

## Effects of Parkinson's Disease on Cognition, Perception and Gait

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Non-motor aspects of Parkinson's disease (PD) such as deficient perception and cognition are a source of a significant decline in daily functional activities and quality of life. Among the most important functions affected in PD is visuospatial ability, which enables the perceptual and cognitive comprehension and navigation of the visual environment. Deficits in this domain arise from pathological changes in high-order association areas of the brain as well as from defective input from more basic visual processing areas. Of potential importance to understanding the visuospatial sequelae of PD is consideration of the side of initial motor impairment, as PD nearly always has unilateral onset of neurodegeneration, and the right hemisphere is especially engaged in many aspects of visuospatial processing. We aim to define the relation between basic vision and visuospatial problems in PD and to examine underlying neural changes. We will present findings on the relation of visual and visuospatial impairments to daily function, including navigation, walking ability, motoric freezing, subjective quality of life, mood and other patient-centered features of PD. To accomplish our goals, we have marshaled the expertise of scientists from complementary disciplines, including neuropsychology, visual psychophysics, cognitive neuroscience and neuroimaging, and clinical movement science. The application of psychophysical, cognitive and imaging techniques that could predict the integrity of higher-level cognitive and daily functions in PD will be useful clinically, enabling the identification of potential spatial problems for the patient at diagnosis. Our tests target visual, visuospatial, and functional symptoms reported by the patients themselves, ensuring that the elucidation of mechanisms will have clinical relevance.

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