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## A Perceptive Plus in Parkinson's Disease

Beard JD, Steege AL, Ju J, Lu J, Luckhaupt SE, Schubauer-Berigan MK. Mortality from amyotrophic lateral sclerosis and Parkinson's disease among different occupation groups—United States, 1985–2011. *MMWR Morb Mortal Wkly Rep* 2017;66(27):718–722.

The puzzle of Parkinson's disease (PD) is particularly elusive, but the next part of the picture is appearing, and it is a curious one: a tale of men, mice, and flies. Recently, Beard and colleagues<sup>1</sup> reported that people who went on to develop PD tended to have jobs with higher socioeconomic status. Their study of >12 million Americans highlighted more than 110,000 deaths from PD, with excess numbers of workers in community services (48%), educational (46%), legal (40%) and the sciences (33%). Such jobs may be demanding of deeper thought, good discrimination, and quick judgments. In a second study of >4.5 million people from the Swedish census, those with lower socioeconomic status had a lower PD incidence.<sup>2</sup>

Although this may appear (at first sight) far-fetched, advantages in cognition in people at risk of PD are predicted from our studies of young PD-mimic flies. These have faster, stronger visual responses<sup>3,4</sup> when the flies are young; however, in old age they show a loss of response and neurodegeneration. This model is noteworthy because ever since the time of Cajal, the homology of vertebrate and fly visual systems has been recognized, with many similarities at the neural circuit, computational, and developmental levels. Crucially, both flies and vertebrates use dopamine for retinal gain control. Furthermore, it is widely accepted that the extra demand for energy is a major cause of neurodegeneration in PD, so that the loss of visual gain control in young flies will lead to increased visual responses, requiring more Adenosine Triphosphate to pump ions and maintain synaptic transmission.

Increased visual processing, and possibly faster neural signaling, as a result of deficits in retinal dopamine signaling may provide people at risk of PD with advantages in younger life, which impact before the later neurodegeneration. They may be more suited to jobs with higher socioeconomic status, both at interview and in the daily routine. This would

explain the new observations.<sup>1,2</sup> Furthermore, PD-linked mutations have been around since prehistoric times<sup>5</sup> and may therefore have had a selective advantage for young people encountering situations demanding rapid responses, for example, escape or hunting activities. ■

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## References

1. Beard JD, Steege AL, Ju J, Lu J, Luckhaupt SE, Schubauer-Berigan MK. Mortality from amyotrophic lateral sclerosis and Parkinson's disease among different occupation groups—United States, 1985–2011. *MMWR Morb Mortal Wkly Rep* 2017; 66(27):718–722.
2. Yang F, Johansson ALV, Pedersen NL, Fang F, Gatz M, Wirdefeldt K. Socioeconomic status in relation to Parkinson's disease risk and mortality: a population-based prospective study. *Medicine (Baltimore)* 2016;95(30):e4337.
3. Afsari F, Christensen KV, Smith GP, et al. Abnormal visual gain control in a Parkinson's disease model. *Hum Mol Genet* 2014; 23:4465–4478.
4. West RJH, Elliott CJH, Wade AR. Classification of Parkinson's disease genotypes in *Drosophila* using spatiotemporal profiling of vision. *Sci Rep* 2015;5:16933.
5. Ben El Haj R, Salmi A, Regragui W, et al. Evidence for prehistoric origins of the G2019S mutation in the North African Berber population. *PLoS ONE* 2017;12(7):e0181335.

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