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Increasing Heritability of Late-Life Cognition: The Case for Phenotype-Environment Effects

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ABSTRACT:

Heritability of cognitive ability increases over time and accounts for the majority of variance in cognitive aging outcomes. The processes that lead to differentiation within aging families remains unclear. We hypothesized that the accumulation of within-family gene-environment correlation would cause dizygotic twins to decrease in similarity with age while monozygotic twin similarity would remain constant with age. We analyzed six waves of data from 3,565 same-sex twin families (≥ 70 years; 58.7% women; $N = 4,457$) collected every two years between 1995-2005 in the Longitudinal Study of Aging Danish Twins (MZ = 1,576; DZ = 2,881). At each wave, global cognitive functioning was assessed. Multilevel SEM was used to test whether family gene-environment correlation increases in DZ twins to cause heritability to increase with age. Results indicate that MZ twin correlations increased over time, increasing from .51 to .69. DZ twin correlations stayed stable over ten years, increasing from .31 to .38. Model fitting results suggest that between-family gene-environment correlative processes, not within-family gene-environment correlation, are implicated in the increasing heritability of late-life cognition. Study findings suggest that between-family gene-environment correlation may have an important role in how heritability of cognition increases with age.

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