

# Key terms

**Accommodation:** When a new experience is inconsistent with existing schemas the system must be adapted to accommodate the new information.

**Alphabetic strategy:** Reading by recognition of individual letters.

**Assimilation:** When dealing with new information that is consistent with an existing schema the information is assimilated into this schema.

**Attachment:** The forming of a close emotional bond, particularly between mother and baby.

**Attention Deficit/Hyperactivity Disorder:** This is one of the most common developmental disorders. It is characterised by a triad of difficulties: chronic and pervasive inattention, impulsive behaviour and hyperactivity.

**Autism:** Childhood autism is a rare developmental disorder, often manifest before the second year of life, which involves a profound failure in social, linguistic and imaginative development.

**Backpropagation algorithm:** An algorithm for learning in connectionist networks.

**Balance beam task:** A balance beam is pivoted in the middle and it has a number of pegs spaced at equal intervals on either side of the fulcrum. Weights are placed at different peg positions and children are asked to predict which side of the balance will go down.

**Big data:** A research approach that involves collecting large amounts of data and using automated, computer-based methods to analyse it.

**Canonical babbling:** Babbling that begins at around six months, and consists of recognisable syllables composed of a consonant sound and a vowel.

**Cardinality:** When counting, the final number reached is the total.

**Central executive:** A component of Baddeley and Hitch's working memory model. It is a mechanism for controlling attention – its main function is to ensure that the limited resources of working memory are used as effectively as possible in a given task.

**Chronological age:** The child's actual age in years and months.

**Clinical interviews:** An interview in which the researcher asks questions but keeps the conversation as open as possible.

**Cochlea:** A spiral-shaped organ in the inner ear, crucial for hearing.

**Communicative Development Inventory:** A tool for measuring the size and growth of children's vocabulary.

**Comorbidity:** When two or more disorders are present in the same individual e.g. specific language impairment often co-occurs with other developmental disorders.

**Concrete operational stage:** Piaget's third developmental stage in which children begin to use logical rules to solve problems. They can deal with more than one salient feature of a problem at a time and are no longer dominated by appearance. However, they are not yet able to deal with abstract problems. This stage lasts from the ages of 6 or 7 to 11 or 12.

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**Connectionist models:** Models of learning implemented on a computer in which there are many interconnected nodes.

**Conservation tasks:** Tests designed to see whether the child understands that some properties of an object or substance remain fundamentally the same even when there are external changes in shape or arrangement.

**Core knowledge:** The idea that certain aspects of knowledge are innate.

**Corpus callosum:** A thick bundle of nerve fibres in the centre of the brain that acts as the major connection between the left and right hemispheres, transferring information between them.

**Cortisol:** A hormone released in response to stress.

**Critical period:** The period of time during which a particular ability can be learned.

**Cross-sectional:** A research design in which children of various ages are studied at the same time.

**Cyber-bullying:** Repeated acts of aggression that are directed towards particular peers through the internet or mobile technologies.

**Developmental co-ordination disorder (DCD):** Developmental co-ordination disorder is diagnosed in children who, for no medical reason, fail to acquire adequate motor skills.

**Developmental dyscalculia:** A disorder of mathematical understanding. The core feature is a severe disability in learning arithmetic.

**Developmental dyslexia:** A syndrome causing problems with learning to read and spell, despite normal intelligence. Also known as word blindness.

**Dizygotic:** Non-identical twins, genetically only as closely related as regular siblings.

**Egocentrism:** To consider the world entirely from one's own point of view.

**Electroencephalography (EEG):** A technique that uses sensors placed on the head to measure changes in electrical activity generated by neural activity in the brain.

**Embodiment:** The idea that cognition is shaped by the body.

**Emerge:** The way in which complex behaviour can arise out of more simple behaviour, such as in connectionist models where many interconnected simple processing units can learn high-level complex tasks.

**Epigenetics:** The study of how genes can be turned on and off by experiences.

**Equilibration:** Using the processes of accommodation and assimilation to produce a state of equilibrium between existing schemas and new experiences.

**Event-related potentials (ERP):** Specific waveforms of neural electrical activity that are derived from the EEG.

**Executive functions:** The system that controls cognitive functions such as planning and executing actions. It is linked to the prefrontal areas of the brain.

**False belief task:** A test to see whether a child will act on a knowingly incorrect belief, or be aware that a second person who is not in possession of a certain piece of information may act 'incorrectly'.

**Familiarisation-novelty preference method:** A way of using infants' looking times to infer their knowledge.

**Feral children:** Children who have grown up with little or no human contact.

**Foetal Alcohol Syndrome:** A pattern of physical and mental abnormalities found in babies whose mothers were heavy drinkers during pregnancy.

**Formal operational stage:** The final stage in Piaget's theory from 11 or 12 years onwards, in which the child becomes able to consider all possible combinations in relation to the whole problem and to reason about an entirely hypothetical situation.

**FOXP2 gene:** Mutation of this gene, among others, in humans causes speech and language impairments.

**functional Magnetic Resonance Imaging (fMRI):** A technique that measures regional blood flow in the brain that correlates with neural activity.

**Goal-directed reaching:** The ability to successfully attain a desired object. This ability emerges at around three or four months and gradually becomes more precise over the first year of life.

**Habituation:** Method used to assess abilities of infants in which a stimulus is presented repeatedly until the infant's attention decreases significantly. Then a novel stimulus is presented and the increase in attention is measured.

**Hill climbing:** A method for solving problems – at each point of the solution you would choose an action that takes you closer to the goal.

**Imprinting:** A biological predisposition for a behaviour that is triggered by, and linked to, a specific environmental stimulus.

**IQ:** The ratio of mental age, defined by an intelligence test, to chronological age, with a score of 100 representing 'average IQ'.

**Joint attention:** An aspect of early communication – a mother and her child both looking at the same object.

**Larynx:** Part of the vocal tract, it is involved in breathing and sound production. Commonly known as the 'voice box'.

**Learning disability:** Children who have a low IQ score are considered to have a learning disability. This can be profound, severe, moderate or mild, depending on the IQ score.

**Linguistic nativism:** The view that children's capacity for language is largely driven by internal factors.

**Logographic strategy:** Reading by recognition of whole words.

**Longitudinal:** A research design in which data are gathered from the same individuals over a period of time.

**Mean Length of Utterance:** This is a measurement in morphemes of the average length of utterance.

**Means-ends analysis:** A method for solving problems based on performing sub-goals to achieve the final goal.

**Memory span:** The number of items that can be accurately recalled in the correct order.

**Mental age:** This gives an indication of a child's level of cognitive function in years and months. This may or may not be the same as chronological age, which is the child's actual age in years and months.

**Mind mindedness:** Describes the way in which parents appropriately interpret their infants' desires and intentions.

**Monozygotic:** Twins that developed from one zygote, so are genetically identical.

**Morpheme:** The smallest unit of meaning in language.

**Morphology:** The form and structure of words in a language, especially the consistent patterns that may be observed and classified.

**Myelination:** The production of the myelin sheath that surrounds axons, forming insulation and improving conductivity.

**'Naughty Teddy' study:** McGarrigle and Donaldson's (1975) study where the experimenter sets out two rows of coins which are adjusted until children agree that both contain the same number. Then, under the control of the experimenter,

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a glove puppet known as ‘Naughty Teddy’ moves the coins in one row so that it is longer than the other row. Children are then asked whether the two rows contain the same or a different number of coins.

**Near Infra Red Spectroscopy (NIRS):** A technique for assessing brain activation based on the observation that increased neural activity is associated with changes in the oxygenation of blood.

**Noble savage:** A character unspoilt by society, in contrast to being ‘corrupted’ by education.

**Object permanence:** The understanding that objects have substance, maintain their identities when they change location, and ordinarily continue to exist when out of sight.

**One-to-one correspondence:** Counting each object only once.

**Orthographic strategy:** Reading by recognition of groups of letters, or orthographic units.

**Orthographic transparency:** A consistent relationship between the sounds of a language and the spelling so that a particular sound always has the same spelling.

**Overregularisation errors:** The tendency to apply grammatical rules in situations that should be exceptions to those rules.

**Phonemes:** The smallest sound categories in speech in any given language that serve to distinguish one word from another.

**Phonological loop:** A component of Baddeley and Hitch’s working memory model. It is used for holding speech-based information.

**Place holder:** The use of zero to mark the column value, even though the column is empty.

**Place value:** The convention of each column in numbers representing certain values, i.e. units, tens, hundreds, etc.

**Positron Emission Tomography (PET):** A brain scanning method that shows activity in the brain by measuring blood flow to different brain areas.

**Power grip:** A grip in which the fingers wrap around the objects.

**Precision grip:** A grip in which there is full opposition of the fingers and thumb. This is only found in humans.

**Preferential looking paradigm:** In a preferential looking experiment, an infant is familiarised, over a series of training trials to a novel stimulus. The infant is then presented with a second, different, stimulus. If the infant looks longer at the second stimulus, this suggests that the infant can discriminate between the stimuli.

**Preformationist theories:** These are based on the idea that the essential characteristics of an individual are fully specified at the outset of development.

**Prefrontal cortex:** Part of the frontal cortex, its primary function is to co-ordinate a wide range of neural processes. The PFC serves a key function in cognitive control in maintaining information about the current goal of a task and the means to achieve that goal.

**Prematurity:** Babies born before 37 weeks of weeks of pregnancy are classed as premature.

**Pre-operational stage:** Piaget’s second stage of cognitive development involving internalisation of forms of actions that the infant has already mastered. The key feature of this stage, which lasts from two to six or seven years, is that the child is able to focus only on one salient feature of a problem at a time and is dominated by the immediate appearance of things.

**Pre-reaching:** Movements of the arm and hand made by newborns towards an attractive object.

**Prosocial behaviour:** Altruistic behaviours such as sharing, helping, caregiving and showing compassion.

**Prosodic pattern:** The rhythmical properties of a language.

**Reading comprehension impairment:** A disorder in which children have significant difficulty in understanding text even though they can read individual words.

**Reduplicated babbling:** Babbling that begins at around eight months, and consists of repetitions of the same sound.

**Reversibility:** The child has an understanding that actions can be reversed.

**Rouge removal task:** A small amount of rouge is surreptitiously placed on a child's face. Then the child is allowed to look in a mirror. This task tests mirror recognition.

**Sally-Ann task:** A test of theory of mind in which a girl doll (Sally) hides a marble and then goes for a walk. A second doll (Ann) then moves the marble while Sally is still away and so cannot see what has happened. The children are asked where Sally will look for the marble.

**Schemas:** Structured organisation of knowledge and actions.

**Self-organisation:** An important concept in dynamic systems – it means that a system can arrange itself in an orderly state without an external agent or plan.

**Self-regulation:** The ability to actively control levels of arousal and emotional responses.

**Semantic bootstrapping:** The linking of certain semantic categories such as 'person' or 'thing' to their corresponding grammatical word class and syntactic categories by a series of 'linking rules'.

**Sensitive period:** A time of heightened ability to learn.

**Sensorimotor period:** Piaget's first stage in the process of adaption, from birth to about two years, in which infants co-ordinate sensory perceptions and motor abilities to acquire knowledge of the world.

**Smarties task:** A false-belief task in which children are shown a Smarties tube that contains pencils rather than Smarties. Children are asked what another child, who has not seen inside the Smarties tube, will think is inside.

**Social referencing:** The gauging of others' emotional reactions before deciding one's own reaction.

**Specific language impairment:** This term is used to describe cases in which children's language skills are much worse than would be expected from their level of nonverbal intelligence and where the difficulties with language cannot be explained by other known causes such as deafness or a pervasive developmental disorder such as autism.

**Stages:** Piaget's theory says that development proceeds along a series of stages that are characterised by qualitatively different systems of thinking and action.

**Statistical learning:** The ability to detect regularly occurring patterns in the environment.

**Stepping reflex:** A reflex elicited when a baby is supported in a standing position and the feet are brought into contact with a surface, such as a table or the floor. The baby responds by making stepping movements, as though walking.

**Still-face procedure:** This involves mothers and their infants and it is divided into three periods of interaction. 1. Mothers are instructed to interact normally with

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their infant. 2. They are instructed not to respond as normal and to adopt a still face with a neutral expression. 3. Mothers resume their normal pattern of responsive interaction.

**Strange situation:** Used in attachment studies. The child is observed first with the mother, next with a stranger, then alone, and finally when reunited with stranger and mother.

**Symbolic play:** Piaget believed that symbolic play, where one object stands for another, serves as a rehearsal for real life in the imagination; he developed a three-stage theory of symbolic play.

**Synaptogenesis:** The forming of new connections between neurons.

**Syntactic bootstrapping:** This involves inferring information about the syntactic properties of words from their position in the sentence and extending these inferences to new cases that occur in similar syntactic positions.

**Tabula rasa:** A blank slate.

**Theory of mind:** The ability to think about other people's mental states and form theories of how they think.

**Tower of Hanoi:** A puzzle often used to study means-ends problem solving. It consists of three pegs; on the first peg there is a series of disks of increasing size, placed with the largest disk at the bottom. The child's task is to move the blocks to the last peg one by one so that they end up in the original order.

**Transitive inference:** Understanding the relation between objects.

**U-shaped development:** A type of non-linear development where performance is initially high but then temporarily decreases before recovering again.

**Violation-of-expectation method:** A way of using infants' looking times to infer their knowledge. The assumption is that infants look longer at something unexpected. So, for example, if they look longer at a physically impossible than at a possible event one can infer that they understand the physical impossibility.

**Visuospatial scratchpad:** A component of Baddeley and Hitch's working memory model. It is used for holding visual and spatial information.

**Vocabulary spurt:** The sudden increase in vocabulary size that occurs at about 12 months.

**Wisconsin Card Sorting Task:** A task to test mental flexibility in which cards are sorted first by one rule and then the sorting rule is switched.

**Working memory:** The system for attending to, processing and remembering information over short periods of time in a temporary store.

**Zone of Proximal Development:** The gap between what a learner can do without help and what she cannot do even with help. Therefore, it describes the problems that the learner can solve with someone's help.