Life

Upper Int/Advanced Reading Text

The first year of life

A study into child development published in 2010 was one of the first to demonstrate that childhood experience influences the structure of the developing brain. Since then, other studies have shown a link between a baby's socioeconomic status and the growth of its brain. Despite millennia of child rearing, we have only a limited understanding of how babies take such gigantic strides in cognitive, linguistic, reasoning and planning ability. At birth the brain has nearly a hundred billion neurons, as many as in adulthood. As the baby grows, receiving a flood of input through their senses, neurons get connected to other neurons, resulting in some hundred trillion connections by the age of three.

Using new technology, scientists can better understand the mystery of how a child goes from being barely able to see when just born to being able to talk, ride a bike, draw, and invent an imaginary friend by the age of five. The more scientists find out about how children acquire the capacity for language, numbers and emotional understanding during this period, the more they realise that the baby brain is an incredible learning machine. Its future—to a great extent—is in our hands.

Judit Gervain, a cognitive neuroscientist at Paris Descartes University, tested how good newborns are at distinguishing different sound patterns. Using near-infrared spectroscopy, the researchers produced images of the brains of babies as they heard audio sequences. In some, the sounds were repeated in an ABB structure, such as mu-ba-ba; in others, an ABC structure, such as mu-ba-ge. The researchers found that brain regions responsible for speech and audio processing responded more strongly to the ABB sequences. In a later study they found that the newborn brain was also able to distinguish between audio sequences with an AAB pattern and those with an ABB pattern. Not only could babies notice repetition, they also were sensitive to where it occurred in the sequence. Gervain is excited by these findings because the order of sounds is the building block of words and grammar. 'Position is key to language,' she says. 'If something is at the beginning or at the end, it makes a big difference: "John killed the bear" is very different from "The bear killed John." '

Elsewhere, researchers led by Patricia Kuhl, a neuroscientist at the University of Washington in Seattle, have found that language delivered by television, audio book, internet, or smartphone—no matter how educational—doesn't appear to be enough for children's development. They carried out a study of nine-month-old American babies. The researchers expected the group who'd watched videos in Mandarin Chinese to show the same kind of learning as the group who were face-to-face with the same sounds. Instead they found a huge difference. The babies exposed to the language through human interactions were able to distinguish between similar Mandarin sounds as well as native listeners. But the other babies—regardless of whether they had watched the video or listened to the audio—showed no learning whatsoever.

‘We were blown away,’ Kuhl says. ‘It changed our fundamental thinking about the brain.’ The result of this and other studies led Kuhl to propose that social experience is necessary for linguistic, cognitive, and emotional development.

KEYWORDS

adulthood (n) the period of your life when you have finished growing and are no longer a child
childhood (n) the period of your life when you are a child, before you become an adult
distinguish (v) to recognize the differences between two or more things
fundamental (adj) relating to the most basic and important parts of something
infant (n) a baby or young child
key (adj) very important or necessary
newborn (adj) a newborn baby has only recently been born; (n) a newborn baby
notice (v) to become aware of something
thinking (n) ideas or opinions
understanding (n) knowledge about a subject