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# Differences in brain structure development may explain test score gap for poor children

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Low-income children had atypical structural brain development and lower standardized test scores, with as much as an estimated 20 percent in the achievement gap explained by development lags in the frontal and temporal lobes of the brain, according to an article published online by *JAMA Pediatrics*.

Socioeconomic disparities in school readiness and academic performance are well documented but little is known about the mechanisms underlying the influence of poverty on children's learning and achievement.

Seth D. Pollak, Ph.D., of the University of Wisconsin-Madison, and colleagues analyzed magnetic resonance imaging (MRI) scans of 389 typically developing children and adolescents ages 4 to 22 with complete sociodemographic and neuroimaging data. The authors measured children's scores on cognitive and academic achievement tests and brain tissue, including gray matter of the total brain, frontal lobe, temporal lobe and hippocampus.

The authors found regional gray matter volumes in the brains of children below 150 percent of the federal poverty level to be 3 to 4 percentage points below the developmental norm, while the gap was larger at 8 to 10 percentage points for children below the federal poverty level. On average, children from low-income households scored four to seven points lower on standardized tests, according to the results. The authors estimate as much as 20 percent of the gap in test scores could be

explained by developmental lags in the frontal and temporal lobes.

"Development in these brain regions appears sensitive to the child's environment and nurturance. These observations suggest that interventions aimed at improving children's environments may also alter the link between childhood poverty and deficits in cognition and academic achievement," the study concludes.

**More information:** archpedi.jamanetwork.com/artic … pediatrics.2015.1475 archpedi.jamanetwork.com/artic … pediatrics.2015.1682

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