Critical period

This article is about a critical period in an organism's or person's development. See also America's Critical Period.

In general, a critical period is a limited time in which an event can occur, usually to result in some kind of transformation. A "critical period" in developmental psychology and developmental biology is a time in the early stages of an organism's life during which it displays a heightened sensitivity to certain environmental stimuli, and develops in particular ways due to experiences at this time. If the organism does not receive the appropriate stimulus during this "critical period", it may be difficult, ultimately less successful, or even impossible, to develop some functions later in life.[1]

For example, the critical period for the development of a human child's binocular vision is thought to be between three and eight months, with sensitivity to damage extending up to at least three years of age. Further critical periods have been identified for the development of hearing and the vestibular system. There are critical periods during early postnatal development in which imprinting can occur, such as when a greylag goose becomes attached to a parent figure within the first 36 hours after hatching. A young chaffinch must hear an adult singing before it sexually matures, or it will never properly learn the highly intricate song. These observations have led some to hypothesise a critical period for certain areas of human learning, particularly language acquisition.

Experimental research into critical periods has involved depriving animals of stimuli at different stages of development. Other studies have looked at children deprived of certain experiences due to illness (such as temporary blindness), or social isolation (such as feral children). Many of the studies investigating a critical period for language acquisition have focused on deaf children of hearing parents.

Linguistics

First language acquisition

The Critical Period Hypothesis states that the first few years of life constitute the time during which language develops readily and after which (sometime between age 5 and puberty) language acquisition is much more difficult and ultimately less successful.[1]. The critical period hypothesis was proposed by linguist Eric Lenneberg in 1967.

Evidence supporting this hypothesis comes from feral children who failed to develop language after being deprived of early linguistic input. The most famous cases are Genie and Victor of Aveyron. However, it is also possible that these children were retarded from infancy and abandoned because of this, or that inability to develop language came from the bizarre and inhuman treatment they suffered.[1] Other evidence comes from neuropsychology where it is known that adults, well beyond the critical period, are more likely to suffer permanent language impairment from brain damage than are children, believed to be due to youthful capabilities of neural reorganization.[1] The nature of this phenomenon, however, has been one of the most fiercely debated issues in psycholinguistics and cognitive science in general for decades.

Second language acquisition

The theory has often been extended to a critical period for second language acquisition, although this is much less widely accepted. Certainly, older learners of a second language rarely achieve the native-like fluency that younger learners display, despite often progressing faster than children in the initial stages. David Singleton (1995) states that in learning a second language, "younger = better in the long run," but points out that there are many exceptions, noting that five percent of adult bilinguals master a second language even though they begin learning it when they are well into adulthood — long after any critical period has presumably come to a close. Evidence is controversial the Second Language Acquisition involves a critical period, nevertheless, it is generally agreed that younger people learning a second language typically achieve fluency more often than older learners. Older learners may be able to...
speak the language but will lack the native fluidity of younger learners. The Second Language Acquisition Critical Period coincides approximately with the Formal Operational Stage of Jean Piaget’s theory of cognitive Development (Age 11+).

**Vision**

In mammals, neurons in the brain which process vision actually develop after birth based on signals from the eyes. A landmark experiment by David H. Hubel and Torsten Wiesel showed that cats which had one eye sewn shut at birth (monocular deprivation) could not see properly, even though the eyes were anatomically normal. The kittens had abnormally small ocular dominance columns (part of the brain that processes sight) connected to the closed eye, and abnormally large columns connected to the open eye. This did not happen to adult cats even when one eye was sewn shut for a year. Later experiments in monkeys found similar results. The critical period for cats is about three months and for monkeys, about six months. [2]

In humans, some babies are born blind in one or both eyes, for example, due to cataracts. Even when their vision is restored later by treatment, their sight would not function in the normal way as for someone who had binocular vision from birth or had surgery to restore vision shortly after birth. Therefore, it is important to treat babies born blind soon if their condition is treatable.

**External links**

- Bibliography of papers on critical periods in second language acquisition [3]

**References**


**Biology**


**Linguistics**


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