

Planning and decision-making in parieto-frontal circuits

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Although the posterior parietal cortex has historically been considered to be involved in sensation, attention, and cross-modal sensory integration, recent studies have also pointed to a role of this region in movement planning and decision making. Movement plans can be more readily decoded from posterior parietal cortex activity than the locus of spatial attention with the lateral intraparietal area (LIP) coding eye movement plans and the parietal reach region (PRR) coding reach plans. Detailed studies of PRR indicate a close connection with movement planning: 1) PRR integrates task context with sensory information to immediately code motor plans; 2) its activity reflects the choice of the animal when selecting reach targets; 3) PRR activity is related to expected value including expected type, probability and amount of reward; 4) during movements it codes both the instantaneous state of the hand as well as the movement goal; 5) there is greater bidirectional corticocortical communication between PRR and the dorsal premotor cortex when the animals are free to choose reach targets compared to instructed reaches. These data support the idea that the posterior parietal cortex is important for sensorimotor transformations and provides an interface between sensory and motor areas of the brain.