

Neurocognitive Deactivation

Neurocognitive deactivation refers to a **reduction in activity of brain regions** associated with cognitive functions, typically observed through neuroimaging techniques such as fMRI or EEG. It may occur under various physiological or pathological conditions and has different implications depending on the context.

Contexts and Interpretations

- **Task performance:**
 - Certain brain regions, notably within the [Default Mode Network \(DMN\)](#), deactivate during goal-directed cognitive tasks.
 - Failure to deactivate these regions is observed in disorders such as [ADHD](#), [schizophrenia](#), or [depression](#).
- **Fatigue, sleep, sedation:**
 - Mental fatigue, sleep deprivation, or use of sedative agents may cause generalized neurocognitive deactivation, reducing attention and executive function.
- **Neurological disorders:**
 - In [traumatic brain injury](#), [stroke](#), or [neurodegenerative disease](#), deactivation of cognitive networks may reflect impaired brain function and poor recovery.
 - fMRI may show hypoactivation in prefrontal or parietal regions during cognitive tasks.
- **Cognitive offloading:**
 - When external aids (e.g., [AI tools](#)) are used, reduced neural engagement in executive networks may occur, a phenomenon known as cognitive offloading.

Affected Brain Regions

- **Default Mode Network (DMN):**
 - Medial prefrontal cortex
 - Posterior cingulate cortex
 - Precuneus
- **Fronto-parietal network:**
 - Dorsolateral prefrontal cortex
 - Intraparietal sulcus
- **Executive control areas:**
 - Anterior cingulate cortex
 - Lateral prefrontal cortex
 - Pre-supplementary motor area (pre-SMA)

Measurement Methods

- **fMRI**: decreased BOLD signal in task-negative regions.
- **EEG**: reduced beta/gamma, increased theta activity.
- **PET/MEG**: showing metabolic downregulation during cognitive tasks.

See Also

- [default_mode_network](#)
- [executive_function](#)
- [functional_MRI](#)
- [cognitive_fatigue](#)

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