Cognitive Control Processes and Working Memory in Parkinson's Disease (PD)

Early Stage Idiopathic PD

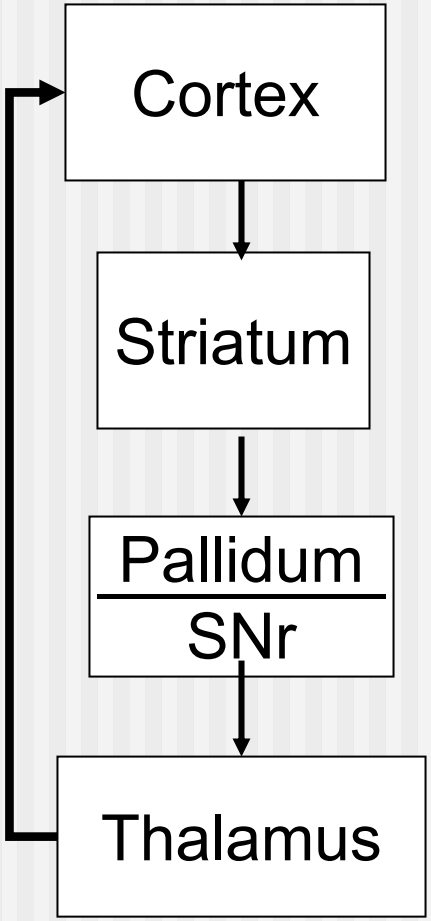
Motor Symptoms

1. Rigidity
2. Tremor
3. Bradykinesia - extreme slowness of movement

Core Pathological Hallmark

- Progressive loss of dopamine (DA) neurons in the ventrolateral tier of the substantia nigra pars compacta which primarily projects to the dorsal striatum

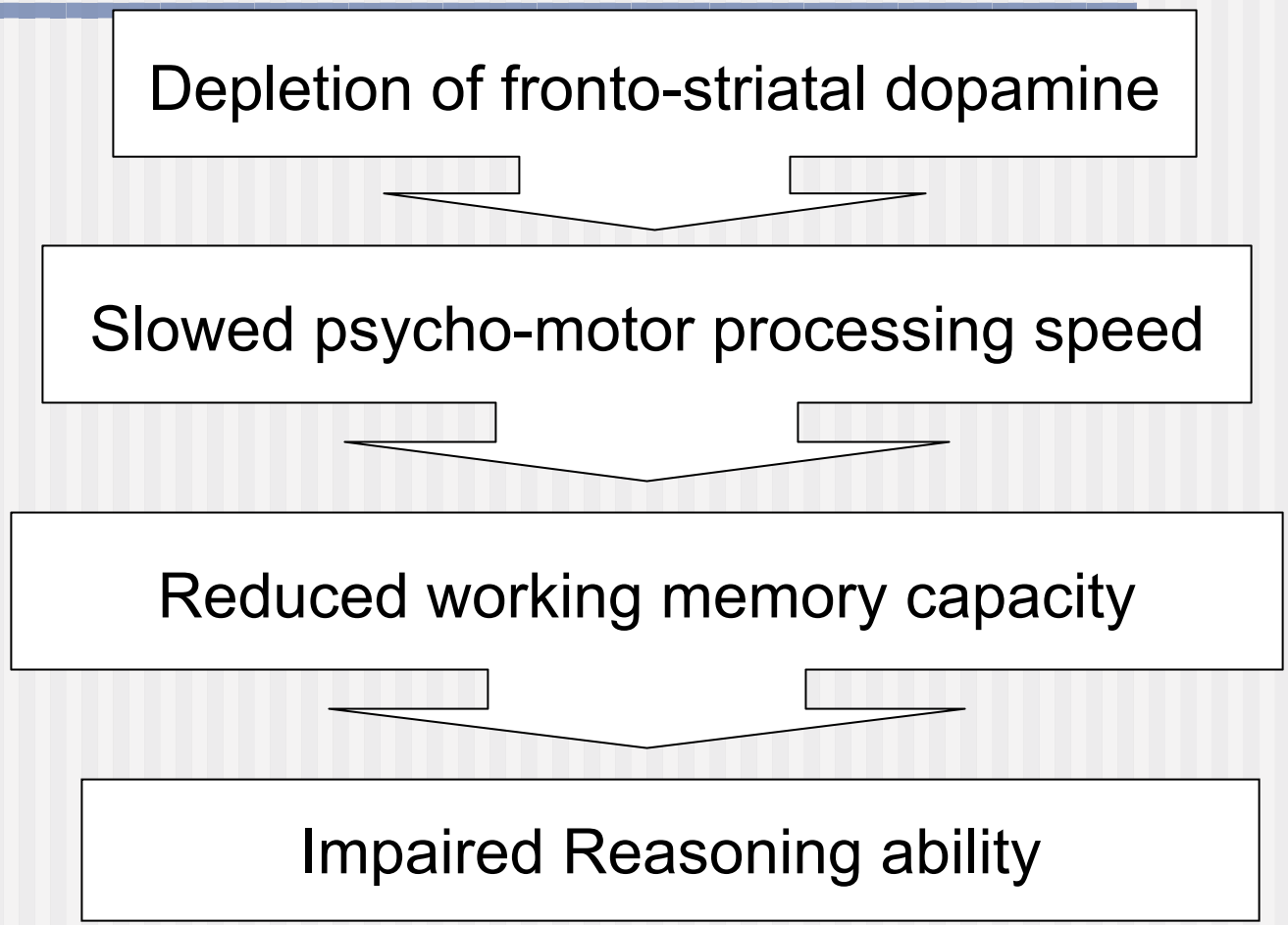
Severe SNpc DA Neuron Loss in PD



Dopamine depletion

Severe dopamine depletion in dorsal striatum affects signals traveling via the nigrostriatal pathway from the striatum to the supplementary motor area and dorsolateral PFC

Progressive Loss of Dopamine Neurons



Less Severely Affected

Direct dopaminergic projections from the ventral tegmental area (VTA) to the PFC via the mesocortical pathway are relatively spared

Executive Deficits

Due to strong reciprocal connections between the striatum and specific areas of the frontal cortex, PD pathology results in a host of executive deficits, such as planning, attention set-shifting, and working memory