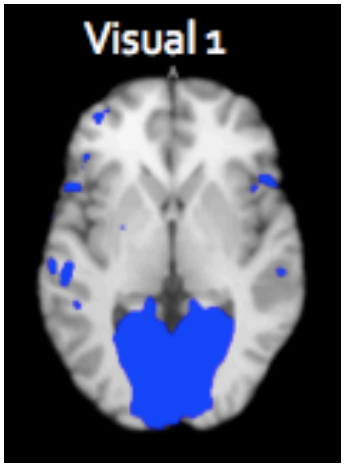
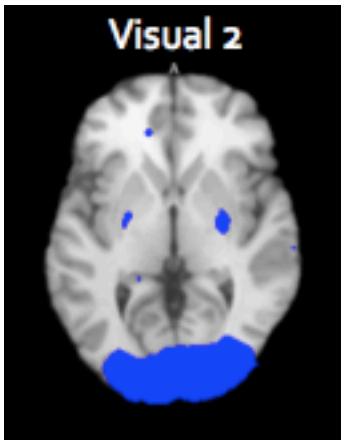
Mariam Ishaque
Nov 2015

Resting-State Networks



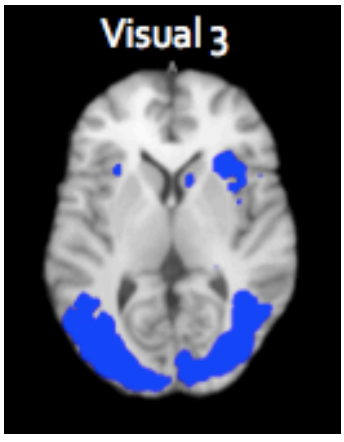
The Visual 1 network is the most fundamental for visual function. It is implicated in visual acuity (sharpness of vision) and depth perception. This provides the "broadest" information on visual stimuli, and its activity should be detected with any type of visual task.

Brief: "Seeing"



The Visual 2 network extracts "higher-level" visual information from visual stimuli. It is involved in the identification and processing of objects, faces, and shapes. This should be activated during in-scanner tasks that require identification of different types of shapes, or in tasks that involve viewing faces.

Brief: "Depth perception – which you need to recognize objects and faces"



The Visual 3 network extracts even higher-level features of visual stimuli. It is implicated in integrating visual and spatial information. For example, targeting in space, visual pursuit/tracking, and motion detection would underlie this network's activity.

Brief: "Perceiving the location of things relative to the space around them"

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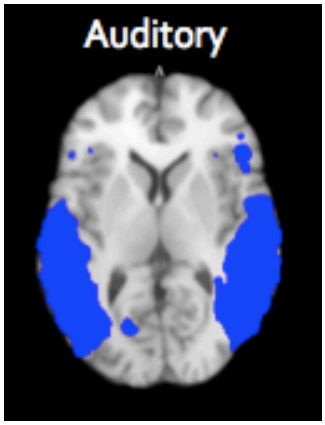
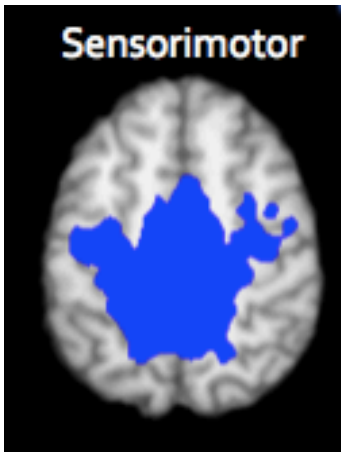


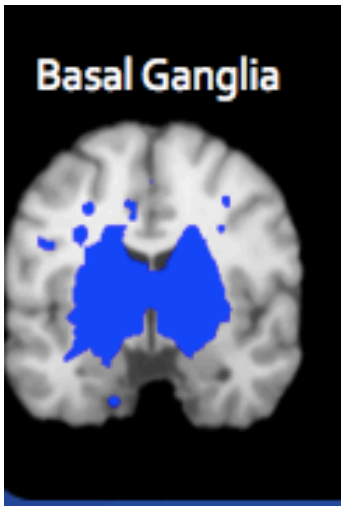
The Auditory network is pretty straightforward. It is implicated in the recognition and processing of various sounds, noises, and voices in the environment. It involves passive and active listening

Brief: "Hearing"



The Sensorimotor network, as its name suggests, is involved in the integration of sensory and motor processes. For example, one uses tactile feedback and motor activity to execute activities such as searching for one's cell phone or keys in one's pocket or purse. This network also underlies skin and joint sensation. One way to test this would be to assess one's perception of tactile stimuli (touch).

Brief: "Touch/tactile perception"



The Basal Ganglia network significantly underlies motor processes (movement). It is implicated in the initiation, control, and learning of voluntary movement. This involves activities such as sitting, standing, and body control/posture. In general, the basal ganglia are what would allow one to move, for example, his/her arm at all (compare to cerebellum).

Brief: "Movement"

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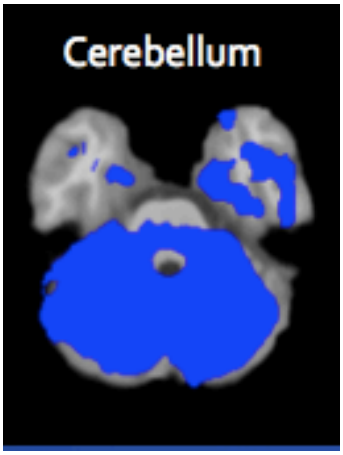
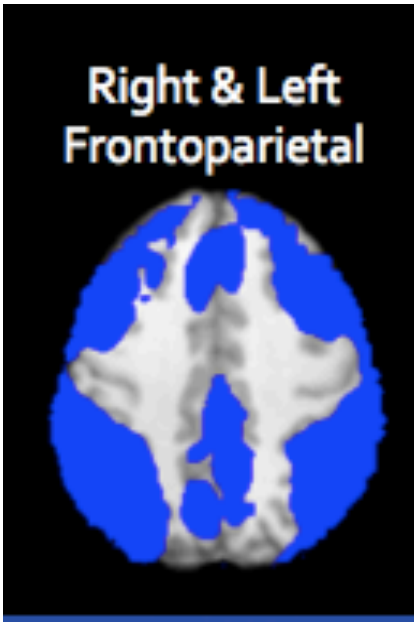


The Cerebellar network is also a largely motor-system network that deals with the coordination and quality of movement. This is what is impaired when drinking alcohol; field sobriety tests, such as nose-to-finger targeting and walking in a straight line, assess the cerebellum's functionality. Whereas the basal ganglia initiate an arm movement (for example), the cerebellum controls the smoothness and quality of the movement.

Brief: "Motor coordination"



The Right Frontoparietal network is involved in allocating attention. It underlies awareness of events in one's environment. For example, if one hears a noise during the night, the right frontoparietal network would allow one to direct his/her attention towards it.

Brief: "Directing attention"

The Left Frontoparietal network is involved in language related process, including expression and comprehension. Damage to these brain regions lead to language impairment (aphasia, for example). This network would be activated in tasks requiring word/sentence comprehension.

Brief: "Language"

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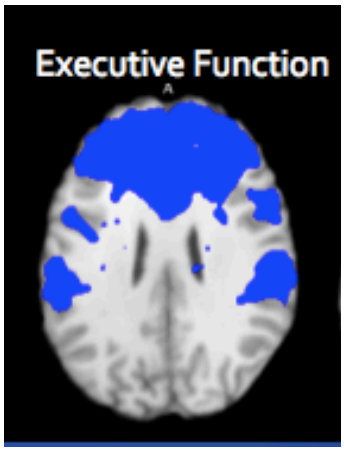
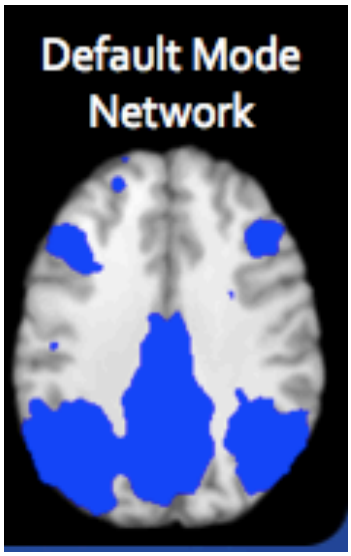


The Executive Function network is involved in judgment, working memory, and perception/anticipation of the future. This is a higher-order network that continues to develop into the second decade of life. This may explain "poor decision-making" by teenagers. This network could also underlie routine-based behaviors.

Brief: "Understanding of the concept of the future"



The Default Mode Network (DMN) is implicated in very high-level behaviors such as social cognition, awareness, introspection, interoception, differentiation of self versus others, recognition of others as people, and more. This is activated in the scanner during autobiographical memory tasks and is thought to correspond to one's internal dialogue. The presence of this network is quite possibly the most important as it implies much more self awareness and cognition than can be assessed clinically.

Brief: "Awareness and internal dialogue"