

NAME OF PRESENTING AUTHOR: Biyao Wang

EMAIL ADDRESS OF PRESENTING AUTHOR: biyao.wang@ucl.ac.uk

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

Biyao Wang¹, Jessie R. Baldwin^{1,2}, Tabea Schoeler¹, Rosa Cheesman^{2,3}, Wikus Barkhuizen¹, Frank Dudbridge⁴, David Bann⁵, Tim T. Morris^{6,7}, Jean-Baptiste Pingault^{1,2}

¹ Division of Psychology and Language Sciences, University College London, London, United Kingdom;

² Social, Genetic and Developmental Psychiatry Centre, Institute of Psychiatry, King's College, London, United Kingdom;

³ PROMENTA Research Center, Department of Psychology, University of Oslo, Oslo, Norway;

⁴ Department of Health Sciences, University of Leicester, Leicester, United Kingdom;

⁵ Centre for Longitudinal Studies, Social Research Institute, University College London, London, United Kingdom;

⁶ Medical Research Council Integrative Epidemiology Unit, University of Bristol, Bristol, United Kingdom;

⁷ Population Health Sciences, Bristol Medical School, University of Bristol, Bristol, United Kingdom

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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.

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