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Early fine motor skills and genetic associations with later educational achievement and psychopathology

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ABSTRACT:

Fine motor skills are heritable and an important milestone in development. Increasing evidence suggests there are associations between early motor skills and later neurodevelopment and cognition. In a study of 4514 preschool children from the Twins Early Development Study, fine motor assessments were completed by 2-4-year-olds and their parents as part of a cognitive battery. Tasks included drawing, block building, and folding. A single fine motor factor score was derived from principal component analysis. Polygenic scores (PGS) for traits previously associated with motor skills (ADHD, autism, schizophrenia, years in education) were created along with those where the association is unclear (anxiety, major depressive disorder, obsessive-compulsive disorder). Regression analyses revealed a significant positive association between higher scores in fine motor skills and the higher years in education PGS (GWAS pT, 1, $b = 0.24$, $p < .001$, $R^2 = 0.004$). A nominal association was found between lower scores in fine motor skills and higher PGS for ADHD (GWAS pT, .01, $b = -0.15$, $p = .069$, $R^2 = 0.001$). As such, our initial results suggest that fine motor development may be linked to later educational outcomes due to shared common genetic pathways. Following these preliminary analyses, the combined effect for all the PGSs will be assessed in a multi-PGS model of fine motor skills.

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