Multi–polygenic score approach to understanding the intergenerational transmission of educational achievement across childhood and adolescence

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KEYWORDS: ALSPAC, educational achievement, longitudinal development, intergenerational transmission, genetic nurture

ABSTRACT:
Educational development in childhood and adolescence is associated with one’s educational attainment, as well as major psychological, social, economic and health milestones throughout the life course. It is thus crucial to understand the processes underlying the intergenerational transmission of educational outcomes during these key developmental stages, which leads to continuing cycles of inequalities across generations. The intergenerational transmission of educational achievement is the mixture of genetic and environmental effects, including direct genetic effects originating in the offspring, and indirect genetic effects (genetic nurture) originating in the parents influencing offspring outcomes via environmental pathways. We used data from the Avon Longitudinal Study of Parents and Children (ALSPAC), a UK cohort study, and included over 1,300 mother-father-child trios. Scores of educational performances at four major Key Stages of education in the UK (age 7, 11, 14 and 16) were obtained through data linkage to the UK National Pupil Database to model the development course of educational achievements. Multiple polygenic scores were used, including educational attainment and its cognitive and noncognitive components, cognitive traits, psychiatric traits, personality, risk behaviors, reproductive behaviors, SES-related traits and health-related traits. There was strong evidence that genetic propensities of multiple traits were associated with cross-sectionally and the development of educational achievement, which can be attributed to both direct genetic effects and genetic nurture. These findings highlight the contribution of parental genetic influences to the intergenerational transmission of educational inequalities, which should justify for compensatory interventions.

GRANT SUPPORT: B.W. and JB.P. are funded by a Nuffield Foundation project (EDO/43939); J.R.B is funded by a Wellcome Trust Sir Henry Wellcome fellowship (215917/Z/19/Z); T.S. is funded by a Wellcome Trust Sir Henry Wellcome fellowship (218641/Z/19/Z). D.B. is funded by the Economic and Social Research Council (ES/M001660/1) and Medical Research Council (MR/V002147/1).