Life-span cognitive activity, neuropathologic burden, and cognitive aging

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Abstract

Objective: To test the hypothesis that cognitive activity across the life span is related to late-life cognitive decline not linked to common neuropathologic disorders.

Methods: On enrollment, older participants in a longitudinal clinical-pathologic cohort study rated late-life (i.e., current) and early-life participation in cognitively stimulating activities. After a mean of 5.8 years of annual cognitive function testing, 294 individuals had died and undergone neuropathologic examination. Chronic gross infarcts, chronic microscopic infarcts, and neocortical Lewy bodies were identified, and measures of β-amyloid burden and tau-positive tangle density in multiple brain regions were derived.

Results: In a mixed-effects model adjusted for age at death, sex, education, gross and microscopic infarction, neocortical Lewy bodies, amyloid burden, and tangle density, more frequent late-life cognitive activity (estimate = 0.028, standard error [SE] = 0.008, p < 0.001) and early-life cognitive activity (estimate = 0.034, SE = 0.013, p = 0.008) were each associated with slower cognitive decline. The 2 measures together accounted for 14% of the residual variability in cognitive decline not related to neuropathologic burden. The early-life–activity association was attributable to cognitive activity in childhood (estimate = 0.027, SE = 0.012, p = 0.026) and middle age (estimate = 0.029, SE = 0.013, p = 0.025) but not young adulthood (estimate = −0.020, SE = 0.014, p = 0.163).

Conclusions: More frequent cognitive activity across the life span has an association with slower late-life cognitive decline that is independent of common neuropathologic conditions, consistent with the cognitive reserve hypothesis.

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