Cognitive flexibility

Cognitive flexibility is the human ability to adapt the cognitive processing strategies to face new and unexpected conditions in the environment.

It is impaired across mental illnesses, including depression, anxiety, addiction, and obsessive-compulsive disorder. Cortico-striatal-cortical circuits are integral to cognition and goal-directed behavior and disruptions in these circuits are linked to cognitive inflexibility in mental illnesses. We review evidence that neurostimulation of these circuits can improve cognitive flexibility and ameliorate symptoms, and that this may be a mechanism of action of current clinical therapies. Further, we discuss how animal models can offer insights into the mechanisms underlying cognitive flexibility and effects of neurostimulation. We review research from animal studies that may, if translated, yield better approaches to modulating flexibility. Future research should focus on refining definitions of cognitive flexibility, improving detection of impaired flexibility, and developing new methods for optimizing neurostimulation parameters. This could enhance neurostimulation therapies through more personalized treatments that leverage cognitive flexibility to improve patient outcomes [1)]

1)

Sachse EM, Widge AS. Neurostimulation to Improve Cognitive Flexibility. Curr Opin Behav Sci. 2025 Apr;62:101484. doi: 10.1016/j.cobeha.2025.101484. Epub 2025 Feb 6. PMID: 39925871; PMCID: PMC11804887.