

Critical Periods and Synaptic Pruning

The human brain begins forming very early in parental life (3 weeks after conception) however brain development is a lifelong project

the major difference between brain development in a child versus learning in an adult is a matter of degree

The brain is far more plastic in early life than in maturity

Brain plasticity neuroplasticity; the brain's ability to recognize neuropathways due to environmental experience

This plasticity means the young children's brains are more open to learning from their environment (nurture) however those brains are also more vulnerable to developmental problems should their environment proved un nurturing.

For example: Each of us is born with the potential to learn language, our brains are programmed to recognize human speech and discriminate subtle differences between individual speech sounds to put words and meaning together and to pick up the grammatical rules for ordering words in sentences.

When children are never exposed to a significant amount of language (feral children) or completely deprived of it these children never learn more than the rudimentary level of communication even in intense training

In short, a normal acquisition of human speech is subject to a **critical period**, times when the brain is intensely adaptable

Critical Period:

The brain is programmed to connect neurons, prune synapses and insulate axons at specific times in childhood.

In some instances, this leads to a critical period, a narrow window of time in which a specific skill has to be acquired in order for development to the normal

The individual shows a heightened sensitivity to environmental stimuli.

If an organism doesn't receive the appropriate stimuli during this critical period it may be difficult or impossible to develop this function later

This occurs because the developing brain is a highly competitive environment

A major critical period in humans occurs around language although the window is much larger.

Children have several years to learn a language but if they don't pick it up before adolescence language skills like pronunciation and grammar will be irreversibly effective

Critical period for language closes between 5 and 6 years old.