-impact-the-development-of-self-id-50524/](#)), you will learn about John Bowlby’s theory of attachment, in which he proposes that 6 to 24 months of age is a critical period for the formation of an attachment between a child and their primary caregiver. After this critical period, it may not be possible for a first attachment relationship to develop, which may possibly result in later relationship issues in adulthood. Research which supports and challenges this is also considered in section 3.2.2.

Research supporting the idea of a critical period for first language acquisition has often come from case studies of children who have suffered deprivation, as shown in **Table 3**.

Table 3. Case studies of effects of deprivation on development.

Case study	Nature of deprivation	Impact on development
Genie (Curtiss et al., 1974) (https://doi.org/10.2307/412222)	Tied to a chair and kept alone in a room. Isolated and neglected until the age of 13. Malnourished, with no interpersonal interactions.	Poor social skills and showed no sign of attachment. Unable to produce grammatical sentences, despite regular training. Researchers claimed this was due to her being deprived of exposure to language during the critical period for language development.
Isabelle (Mason, 1942) (https://doi.org/10.1044/jshd.O704.295)	Spent 6.5 years in silence living in a room with a deaf and mute mother.	After being removed from her home, she developed a wide vocabulary and could produce grammatically correct sentences.
Anna (Davis, 1947) (https://doi.org/10.1086/220036)	Tied to a chair and kept alone in a room for 5.5 years. Malnourished and neglected.	At age 9, she went to live in a foster home and developed some speech and social interaction.

While the research findings contained in **Table 3** are certainly informative, it is important to reflect on the concept of causality. It is difficult to compare the findings from these unique case studies, as they each differ in the level of possible influence of other related variables (confounds), such as the level of malnutrition and social, emotional and sensory

Home
Overview
(/study/app/
new/sid-
540-
cid-
763690/k

deprivation. More recent research, which has focused on deaf children born to hearing parents, has been able to eliminate these other forms of deprivation, and only focus on deprivation of language. [Kroll and De Groot \(2009\)](#) (<https://doi.org/10.1093/oso/9780195151770.001.0001>) concluded that the older the age of exposure to sign language, the worse its ultimate attainment. Thus, it may be more difficult to learn language at an older age, but not impossible.

Researchers have also looked at whether there is a critical period for second language acquisition. Findings suggest that the earlier a person starts learning a second language, the better their proficiency, particularly in areas like pronunciation, accent and grammar. However, while it may be easier to learn a second language when younger, this does not mean it becomes impossible in adulthood. Factors such as motivation to learn, levels of exposure to the language and learning methods can all play a major role in language success at any age.

Therefore, the extent to which humans can only develop certain skills during a critical period is debatable. As the human brain is highly adaptable, perhaps it is better to think of development as having sensitive periods. This is a time when an individual is more receptive to learning, but it does not mean that learning or development cannot happen outside of this period; it may just be more difficult or less efficient.

Learning outcomes

By the end of this section, you should be able to:

- Explain the role of brain maturation, critical periods and neuroplasticity in human development and behaviour.
- Evaluate the extent to which critical periods explain human development.

¹ [Snoek & Horstkötter, 2021](#) (<https://doi.org/10.1007/s12152-021-09474-8>), ‘Neuroparenting: the Myths and the Benefits. An Ethical Systematic Review’, *Neuroethics*, Volume 14, Pages 387–408. Licensed under the CC-BY-4.0 licence <https://creativecommons.org/licenses/by/4.0/> (<https://creativecommons.org/licenses/by/4.0/>).

4 section questions

 Previous section (/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49671/review/)

Next section  (/study/app/psychology-r



What are strengths and limitations of a stage theory approach to human development?

B-2-1-3: Describe the effectiveness of stage theories and continuous models in understanding human development.

B-2-1-4: Explain the role theory of mind has in understanding human development and cognition.

B-2-4-1b: (HL) Discuss the extent to which western models of development can be applied to explain child development in indigenous cultures — or vice versa.

B-2-4-3b: (HL) Identify the role of AI to test models of human development.

Teacher instructions

Learning outcomes

- Describe the effectiveness of stage theories and continuous models in understanding human development.
- Explain the role the theory of mind has in understanding human development and cognition.
- **HL Extension**
 - Discuss the role of AI to test models of human development.
 - Discuss the extent to which Western models of development can be applied to explain child development in Indigenous cultures — or vice versa.

Facilitation guidance

This section delves into theories of cognitive and personality development, and encourages students to consider the effectiveness of explaining human development in stages.

The theory of mind is also considered in relation to how it can help explain our cognitive development.

? Guiding question(s)

In this subtopic, you will be thinking about the question, '**To what extent is human development universal?**' This section will help you make an informed response by working through the following guiding question:

- What are strengths and limitations of stage theories and continuous models of human development?

This section delves into theories of cognitive and personality development, and encourages you to consider the effectiveness of explaining human development in stages.

The theory of mind is also considered in relation to how it can help explain our cognitive development.

Keep the guiding question in mind as you progress through this section. The guiding questions build into the subtopic question(s). You will return to the subtopic question(s) at the end of each subtopic. The subtopic questions require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.



Piaget's stages of cognitive development

Overview
 (/study/app/psychology-new/sid-540-cid-763690/)

One approach you can take when trying to understand and explain development in humans is to look at the common behaviours, skills and attributes seen at different ages and then call this a 'stage.' Stage theories are based on the idea that each stage is characterised by specific characteristics, and that later stages build on the achievements of earlier stages. In this topic, we will consider how effective a stage theory approach is to explain human development.

Theory of knowledge

Active learning

Jean Piaget, a Swiss psychologist, was not so much interested in *what* children know but in *how* they come to know what they know. He believed in the idea of active learning, in which the child takes a central role in discovering their world and in making sense of it.

Reflection question

1. Can you give an example of when you used active learning to know and understand the world?

Piaget emphasised the importance of schemas in cognitive development. He believed schemas are building blocks of knowledge, on which to organise knowledge and our understanding of the world. Schemas play a major role in cognition in general; they are the frameworks through which we both make sense of the world and through which we filter our perceptions. Schemas are built up through experience and developed through the process of accommodation and assimilation.

Accommodation is when an existing schema is changed as a result of new information. For example, a child who has learned that cows are four-legged animals that are shown in farm contexts may mistake a horse for a cow, as they are both large, four-legged animals. However, when the child is corrected, they will accommodate their 'cow schema' to exclude large, four-legged animals with long necks and manes. Assimilation (in schema theory) is when new information is integrated into an existing schema without major change to that schema. For example, a child may have a schema for cows that only includes black and white cows but not brown cows. When the child acquires new information that cows may also be brown, they will assimilate this information into their existing cow schema.

Making connections

Schemas and memory

Schemas can also impact memory input and recall. They can allow memories to be stored in an organised manner, allowing for quick, although not always accurate, recall. You can read more on how schemas can influence your memory recall in [section 5.2.2 \(/study/app/psychology-new/sid-540-cid-763690/book/what-factors-affect-the-reliability-and-validity-of-memory-id-50539/\)](#).

The assumption is that we create and store cognitive schemas and apply them when needed. Piaget thought that children were constantly creating, modifying, organising and reorganising their schemas. **Figure 1** explains how he believed this occurred. Piaget used the term disequilibrium to explain what happens when a child comes across something new that does not fit into a pre-existing schema. This helps explain how children then adapt their schemas to accommodate this new information. Equilibrium is the cognitive balance they experience when they are exposed to new information that does fit their existing schema.

Student view

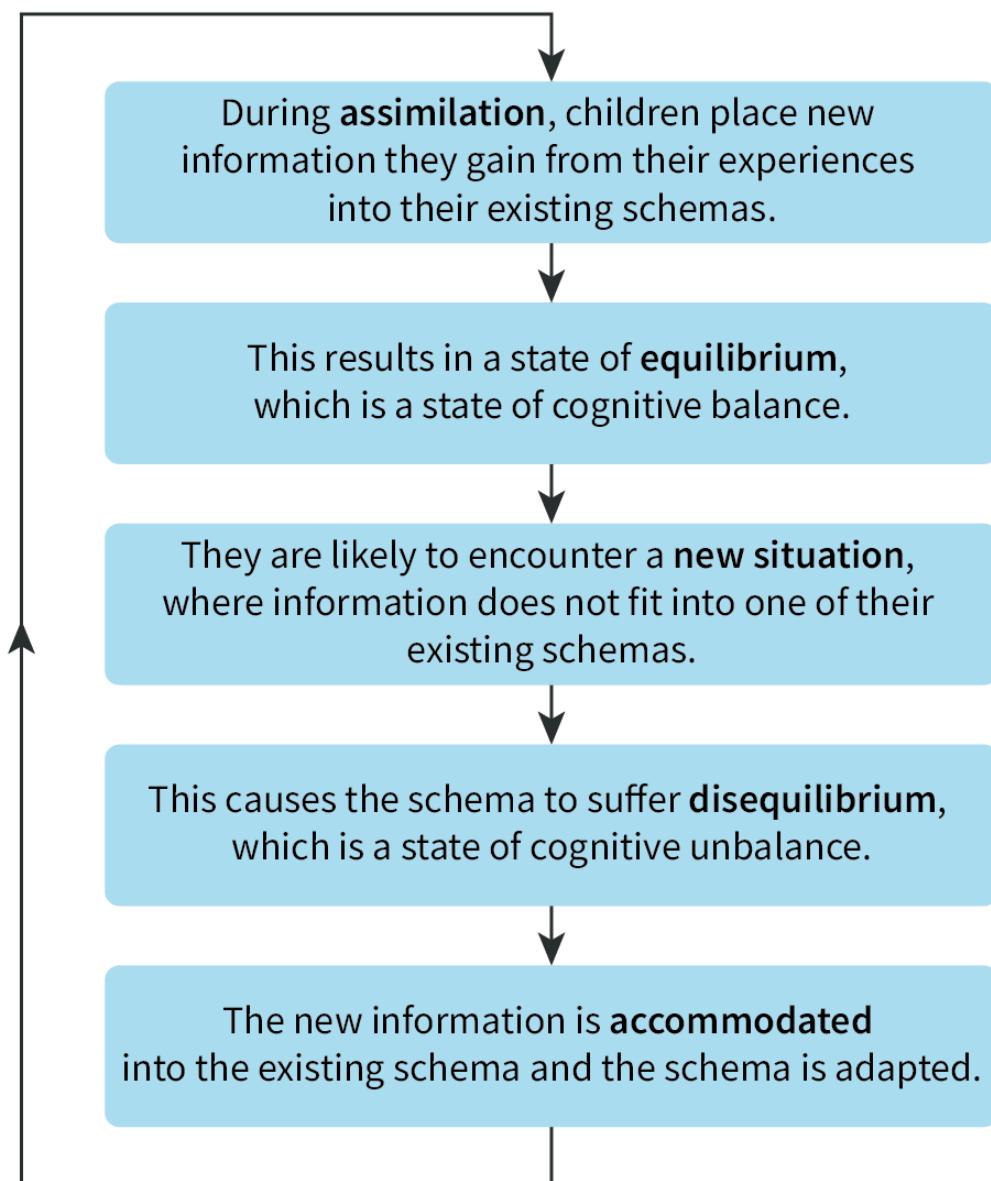


Figure 1. Schema formation according to Piaget.

More information for figure 1

Cyclical flow chart. Running from the top of the flow chart, arrows connect 5 sections of text. First of all, during assimilation, children place new information they gain from their experiences into their existing schemas. Next, this results in a state of equilibrium, which is a state of cognitive balance. Next, they are likely to encounter a new situation, where information does not fit into one of their existing schemas. Next, this causes the schema to suffer disequilibrium, which is a state of cognitive unbalance. Finally, the new information is accommodated into the existing schema and the schema is adapted. An arrow points from the end of the flow chart back to the beginning.

Teacher instructions

Goals

- To apply knowledge of how schemas are altered.
- To use relevant psychological terminology appropriately.

Facilitation guidance

Piaget believed that as children interact with their environment, they actively construct and change their schemas. This task will allow students to demonstrate their understanding of how schemas can be developed and altered.

Present students with the list of animals and ask students to classify them into mammals or non-mammals. They must classify all animals into only one of the two categories. They may be unfamiliar with some of the animals and may need some descriptions of the animals to help them. They should avoid using the Internet to research the animals, as this may prevent them using their own schemas to complete the task. Instead, be prepared to provide a description of the animals, or have a brief description and picture of each animal to show students.

Activity

IB learner profile attribute: Knowledgeable/Reflective

Approaches to learning: Thinking skills

Time required to complete activity: 15 minutes

Activity type: Individual

How do you use and change your schemas?

Concept application: Change

Piaget believed that as children interact with their environment, they actively construct and change their schemas. This task will allow you to demonstrate your understanding of how schemas can be altered.

Classify the following animals into mammals or non-mammals.

- Dog
- Horse
- Fox
- Platypus
- Sheep
- Elephant
- Penguin
- Bat
- Dolphin
- Echidna

Reflection questions

1. How did your existing schemas help classify the animals?
2. Were there any animals you found it hard to classify? Applying your understanding of schemas, explain why/why not.
3. Did you experience disequilibrium at any point during the task? Why/why not?
4. Did you develop any new schemas, or did any of your existing schemas change as a result of this task?

Piaget believed the development of schemas helps a child progress through four stages of development, as outlined in **Table 1**. He stated that each stage is the same for all children and that all children will proceed through the stages in order. Piaget thought that children are born with an inherited mental structure that is the basis for all subsequent learning and knowledge. At each stage, the child will acquire more complex skills and abilities, and they will gradually progress through one stage into the next one. This is a maturational-based theory, which means that as children age, and biological changes occur, this will allow them to progress through the stages of cognitive development.

Stage	Characteristics	Ways of testing stage
The sensorimotor stage Ages: birth to 2 years	Babies start to build schemas representing the most foundational elements of the world. This is done through the gathering of information via their senses, by touching, grasping, watching and listening. They also begin to develop a sense of object permanence , which means they understand that objects exist even when they cannot see them.	Object permanence task: Show the child a toy and, while the child watches, hide the toy under a blanket. Watch to see whether the child searches for the toy under the blanket.
The preoperational stage Ages: 2–7 years	Children develop their ability to engage in symbolic thinking. They also begin symbolic play (pretend play). A child may use their schemas to choose objects available to them to represent other objects. For example, a stick may be used as a magic wand, due to its similar size and shape. Children in this stage do not understand conservation and are egocentric .	Conservation task: Have the child watch you pour the same amount of water into two identical glasses. Ask the child which glass has more water. Then, have the child watch you pour the water from one of the identical glasses into a taller, thinner glass. Ask again which glass has more water.
The concrete operational stage Ages: 7–11 years	Children become capable of operational , logical thought. They can apply rules (e.g. in mathematics), but they are still limited to applying those rules to concrete objects rather than abstract ideas. They are not capable of abstract thought . Children in this stage can perform reverse operations . They have developed the ability to conserve , as they have adjusted their schemas concerning volume and properties of objects. This is because they have more experience, e.g. of the concept of volume. Children are no longer egocentric.	Egocentric task: Show the child two dolls, named Sally and Anne. Use the dolls to act out the following steps. Sally has a basket, and Anne has a box. Sally puts a marble in her basket and then leaves the room, leaving the basket in the room. While Sally is away, Anne moves the marble from the basket to her box. Sally returns. Ask the child, 'Where will Sally look for the marble?'
The formal operational stage Ages: 12 and over	Young people are capable of abstract thought . They have developed a large number of schemas, which helps them consider various solutions and perspectives.	Abstract thinking task: Ask the child a hypothetical question, such as: 'If a tree falls in a forest and no one is around to hear it, does it make a sound? Why or why not?'

Theory of mind (ToM)

Theory of mind and Piaget's theory are closely linked in understanding how children develop cognitively, particularly regarding the ability to recognise the thoughts and perspectives of others. Piaget's stages of cognitive development lay the foundation for theory of mind, as children's increasing cognitive abilities (like decentring and perspective-taking) enable them to develop empathy, moral reasoning and the cognitive ability to understand that others have their own thoughts and perspectives (see **Video 1**). Hughes' (1975) (<https://era.ed.ac.uk/handle/1842/22329>) quasi-experiment found that 88% of 3 year olds and 95% of 4 year olds had lost their egocentric thinking and were able to understand different perspectives, suggesting that theory of mind could develop in children aged between 3 and 4.

🔗 Concept

Perspective

Theory of mind refers to the ability to understand that others have thoughts, beliefs, desires and perspectives that may differ from your own. This cognitive skill is crucial for social interactions. **Video 1** provides a comprehensive summary of theory of mind.

Reflection question

1. How can understanding that people can have different perspectives help children develop socially?



Video 1. Theory of mind.

Research by Baron-Cohen, Leslie and Frith (1985) ([https://doi.org/10.1016/0010-0277\(85\)90022-8](https://doi.org/10.1016/0010-0277(85)90022-8)) suggests that theory of mind can be delayed or impaired in people with autism spectrum disorders. They used a common false-belief task, known as the Sally–Anne task, to investigate this.

False-belief tasks assess whether the participant is able to consider whether someone else is able to hold a belief that may actually be false. In the Sally–Anne task, two dolls are used (Sally and Anne). Sally places a marble in her basket, which Anne sees before she leaves. While Sally is away, Anne takes the marble and places it in her box. Children are then asked where Sally will look for the marble when she returns. Baron-Cohen, Leslie and Frith (1985) found that 86% of children aged between 4 and 5 years were able to understand false beliefs and answered correctly that Sally would look in her basket. 80% of children with autism spectrum disorders answered incorrectly. However, the claim that people with autism spectrum disorders lack theory of mind is questionable due to the nature of tasks often used to reach this conclusion. These can sometimes involve complex language and scenarios that people with autism spectrum disorders may not fully comprehend.

🔗 Concept

Measurement

The Sally–Anne task and others like it have been used to measure theory of mind. The task is believed to be valid because it requires the participant to place themselves in the ‘mind’ of Sally and understand that, as far as Sally is concerned, the marble is in the basket. As mentioned in the body of the text, this test has been used to establish different cognitive stages of development, as well as to help characterise autism spectrum disorder.

Reflection questions

1. What are some limitations of measuring theory of mind through the Sally–Anne task and tests like it?
2. What are the strengths of measuring theory of mind in this way?



3. Can you design an alternative method for measuring theory of mind that might address the limitations that you identified in question 1?

Erik Erikson's stages of psychosocial development

Child psychoanalyst Erik Erikson (born in Germany) proposed another stage theory to explain personality development. Like Piaget, Erikson proposed that development happens in stages, and he believed that failure to complete a stage can result in a reduced ability to complete further stages.

In each stage, he described how a **psychosocial conflict** exists that needs to be resolved by the person. The conflicts form from conflicting perspectives of the individual's psychological needs (*psych*) and the needs of society (*social*). Resolving a conflict is crucial for healthy emotional and psychological development.

Stage theories propose that, for healthy development, the stages should be completed sequentially, in a predetermined order, as each stage builds upon the previous one. However, unlike Piaget, Erikson did acknowledge more flexibility. He believed that if a stage was not completed due to the conflict not being resolved, it could be resolved successfully at a later time.

Erikson also placed a greater emphasis than Piaget did on the role that others had in each stage. The resolution of psychosocial conflicts often depends on interactions with other people, particularly caregivers, family members, peers and society. For example, in the first stage, 'trust vs. mistrust,' an infant learns to trust or mistrust based on their environment, with caregivers playing a central role (Figure 2). Consistent and attentive caregiving builds trust, while neglect or inconsistency leads to mistrust.

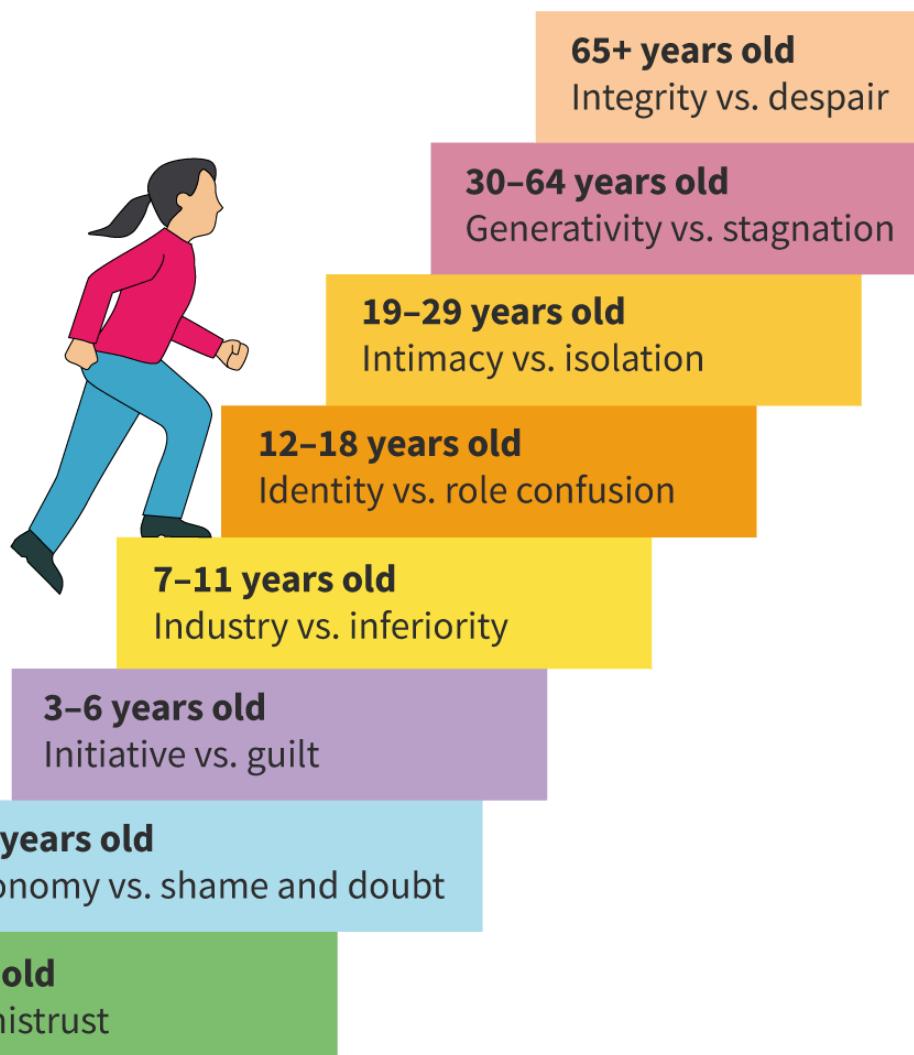




Figure 2. Erikson's eight stages of psychosocial development.

Source: Erikson, 1964 ↗ (<https://www.norton.co.uk/books/9780393312140-insight-and-responsibility>)¹

More information for figure 2

A person climbs 8 labelled steps representing increasing age. The lowest step is labelled zero to one years old, with the text trust versus mistrust. The next step is one to three years old, with the text autonomy versus shame and doubt. Next comes three to six years old, with the text initiative versus guilt. Next comes seven to eleven years old, with the text industry versus inferiority. Next comes twelve to eighteen years old, with the text identity versus role confusion. Next comes nineteen to twenty-nine years old, with the text intimacy versus isolation. Next comes thirty to sixty-four years old with the text generativity versus stagnation. The highest step is sixty-five years old and above, with the text integrity versus despair.

According to the theory, successful completion of each stage results in a healthy personality and the development of basic virtues, such as hope, purpose and care. **Video 2** will help you understand more about how humans develop according to Erikson's theory of psychosocial development.

Erikson's 8 Stages of Psychosocial Development Explained



Video 2. Erikson's theory of psychosocial development.

Both stage theories proposed by Erikson and Piaget have been influential and have aided our understanding of human growth and development. However, each has its own strengths and weaknesses, as does the concept of adopting a stage approach in general to human development (**Table 2**).

Table 2. The strengths and weaknesses of stage theories.

Strengths	Weaknesses
Stage theories provide a guide to milestones that are typically reached during different ages, allowing researchers, parents and educators to assess a child's development.	Stage theories assume that everyone progresses through the stages in a fixed, linear order. However, in reality, individuals may develop at different rates. Piaget and Erikson did acknowledge this, but their stage approach still implies that the majority of people will move through the stages in a fixed order and time.
Stage theories have been applied to real life. For example, Piaget's theory has influenced teaching by providing guidance about the suitability of tasks for specific age groups. Erikson's theory is widely used in counselling settings, particularly in understanding psychosocial crises that clients may be experiencing.	Stage theories may lead to the underestimation of the ability of children. For example, Piaget claims that children are egocentric until the concrete operational stage, and this may lead to an incorrect assumption that children younger than seven years old cannot understand the perspectives of others.



Strengths	Weaknesses
A lot of the concepts in Piaget's model can easily be tested; there is a lot of supporting research, such as Erick et al.'s (2014) (https://doi.org/10.3389/fpsyg.2014.00386) adaptation of Piaget's three mountain task, to test for egocentrism.	They may oversimplify development, as, in reality, humans may display characteristics from multiple stages at the same time.
Although influenced by Western ideals, both Piaget's and Erikson's stages have been shown to exist in many different cultures, suggesting some universal applicability.	Piaget and Erikson's stage theories have been particularly criticised for having a Western bias, assuming that all people, regardless of culture, follow the same developmental timeline and paths, based on patterns observed in humans from Western cultures.
Erikson's theory encompasses development across the entire lifespan, from infancy to old age.	How people transition between stages in stage theories can be somewhat vague. For example, in Erikson's theory, how do we know if someone has resolved a conflict successfully to allow them to complete a stage?

💡 Theory of knowledge

Models in psychology

In psychology, models are conceptual frameworks or theories that help explain and predict human behaviour and mental processes. Models often simplify complex phenomena. A number of models have been proposed on various psychological topics, such as learning, cognition, emotion and development. Some models seem to challenge each other and differ on fundamental aspects. For example, Vygotsky's theory of cognitive development places a stronger emphasis on the role of the environment than Piaget's model. Considering the ideas of models that offer different perspectives can help provide a holistic explanation of human behaviour.

Reflection question

1. Discuss the strengths and limitations of models as representations of human behaviour and mental processes.

HL Extension

🔍 Culture

The universality of stage theories

Both Piaget and Erikson believed that their theories can be applied universally, but both theories may be biased towards Western culture, and therefore this biased perspective may limit the universality of the stages.

Erikson based his theory primarily on observations of middle-class, white children and families in the United States and Europe, while Swiss psychologist Piaget based a lot of his theory on observations of his own children and other educated children from relatively affluent backgrounds. To what extent can models which are based on findings from such small, select samples of children be universally applied?

Some of the key concepts of Erikson's theory may not be applicable beyond Western, individualistic cultures. The conflicts emphasised in each stage of Erikson's theory strongly reflect the values of independence and autonomy, which are deeply ingrained in Western, individualistic cultures. However, such conflict may not exist in more collectivistic cultures, which highly value interdependence and conformity. For example, the 'autonomy vs. shame and doubt' crisis, which Erikson proposed occurs in infancy, may not occur in collectivist cultures, where obedience and conformity to elders is typically prioritised over autonomy and independence.

According to Piaget, all children go through the four stages of cognitive development in the same order, regardless of their cultural context. However, he did acknowledge that the rate in which they move through the stages can be influenced by cultural factors. For example, in Indigenous cultures with a strong tradition of



communicating via storytelling, the ability to think more abstractly may come much earlier than Piaget proposed. Education can play a significant role in cognitive development. In cultures where children have a highly structured and formal style of typical ‘Western’ education, children may develop logical thinking skills differently than in cultures where education is more informal. [Rogoff \(2003\) ↗](https://global.oup.com/academic/product/the-cultural-nature-of-human-development-9780195131338) (<https://global.oup.com/academic/product/the-cultural-nature-of-human-development-9780195131338>) found children develop skills that resemble the activities they do in school. Children exposed to ‘Western schooling’ perform well on tests that involve memory and classification, as the activities they do in school help prepare them. Thus, the development of cognitive skills may not be universal, as it may be highly influenced by the type of schooling a child receives.

Research also suggests that theory of mind (ToM) is universal, but how and when ToM is developed is influenced by cultural values and environmental factors. [Shahaeian et al. \(2011\) ↗](https://doi.org/10.1037/a0023899) (<https://doi.org/10.1037/a0023899>) investigated how culture influences the development of ToM. They compared the responses of 135 Australian and Iranian children aged 3–6 years and found differences in the sequencing of ToM, but not in overall rates of ToM mastery. Children in Australia generally showed earlier understanding that others can hold beliefs that are false.

Reflection questions

1. What specific cultural and environmental factors could account for the differences that Shahaeian et al. (2011) found between Australian and Iranian children?
2. Read about the development stages of Aboriginal and Torres Strait Island children outlined [here ↗](https://cdn.healingfoundation.org.au/app/uploads/2021/08/18121800/Child-Development-Stages.pdf) (<https://cdn.healingfoundation.org.au/app/uploads/2021/08/18121800/Child-Development-Stages.pdf>). How does this compare to the stages of development that children typically go through in your culture?
3. Choose an Indigenous culture (for example, Aboriginal and Torres Strait Islanders of Australia or the Māori of New Zealand) to research, and make a poster to display in your class to inform your peers about an aspect of development (cognitive, emotional or social) of children in your chosen culture.
4. What can these cultural variations teach us about the importance of context in psychological research and development?

HL Extension

Q Technology

The role of AI to test models of human development

AI (artificial intelligence) can be used to provide a data-driven approach to testing and expanding models of human development, such as Piaget’s stage theory of cognitive development and theory of mind.

Data from a large number of studies, across many cultures, can be quickly analysed by AI, to identify patterns in children’s performance in cognitive tasks. This can then be compared to models, such as Piaget’s stage theory, to see if children’s cognitive abilities develop according to the proposed stages. By examining patterns across cultures, the extent to which culture can influence cognitive development could also be determined.

Large language models (LLMs), such as ChatGPT, are trained on vast amounts of text data to enable them to generate human-like responses. They can mimic the cognitive and linguistic abilities of adults, but how successfully can they mimic those of children? If they can successfully mimic the responses of children of different ages, LLMs could be used to test models of cognitive development. [Milička et al. \(2024\) ↗](https://doi.org/10.1371/journal.pone.0298522) (<https://doi.org/10.1371/journal.pone.0298522>) investigated the ability of LLMs to replicate the responses that would be given by children who, compared to adults, typically have limited cognitive and language skills. The researchers conducted 1,296 independent trials, using GPT-3.5-turbo and GPT-4 models. They wanted to see if the LLMs could generate responses that reflect the language complexity and cognitive abilities typical of children aged between 1 and 6 years. Responses from the LLMs were analysed for their linguistic complexity and accuracy in solving false-belief tasks. False-belief tasks are used in developmental psychology to assess a child’s understanding of others’ perspectives. These tasks help test a child’s theory of mind (ToM), which is the ability to recognise that others have thoughts, beliefs and knowledge that may not match theirs.

They found that both GPT-3.5-turbo and GPT-4 showed an ability to accurately respond to the false-belief tasks, with accuracy and linguistic complexity improving as the age of the simulated child increased. They concluded that the cognitive and language deficiencies in the responses did not occur randomly. The high proportion of

correct responses from the 6-year-old personas suggests that LLMs can effectively employ theory of mind, thus providing support for using LLMs as a tool to test theory of mind. It also suggests that LLMs could mimic the responses of children to other cognitive tasks. This would allow aspects of other cognitive models of development to be tested, such as Piaget's concepts of egocentrism and conservation.

Reflection questions

1. What ethical considerations do you think are important to consider when using AI to mimic children's responses?
2. How could large language models be used to investigate social and emotional development in humans?
3. Reinforcement Learning with Human Feedback (RLHF) is a method of improving AI by refining the AI model's responses based on feedback from humans. What impact do you think this can have on the accuracy of AI responses for theory of mind?
4. Conduct your own research to see how AI is being used as a personalised learning tool for students. Prepare a summary of your findings to present to your class.

Learning outcomes

By the end of this section, you should be able to:

- Describe the effectiveness of stage theories and continuous models in understanding human development.
 - Explain the role the theory of mind has in understanding human development and cognition.
 - HL Extension
 - Discuss the role of AI to test models of human development.
 - Discuss the extent to which Western models of development can be applied to explain child development in Indigenous cultures — or vice versa.

¹ Erikson, Erik (1964) [2] (<https://www.norton.co.uk/books/9780393312140-insight-and-responsibility>), *Insight and Responsibility*, W. W. Norton & Company Ltd.

4 section questions ▾

 Previous section (/study/app/psychology-new/sid-540-cid-763690/book/what-is-the-role-of-biology-in-human-development-id-50514/review/)

Next 



Overview
(/study/app/
new/sid-
540-
cid-
763690/k/)

3. Human development / 3.1 Models of development



(https://intercom.help/kognity)



To what extent does the environment impact human development?

B-2-1-2: Identify the influence of sociocultural factors in human development.

B-2-1-3: Describe the effectiveness of stage theories and continuous models in understanding human development.

B-2-4-1a: (HL) Discuss the role of cultural dimensions in understanding the social and cognitive development of children.

B-2-4-2b: (HL) Discuss the role of extrinsic motivators in the social development of a child.

Notebook



Glossary



Reading assistance

ⓘ Teacher instructions

Learning outcomes

- Identify the influence of sociocultural factors in human development.
- Describe the effectiveness of stage theories and continuous models in understanding human development.

HL Extension

- Discuss the role of extrinsic motivators in the social development of a child.
- Discuss the role of cultural dimensions in understanding the social and cognitive development of children.

Facilitation guidance

In section 3.1.1 (/study/app/psychology-new/sid-540-cid-763690/book/what-is-the-role-of-biology-in-human-development-id-50514/), the role of the environment was discussed in relation to neuroplasticity. In this final section of subtopic 3.1, students are encouraged to consider the role of the environment on human development. This will include learning about Vygotsky's theory of cognitive development, and the role that peers, privation and deprivation can have on a child's development.

Note: To illustrate the impact of the environment on development, examples of child neglect experienced by children raised in institutions will be considered, which may cause some distress.

ⓘ Guiding question(s)

In this subtopic, you are thinking about the question, 'To what extent is human development universal?' This section will help you make an informed response by working through the following guiding question:

- To what extent does the environment impact human development?

In this final section of subtopic 3.1, you will be encouraged to consider the role of the environment on human development.

Vygotsky was a Russian psychologist who believed that people in our environment can play a significant role in our cognitive development. You will look at Vygotsky's theory and other research which has shown the impact of sociocultural factors in human development, including the influence of peers, privation and deprivation.

Keep the guiding question in mind as you progress through this section. The guiding questions build into the subtopic question(s). You will return to the subtopic question(s) at the end of each subtopic. The subtopic questions require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

Student view



The influence of culture

Overview

(/study/app

new/sid-

540-

cid-

763690/k

How similar are you to people you know from different cultures? Have you all gone through similar stages of development to become who you are today?

Research in psychology has shown the influence culture can have on our development, but there also seem to be some universal features of development that exist across cultures. For example, when developing language most children begin by making noises, then saying single words and then forming sentences. The question to consider is: To what extent is human development universal?

Vygotsky's theory

Lev Vygotsky, a Russian psychologist, developed his theory of cognitive development in 1934, around the same time as Piaget. There are similarities as well as differences between the two theories.

A main difference is that Vygotsky put forth what psychologists call a continuous model of development, while Piaget's theory of development was stage-based. Vygotsky placed a lot of emphasis on the social context of learning and the importance of culture, language and community. Whereas Piaget saw the child as a 'little scientist,' Vygotsky considered a child to be a 'little apprentice,' developing cognitive skills with the help of a more knowledgeable other (MKO), for example, a teacher or a parent, with developmental milestones being more fluid in nature.

Making connections

Role models

Bandura also stressed the importance of others in a child's learning. In his social learning theory (SLT), which is covered in subtopic 2.3 (/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49450/), he proposed that role models are significant people in a child's life, who children learn from by observing and imitating their behaviour.

Scaffolding

Vygotsky introduced the idea of scaffolding: that a child requires some support from a more knowledgeable individual to help them access opportunities for learning. This scaffolding might come in the form of a parent helping the child to complete a jigsaw, or an older sibling showing the child how to ride a bike. It also applies strongly to educational settings, where adults are there to guide the child in various learning activities.

Vygotsky also theorised that most learning comes within an individual's zone of proximal development (ZPD). The ZPD refers to how 'what the child can already do or knows' can be set in context with 'what the child could potentially achieve,' given the right guidance. The ZPD has been defined as 'the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers'¹ (Vygotsky, as published posthumously in 1978).

Perspective lens

Sociocultural perspective



The sociocultural perspective assumes that our social and cultural environment influences our development. One of the criticisms of Piaget's theory of cognitive development was that he failed to consider the influence of sociocultural factors. Vygotsky addressed this in his theory. He believed that cognitive development is significantly impacted by a child's social

interactions with others, such as teachers, caregivers and peers. He believed they could support a child's cognitive development by being a more knowledgeable other (MKO).

However, critics of Vygotsky say that by focusing on external, social factors, the role of personal experiences, intrinsic motivation or brain maturation in cognitive development was underestimated by Vygotsky.

This last critique pertaining to brain maturation, in particular, also serves as a broad critique of **continuous models of development**.

Reflection questions

1. To what extent do you believe sociocultural factors influence human development?
2. What are some limitations of a continuous model of development?
3. What are some strengths of a continuous model of development?
4. How might Piaget's stage model and Vygotsky's continuous model be combined to provide a more holistic explanation of cognitive development?

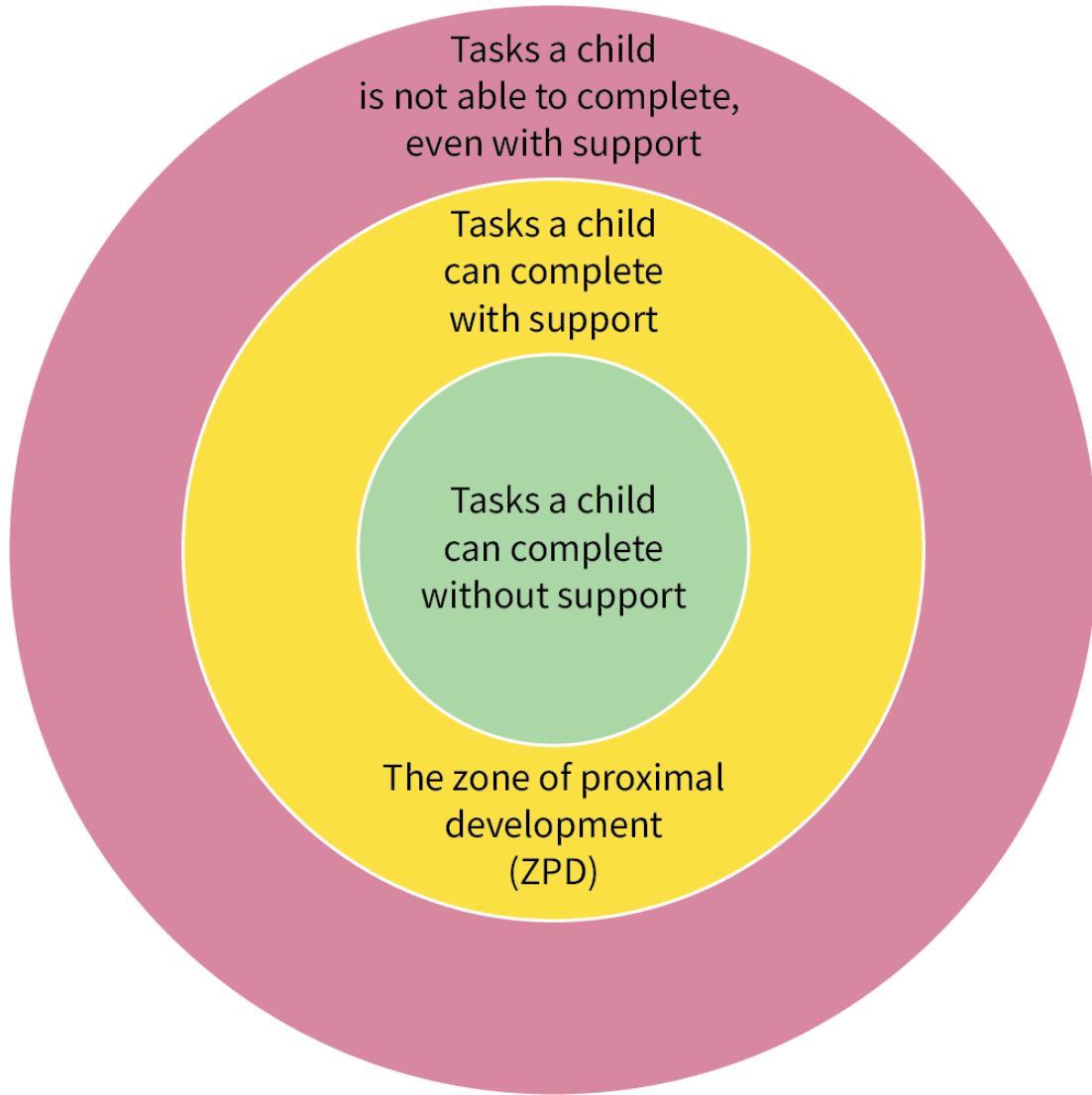


Figure 1. Vygotsky's zone of proximal development.

More information for figure 1

Three labelled concentric circles. The innermost circle is labelled tasks the child can complete without support. The next circle is labelled tasks the child can complete with support and the zone of proximal development, or ZPD. The outermost circle is labelled tasks a child is not able to complete, even with support.

Home
 Overview
 (/study/app/
 new/sid-
 540-
 cid-
 763690/k)

The ZPD works by an MKO (for example, teacher, parent) offering the framework to encourage the child to progress to the next level of their learning. This is scaffolding, as the MKO provides a secure framework which the child can use for support, but which is ultimately there to enable the child to progress. Offering tasks which are too easy traps the child within their current level; tasks which are too difficult may de-motivate the child and lead them to think that a task is always going to be beyond them.

Concept

Change

Scaffolding

Scaffolding involves support and prompting, usually provided by an adult, which helps a child or person to conquer tasks such as reading, understanding or finding solutions that they could not achieve alone.

Reflection questions

1. Can you think of a time in your life when scaffolding was provided to help you acquire new skills or knowledge?
2. Can you think of a time in your life when you acquired a new skill or knowledge without the support of someone else?
3. How does the effectiveness of scaffolding vary across different stages of development?

An important aspect of scaffolding is that there is a *gradual withdrawal* of support as the child's knowledge and confidence increase. A study by [Wood and Middleton \(1975\)](https://doi.org/10.1111/j.2044-8295.1975.tb01454.x) demonstrates how adults can be MKOs and provide support via scaffolding to assist a child to successfully complete a task they find challenging.

HL Extension

Culture

Cultural dimensions and the social and cognitive development of children

In [section 4.1.1](#), the cultural dimension individualism—collectivism is explained in more detail.

Understanding this dimension can help aid our understanding of cultural differences in the development of children and prevent us from making an incorrect judgement about a child's developmental progress.

Piaget believed his stage theory of cognitive development was universal but did acknowledge that children may progress through the stages at varying rates. This may be due to different parenting methods. [Yaman et al. \(2010\)](#) found that mothers from Turkey, typically a collectivist culture, were less supportive and gave less clear instructions than mothers from the Netherlands, typically an individualist culture. This may lead to children from collectivist cultures being more independent at a younger age, resulting in them being able to solve complex problems without assistance and to show more awareness of others' points of view at a younger age than a child raised in an individualist culture.

How development is measured across cultures needs to be carefully considered. The validity of the findings from Piagetian tasks relies heavily on children understanding the task, which can be a significant problem in cross-cultural research. The familiarity of objects used in tasks is also an important factor to consider. Most cross-cultural research on Piaget's theory has taken an etic approach, applying a Western theory and applying typical Western methods of testing to different cultures. [Dasen \(2022\)](#) explains some attempts that have been made at applying a more emic approach. This includes using locally made string bags as familiar objects to test conservation among the Oksapmin people in Papua New Guinea, and the use of the native African board game, Awele, in Côte d'Ivoire, to assess formal operations in Piaget's fourth stage of development. However, a Western theory is still being applied, rather than attempting to gain an understanding of development from a native perspective.



Reflection questions

1. To what extent are there universal aspects to human development?
2. How important is cross-cultural research in our understanding of human development?
3. Find other examples of cross-cultural research in psychology that have taken an emic approach. Choose one to summarise with the class, and ask for their evaluation comments about how successful the researchers were in gaining an understanding of behaviour.

Deprivation and privation

'With approximately 8 million children growing up in institutions around the world and 75% of child abuse cases in the United States classified as neglect, it is an issue that demands our attention and concern' (The Bucharest Early Intervention Project) [\(https://bucharestearlyinterventionproject.org/\)](https://bucharestearlyinterventionproject.org/).

Research into the effects of childhood institutionalisation has helped us understand the impact of privation and deprivation on development. The distinction between the two is important to keep in mind when considering the research findings of the effects of childhood institutionalisation. **Privation** refers to the complete lack of an attachment bond from early in life, as opposed to **deprivation**, which involves losing or disrupting an existing attachment. Theories of attachment will be explored in more detail in **subtopic 3.2** (/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49519/).

Michael Rutter has conducted multiple studies into children raised in neglectful conditions in institutions in Romania. He funded the English and Romanian Adoptee Project [\(\(https://www.kcl.ac.uk/research/the-english-and-romanian-adoptee-era-project\)\)](https://www.kcl.ac.uk/research/the-english-and-romanian-adoptee-era-project), a longitudinal investigation into the development of children who were adopted from Romanian institutions in the 1990s. Read more about this ongoing project here [\(\(https://doi.org/10.1111/j.1469-7610.2007.01792.x\)\)](https://doi.org/10.1111/j.1469-7610.2007.01792.x) (Rutter et al., 2007).

As many of the children had been raised in institutions since birth, Rutter believed they had suffered from privation, which he claimed has more severe consequences on development than deprivation. His longitudinal research has been able to provide us with insight into the long-term effects on development of institutionalisation.

Teacher instructions

Goal

- To identify the influence of sociocultural factors in human development.

Facilitation guidance

This task is going to introduce students to the effects of institutionalisation on development, with particular focus on Romanian orphans. To help students appreciate the severity of some of the conditions orphans faced while living in Romanian institutions, you may choose to show them relevant video clips, such as this [\(\(https://www.youtube.com/watch?v=VCeWr8OFuEs&t=1s\)\)](https://www.youtube.com/watch?v=VCeWr8OFuEs&t=1s).

Note: This video does include images of children living in severely neglectful conditions, which some may find distressing.

Activity

IB learner profile attribute: Knowledgeable/Inquirer/Thinker/Balanced

Approaches to learning: Thinking/Research



Time required to complete activity: 30 minutes

Overview
(/study/app/new/sid-540-cid-763690/k)

Activity type: Pairs

How does institutionalisation affect children's development?

Concept application: Change

Section task is going to introduce you to the effects of institutionalisation on development, with particular focus on Romanian orphans. The severe neglect they experienced impacted their development in various ways!

- After reading [these studies](https://www.psychstory.co.uk/developmental-psychology/romanian-orphan-studies), use the four categories in the table to note down examples of how children's development was impacted in the studies included in the article.

Physical	Emotional	Cognitive	Social

- Discuss your responses with your partner.
- To what extent do you think any impacts on the development of children raised in institutions may be permanent?

Positively, [The Bucharest Early Intervention Project](https://bucharestearlyinterventionproject.org/) is an ongoing longitudinal study which is showing positive developmental consequences for children who are removed from institutions and placed in homes where they have the opportunity to form attachments. However, [Gunnar \(2010\)](https://doi.org/10.3389/fnins.2010.00170) still believes that, although removal from institutional care may improve some aspects of cognitive development, children will still continue to show differences in development compared to children who never experienced institutional care.

International mindedness

Children in institutions

Are children raised in institutions in your culture? Why/why not?

To understand why children were allowed to be raised in such neglectful conditions in Romania, it helps to keep an open mind and try to understand the context behind such behaviour. This is not to justify it, but to appreciate what may have led to it and to help prevent its recurrence.

To help you gain a better perspective on why such large numbers of children were raised in institutions in Romania, conduct your own research into the austerity policy of the Socialist Republic of Romania.

Role of peers

The role of peers on human development, particularly social development, can be seen to have an influence from an early age. During early childhood, peer interactions are often centred around play.



Student view



Figure 2. Childhood peer interactions are often centred around play.

Credit: Liderina, Getty Images

Play helps children learn to engage with peers, share and understand social roles. The ability to cooperate and resolve conflicts with peers during play is an important aspect of early social development. Playing in sports teams also has many benefits, especially for adolescents. [Zuckerman et al. \(2020\) ↗](https://doi.org/10.1080/00913847.2020.1850152) (<https://doi.org/10.1080/00913847.2020.1850152>) conducted a meta-analysis of 35 studies, across 10 countries, which had investigated the impact team sports had on people aged 25 and younger. They concluded that the majority of studies reported positive outcomes for team sport involvement, including increases in self-esteem and academic performance.

Play can also aid cognitive development by providing opportunities to solve problems and think abstractly. Perspective-taking is often involved in peer interaction, which is important for cognitive as well as social development because it helps children consider the views of others and not be egocentric. This is the basis of empathy and theory of mind, which was covered in [section 3.1.2](#) ([/study/app/psychology-new/sid-540-cid-763690/book/what-are-strengths-and-limitations-of-a-stage-theory-approach-to-human-development-id-50515/](#)).

HL Extension

Q Motivation

Extrinsic motivators in the social development of a child

Social development involves becoming socialised into society and learning how to interact with others. Extrinsic motivators and intrinsic motivators can play a significant role in shaping a child's social development. Intrinsic motivators are internal, such as personal interest, enjoyment or satisfaction. A child may gain personal satisfaction from interacting with their peers and this may motivate them to join teams and social groups. On the other hand, extrinsic motivators are external, such as rewards, praise and social approval from others. For example, a child may receive praise from their parents when they help their siblings, and this could foster prosocial behaviour because the child might engage in helping behaviours more frequently in order to receive the external reward of praise.

[Martin and Olson \(2015\) ↗](#) (<https://doi.org/10.1177/1745691615568998>) explored the different motivators that can influence children's prosocial behaviour. They proposed that children's motivations for engaging in prosocial behaviour can be understood in terms of their moral and cognitive emotional development. Young children are often highly motivated by self-interest; they will display prosocial behaviour to receive rewards, or avoid punishment. However, as they mature, they develop emotionally and cognitively, and develop a deeper understanding of others' feelings. Their motivations become more complex and stem from a blend of personal

 Overview (/study/app/psychology-new/sid-540-cid-763690/book/to-what-extent-does-the-environment-impact-human-development-id-50516/review/)

To what extent does the environment impact human development? | IB DP Psychology FE2027 (NEW)

emotions (like empathy), social expectations (like moral standards) and self-interest (like gaining rewards or approval). Thus, extrinsic motivators may still have an influence but, for older children, they are not the sole factor in the decision to engage in prosocial behaviour.

It is important to consider the cultural context when assessing the effectiveness of extrinsic motivators. Different cultures have different expectations for social behaviour, and what is considered an extrinsic motivator in one culture may not hold the same significance in another. For example, cultures that emphasise cooperation and group harmony tend to use social rewards and recognition to reinforce positive behaviours in a group setting. In East Asian cultures, children often engage in more cooperative play compared to Western cultures, which tend to emphasise independent play. Extrinsic motivators, like group rewards or collective praise for maintaining harmony, are used to encourage prosocial behaviours. This, in turn, has a direct impact on an individual's social and moral development.

Understanding cultural differences can help parents, educators and policymakers create more culturally relevant motivational strategies, to offer effective support for child development across culturally diverse contexts.

Reflection questions

1. Are you more intrinsically or extrinsically motivated?
2. To what extent do you believe that humans are altruistic (to help others without any reward)?
3. Conduct an interview with one of your peers to see what motivates them to study. In what ways are your motivators similar or different?

Learning outcomes

By the end of this section, you should be able to:

- Identify the influence of sociocultural factors in human development.
- Describe the effectiveness of stage theories and continuous models in understanding human development.

HL Extension

- Discuss the role of extrinsic motivators in the social development of a child.
- Discuss the role of cultural dimensions in understanding the social and cognitive development of children.

¹Vygotsky, L.S. (1978) *Mind in Society: Development of Higher Psychological Processes*, Harvard University Press.

4 section questions

 Previous section (/study/app/psychology-new/sid-540-cid-763690/book/what-are-strengths-and-limitations-of-a-stage-theory-approach-to-human-devel...)



Overview

(/study/app)

new/sid-

540-

cid-

763690/k

3. Human development / 3.1 Models of development



(https://intercom.help/kognity)



Activity sheet: Models of development

Section

Student... (0/0)

Print (/study/app/psychology-new/sid-540-cid-763690/book/activity-sheet-models-of-development-id-50517/print/)

Assign

Table of
contents

Notebook



Glossary

Reading
assistance

Teacher instructions

Learning outcome

- To describe the effectiveness of stage theories and continuous models in understanding human development.

Facilitation guidance

This activity sheet is designed to give students the opportunity to review their understanding of the three models of development included in this subtopic: Piaget's, Erikson's and Vygotsky's. Students will evaluate the models and consider the universality of theories of human development.

In this activity, you will have the opportunity to review your understanding of the three models of development included in this subtopic: Piaget's, Erikson's and Vygotsky's. You will also evaluate the models and consider how they have aided our understanding of human development.

? Subtopic question(s)

During this activity sheet, you will be working towards answering the following subtopic question:

- To what extent is human development universal?

Before you start

Review [section 3.1.2](#) (/study/app/psychology-new/sid-540-cid-763690/book/what-are-strengths-and-limitations-of-a-stage-theory-approach-to-human-development-id-50515/) and [section 3.1.3](#) (/study/app/psychology-new/sid-540-cid-763690/book/to-what-extent-does-the-environment-impact-human-development-id-50516/) to refresh your memory of Piaget's, Erikson's and Vygotsky's models.

Part A

Knowledge and understanding

Piaget and Erikson's theories are both universal.

1 True



2 False

Erikson's theory gave more regard to the role of the environment than Piaget's theory.

1 True



2 False

- Most supporting research for Piaget takes an **etic** approach, by applying another culture's perspective. Taking an **emic** approach would study people within a particular culture from their own perspective.
- Overview
(/study/app/new/sid-540-cid-763690/k)

Part B

Application and analysis

Research investigating models of development often uses the observation method, allowing both qualitative and quantitative data to be obtained. Why do you think this method is commonly used for investigating development in children?

Wood and Middleton (1975) (<https://doi.org/10.1111/j.2044-8295.1975.tb01454.x>) investigated Vygotsky's concept of scaffolding by observing how mothers provide support to their children when they are completing puzzles.

Review Wood and Middleton's (1975) study and list relevant strengths and weaknesses.

0

Key

Strengths

- The task has mundane reality, as mothers often play with their child and offer help and encouragement, which increases **validity**.
- It is easily replicable to test for **reliability**.
- Qualitative data** is obtained, providing in-depth insight into how mothers scaffold.

Weaknesses

- There is possible **observer effect**.
- Social desirability **bias** may have occurred.
- No quantitative data** means the results cannot be objectively analysed.
- Researcher bias** could be present when noting and interpreting what was observed.
- It was a **limited sample**.
- There was a lack of generalisability to other **cultures**.

Wood and Middleton's (1975) study did not take the role of culture into account.

Think about how you could design a cross-cultural study into scaffolding with children.

Plan your own study using these four headings for guidance:

- Research question/Aim
- Research method
- Sample
- Procedure



Take a picture of your plan and upload it into the box.

Home
Overview
(/study/app
new/sid-
540-
cid-
763690/k
—



JPEG or PNG, max 5 MB

Drag & drop image here**Select from device****Key**

Points to consider:

- **Research question**
 - What is the purpose of your investigation?
 - The wording of your research question should be focused and not too broad.
- **Qualitative and/or quantitative data**
 - Are you focusing on measuring the success of scaffolding or how it is used?
 - Your research question should help you decide which type of data will be the most appropriate.
- **Suitable research method**
 - How will you be able to observe scaffolding?
 - What type of observation would be best?
 - Will using an additional method allow you to gain more of an understanding about scaffolding?
- **Sampling method**
 - Consider the practical implications of obtaining a sample of children in different cultures.
 - How can you reduce possible sampling bias?
- **Age of participants**
 - What age would be the most suitable?
 - If they are very young, will the effect of scaffolding be able to be seen?
- **Ethical considerations**
 - How will you gain informed consent for the children?
 - What precautions will you need to take to ensure children are protected?

Compare the study you planned with Wood and Middleton's (1975) study. Aside from considering the role of culture, consider other ways in which your study design is an improvement on their study.

**Key**

Points to consider:

- **Internal validity of results**
 - Did you measure scaffolding in a more precise way?
- **External validity of results**
 - Does your study have greater generalisability to other children?
 - Can your findings be applied more to other real-life examples of scaffolding?
- **Ethical considerations**
 - Did you take more precautions to protect participants?



Student view



Part C

Overview
(/study/ap/
new/sid-
540-
cid-
763690/k)

Synthesis and evaluation

Imagine there is an award for ‘Best Model of Cognitive Development’ and both Piaget and Vygotsky are nominated; who should win the award?

Considering the strengths and limitations of each model individually helps us appreciate how a combination of both of these models provides a more holistic, insightful and comprehensive account of a child’s cognitive development than either theory on its own.

Your teacher will assign you to a debate side. You should use your knowledge of both models to prepare to debate which model should win ‘Best Model of Cognitive Development.’ It is important to consider the strengths and support for the model you are assigned to, as well as the limitations of the opposing model. [This source ↗](#) (<https://doi.org/10.1016/j.newideapsych.2011.12.006>) may assist you.

Imagine there is an award for ‘Best Model of Cognitive Development’ and both Piaget and Vygotsky are nominated; who should win the award?

Using the knowledge you have gained from this subtopic, plus your own research, prepare to engage in a debate on this topic in your class. Be sure to cite research in support of your ideas.

Your teacher will assign you to a debate side and you should consider the arguments and research which support the side you are assigned to, as well as the limitations of these arguments and relevant research.



Key

Points to consider:

- **Testability of models**
 - Do the models have aspects which can be tested or are they too vague?
 - Do the models lend themselves to experimental research?
- **Amount of supporting research and validity of research**
 - How much supporting research does each model have?
 - How well did the studies measure the aspect of the model?
- **Reliability of supporting research**
 - Have replications of research been conducted, and were similar findings found?
- **Real-life application of models**
 - What influence have the models had on real life?
- **Implications of models**
 - Do the models suggest development is predetermined and cannot be improved?
 - Do the models suggest development can be aided by environmental factors?
- **Extent to which models take a holistic or reductionist approach**
 - Do the models look at development from multiple perspectives, or do the models ignore possible influential factors?
- **Universality of models**
 - Can the models explain development across cultures?



Student
view



Summary

Overview
(/study/app/new/sid-540-cid-763690/k)

In this activity, you have reviewed your understanding of the three models of development included in this section by comparing and evaluating them. You have also considered the universality of theories of human development.

Reflection

Referring back to the subtopic question:

- To what extent is human development universal?

How would you answer this question after completing this activity?

∅

[◀ Previous section](#) (/study/app/psychology-new/sid-540-cid-763690/book/to-what-extent-does-the-environment-impact-human-development-id-50516/review)



Student view



Overview

(/study/app/

new/sid-

540-

cid-

763690/k

3. Human development / 3.1 Models of development



(https://intercom.help/kognity)



Checklist

Section

Student... (0/0)

Feedback

Print

(/study/app/psychology-new/sid-540-cid-763690/book/checklist-id-

50521/print/)

Assign

Table of
contents

Learning outcomes



Notebook



Glossary

Reading
assistance

By the end of **subtopic 3.1**, you should be able to:

- Explain the role of brain maturation, critical periods and neuroplasticity in human development.
- Evaluate the extent to which critical periods explain human development.
- Describe the effectiveness of stage theories and continuous models in understanding human development.
- Explain the role the theory of mind has in understanding human development and cognition.
- Identify the influence of sociocultural factors in human development.

HL Extension

- Discuss the role of AI to test models of human development.
- Discuss the extent to which Western models of development can be applied to explain child development in Indigenous cultures — or vice versa.
- Discuss the role of extrinsic motivators in the social development of a child.
- Discuss the role of cultural dimensions in understanding the social and cognitive development of children.



< Previous section (/study/app/psychology-new/sid-540-cid-763690/book/key-terms-id-50520/review/)

Next section > (/study/app/psychology-new/



Overview
(/study/app/
new/sid-
540-
cid-
763690/k
—



Student
view



Overview

(/study/app/

new/sid-

540-

cid-

763690/

3. Human development / 3.1 Models of development



(https://intercom.help/kognity)



Collected research studies

Section

Student... (0/0)

Feedback

Print (/study/app/psychology-new/sid-540-cid-763690/book/collected-research-studies-id-50522/print/)

Assign



Table of contents



Notebook



Glossary



Reading assistance

Teacher instructions

These are the main research studies mentioned throughout this subtopic. However, this is not an exhaustive list, and you are encouraged to use other research studies that are relevant.

Students are not required to memorise all details of the studies but may wish to include them to support their explanations.

Summary	Evaluation
<p>Chugani (1999) https://doi.org/10.1177/107385849900500105.</p> <p>Location of study</p> <p>UK</p> <p>Aim</p> <p>To investigate the development of the brain</p> <p>Method</p> <p>PET scans were used to measure glucose metabolism in various brain regions, as increased brain activity requires more glucose. The scans of different age groups were compared.</p> <p>Results</p> <p>In newborns, there was little activity in the cerebral cortex. Areas associated with basic functions, like the brainstem and the cerebellum, showed higher levels of activity.</p> <p>As infants grew, brain activity began to spread to the sensorimotor cortex, responsible for sensory input and motor functions.</p> <p>During adolescence, the cerebral cortex, associated with complex cognitive functions, such as decision-making, impulse control and abstract reasoning, showed significant development.</p> <p>The most advanced brain functions in the cerebral cortex continued to mature into late adolescence and early adulthood.</p> <p>Conclusion</p> <p>The cerebral cortex, especially the prefrontal cortex, develops later compared to other brain regions. This suggests that basic survival functions are prioritised in early development.</p>	<p>Strengths</p> <ul style="list-style-type: none"> Use of PET scans allowed brain activity to be observed in real time. <p>Limitations</p> <ul style="list-style-type: none"> Since the study did not follow individuals over time, it could not track brain development within individuals. Research did not account for possible cultural or environmental differences in brain development. <p>Ethical considerations</p> <ul style="list-style-type: none"> PET scans are non-invasive. <p>Research considerations</p> <ul style="list-style-type: none"> The spatial resolution of scans varies, and PET scans have limited spatial resolution compared to newer techniques, like fMRI.



Student view

Summary	Evaluation
<p>Rosenzweig, Bennett and Diamond (1972) [↗] (https://escholarship.org/uc/item/2nf200ps)</p> <p>Location of study USA</p> <p>Aim To investigate how environmental conditions influence brain development in rats</p> <p>Method True experiment with three experimental conditions:</p> <ul style="list-style-type: none"> • Control cage: Rats were housed together in a regular environment, with basic food and water. • Enriched environment (EC): Rats were placed in a large cage filled with various toys, obstacles and the company of other rats. • Impoverished environment (IC): Rats were kept in isolation, without toys or social interaction. <p>After several weeks in these environments, the rat's brains were examined.</p> <p>Results Rats raised in an enriched environment showed significant structural changes in their brains compared to the IC group. They had increased thickness and weight of the cerebral cortex, and higher levels of neural activity in neurons associated with the transmission of acetylcholine.</p> <p>Conclusion The brain can change in response to environmental factors.</p>	<p>Strengths</p> <ul style="list-style-type: none"> • Other studies with humans have found similar findings, suggesting it is possible to generalise the results to some extent. • The study has been replicated many times, with similar findings, thus providing reliability for the results. • The controlled experimental design allowed for a systematic comparison of the effect of the different environments, allowing a cause-and-effect relationship to be established. • Rats were randomly allocated to conditions, reducing any potential sampling bias. • Rats were from an inbred line, which helps control for genetic influences. <p>Limitations</p> <ul style="list-style-type: none"> • The findings may not directly translate to humans due to species differences. • It is unknown which of the specific factors in the enriched conditions (e.g. social interaction, physical or cognitive stimulation) contributed most to the changes in the brain. • Long-term effects of the environment are unknown. <p>Ethical considerations</p> <ul style="list-style-type: none"> • Some of the rats were kept alone and in impoverished conditions, which could have caused them distress. • The rats had to be killed for the brains to be examined.

Summary	Evaluation
<p>Summary</p> <p>Hughes (1975) ↗ (https://era.ed.ac.uk/handle/1842/22329)</p> <p>Location of study UK</p> <p>Aim To investigate perspective-taking abilities</p> <p>Method A quasi-experiment in which 30 children aged between 3 years, 6 months and 4 years, 11 months were divided into three different age groups and each completed three tasks.</p> <ul style="list-style-type: none"> Task 1: An intersection of two walls is made on a table, with four areas (A, B, C and D). The researcher places a policeman doll in an area where it can see another toy doll (a small boy) and asks children, 'Can the policeman see the boy?' The researcher moves the toy doll to different areas where the policeman doll cannot see the other doll and asks children again, 'Can the policeman see the boy?' Task 2: Children were asked to place the toy doll in an area that the policeman cannot see him. Task 3: A second policeman doll is added, and children were asked to place the toy doll in an area that the policeman cannot see him. <p>Results</p> <ul style="list-style-type: none"> Group 1: (mean age 3 years, 9 months) 88% correct responses. Group 2: (mean age 4 years, 3 months) 88% correct responses. Group 3: (mean age 4 years, 9 months) 95% correct responses. <p>Conclusion The results suggest Piaget overestimated how long it took for children to not be egocentric. Piaget suggested it was not until 7–8 years old, but these results show it can be as early as 3 years.</p>	<p>Strengths</p> <ul style="list-style-type: none"> High ecological validity due to the use of animate, physical objects in an age-appropriate task which would be familiar to children Results in each of the different tasks were all similar, providing reliability of results. <p>Limitations</p> <ul style="list-style-type: none"> Low population validity, as it was a small sample, and all children attended the same playgroup <p>Ethical considerations</p> <ul style="list-style-type: none"> All researchers conducting studies within psychological research are expected to consider ethical guidelines. <p>Research considerations</p> <ul style="list-style-type: none"> This quasi-experiment does not allow for random assignment of participants to different groups, meaning a cause-and-effect relationship cannot be established.

Summary	Evaluation
<p>Frick et al. (2014) [2] (https://doi.org/10.3389/fpsyg.2014.00386)</p> <p>Location of study USA</p> <p>Aim To investigate perspective-taking abilities</p> <p>Method The experiment was with 80 children, aged between 4 and 8 years old. Scenes of toy models taking pictures of layouts of objects from different angles were created and then presented to each individual child. Children were asked to choose which one of four pictures could have been taken from the toy model's viewpoint.</p> <p>Results Performance increased and egocentric responses decreased dramatically around age 7. There was a considerable variability in individual test scores, with not all 8-year-olds answering correctly.</p> <p>Conclusion The results offer support for Piaget's concrete operational stage for most children, but individual differences in egocentrism are evident.</p>	<p>Strengths</p> <ul style="list-style-type: none"> Compared responses from a wide age range to help establish when children are no longer egocentric The controlled experimental design allowed for a systematic comparison of the responses, allowing a cause-and-effect relationship to be established. Can be easily replicated to test for reliability of results <p>Limitations</p> <ul style="list-style-type: none"> Low ecological validity, as it was a lab setting The task itself is unusual for children due to the use of pictures to represent scenes, and this reduces the ability to generalise the findings to other, more real-life situations. Low population validity, as it was a small sample, and all children were from similar backgrounds <p>Ethical considerations</p> <ul style="list-style-type: none"> All researchers conducting studies within psychological research are expected to consider ethical guidelines. <p>Research considerations</p> <ul style="list-style-type: none"> When children are participants, it is important to ensure that tasks and instructions are 'child friendly'. Children may not have fully understood this task, and this may affect their responses, thus questioning the internal validity.

Summary	Evaluation
<p>Wood and Middleton (1975) ↗ https://doi.org/10.1111/j.2044-8295.1975.tb01454.x</p> <p>Location of study UK</p> <p>Aim To investigate how mothers provide scaffolding to their children</p> <p>Method 12 children, who were 4 years old, were given puzzles to complete, which were too difficult for them to complete alone. Their mother's behaviour was observed in terms of how they interacted with the children to provide support to the child.</p> <p>Results The type of support the mother gave included: <ul style="list-style-type: none"> • general encouragement, e.g. 'now you have a go' • specific instructions, e.g. 'get four big blocks' • direct demonstration, e.g. showing the child how to place one block on another. No single strategy was best for helping the child to progress. The most effective assistance was given by mothers who varied their strategy according to how the child was doing. </p> <p>Conclusion More knowledgeable persons (MKOs) are vital to help a child progress.</p>	<p>Strengths</p> <ul style="list-style-type: none"> • The task has ecological validity, as caregivers often support their children with such tasks in real life, which increases external validity of findings. • Rich data was obtained about how scaffolding was provided, rather than just how much or how often it was provided. <p>Limitations</p> <ul style="list-style-type: none"> • Observer effect due to being aware of being observed • Social desirability effect, to appear more favourable to research • Research bias when interpreting observations • Low population validity due to small sample size (12) and children all being the same age <p>Ethical considerations</p> <ul style="list-style-type: none"> • All researchers conducting studies within psychological research are expected to consider ethical guidelines.

Summary	Evaluation
<p>Rutter et al. (2007) ↗ (https://doi.org/10.1111/j.1469-7610.2007.01792.x)</p> <p>Location of study UK</p> <p>Aim To compare the development of Romanian orphans, after they had been adopted, with UK-adopted children, who had not experienced neglect</p> <p>Method 144 Romanian orphans, who had been adopted, were compared with 52 UK-adopted children. Tests for cognitive functioning were conducted, and semi-structured interviews were carried out with the adoptive parents.</p> <p>Results Children who had been adopted but not experienced neglect in institutions showed no development impairment. Cognitive impairment was higher in the Romanian orphans who had spent more than 24 months in the institution than in those who had spent under 24 months. Many of the Romanian orphans displayed disinhibited attachment — a lack of differentiation towards different people.</p> <p>Conclusion The longer spent in an institution, the more cognitive development is impaired and attachment disorders are evident. Negative outcomes from institutionalisation can be overcome if children are removed before 6 months of age. Separation from an attachment figure is not sufficient by itself to cause impairment to development.</p>	<p>Strengths</p> <ul style="list-style-type: none"> Part of an ongoing, longitudinal project which is providing valuable insight into how the environment can influence human development <p>Limitations</p> <ul style="list-style-type: none"> No control over other factors, such as genetics Not possible to know the role malnutrition played on the developmental impairments <p>Ethical considerations</p> <ul style="list-style-type: none"> Researchers did not expose children to deprived conditions; this occurred naturally. But researchers have an obligation to ensure children are protected from any further physical or psychological harm. <p>Research considerations</p> <ul style="list-style-type: none"> Longitudinal research is time consuming and expensive, and participants may choose to 'drop out' of the study.

◀ Previous section (/study/app/psychology-new/sid-540-cid-763690/book/checklist-id-50521/review/)

Next section ➔ (/study/app/psychology-new/sic