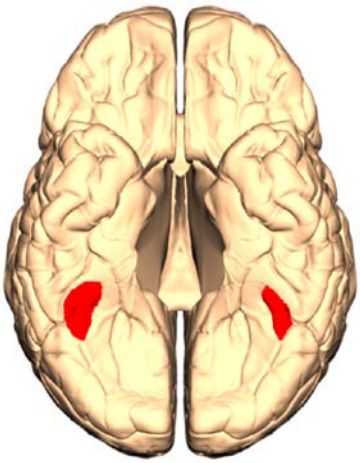
Facial Recognition and Prosopagnosia

Many mammals, but particularly human and non-human primates, are highly reliant upon environmental visual stimuli from various categories. Despite human faces being highly similar (e.g., all contain the same features: eyes, ears, mouth, and nose), we can almost instantaneously distinguish between individuals, and perceive their age, sex, emotion, and gaze. This ability has evolutionary significance, contributing to the survival of the species, allowing us to distinguish between potential mates, relatives, friends, and threatening foes. Given the intimate relationship between structure and function, it is not surprising that we have specialized neurals network mediating these facial recognition perceptual abilities.

Research has gradually illuminated the underlying neural mechanisms of facial processing and recognition. Neuroimaging studies have shed light on the neuroanatomy of facial processing, specifically the occipito-temporal network that include the fusiform face area (FFA; Kanwisher, McDermott, & Chun; 1997), occipital face area (OFA; Kanwisher et al., 2000), and the posterior superior temporal sulcus (pSTS; Chao et al., 1999). These regions all clearly demonstrate a higher response to facial stimuli than to non-face stimuli, however their function in discrimination between different identities of faces remains elusive.

Among the first evidence to suggest that there exist specific neurological mechanisms for the perception of faces, was evidence from patients who lose the ability to recognize faces following brain injury or damage. This syndrome, known as *Prosopagnosia*, does not result in a loss of ability to identify individuals, as patients with this syndrome can identify a person based on their smell or voice (Wada & Yamamoto, 2001). However, Prosopagnosia is the inability to identify people based on their faces. Patients with this disorder cannot identify even their loved ones based on their faces alone, but can do so once the person begins to speak. Prosopagnosia has been identified following focal injury to the FFA (see image).



Fusiform Face Area (FFA)

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