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## Gene–environment interactions for childhood educational achievement: do within–family polygenic score effects vary across schools and neighbourhoods?

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### KEYWORDS:

Education, gene-environment interaction, development, polygenic scores

### ABSTRACT:

Little is known about whether and how children’s educational outcomes are shaped by interactions between their genetic propensities and their social environments beyond the family. We link register data on children’s standardised test results, schools, and neighbourhoods to the Norwegian Mother, Father and Child Cohort Study (MoBa), which includes >25,000 genotyped parent-child trios. We study the effects of children’s polygenic scores on their achievements in Mathematics, Reading and English, and estimate gene-environment interactions (GxE) by allowing the effects to vary across schools and neighbourhoods. We then explore contextual differences in how polygenic effects change across ages 10-14, and use multi-generational data to investigate bias from social sorting (leading to passive gene-environment correlation) and population stratification.