Session/Poster#	Presenter
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Computational Models of Age-Associated Cognitive Slowing

Background: Slowing of cognitive function accompanies normal aging, and profound cognitive slowing is a feature of some types of dementia, which is a growing cause of disability. Current understanding of the mechanisms of cognitive slowing is limited.
Objective: We created multiscale computer models of a simple cognitive task - condition 1 of the Stroop test - and then studied how changes associated with aging such as neuronal loss, axonal demyelination, and signal and neuronal noise would affect function of the model.
Method: Simulations were developed using the Nengo system (Bekolay, Bergstra et al, 2014), a cognitive simulation environment designed to model cognitive tasks.
Results: Neuronal ablation had no effect on the time to registration (TTR) within an age-associated range, with breakdown in memory maintenance preceding changes in cognitive speed. The effects of ablation could be compensated for by increasing the gain of recurrent excitations, which was associated with marked slowing. Increases in the amount of noise in the input signal and axonal loss were associated with cognitive slowing.
Conclusion: Our models evaluate hypotheses about mechanisms of cognitive slowing and suggest empirical studies to test those hypotheses.