

Early organization and development of the visual pathway

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In both human and non–human primates, the ventral visual cortex comprises multiple specialized subregions that are involved in the visual recognition of image categories such as objects, faces or places remarkably similar across individuals despite differences in cultural, linguistic, or socio–economic background. Even for culturally learned skills such as reading, similarly–localized activations are observed across writing systems and ages of acquisition revealing the weight of structural constraints on functional architecture. In this talk, we will examine how an early developing cognitive function, face recognition and a cultural acquisition, reading, settled in the ventral visual cortex, how they interact and what these observations teach us about human brain plasticity and on how education can take advantage of this particular plasticity.

Pediatrician, director of the developmental brain imaging lab (INSERM U992, Neurospin/CEA, Paris–Saclay, France), Ghislaine Dehaene–Lambertz and her team investigate the development of cognitive functions in infants and children using brain imaging techniques. Their goal is to understand how complex cognitive functions, such as language, music, mathematics, etc... emerge in the human brain, thanks to a thorough description of the brain initial structural and functional organization. She published pioneering work using high–density event–related potentials (Nature 1994), functional resonance magnetic imaging (Science 2002) or optical topography (PNAS 2003–2013) to study language acquisition, and the neural signatures of consciousness (Science 2013) in the infant brain as reading in the child brain (Plos Biology, 2018). She is the recipient of several national and international awards (Prix Justine and Yves Sergent 2013, Grand Prix Scientifique de la Fondation de France, 2015, NRJ–Institut de France, 2016, Médaille d’argent du CNRS, 2018).